

FIDELIO

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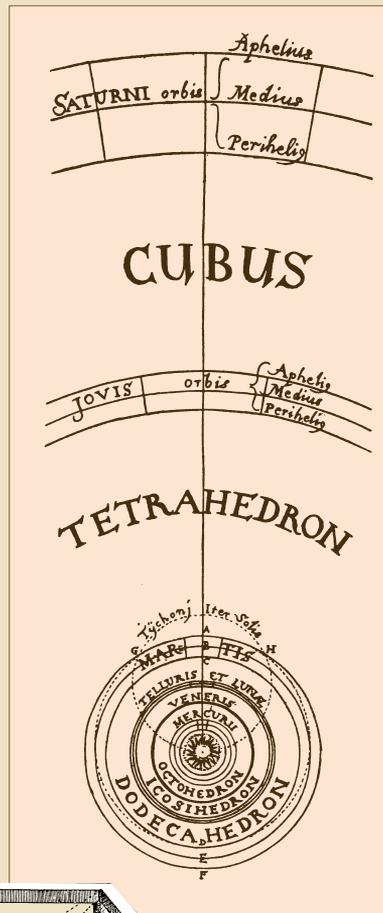
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Music and Keplerian Astronomy

The development of astronomy, from the most ancient times up to Kepler and Gauss, provides the most direct access to the notion of a *multiply-connected manifold*.

The study of the motions in the heavens leads to the discovery of more and more *astronomical cycles* as *principles of motion*. Thus, observing the rising and setting of the sun and the stars, we conceive the cycle of the *day*. Noting, however, that the path of the sun shifts slightly from day to day, we discover the longer cycle of the *year*. What at first glance appear to be very slight discrepancies in the yearly cycle of the sun with respect to the stars, reveal a much longer cycle of the *precession of the equinoxes*. Later, additional cycles emerge, connected with the non-uniform (elliptical) motion of the Earth around the sun. In addition to these solar-terrestrial and stellar cycles, we must also take into account the cycles associated with the motions of the planets.

Thus, as astronomy develops, we discover new principles of motion not only as new cycles *per se*, but also as internal principles of organization of the cycles, and principles of multiple-connectedness or ‘colligation’ among the cycles. The observed motion of any



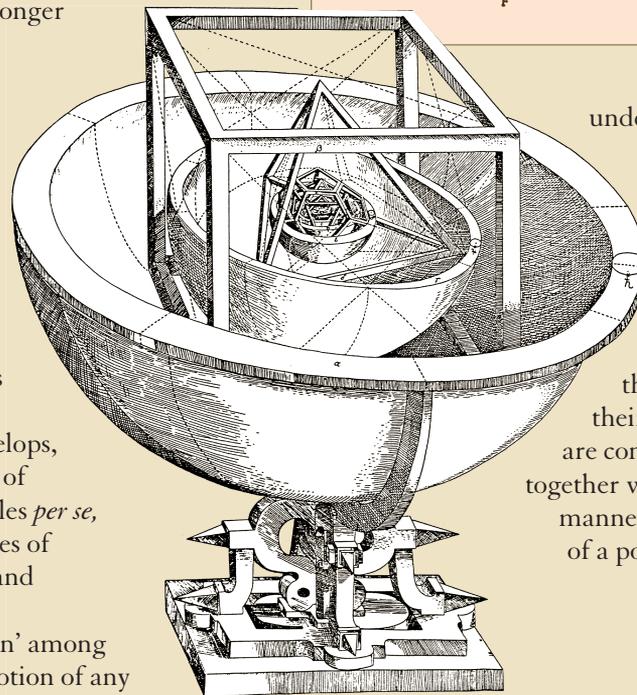
planet or other heavenly body is the resultant of all cycles and related principles acting conjointly. So, for example, even though the equinoctial cycle has a length of some 26,000 years, it acts efficiently within any arbitrarily small time interval, to produce a distinct, implicitly measurable modification of any observed motion.

This concept of ‘curvature in the infinitely small’ of astronomical motions, has an unavoidable, paradoxical feature: The motions we observe, embody not only the cycles which are *known* to us at any given time, but also those *we do not yet know* explicitly—cycles whose future discovery is inherent in the self-similarity of the principle of creation

underlying the Universe as a whole.

Reflecting this, Kepler’s determination of the harmonic ordering of the planetary orbits specifies certain band-like regions, or corridors, as the location of the planetary orbits, and not fixed algebraic values. The exact orbits of the planets, while remaining within their harmonically ‘quantized’ corridors, are constantly changing and evolving together with the Universe as a whole, in a manner Kepler likened to the performance of a polyphonic musical composition.

[SEE ‘The Case of Classical Motivic Thorough-Composition’]



Kepler’s harmonic ordering of the solar system. The planetary orbits are nested according to the ratios of inscribed and circumscribed Platonic (regular) solids.

Top: Diagram from Kepler’s ‘New Astronomy.’ Bottom: Three-dimensional model, illustration from ‘Mysterium Cosmographicum.’

FIDELIO

"It is through beauty that one proceeds to freedom."
—Friedrich Schiller

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Fidelio is dedicated to the promotion of a new Golden Renaissance based upon the concept of *agapē* or charity, as that is reflected in the creation of artistic beauty, the scientific mastery of the laws of the physical universe, and the practice of republican statecraft for the benefit of our fellow men.

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On the Cover
Rembrandt van Rijn, *The Prophetess Anna (Rembrandt's Mother)* (1639). What endured when Classical Greece died? Plato endured. (Kunsthistorisches Museum, Vienna)

SPECIAL ISSUE

4

The Substance Of Morality

Lyndon H. LaRouche, Jr.

29

APPENDIX

The Case of Classical Motivic Thorough-Composition

A report compiled by Liliana Celani, Ortrun and Hartmut Cramer, Bruce Director, Anno Hellenbroich, Stephan Marienfeld, Mindy Pechenuk, John and Renée Sigerson, Jonathan Tennenbaum, and Kathy Wolfe

- 1 *Florentine bel canto* 30
- 2 *J.S. Bach and Inversion* 38
- 3 *The Scientific Discoveries of Bach's The Art of the Fugue* 49
- 4 *The 'Royal Theme' from A Musical Offering* 56
- 5 *Mozart's Fantasy in C minor and the Lydian Principle* 67
- 6 *'Time-Reversal' in Mozart's Works* 79
- 7 *Motivic Thorough-Composition in Late Beethoven* 83
- 8 *Brahms' Fourth Symphony* 105

Editorial 2 President Clinton Must Appoint Lyndon LaRouche As His Economic Adviser!

News 112 European Conference: 'Dump Globalism'
113 U.S. Conference: Challenge of Global Leadership
115 Schiller Delegates at China Land-Bridge Meeting
116 Brazil: Zepp LaRouche Calls for New Alliances
116 Mexico: Fight To Defend Music Education
118 Schiller Celebrations Focus on Classical Tragedy

President Clinton Must Appoint Lyndon LaRouche as His Economic Adviser!

At the Schiller Institute semi-annual conference this past Labor Day, an initiative was launched by a group of elected officials with the support of the Schiller Institute, to defend the U.S. Presidency. The initiative, entitled Americans To Save the Presidency, was ultimately responsible for preventing the forced resignation of President Clinton, and for catalyzing the November 3 marginal victory of what Franklin Roosevelt referred to as the "Forgotten Man," over the unholy Third Wave alliance of Gingrichites and New Democrats which has increasingly dominated U.S. policy-making. Later in September, when President Clinton failed to tell the truth about the state of the world economy at the G-7 and G-22 meetings in Washington, D.C., the Schiller Institute launched a second initiative, escalating its defense of the President, but at the same time, urging him to appoint Lyndon LaRouche as his economic adviser. The text of that appeal follows:

* * *

The attempt on the part of Special Prosecutor Kenneth Starr and the Speaker of the U.S. House of Representatives, Newt Gingrich, to misuse the American Congress for an impeachment proceeding against you in the style of the British parliamentary system, is equivalent to a coup d'etat against the office of the President and against the American Constitution. Should this coup d'etat succeed, not only the United States, but the entire world would be thrown back into a political condition such as existed before the American Revolution—with the worst possible consequences. Therefore, we assure you, Mr. President, of our full support.

"You yourself have directly spoken of the fact, that the world finds itself in the most dangerous economic and financial crisis of the last fifty years. Unfortunately, it was demonstrated at the different meetings of the Group of 7, the Group of 22, the International Monetary Fund, and the World Bank in Washing-

ton, that these governments and institutions are incapable of dealing with the urgently required reorganization of the international monetary and financial system.

"However, the free market and 'laissez faire' economic system is today just as bankrupt as the destroyed Soviet Union. If the governments now attempt to respond to the crisis with austerity and hyperinflationary policies, this will only lead even more rapidly to the nuclear meltdown of the system.

"The economist Lyndon LaRouche alone has warned for a long time, that the series of wrong decisions in the framework of the neo-liberal economic policies of the last thirty years must inevitably lead to a systemic crisis. He has been right; all of his critics are today fully discredited. LaRouche is well-known in many countries throughout the world and is highly esteemed for his uncompromising action in behalf of a new, just world economic order. We appeal to you, President Clinton, to appoint Lyndon LaRouche immediately as economic adviser to your administration."

* * *

We feature in this Special Issue of *Fidelio*, Lyndon LaRouche's essay, "The Substance of Morality" and its Appendix, "The Case of Classical Motivic Thorough-Composition," which previously appeared in two separate issues of *Executive Intelligence Review*.

In contrast to the Elmer Gantry's of this world, such as Kenneth Starr, whose pharasaical moralizing is a mere cover for a British-centered coup d'etat against the U.S. Constitutional system, Lyndon LaRouche calls upon the reader to consider morality from the world-historical standpoint—the standpoint of developing within oneself and others that moral-intellectual capacity, which Friedrich Schiller describes as the creative play-impulse (*Spieltrieb*) in his "Letters

EDITORIAL

Theater Considered As a Moral Institution

One noteworthy class of men has special grounds for giving particular thanks to the stage. Only here do the world's mighty men hear what they never or rarely hear elsewhere: Truth. And here they see what they never or rarely see: Man.

Thus is the great and varied service done to our moral culture by the better-developed stage; the full enlightenment of our intellect is no less indebted to it. Here, in this lofty sphere, the great mind, the fiery patriot first discovers how he can fully wield its powers.

Such a person lets all previous generations pass in review, weighing nation against nation, century against century, and finds how slavishly the great majority of the people are ever languishing in the chains of prejudice and opinion, which eternally foil their strivings for happiness; he finds that the pure radiance of truth illumines only a few isolated minds, who probably had to purchase that small gain at the cost of a lifetime's labors. . . .

When grief gnaws at our heart, when melancholy poisons our solitary hours; when we are revolted by the world and its affairs; when a thousand troubles weigh upon our souls, and our sensibilities are about to be snuffed out underneath our professional burdens—then the theater takes us in, and within its imaginary world we dream the real one away; we are given back to ourselves. . . . And then, at last—O Nature! what a triumph for you!—Nature, so frequently trodden to the ground, so frequently risen from its ashes!—when man at last, in all districts and regions and classes, with all his chains of fad and fashion cast away, and every bond of destiny rent asunder—when man becomes his brother's brother with a *single* all-embracing sympathy, resolved once again into a *single* species, forgetting himself and the world, and reapproaching his own heavenly origin. Each takes joy in others' delights, which then, magnified in beauty and strength, are reflected back to him from a hundred eyes, and now his bosom has room for a *single* sentiment, and this is: to be truly *human*.

—Friedrich Schiller,
excerpted from 'Theater Considered
As a Moral Institution'

on the Aesthetical Education of Man.”

As LaRouche points out, in the long history and pre-history of mankind, only a few strains of cultural development have not been rightly cast aside as failed cultures. Such a failed culture was that of the Denmark of Shakespeare's *Hamlet*, or the Spain of Schiller's *Don Carlos*.

There is virtually no difference between Hamlet, and those tragic statesmen today, who, faced with the inevitable disintegration of the world's financial and monetary system, prefer to stay within the confines of the doomed system, rather than implement a valid new discovery of higher principle, which supersedes the paradoxes inherent in the cultural belief-structure responsible for the crisis.

To achieve the necessary, higher-order ($n+1$) manifold of physical principle in the economic domain, requires progress in the moral-aesthetical domain, what LaRouche refers to in his essay as the m -fold manifold.

Take the case of music, for example: As opposed to so-called “popular music,” which does not challenge the human mind to develop its moral-intellectual capacities to a higher level, Classical musical composition, like Classical tragedy, has a moral function. As LaRouche writes, it “uses the special features of the musical medium to cultivate in both the musician and the audience certain moral qualities of passion, qualities which naturally tend to spill over, in other ways, from musical composition itself, into the development of the character of the musical audience.”

As we enter the new millennium, civilization will prove itself morally fit to survive, only to the extent we free ourselves from the evil of financial oligarchism. To achieve that, will require a seeming miracle—but, a very intelligible one. President Clinton must do the right thing for humanity; he must appoint Lyndon LaRouche as his economic adviser. We urge you: become a world-historical soul, circulate and support this urgent appeal!

Justice, truthfulness, and those creative powers by means of which we may discover valid, revolutionary principles of our universe, form a seamless whole, in which Classical culture, morality, and physical science, are united by a common passion for universal justice and truth.



Photo: Statens Konstmuseer, Nationalmuseum, Stockholm

Where are the men and women fit to lead us in the pathway toward safety, the pathway toward rule by the principles of truth and justice, not 'popular opinion'?

The Substance of Morality¹

by Lyndon H. LaRouche, Jr.

May 28, 1998

Evidence from as early as hundreds of thousands of years ago, shows the continuing existence of hominids capable of those kinds of discovery of physical principle, the which place mankind apart from, and absolutely above the higher apes.² All competent scientific inquiry respecting the nature of the human species, and of qualities specific to human behavior, rests upon a showing of crucial evidence of our species' distinguishing, manifest type of generation of an original or replicated discovery of a physical principle. No substitute for such knowledge of principles exists among outgrowths of such qualitatively inferior levels of mental activity as deduction or mere animal "learning from repeatable experience."

On this point, the combined archeological and historical record shows, that the totality of human existence,³ as a developing, functional fraction of the totality of our growing biosphere,⁴ is dominated by an accumulation of progress in increase of mankind's power over nature, a measurement conveniently reflected upon our perceptual apparatus in the form of increase of demographic values, *per capita* and *per square kilometer*, of the Earth's surface.

The human species is unique in its capacity for willful changes of this sort in its relationship, both to the biosphere and the universe in general.

Yet, in these facts lies a relevant, crucial paradox. The human species' long-term progress, when measured, as a whole, over the span of hundreds of generations, shows progress to be a crucial, characteristic, and implicitly inevitable feature of our species, as a species. However, it is not simply pre-assured that every step of progress during a shorter term, such as several or more generations of a global or local culture, will lead to its appropriate supercessor. Scientific and technological progress, as such, are indispensable for the continued progress of the entirety of our species. However, when and whether progress, or even retrogression occurs, is never automatic; the actual outcome is a result of what we term "cultural factors," as much as impulses attributable to progress in discovery of higher physical principles as such.

In fact, for reasons to be considered here, it is "cultural factors" which govern even scientific and technological progress as such, and which also govern the manner in which discovered physical principles are fostered and

1. See, the references to the relationship between an "*m*-fold" and "*n*-fold" manifold, in Lyndon H. LaRouche, Jr., "Russia Is Eurasia's Keystone Economy," prologue to report by Dr. Sergei Glazyev, *Executive Intelligence Review*, March 27, 1998 (Vol. 25, No. 13), pp. 45-51.

2. Recent archaeological work in Germany has revealed well-crafted throwing spears, solidly dated to about 400,000 years ago. The use of such technology predating 40,000 years ago was previously unknown. The wooden spears were shaped and balanced to be used as javelins, rather than simple thrusting implements, and

reflect a technological skill by their makers, that has generally not been credited to humans of this Pleistocene, so-called Lower Paleolithic, period. See Hartmut Thieme, "Lower Paleolithic Hunting Spears from Germany," and Robin Dennell, "The World's Oldest Spears," *Nature*, Feb. 27, 1997, pps. 807-810 and 767-768.

3. I.e., as a component of the existence and development of the biosphere as a whole.

4. Man is part of the total biosphere. Man's portion of the biosphere increases, but the biosphere also grows, *per capita*. Compare this with Vernadsky's conception of a *noosphere*.

realized in ways bearing upon improvements in both man's physical power over nature, and the realization of that physical power in the form of net improvements in demographic characteristics of cultures.

Presently, the ongoing, global financial and monetary collapse, has been plunging the once-proud civilization of the 1946-1963 post-war reconstruction period, into the threatened onset of a worldwide "new dark age." We are faced, thus, once again, with the fact, that the most powerful technological cultures can be doomed by the kind of moral and cultural "paradigm shift" which has dominated the world, increasingly, since the 1964-1972 youth-counterculture revolt against both technological progress and rationality generally.

Therefore, sane national and related policies depend upon discovering and adopting those principles of culture to which we must turn, if we are to avert the seemingly inevitable demographic and *per-capita* collapse now gripping this planetary civilization. The author proposes, that the nature and importance of such cultural issues, ought to have been made clear by those studies of the principles of Classical art-forms and education which had occupied the best minds of the scientists, artists, and statesmen of European civilization's early Nineteenth century, such as, for Germany, Friedrich Schiller and his friends, the brothers von Humboldt,⁵ and, for the U.S.A., Benjamin Franklin's great-grandson, the Humboldt-linked Alexander Dallas Bache.⁶

5. See Marianna Wertz, "The Classical Curriculum of Wilhelm von Humboldt," *Fidelio*, Summer 1996 (Vol. V, No. 2), pp. 29-39. Works by the von Humboldt brothers include: Wilhelm von Humboldt, *On Language: The Diversity of Human Language-Structure and Its Influence on the Mental Development of Mankind*, trans. by Peter Heath (London: Cambridge University Press, 1988); and Alexander von Humboldt, *Cosmos: A Sketch of the Physical Description of the Universe*, trans. by E.C. Otté (Baltimore: Johns Hopkins University Press, 1997 reprint).

6. Alexander Dallas Bache (1806-1867), the great-grandson of Benjamin Franklin, graduated U.S. Military Academy (1825); was sent to Europe in 1836 to work with scientists and educational leaders including Carl F. Gauss, Wilhelm Weber, and Alexander von Humboldt. Bache formed an elite American grouping of scientists, cooperating with German and French co-thinkers. He and his aides designed and organized the U.S. Naval Academy. As chief of the U.S. Coast and Geodetic Survey, Bache was chief strategist for the emergence of an advanced U.S. military-industrial capability, and the creation of the electrical industry; he was a leading intelligence adviser to President Abraham Lincoln.

Bache travelled in Europe in 1836-38, examining 280 schools in the British Isles, Germany, Austria, France, Italy, and other countries. His detailed report on his educational findings is a milestone in the history of American schools. He was the first president of Philadelphia's Central High, the first U.S. public high school outside New England, and the model for successful American urban schools. Bache was said to have organized Central High School, in particular, on the principles of the *Gymnasium* and *Real* schools of the Leipzig system.

On this account, generally speaking, when compared to the superior levels of culture represented by early to middle Nineteenth-century European Classical culture in general, even the leading sections of those of today's populations dominated by our recent generations of global, European-dominated trends in global cultures, are ignorant, appallingly backward, even relatively bestial. This recent, moral and cultural degeneration of successive post-World War II generations, is typified by the recent rise in homicidal outbreaks of existentialism among present-day adolescents.⁷ This deplorable trend is typical of the majority of both the top-most ranks, and the lower levels of today's society.

The challenge of reversing the present cultural and physical-economic collapse of global civilization, is the context for the following report. The solution to the difficulties of comprehending these presently most urgent matters, was first discovered, and, later, developed in the following way.

1. Three Crucial Discoveries

It was during the interval 1948-1952, that I first made three original, interdependent discoveries of physical principle, a set of principles whose continued and interconnected development has since dominated my life, my professional and related accomplishments, and also the controversies in which I have become an increasing central figure of recent decades.

The first among these principles, is one whose adop-

7. Six serious incidents of school killings took place in rural areas of America between February and May 1996, involving children between the ages of 11 and 16. In all cases, the children were immersed in video games, such as "Mortal Kombat," mind-numbing rock music, and violent films. The phenomenon of juvenile violence in Germany was addressed by Countess Marion Dönhoff, in the weekly *Die Zeit* on April 8, 1998. Dönhoff pointed to the sources of juvenile violence as "the lack of sense of injustice, intolerance, extreme ego-centrism"—the results of a permissive society in which "everything revolves around material and commercial success."

The lack of cultural moorings in today's society produces an increasing number of monstrous *Steppenwolfs*, who conform to Nazi-existentialist philosopher Martin Heidegger's theory of "*Geworfenheit*" ["being-thrownness"]—that "the actuality of true life, lies in the banal, basic experience of *Geworfenheit*"; i.e., that individual man is merely "thrown into history," devoid of the cultural fabric of family and society we identify with civilization. Heidegger was a major influence on Jean-Paul Sartre, and on Sartre's epigone Frantz Fanon's theory of "purgative violence."

tion dates from work during the 1948-1951 interval: man's increase of power over nature, *per capita* and *per square kilometer* of the Earth's surface, may be described, in rough approximation, as follows.⁸

It is to be said, that that ordered increase of man's power over nature, *per capita* and *per square kilometer* of the Earth's surface, is always expressed in the form of the outcome of *successive, revolutionary*, realized discoveries of physical principle. It is shown, on physical grounds, that experimentally validatable, revolutionary discoveries of physical principle, form orderable, if not linear, or otherwise simple sequences.⁹ It is the realization of those sequences, whose accumulation correlates with an increase of mankind's potential (physical) power over nature. During 1948-1951, as today, the argument remains, that this connection is typified by the treatment of an experimentally validated physical principle as the subsuming source of those applicable machine-tool designs, and analogous principles, which are to be recognized as "technologies."¹⁰

The second of the three principles, whose discovery also dates from the 1948-1951 interval, was the apprehension of the fact, that those same processes of creative mentation, by means of which experimentally validated, original (i.e., "revolutionary") discoveries of physical principle are generated, in response to deductively insoluble paradoxes of experimental physics, are processes identical in their nature to the validatable solution for the type of paradox rightly identified as *metaphor*, as such metaphors are unique to *strictly Classical* modes of musical, poetic, dramatic, and plastic composition in art. This second principle, which is contrary to the currently popular, erroneous notion of a division of art (e.g., *Geis-*

teswissenschaft) from physical science (e.g., *Naturwissenschaft*),¹¹ is the key point of reference for the present report.

The third of these principles, dating from 1952, was my recognition of a relevant implication of that generalized notion of a Keplerian, multiply-connected manifold, first defined as an amendment to the work of Carl Gauss, in Bernhard Riemann's 1854, revolutionary habilitation dissertation.¹² From a re-examination of Riemann's habilitation dissertation at that time, I recognized, that his discovery provides the indispensable, meta-mathematical basis for comprehending, and integrating, the function of validated creative discoveries of principle, not only in physical science, but also Classical art-forms.¹³ Furthermore, my appreciation of Riemann's discovery was novel, in the degree that it is associated with an explicitly Platonic notion of the relevant principles of ontology in general. I contended, that this metaphysical connection to the ontology of Platonic ideas, is strongly implied in Riemann's work by a comparison of several among his writings from that period¹⁴; in my own statement of the case then, as restated here for the case of music, the notion is explicit.

If one is to adhere to the principles of a Classical humanist education, one must account for the origin, and deeper, present-day implication of these three, interrelated discoveries. One must take into account that consuming occupation with modern philosophy which had dominated my adolescent years.¹⁵ All of these discoveries of the 1948-1952 interval, were rooted in an adolescent choice of the worldview of Gottfried Leibniz. During

8. Lyndon H. LaRouche, Jr., *So, You Wish to Learn All About Economics? A Textbook in Mathematical Economics*, 2nd ed. (Washington, D.C.: EIR News Service, 1995).

9. Consider the intersecting, but distinct contributions to the founding of a science of electrodynamics by Ampère, Fresnel, Wilhelm Weber, Gauss, Riemann, *et al.* See Laurence Hecht, "The Significance of the 1845 Gauss-Weber Correspondence," and "Optical Theory in the Nineteenth Century, and the Truth about Michelson-Morley-Miller," *21st Century Science & Technology*, Fall 1996 (Vol. 9, No. 3), and Spring 1998 (Vol. 11, No. 1). To be emphasized, on this account, are Ampère-Weber on the "longitudinal force," and Fresnel-Riemann on refraction and retarded propagation.

10. Formally, the introduction of "machine-tool design" into modern economy, originates with the work of Lazare Carnot, especially his role in the economic-military mobilization of 1792-1794. However, the "machine-tool-design era" is dated to a later time, the 1861-1876 mobilization of the U.S. economy. The "industrial revolution" proper was thus launched from the United States, from whence direct U.S. influence spread it into Bismarck's Germany (1877), Meiji Restoration Japan, and the Russia of Alexander II.

11. I.e., the doctrine of G.W.F. Hegel's politically reactionary ally, the neo-Kantian Romantic Karl Friedrich Savigny: i.e., the absolute separation of *Geisteswissenschaft* from *Naturwissenschaft*. In a cruder version, this is also the doctrine of "art for art's sake": that there is no rational principle underlying the determination of value in art, that art is the arbitrary taste of artists and their audiences.

12. Bernhard Riemann, "Über die Hypothesen, welcher der Geometrie zu Grunde liegen," in *Bernhard Riemanns Gesammelte Mathematische Werke*, ed. by H. Weber (New York: Dover Publications reprint, 1953). This Kepler-Gauss-Riemann standpoint, is identical with Leibniz's insistence that the "infinitesimals" of his calculus are not linear, but are intervals of non-constant curvature.

13. Bernhard Riemann, "Zur Psychologie und Metaphysik," in *Werke*, *op. cit.*, pp. 509-520.

14. E.g., *Geistesmasse*, in Riemann's posthumously published manuscripts on the subject of metaphysics, *Werke*, *op. cit.*

15. In Classical culture, no principle is ever merely learned. A principle must be known, rather than merely learned. To know a principle, is both to experience in oneself the process which generates the discovery, and to experience the equivalent of a crucial-experimental proof of that principle. By "principle," one signifies a law of nature which can not be derived by deduction, but only by discovering an experimentally validatable idea which solves an otherwise insoluble contradiction in previously established knowledge.

adolescence, my adherence to Leibniz's standpoint,¹⁶ included a specific, explicit opposition to the educational dogmas of John Dewey,¹⁷ and coincided with my continuing rejection, to the present day, of the Seventeenth and Eighteenth Centuries' English and French reductionists generally.¹⁸ It was during the later phase of that adolescent study, that I first defined my opposition to that paradigmatic, neo-Aristotelean attack on Leibniz which is central to Immanuel Kant's famous *Critiques*.¹⁹

On account of those same principles of Classical humanist education, one must emphasize, that there was nothing accidental in the fact, that the combined, 1948-1952 discoveries themselves, were prompted chiefly by my impassioned concern to expose the essential, neo-Kantian fraud underlying certain radical-positivist innovations introduced by two prominent devotees of Bertrand Russell. Those latter, targeted frauds, were, the radically reductionist "information theory" (e.g., radically positivist "linguistics") of Professor Norbert Wiener,²⁰ and the closely related hoax, the "systems analysis" of Professor John Von Neumann.²¹

Similarly, the tactic which I chose for development of my 1948-1952 refutations of, initially, Wiener and, later, Von Neumann, was a conviction which I had adopted

during the war-time 1940's, that the problems of a theory of knowledge posed by Kant's *Critiques*, must be attacked from the vantage-point of a general science of physical (as distinct from monetary-financial) economy—i.e., man's self-perpetuating increase of his species' practical power over nature. This must be a science whose elementary focus is the adducing of those principles which govern mankind's manifest, unique potential for willfully increasing our species' *potential relative population-density*. This ordering must be associated with the impact and correlatives of the generation of scientific, technological, and cultural progress.²²

In service of the same, Classical humanist principles of accounting for one's own knowledge, today's continuing, central, practical issue of world culture and politics, which I shall bring into sharper focus here, is the fact, of the increasing political hegemony, within modern European world-culture, of an anti-Renaissance, reductionist, and specifically Venetian world-outlook. That perverted outlook, is, most notably, the legacy of Pietro Pomponazzi,²³ Paolo Sarpi,²⁴ Antonio Conti,²⁵ *et al.* This Venetian influence has established, as its legacy, a specific pathological trait, a trait which has been imposed upon the most widely accepted beliefs and practice of modern

16. Especially, at that time, the *Theodicy*, *Monadology*, and *Leibniz-Clarke Correspondence*.

17. A reading of works by and on the subject of Dewey's educational programs, during my fourteenth year, in the ninth grade, left me with a sense of being degraded by, and hostile to submission to the philosophy of education integral to the courses of instruction offered in secondary education at that time. It was this issue which led me to the subsequent years impassioned occupation with the issue of Kant's *Critique of Pure Reason*.

18. E.g., the reductionism of such followers of Paolo Sarpi as Francis Bacon, Galileo Galilei, Thomas Hobbes, René Descartes, John Locke, Bernard Mandeville, David Hume, and such followers of Antonio Conti as Voltaire and the French "Encyclopaedists."

19. At that time, Kant's *Critique of Pure Reason* and *Prolegomena*. See also, on Leonhard Euler's resort to the fraud of *petitio principii* in his own effort to supply an argument against Leibniz's *Monadology*: Lyndon H. LaRouche, Jr., "Pope's Havana Homily Defends Nation-State," *Executive Intelligence Review*, Feb. 6, 1998 (Vol. 25, No. 6), p. 51.

20. E.g., Norbert Wiener, *Cybernetics, or Control and Communication in the Animal and Machine* (New York: John Wiley, 1948). The root of Wiener's "information theory," is to be found in the founding of Russell's school of linguistics in the relevant collaboration of Russell, Karl Korsch, Carnap, Hutchins, Harris, *et al.* Russell's 1938 "unification of the sciences" project, is the setting for the M.I.T. school of linguistics and "artificial intelligence" of Noam Chomsky and Marvin Minsky.

21. After John Von Neumann's work had received a devastating blow at the hands of Kurt Gödel's 1930-1931 works "On Formally Undecidable Propositions of *Principia Mathematica* and Related Systems" and "Discussion on Providing a Foundation for Mathematics" [*Collected Works*, Vol. I (New York: Oxford University Press, 1986)], Von Neumann shifted into the field of a mathemati-

cal theory of games. By 1938, Von Neumann fell into the absurdity of claiming that he could reduce economics to a matter of solutions for simultaneous linear inequalities. In this connection, Von Neumann fell into collaboration with Oskar Morgenstern, producing the radically absurd doctrine of their *Theory of Games and Economic Behavior* (Princeton, N.J.: Princeton University Press, 1953, 3rd ed.). In a similar vein, Von Neumann, like Wiener, proposed the possibility of defining "artificial intelligence" as an offspring of a linear digital computer-system.

22. The initial attack on this problem occurred, during the early 1940's, as a critique of Karl Marx's *Capital*. The writer's critical focus was on the devastating effects of Marx's refusal to consider the implications of "the technological compositions of capitals," a refusal, stated in Volume I, which supplies the crucial error in Marx's attempt, in his Volumes II and III, to construct an account of "simple" and "extended reproduction of capital." The technological issues which Marx evades, are the foundation for any scientific approach both to the understanding of the processes of physical economy generally, and to the origins of so-called "business cycles." On account of Marx's axiomatic error on this point, the four-volume edition of his *Capital* manuscripts, and related writings, absolutely does not meet the requirements of a science of extended social reproduction. Over the recent four decades, and longer, this has often been a persisting, crucial issue of attacks on the present writer by those esteeming themselves defenders of Marxist economics orthodoxy.

23. Pietro Pomponazzi (1462-1525). Padua's Pomponazzi emerged as a leading apologist for the opponents to the mid-Fifteenth-century ecumenical Council of Florence. In his capacity, together with his student Cardinal Gasparo Contarini, as the leading opponent of the Fifteenth-century Renaissance throughout Europe, he introduced the gnostic, Aristotelean dogma of Averroes *et al.* into the Venice-dominated, post-League of Cambrai, Sixteenth century.

European academic and related culture. The latter, sundry—variously Aristotelean, “neo-Aristotelean,” “empiricist,” “Cartesian,” materialist, and “positivist”—trends in leading opinion, have established the hegemony of their common pathological dogma, the which implicitly demands a dichotomy between the idea of knowledge in general, such as the so-called “liberal arts,” and the notion of rational behavior to be associated with physical science. This conflict is usefully compared with what British author C.P. Snow identified, more simplistically, as the “Two Cultures” dichotomy of modern European empiricist dogma.²⁶

Despite presently hegemonic kinds of philosophically reductionist influences: since the influence of Classical Greek culture, especially the heritage of Plato and his Academy,²⁷ the best currents of European civilization had acquired a relatively clear, if not simple conception of an implicitly ordered relationship underlying the ordering of human social progress, the latter respecting both individual physical practice and demographic characteristics of cultures at those technological levels of practice. This is an ordering correlated, measurably, with notions of *relative potential population-density*. The notion of a correlation between an improvement in the demographic and related individual characteristics of populations, and the related role of applied scientific and technological progress in fostering advances in *per-capita* and *per-square-kilometer* power over nature, has supplied a clear practical standard for measuring what, until recently, had been recognized as “the idea of progress.”²⁸

However, although the idea of progress involved clear notions of ordering, and of related measurements, the

inevitability of progress was not a matter of clearly established principle. It appeared, for example, that there exists no conceivable mathematical function of the ordinary type, the which would ensure that any valid advance in discovery of applicable physical principle should lead to the lawful generation of a next higher order of discovered principle of general practice. Indeed, even in the case of a valid discovery of principle, there was no clear assurance that society would accept an experimentally proven such principle as a rule for improved social practice. Taking as much as we know of the whole span of the human species’ existence to date, human progress has been the likely, but uncertain outcome of history considered in the large.

To repeat the crucial point: It was clear to modern European civilization, that progress were always possible,²⁹ but that progress did not necessarily occur in the manner a simple notion of physical science suggested. Stagnation, or worse, demographic and physical retrogression, often occurred. In the long, combined history and pre-history of mankind, only a few strains of cultural development have not been cast aside, rightly, as failed cultures. In known history, the catastrophic persistence of oligarchical forms of society, such as those of the ancient Mesopotamians, the Romans, Byzantium, and the Aztecs, illustrate the frequent case, of cultures which, although more or less long-dominant, are best characterized as cultures ultimately self-doomed by their inherent lack of sufficient “moral fitness to survive.”

We pivot our argument here upon the issues of that pathological, cultural-historical paradigm referenced by Friedrich Schiller.³⁰ We reference, so, the awful history of

24. Paolo Sarpi (1552-1623). Sarpi, who was, from 1582 onward, the leader of the dominant faction of Venice, is notorious for his adoption of a radical version of Aristotelean formalism, a formalism derived from the model of William of Ockham. Sarpi was, in his time, the controller of the English monarchy of King James I, and the sponsor of such related notables as Francis Bacon, Galileo Galilei, and Thomas Hobbes. He is the founder of the British empiricist and Cartesian method.

25. Antonio Conti (1677-1749), famous as the creator of Voltaire and of the myth of Isaac Newton’s calculus. He was the leading successor to the role of Paolo Sarpi in spreading the hegemony of the Eighteenth-century versions of the British and French (anti-Renaissance) “Enlightenment” throughout Europe. Conti’s influence, as expressed by Leonhard Euler, Lagrange, Laplace, and Augustin Cauchy, established the political hegemony of the radically reductionist faction in scientific teaching throughout European civilization, to the present day. The notion of “linearity” in the infinitesimally small, and the related radical empiricism of the positivists Bertrand Russell, Norbert Wiener, John Von Neumann, *et al.*, are included among the products of this influence of Conti.

26. C.P. Snow, *The Two Cultures and the Scientific Revolution* (London

and New York: Cambridge University Press, 1993 reprint).

27. “Plato and his Academy” embraces the work of Plato’s followers, through the work of Archimedes’ contemporary Eratosthenes.

28. The improvement of transportation, water management, and usable energy *per capita* and *per square kilometer*, are typical of those changes in basic economic infrastructure which have the same general effect as technological progress in general.

29. Admittedly, influential radical empiricists, such as Bertrand Russell and his followers, did not share that optimistic view.

30. Referencing the failure of the French people to seize the opportunity of the French Revolution, Schiller writes in the Fifth of the Letters on the Aesthetical Education of Man, that “a *physical* possibility seems given, to place the law upon the throne, to honor man finally as an end in himself and to make true freedom the basis of political union. Vain hope! The *moral* possibility is wanting; and the generous moment finds an unresponsive people.” “Letters on the Aesthetical Education of Man,” in *Friedrich Schiller, Poet of Freedom*, Vol. I (New York: Schiller Institute, 1985) p. 230. His famous epigram, “The Moment,” reads:

A momentous epoch hath the cent’ry engender’d,
Yet the moment so great findeth a people so small.

Ibid., p. 325.

France's moral degeneration, during most of the periods following the outbreak of the French Revolution of 1789.³¹ Excepting such great, exemplary achievements of 1792-1814, as were led by the circles of Lazare Carnot and Gaspard Monge's *Ecole Polytechnique*, the reconstructed France of Louis XI, which had continued until 1789 as the world's most developed nation-state, had, by 1789, turned sharply downward, away from the course implied by the Marquis de Lafayette's role in the American Revolution, into those "Enlightenment" orgies of moral degeneracy typified by followers of Robespierre, Barras, Napoleon Bonaparte, and the French positivists in general.

Schiller's intent in addressing this ominous, crucial failure of French culture, is elaborated in locations such as his *Über die Ästhetische Erziehung des Menschen*.³² Nonetheless, although Schiller's intent ought to be clear from his own writings, the deeper, most crucial, *ontological* implications of his argument, as in the Fifth Letter of that series, appear to be grasped by most among his putative admirers only in a relatively superficial way, not grasped in the sense of a relevant, cognitively rigorous notion of ontology. It is those ontological implications which I am specially qualified to address, as I do here. Those ontological issues, and their practical implications for world politics today, are the essential subject of this report.

In the accompanying report [SEE Appendix, page 29], we focus upon the case of music, to illustrate the ontological basis for Schiller's insight into the role of cultural development. There, we focus upon the exemplary case of Classical musical, *motivic thorough-composition*, as located by W.A. Mozart in the foundations supplied by such works of J.S. Bach as *A Musical Offering*.³³ That

development, from Bach, through Haydn,³⁴ Mozart, Beethoven, and Brahms, is employed here as a model of the ontological function at the core of Schiller's principle of aesthetical education. We include, as crucial, reference to Goethe's poor judgment on Mozart's and Beethoven's song settings for Goethe's poems, and the related case of Franz Schubert's sharing Schiller's opposition to Goethe on this matter of practice.³⁵

What we offer, thus, is not a complete treatment of the role of Classical culture. Our task here, is to lead the reader into a breakthrough in recognizing, from the example of music, the nature of the *ontological* principle involved in Classical culture, as a whole.

2. Art as Science

In the history of ideas of principle as represented by the work of Plato, the relatively brief *Parmenides* dialogue occupies a special place of relevance. From the standpoint of that *Parmenides* and related writings, Plato's notion of what he defines as *ideas* is presented by him as a defense of the seminal contributions of the school of Pythagoras, against the anti-Pythagoras, Eleatic faction of reductionism. These Eleatics are epitomized by the dialogue's Parmenides. Constantly, the echoes of Heraclitus' ontological standpoint, "nothing is constant but change," reverberate in the crucial passages of Plato's dialogue.

The central issue attacked in that dialogue, is the same ontological blunder which underlies all of the reductionist tradition, from the Eleatics, through the sophists and Aristotle, through to the modern empiricists, materialists, and positivists. Given a sequence of developments which corresponds to some ordered change of principle, how might we conceptualize a higher principle which underlies and generates the ordered sequence of relevant, successful changes in apparent principle?

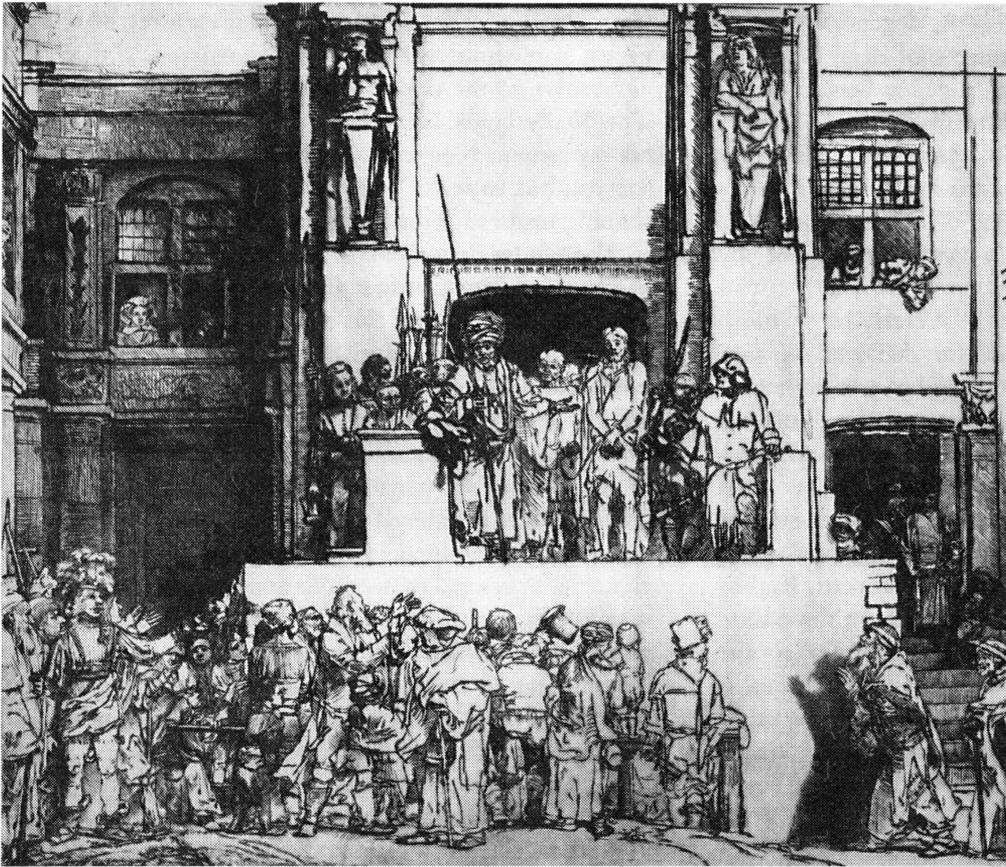
31. Not only under the Jacobins and the Napoleonic regimes, but also the post-1898 Third Republic, the Fourth Republic, and the Mitterrand regimes.

32. F. Schiller, "Über die Ästhetische Erziehung des Menschen in einer Reihe von Briefen" ["Letters on the Aesthetical Education of Man"], in *Friedrich Schiller Sämtliche Werke: Fünfter Band*, ed. by Gerhard Fricke and Herbert G. Goepfert (Munich: Carl Hanser Verlag, 1993). See footnote 30 for an English translation.

33. Briefly, J.S. Bach's development of a form of polyphony situated with respect to the Florentine *bel canto* voice-training standard, led into a determination of both pitch and of counterpoint derived from a rigorous application of the principles of a multiply-connected manifold. The related treatment of the principle of polyphonic (e.g., "cross voice") inversions led into such crucial Bach works as his *A Musical Offering* and *The Art of the Fugue*. The rigorous study of this aspect of J.S. Bach's methods of composition, from the standpoint of *A Musical Offering*, steered Wolfgang Mozart directly (e.g., the K.475 *Fantasy*) into that method of *motivic thorough-composition* which is the characteristic of the post-1783 work of Mozart, Haydn, Beethoven, *et al.* It is this process of development, from J.S. Bach through Brahms, which defines the Classical, as opposed to Romantic *et al.* notions of musical composition.

34. The evidence is, that Professor Norbert Brainin is probably unique among contemporaries in his recognition of Haydn's initial demonstration of principles of thorough-composition, although the discovery of the more general such principle is dated to the work of Wolfgang Mozart, beginning 1782-1783. Nonetheless, without Haydn's work in carrying the development of composition beyond the standard established by C.P.E. Bach, Mozart would have lacked the foundation upon which to grasp the fuller implications of J.S. Bach's *A Musical Offering*, implications upon which a general principle of *motivic thorough-composition* depended.

35. *A Manual on the Rudiments of Tuning and Registration*, Book I, ed. by John Sigerson and Kathy Wolfe (Washington, D.C.: Schiller Institute, 1992), Chap. 11, "Artistic Beauty: Schiller versus Goethe."



"Christ Presented to the People," drypoint, first state (detail) (1650).

In the long history of mankind, only a few strains of cultural development have not been cast aside, rightly, as failed cultures. The catastrophic persistence of oligarchical forms of society, such as those of the ancient Mesopotamians, the Romans, Byzantium, and the Aztecs, illustrate the frequent case, of cultures which are ultimately self-doomed by their inherent lack of sufficient 'moral fitness to survive.'

In art generally, as in Plato's dialogues, the dominant role performed by the composition, is the quality of *ontological surprise*, a point in the development at which a paradoxical transformation occurs in the import of that composition, a point at which the composer leads the audience away from a narrow focus upon the apparent, relatively literal, merely formal expression of the ongoing subject-matter, into what proves to be an ordered series of successive, more or less kaleidoscopic transformations in meaning, in principle. That principle which subsumes such an ordering of successive, mutually contradictory principles, appears, thus, ontologically, as the true, subsuming subject-matter of the artistic composition.

That true subject is the location of the *ontological* quality of the composition, the location of the *ontological* quality of all Classical art.

For example, in Shakespeare's *Hamlet*, especially the notable Act III soliloquy, Hamlet is confronted by the choice of either clinging to his "macho's" habitual, petty, paranoid, swashbuckling world-outlook, which assures his self-imposed doom, or venturing into a new quality of world-outlook, the latter which he rejects as a "bourne from which no traveller" has returned. There is virtually

no difference between that Hamlet and those tragic statesmen, today, faced with the inevitable collapse and disintegration of the world's present financial and monetary system, who prefer to work within the bounds of adapting, as "practical politicians," to the doomed system, rather than risk the escape to safety from the doomed system, by adopting what they presently abhor as a radically new form: a bourne from which no traveller has returned. For them, it is more comfortable to return to the old, familiar, diseased slut, than to couple with a healthy immigrant.

On this account, no great playwright ever composed fiction. Just as Aeschylus' *Prometheus Bound* is nothing but a truthful presentation of the paradoxical principle then governing the real universe of ancient Greek culture, so neither Shakespeare nor Schiller ever composed mere fiction, mere existentialists' entertainment. The essence of Classical tragedy and poetry is the equivalence of truth and beauty. No great tragedian ever composed a drama in which the principle of history exhibited on stage was not a truthful representation of a relevant principle of real-life history, a principle expressed in a real-life-based apprehension of historical specificity.

Contrast Classical tragedy with the degeneracy which has taken over the modern staging of even Classical opera and dramas. The Classical stage has been replaced by the theater of cheap tricks performed by aid of irrelevant sensual effects and paranoid symbolisms. Take, for example, the late Orson Welles' famous 1937-1938 Mercury Theater, "relevant" staging of Shakespeare, as a notable example of this presently continuing degeneracy of practice.³⁶

In the Classical theater, from Aeschylus through Shakespeare and Schiller, the medium deployed on stage is what appears, at first, to be nothing but a literal representation of what the dramatist intended to portray: without symbolism, without cheap sensual, or other "special effects." The substance of the drama emerges as an eerie something which is occurring behind the scene, within what the author and audience apprehend as the minds of the characters. This is a different, higher dimension than the literal actions on stage, a dimension of paradox and metaphor. In a valid performance, the mind of the audience is shifted from the literal drama as such, to the eerie sense of some principle of the mind which intervenes to change the character of the literal events on stage. The drama is thus shifted from the literal drama on stage, to the drama within the mind of the audience.

Thus, it was Schiller's principle, that the audience must emerge from the theater better people than they had entered that theater. In great Classical tragedy, the audience is horrified at the discovery that it entered the theater with a disposition for condoning the kinds of errors which led the tragic figures on stage to the latter's doom. It is in that eerie sense of irony, that the true drama lies; there, thus, within the audience itself, lies the true *ontological* dimension of the Classical drama.

Consider the case of Schiller's *Don Carlos*. Apart from the sole hero(ine) of the tragedy, Elizabeth, Don Carlos, Posa, and King Philip II, are each gripped, like Shakespeare's Hamlet, by a compelling devotion to some fatal degree of relative spiritual littleness in themselves. World-historical roles are more or less evaded, out of small-minded attachment to small-minded family and kindred personal considerations. Among the three principal male characters, the otherwise flawed

Posa, alone, rises to the relatively highest level; he recognizes, if without the necessary consistency, that the alternative to the doom of Spain's monstrous follies in The Netherlands, is to rise to the level of world-historical statesmen: Not what might seem to offer personal success, but to make one's living a meaningful role in shaping history for the betterment of future mankind.³⁷

There is no fiction, no petty moralizing, in the writing of Schiller's *Don Carlos*; it is a *truthful* account of those principles underlying the historical specificity of that senseless butchery in which the contending forces of The Netherlands' warfare went down to mutual bestiality, the folly by which Spain doomed itself to degenerating from a world power into a morbid relic of its earlier pretenses to grandeur. The audience, gripped by such great tragic compositions, is induced to sense the paradox, the irony, the metaphor lodged in the discrepancy between the character's personal motivations and that same character's world-historical accountability for the outcome of current events. In Schiller's composition of the drama, the truth lies not in the selection of literal events on stage; the truth lies in the artful juxtaposition of those conflicts of principle—those metaphors—which account for the tragic, actual history of referenced, real-life events.

Indeed, it should be noted that, for reasons we shall identify below, all great tragedy is grounded in historical specificity.³⁸ If Rome of the doomed Julius Caesar is the subject chosen, then it is the historically specific crisis of

37. See F. Schiller on the role of Elizabeth, as contrasted with that of Posa, in *Don Carlos*. Posa, finding the King, Philip II, in a state of mind that disposes him to seek an adviser other than his usual court lackeys, seizes the moment of opportunity to reveal, to this most powerful ruler in the world, his own innermost thoughts, including his perspective for securing happiness for the people of Flanders. That Posa does so is understandable; but the fact that he allows himself to believe that in Philip, he has found his instrument for effecting the "greatest possible realization of individual freedom, alongside the greatest flourishing of the state," borders on delusion.

Worse still, is, that for this and other reasons, Posa breaks his alliance with Don Carlos, without informing the latter of the changed situation ("Why show a sleeping person the storm cloud that is hanging over his head?"), and that he even resorts to court intrigues, ostensibly in order to save Carlos. Finally, when his plan fails, he sacrifices himself out of egotistical motives: ". . . it is entirely in keeping with the character of this heroic enthusiast, that in order to shorten this route [out of a condition of despondency], he seeks to place himself once again in high esteem by means of some extraordinary act, by means of a momentary heightening of his being," writes Schiller in his "Letters on Don Carlos." Cf. F. Schiller, *Briefe über Don Carlos*, in *Friedrich Schiller Sämtliche Werke* (Munich: Carl Hauser Verlag, 1981), Vol. II, *Dramen II*, Letters Six through Twelve, pp. 244-267.

38. For a more fulsome treatment of this principle of historical specificity, see the treatment of the case of world-historical individual, below.

36. Welles' *Caesar*, adapted from Shakespeare's *Julius Caesar*, opened in 1937 at the Mercury Theater in New York, with staging and costumes designed to suggest the fascist regimes of Hitler and Mussolini, including what was described as "Nuremberg lighting." See Orson Welles and Peter Bogdanovich, *This is Orson Welles* (New York: HarperCollins, 1992).

the process of continued degeneration of the Republic of Rome which is the matter addressed by Shakespeare. Similarly, the real, self-imposed doom of Spain is the historically specific location of the subject of Schiller's *Don Carlos*, just as Aeschylus' *Prometheus Bound* is historically specific to the self-induced doom of the ancient oligarchical Greece dominated by the pervasive influence of the satanic cult of Apollo.

In drama, as in Classical poetry, the essential difference between mere fiction and true art, is that the artistic content of great tragic compositions lies not within the literal events arranged on stage; the content lies in the successively emerging conflicts of principle, that succession of surprising ideas which prompts the audience to leave the theater better people than they entered it, shortly before.

In music, the same principle of Classical artistic composition appears in a different form of expression. Nonetheless, the same ontological principle, as implicit in the paradoxes of Plato's *Parmenides*, is the governing principle underlying those transformations in physical science which are the outgrowth of successive, validated discoveries of physical principle. In fact, it is this same principle, as expressed in the form of Classical artistic composition, which is the governing moral principle of realized scientific progress.

To this purpose, shift our focus from the Classical tragedy of Aeschylus, Shakespeare, or Schiller, to the manner in which the same principle of artistic composition is developed, with relative perfection, in the progress of post-Renaissance musical composition from J.S. Bach through Haydn, Mozart, Beethoven, Schubert, Chopin, Schumann, and Brahms.³⁹ To that end, let us now define the historical setting in which the importance of modern Classical musi-

cal composition is situated. We emphasize the development of modern European culture which was built upon the foundations of the Fifteenth-century "Golden Renaissance," contrasting this to the presently dominant role of the anti-Renaissance, Aristotelean and Ockhamite "Enlightenment," which gained increasing hegemony in post-League of Cambrai, Sixteenth-century Europe.

To restate the nature of the connections: the essence of the matter, is the precise agreement between the principles of physical-scientific discovery, as these principles might be adduced from the accomplishments of Bernhard Riemann, with the principles of such Classical art as Eighteenth- and Nineteenth-century Classical, musical motivic thorough-composition. For the purpose of locating those developments of Renaissance science leading into the emergence of Classical motivic thorough-composition, Cardinal Nicolaus of Cusa⁴⁰ is the founder of modern experimental physical science, a role which emerged from his *De docta ignorantia*⁴¹ and those other, later writings,⁴² which educated, and otherwise inspired such founders of modern science as Luca Pacioli, Leonardo da Vinci, William Gilbert, and Johannes Kepler.⁴³

In method, Cusa, is, in turn, a follower of the great Plato; his work is in the same Platonic tradition so clearly adopted for theology by the Apostles Paul and John.⁴⁴ The special emphasis to be supplied here, is, that although the glimmerings of the notion of Classical *ideas* do antedate Plato's dialogues, it is with Plato that the nature and role of the *idea* first appears in a rigorous and clearly replicatable form. This principle of the *idea*, which underlies the work of such Fifteenth-century *Golden Renaissance* figures as Cusa, is key to grasping the ontological implications of Friedrich Schiller's arguments in his *Aesthetische Erziehung* and related writings.⁴⁵ Here,

39. Contrast the success of the first movement of Frédéric Chopin's echoes of Beethoven's Opus 111, with the pathetic folly of Franz Liszt's notoriously failed effort to replicate the same Mozart-Beethoven legacy of the K.475 *Fantasy*.

40. Nicolaus of Cusa (1401-1464). See Helga Zepp LaRouche, "Nicolaus of Cusa and the Council of Florence" *Fidelio*, Spring 1992, pp. 17-22.

41. *De docta ignorantia* (*On Learned Ignorance*), trans. by Jasper Hopkins as *Nicholas of Cusa on Learned Ignorance* (Minneapolis: Arthur M. Banning Press, 1985).

42. The principal writings on the subject of scientific topics by Cardinal Nicolaus of Cusa, composed after *De docta ignorantia*, include: "On Conjectures,"* "On Beryllus,"* "On the Game of Spheres," "The Vision of God," "On Mathematical Complements," "On Geometrical Transformation," "Quadrature of the Circle,"* "The Golden Proposition in Mathematics," and "The Layman on Experiments Done with Weight-Scales." Starred items are included in *Toward a New Council of Florence: "On the Peace of Faith" and Other Works by Nicolaus of Cusa*, rev. ed., trans. by William F. Wertz, Jr. (Washington, D.C.: Schiller Institute, 1995).

43. For the case of Luca Pacioli and his collaborator Leonardo da Vinci, see Pacioli, *De Divina Proportione* (1497) (Vienna: 1896; Milan: Silvana Editoriale, 1982, facsimile of 1497 ed.), Chap. 1.

For Kepler on the "divine" Cusa, see Johannes Kepler, *Mysterium Cosmographicum* (*The Secret of the Universe*), trans. by A.M. Duncan (New York: Abaris Books, 1981), p. 93. Kepler frequently acknowledged his debt to the Englishman William Gilbert, for Gilbert's application of a field (structure of space) approach to magnetic and, by analogy, solar gravitational phenomena, in opposition to the mechanistic Aristoteleanism of Paolo Sarpi and Sarpi's agents Francis Bacon and Galileo. Gilbert was repeatedly attacked by Bacon for propounding an experimental method rooted in hypothesis (e.g., in Bacon's *New Organon*).

44. For example, the treatment of *agapē* in Paul's *I Corinthians 13*.

45. E.g., "Letters on the Aesthetical Education of Man," *op. cit.*; "On Grace and Dignity," "Kallias, or, On the Beautiful," in *Friedrich Schiller, Poet of Freedom*, Vol. II (Schiller Institute: Washington, D.C., 1988); "Philosophical Letters," "On the Pathetic," and "On the Sublime," in *Friedrich Schiller, Poet of Freedom*, Vol. III (Schiller Institute: Washington, D.C., 1990).

by way of that Platonic *Golden Renaissance*, art found its essential unity with science.

In narrowest focus, the *idea* which distinguishes the essence of Classical musical composition, from Romantic and other alternatives, exemplifies the kind of Platonic *idea* we must associate with Schiller's attention to "*der Gegenstand des sinnlichen Triebes*"⁴⁶ ["the object of the sensual impulse"]. It is for that reason, that we have selected the case of Classical music to illustrate the principle of culture in general. For this reason, it may be said, that the general principle of all Classical art, is most simply illustrated by the case for the principles of Classical motivic thorough-composition in music.

The ontological issues are sharply defined. It is not the notes—the tones, chords, overtones, etc., as such—which form the self-evident, sensuous elements of Classical musical composition. The substance of Classical music, in its defining, subsuming process of development, from Bach through Brahms, lies within the same creative-mental process of development which governs the ordering of metaphor expressed as the coherent unfolding of a work of Classical motivic thorough-composition.⁴⁷ It is in that ordering, not any collection, or interpretation of the individual tones as such, that the ontological actuality of Classical musical composition and performance lies.

Agreed: in Classical composition, the composer's intent must be followed scrupulously. Echoes of the decadent, symbolism-ridden, anti-Renaissance mannerism of reactionary, mid-Sixteenth-century European art, are not to be tolerated kindly. However, the function of that rigorous respect for the composer's intent, is not rightly intended to represent a strict school-book interpretation of the score, as if according to the vanity of some poor pedant's conceits. The strict observance of the composer's intent, is to ensure that the paradoxes (e.g., metaphors) generated within the composition, are clearly defined ambiguities, paradoxes (metaphors) whose resolution must be the idea corresponding to the artistic intent of that choice of motivic thorough-composition taken in its wholeness.

Contrary to today's widely taught musicological dogmas, the "substance" of Classical music is located outside any linear measure, outside any domain of constant curvature; what we hear, and what should be performed, thus, must be heard "between the notes," not within them. It is not the notes we must hear; it is not merely a matter of the "right tuning" of the well-tempered scale.

46. Friedrich Schiller, "Über die Ästhetische Erziehung des Menschen," *op. cit.*, *Fünftehnter Brief*, p. 614.

47. For an example of this, see Mindy Pechenuk on the function of the Lydian principle in Mozart's thorough composition of his *Ave Verum Corpus* motet. Mindy Pechenuk, "Mozart's Ave Verum Corpus," *Fidelio*, Winter 1996 (Vol. V, No. 4), pp. 34-45.

So, for J.S. Bach, as for Mozart *et al.* after him, we must never hear intervals merely within voice-parts, or even merely across voices, except that we *also* hear the totality of the implied, complementary inversions within and across the voices, as these unfold in the course of that motivic development which is the unity of the composition as an indivisible whole.⁴⁸

As we show in the accompanying report, it is the ordering of that "in-betweenness," which is the rudimentary location of that musical developmental process, the which is heard primarily with the mind, and only in a lesser degree the ear as such. Monkeys with perfect pitch do not make music. From J.S. Bach on, well-tempered tuning, whether within the individual composition, or subsuming the succession of development of musical ideas by great Classical composers, is a reflection of a coherent process of thoroughly composed motivic development; it is in the process of composition, that the required coherence of the performance must lie.⁴⁹ No mere computer could ever compose, or perform—or hear—such music.

On account of such underlying principles, Cusa's role as the initiator of modern experimental science, situates him, historically, within the "Golden Renaissance," as the most relevant, Platonic point of reference, for uncovering the essential unity of modern science and the accompanying development of Classical culture, Classical musical culture included.

A Matter of Passion

Using the case for Classical musical composition as paradigmatic, three propositions are to be addressed.

- First, how do we demonstrate a common ordering for both Classical artistic ideas—in Plato's sense of *idea*—and the ideas associated with experimentally validated, revolutionary discoveries of physical principle?
- Second, how do such ideas regulate both the impetus

48. Among the very best demonstrations of that principle of performance is a Wilhelm Furtwängler recording of Franz Schubert's great C-Major Symphony (available on Music & Arts label, MUA 826). Other leading conductors' performances have a tendency toward a "pasted together" quality, by contrast with the gripping unity of motivic thorough-composition which Furtwängler achieves, and sustains, from the initial attack, onward.

49. Start with Wolfgang Mozart's work of the 1782-1783 period. Locate a significant number of those compositions which Mozart derived from the same solution for Bach's *A Musical Offering* which is typified by the K.475 *Fantasy*. Next, arrange a set of compositions by Mozart, Beethoven, Schubert, Brahms, *et al.*, which are derived from this same root. The K.475 "Lydian" modality, represents not only a principle of motivic thorough-composition for individual works; the development of successive works, by various such composers, expresses a higher principle of motivic thorough-composition than any single work of that species.

for such scientific progress, and the adoption of a corresponding, revolutionary practice?

- Third, how do Classical artistic ideas govern the moral motivation of a population, to the effect that the lack of such motivation usually results, erosively, or catastrophically, in a great cultural calamity such as that ongoing today?

The answer to those three questions is embedded, pervasively, in Plato's notion of *agapē*, as a motivation—a *passion*—which compels one to subordinate everything to concern for realizing justice and truth. This is the same passion, *agapē*, so prominently emphasized in the Apostle Paul's *I Corinthians 13*. The related issue, is the central feature of Plato's dialogues, that truth lies, ultimately, not in any fixed belief, but only in those valid, progressive changes in belief and behavior, the which supersede the paradoxes inhering in a previously established learning, with a validated discovery of higher principle.

Thus, the central feature of the thesis which we present here, is summarily the following.

Justice, truthfulness, and those creative powers by means of which we may discover valid, revolutionary principles of our universe, form a seamless whole, in which Classical culture, morality, and physical science, are united by a common passion for universal justice and truth.

These issues of truth and justice are associated empirically with tests of humanity's increased power over the physical universe, *per capita*, and *per square kilometer* of the Earth's surface. The increased development of the average newborn individual, the increase of *per-capita* power, the maintenance of the increase of those improvements in demographic and productive characteristics, and so forth, are typical of the evidence by means of which we may know that changes in knowledge for practice are in accord with the Creator's intent for the laws of the universe. This accords with justice, as *justice means a more adequate participation of each individual life as a world-historical being, a life so dwelling in the simultaneity of eternity, a mental life thus situated in the further development of the condition of all mankind.*

That passion for truth and justice, is rightly, and most conveniently identified as the *agapē* of both Plato and the Christian New Testament; it was, indeed, this Christian, Apostolic standpoint, based in *agapē*, which is the key to what emerged, during the period of the Fifteenth-century *Golden Renaissance*, as modern European Classical culture. This passion, expressed as the powers of concentration through which valid discoveries of principle are prompted by metaphors, is the purest expression of reason, its *active* expression.

For example: contrast *reason* and mere *logic*, as opponents of one another. Where is the *passion* in a formal,

deductive logic? The question itself is a contradiction in terms! Without the passion of relentlessly extended concentration, how might we discover the principle which overcomes a defiant paradox? Without the passion for truth, how would we be impelled to refuse to accept less than the recognition, or new discovery of such a principle?

The notion of a "dispassionate" search for truth, is a contradiction in terms. Logic as such, is morally dead, or, better said, outrightly immoral because it is amoral. It is the creative impulses governed by an overriding passion for truth, that same passion, *agapē*, which separates the Christian from the moralizing hypocrite in *I Corinthians 13*, which are the only efficient source of truthfulness and justice. This is the passion which produces truth in the progress of physical science. This is the passion for truthfulness, the which is the essential distinction between Classical and allegedly "alternative" forms of art such as "the popular," Romantic, Modernist, Existentialist, Post-Modernist, etc.

This, as we shall see, leads us directly to the issue: If reason must be controlled by passions, rather than the dead hand of mere logic, what shall govern these passions? How shall we define the injunction of *I Corinthians 13* on this account? By what means are such passions uniquely efficient in guiding us to practices of truth and justice? How do we, then, distinguish, those passions and forms of passion which are irrational, from those contrary forms which are the seat and substance of reason? This is the issue of culture. This is the issue which places Classical culture morally and otherwise apart from and above all currently popular misconceptions of culture.

The role of passion in the composition and performance of Classical music, is to be located so. As we shall indicate by aid of the accompanying report, summarizing Classical musical tuning, the medium of Classical motivic thorough-composition, as we have located that here, is the sensuous domain within which musical ideas are expressed as musical ideas.

To that effect, turn now to those aspects of Plato's dialectical method which bear more emphatically on the matters of physical science.

3.

The Principle of Hypothesis

The formalist, such as that pathetic creature, the mere logician, is a reductionist duped into believing that definitions, axioms, and postulates are given implicitly beforehand (as if *a priori*). The formalist presupposes, that one might discover such definitions, axioms, and postulates by means of deduction, a method of deduction which

Truth, then, does not lie in any one choice of hypothesis. Truth lies in the always radically revolutionary process, by means of which valid new principles are generated, new principles which take into account the contradictions inhering in the previously proposed hypothesis.

*"A Man Seated in His Study,"
pen and wash in bistre
(c.1640-45).*



Photo © R.M.N., Louvre

presumes to recognize these terms as if they had been given *a priori*. On the basis of such presumptions, such as those presumed by an Aristotle or Immanuel Kant, it is decreed that all acceptable theorems are derived by deduction from those initial presumptions.

The Socratic method of Plato proceeds in a directly opposite direction.

With Plato, one begins with propositions being entertained as prospective theorems, and then follows the approach taken in his dialogues, as a way of searching out discoverable fallacies in those underlying presumptions (definitions, axioms, and postulates) which are the adducible motives for those propositions which our prejudices have imposed upon us. The challenging of such prejudices, provides the user of Plato's method with what appears to be, for the moment, a refined array of mutually non-contradictory definitions, axioms, and postulates; this refined array, taken as a whole, is an *hypothesis*. For example, what was traditionally taught to modern students as Euclidean geometry was such an hypothesis.

The method of Plato starts with the recognition that all propositions, and, therefore, all hypotheses, including what were previously the most refined ones, must include some significant, axiomatic fallacy of some kind. In the method of Plato, we show that a sufficiently rigor-

ous such exploration of previously accepted sets of definitions, axioms, and postulates, leads us to what are empirically contrary, mutually contradictory results. If that discovered contradiction is itself empirically truthful up to that point, then there must exist some previously overlooked, or unknown principle—some new definition, axiom, or postulate—which, as correction, resolves that contradiction. The result of a validated such correction represents a radically new set of definitions, axioms, and postulates: in other words, a new hypothesis.

Truth, then, does not lie in any one choice of hypothesis. Such deductively consistent hypotheses are merely conditional upon such tests; there is no certainty of settled truth in any method of deduction. Truth lies in the always radically revolutionary process, by means of which valid new principles are generated, new principles which take into account the contradictions inhering in the previously proposed hypothesis. The method by which such new principles are ordered, in overcoming successively ordered contradictions, thus represents a notion of *higher hypothesis*, the latter a verifiable ordering principle which is demonstrated, repeatedly, to generate successively improved hypotheses. That notion of higher hypothesis coincides with the domain of *reason*, a domain above and beyond any mere logic, the domain within which truth and true knowledge lie.

Riemann's 1854 habilitation dissertation supplies us the exemplary case.

Given any physical hypothesis, eliminate all *a priori* notions of space, time, and other dimensionalities. In place of dimensions, employ principles which are each based on a crucial-experimental validation. These n principles, then constitute an n -fold manifold of physical principles: principles of physical space-time.

Next, given the case, in which experimental evidence shows a persistent error of magnitude in what had been earlier assumed to be a valid n -fold manifold.⁵⁰ Take the case, that there be no experimental error internal to the n -fold manifold as defined previously. In the case that the self-contradictory evidence is crucially valid, there must be some previously overlooked, hidden physical principle, which accounts for the fact that an otherwise empirically validated n -fold manifold is contradicted by some adducibly persistent, crucial margin of error. The task posed is twofold: first, to discover a principle which resolves this contradiction, and, second, to provide a crucial-experimental demonstration of both the validity of the new principle and the factor which must be measured as the margin of difference between the characteristic of the n -fold and its replacement, the $(n+1)$ -fold manifold which supersedes it.

The lesson of Plato's *Parmenides* haunts us once more. In such a physical geometry, neither space by itself, nor time by itself, have an *a priori*, self-evident existence. Space exists only as an empirically defined physical prin-

ciple; the same is the case for time. All other notions of dimensionality are subject to the same condition.

Such is Plato's dialectical method. Instead of fashioning an hypothesis from sheer prejudice, or other presumptions, use the Socratic method of dialectical negation, to locate errors of presumption, and to adduce principles which not only account for the falsity of earlier presumptions, but which are demonstrably a guide to the needed corrections.

The exemplary case is Cusa's discovery of a rigorous, superbly elementary proof, that, by the standard of Eratosthenes' "sieve," π is what mathematician Georg Cantor later defined as a transcendental magnitude, rather than merely a Classical-Greek, irrational magnitude, as Eratosthenes' contemporary and correspondent, Archimedes, had imagined it to be.⁵¹

To indicate the connection between Plato's dialectical method and Riemannian manifolds, compare the earliest known, reasonably valid forms of ancient sidereal-solar astronomical calendars.⁵² From this, derive a relatively simple type of multiply-connected manifold.

The simplest quality of change defined in respect to solar-sidereal observation, from a position on the surface of the Earth, is the solar day: apparently a circular orbit. The next choice, for example, could be the solar year. The next choice, might be the complexity of the apparent movement of moon and sun. A next one, the equinoctial cycle. A next one, is the evolutionary change of the solar orbit, a phenomenon associated with the periodicity of Ice

50. Treat Wilhelm Weber's correction and proof of Ampère's notion of a *longitudinal*, or *angular* force as an example of this. See Laurence Hecht, "The Significance of the 1845 Gauss-Weber Correspondence," *op. cit.*

51. See Lyndon H. LaRouche, Jr., "On The Subject of Metaphor," *Fidelio*, Fall 1992 (Vol. I, No. 3). See also *Nicolaus of Cusa on Learned Ignorance*, *op. cit.*, pp. 52-53, and "On the Quadrature of the Circle," *op. cit.*, Compare Archimedes, "Measurement of a Circle," and "Quadrature of the Parabola," in *The Works of Archimedes*, ed. by T.L. Heath (New York: Dover Publications), pps. 91-98, 233-252. See also Lyndon H. LaRouche, Jr., "The Ontological Superiority of Nicolaus of Cusa's Solution Over Archimedes' Notion of Quadrature," *Fidelio*, Summer 1994 (Vol. III, No. 2), pp. 31-34.

Contrast the popularized, academic delusion, which, like Professor Felix Klein, insists that the proof of the transcendental quality of π was first established by the successive work of Hermite and Lindemann. Note, that Klein himself traces the hereditary origins of Hermite's and Lindemann's argument to what was in fact an outright, *petitio principii* hoax by Berlin-based avowed enemy of Gottfried Leibniz, Venetian asset Leonhard Euler. Euler's argument against Leibniz's monadology rests upon Euler's arbitrary adoption of an axiom which presumes perfect continuity of linear extension, down to the smallest infinitesimal. Euler's proof, and the derived arguments of Hermite, Lindemann, and Klein, is thus a product of Euler's assertion, as an axiom of his argument, of the very conclusion, against Leibniz, which he professes to have proven.

52. As a result of the ideological fanaticism of the British Israelite

movement, the growth of political influence of Venice's clone, the Anglo-Dutch financier-maritime oligarchy, wild-eyed hoaxsters such as the London-based Victorian archeologists degraded archeology in general virtually to a search for the exact street address of Abraham in ancient Ur. As a result of this British cult's influence, the most generally accepted doctrines respecting history, physical science, and culture generally were pivoted upon the notorious Bishop Usher's dating of Creation to an event located in Mesopotamia circa 4004 B.C. One consequence of this British Israelite hoax, is the popular delusion which dates astronomy from the lunar obsessions of early Mesopotamia. Similarly, although it is readily demonstrated that the earlier civilization in Mesopotamia was the Dravidian colony known as Sumer, the British Israelites insist that Sumer was founded by Semites. The latter dogma continues to be asserted by both fanatics and their dupes, a teaching deployed in the interest of dating Creation from the place where God's foot stood in 4004 B.C. In fact, known solar-sidereal calendars are dated to no later than Vedic calendars from between 6000 and 4000 B.C.; evidence of still more ancient solar-sidereal calendars is known. The related fact is, as the Greek Herotodus reported, that the ancient cultures of Sumer, Sheba (modern Yemen), Ethiopia, and Canaan, were colonies of an ancient Dravidian culture which dominated the maritime regions of South and Southeast Asia, probably long before the close of the last Ice Age. The modern cultural heritage of India and Southeast Asia, as in the case of Thailand, for example, is predominantly a result of interactions among Dravidian, Vedic, and Chinese cultural interactions over millennia.

Ages. And, so on. Kepler's adducing of the elliptical orbits from observation of Mars, is an example of this same approach.⁵³

The universe, as far as we know it, is a wonderful, vastly, perhaps endlessly complex process. This complexity begins to be transparent as we attempt to define a relatively universal frame of reference, a reference with which to compare the depicting of some motion observed from a fixed point on Earth to the same motion represented by a more universal standpoint. As we increase the number of interacting orbits considered, and include sundry other kinds of regular, semi-regular, and other pulsations, we recognize that there could be no point in the universe so smally infinitesimal, that any interval of action could be linear. The universe is, thus, Leibniz's domain of a calculus of non-constant curvature.

That considered, we shift our focus from orbits and analogous periodicities and quasi-periodicities, to physical principles. We view the universe as a multiply-connected manifold of such physical principles. This is Bernhard Riemann's domain, in which we are supplied no estimate of foreseeable limits to the number of such colligating principles. We abandon the notions of "dimensions" in their naive sense, in favor of an orderable accumulation of successive physical principles.

Looking at this matter from Riemann's standpoint, we have a useful way of defining a transfinite architecture for scientific progress. For this purpose, scientific progress, as envisaged by Nicolaus of Cusa,⁵⁴ is expressed in chiefly two ways.

In the first approximation, the experimental physical science of Cusa obliges us to recognize and prove outright fallacies, such as the fallacy of Archimedes' argument on the squaring of the circle, in previously enshrined scientific opinion.⁵⁵ In the next approximation, we are presented with more interesting challenges. In the leading features of the internal history of modern scientific progress since Cusa, we have to consider something other than pure and simple fallacies. In the best scientific work of discovery, we have to consider the cases, in which a particular colligating set of principles is in error only because it lacks some addi-

tional principle. On this account, at some point in the history of scientific progress, physics, for example, exhibits to us some newly discovered, persistent margin of empirical error, which we must suspect to correspond to existence of some previously unrecognized, additional physical principle. Thus, physical science assumes the form of a process of transformation from a valid n -fold manifold of physical principle, to a higher one of $(n+1)$ -fold manifold.

In the latter type of case, we are presented with the case in which some physics, for example, was truthfully constructed, yet is shown, now, to be also untrue. This is a paradox of the type appropriately recognized as a metaphor. The discovery of the relevant new principle, together with the crucial experimental proof of that principle, is the reality which corresponds to that metaphor. So, in physical science, we give the name of the discoverers of the paradoxes and their solutions to the paradox and its solution, just as we give the name of a composer and of the relevant metaphor to a Classical-artistic composition.

In physical science, it is such experimental solutions to well-defined such paradoxes, which define *knowledge*, as distinct from mere learning. One knows a principle only if one has replicated the relevant paradox and its corresponding, discovered principle of solution. Knowledge is the accumulation of such replications of validated discoveries of principle. That is to emphasize, that knowledge lies in the succession of valid discoveries which have been mastered by the student, for example; what one may have "learned" in other ways, does not constitute knowledge. Merely passing written and oral examinations, does not measure knowledge, but, usually, measures only the inferior mental condition of mere learning.

This is precisely parallel to the case we identified for Classical artistic composition. The composition does not lie in the details produced, but rather in the process of development which lies "outside" and above anything so produced. Just so, the paradoxes which force the audience to recognize the need for a higher principle of change, shift the location of the drama (for example) from the literal features of the composition, to the principle of ordering which underlies the succession of changes in state, those transformations of hypothesis, which is the unity of the entire composition.

To restate the crucial issue once again: Reality does not lie in a deductive form of representation of experiences as those phenomena are situated in terms of a fixed hypothesis. Reality lies in that higher authority which exists above any one hypothesis, which exists in the ordering of a valid succession of hypotheses. The reality experienced in that succession, is the "substance" of the experience of this succession. That is the crucial ontolog-

53. For Kepler's determination of the elliptical character of the Mars orbit, see Johannes Kepler, *New Astronomy*, trans. by W.H. Donahue (London: Cambridge University Press, 1992). The method is discussed in Jonathan Tennenbaum and Bruce Director, "How Gauss Determined the Orbit of Ceres," *Fidelio*, Summer 1998 (Vol. VII, No. 2).

54. Cusa, *loc. cit.*

55. The proof of the transcendental character of π is a perfect model of this kind of proof of existence of a necessary, new physical principle.

ical issue of physical science; there lies the efficient inter-connection between the ordering of realized scientific progress and the development of the principles of Classical culture.

At this point, on this account, a deeper problem confronts us.

The more thoroughly we attempt to exhaust the lessons of physical scientific progress as such, such as a Riemannian representation of such progress, the more stubbornly a certain perplexity confronts the scientific thinker. There are two leading issues. First, what is the nature of that creative process, by means of which the mind generates valid solutions of principle for crucial experimental-scientific paradoxes? Second, what is the active ordering-principle associated with such valid discoveries of principle? If we reflect carefully on what these considerations imply, we must recognize that there is no adequate formal-scientific answer for these two questions. This leads us to discover a second manifold, an m -fold manifold of principles of Classical-artistic composition. This m -fold manifold expresses the passion, the driving and directing force which underlies and otherwise governs both scientific and artistic progress.

4. Order in Physical Science

Since Plato's dialogues, the leading intellectual currents of European civilization have focussed upon the implications of a certain central paradox, a central metaphor, as the central issue of scientific principle respecting our universe taken as a whole. From the root supplied by Plato's emphasis upon a parallel between the characteristic of living processes and principles of musical composition, Plato, Luca Pacioli, Leonardo da Vinci, and Johannes Kepler, among others, have emphasized two qualitatively distinct kinds of ordering within the physical universe: those orderings cohering with the Golden Section, and those which do not. Living processes, in particular, cohere with the former, but, as Kepler emphasized, also ostensibly non-living systems, such as the Solar System as a whole. For our purposes, we associate non-living systems generally with entropic processes, and living ones as the most exactly paradigmatic expression of not-entropic processes in general.⁵⁶

Perhaps the most efficient approach to conceptualizing those distinctions, is the case of the not-entropic phys-

ical-economic process. There is nothing to be properly viewed as accidental in this view of physical economy. The central practical question of all knowledge, is the question: Is man's knowledge of the physical universe, merely his conceit, or is there some objective proof, by means of which one kind of thinking corresponds, demonstrably, to the lawful ordering of our universe, and a contrary kind of thinking does not? In this matter, there ought to be no objection to the proposition, that the test of human knowledge is posed by the question: Does a certain method of transformation of human knowledge result, unquestionably, in a process of increase of mankind's mastery of the universe?

The general form of the answer to this question, appears at the moment, we shift the issue of mastery, from focus on the practice of the particular, isolated individual, to measuring the increase of the human species' power to increase its *per-capita* power over nature. This increase must be defined with the attached condition, that the potential relative population-density is also increased by this change. To express this connection in a rigorous way, we must introduce the notion of the progressive ordering of higher hypothesis and increase of mankind's potential relative population-density.

We are confronted, then, with two distinct, but inter-dependent aspects of the human species' increase of its potential relative population-density. One, is the relationship of the human species to the given biosphere within which it is presently, or recently located; the other, is the actions of mankind affecting the increase of potential of the biosphere to serve as a foundation for increase of mankind's potential relative population-density. The simplest way to force attention to these combined considerations, is to look at such challenges of the coming century as colonizing another planet, or even terra-forming it.

Ask ourselves: Given, the total set of preconditions, including the biosphere's current state of development, upon which we must depend for the *per-capita* and *per-square-kilometer* perpetuation of the total current output of our species. What must we produce, to maintain at least a continuous supply of that quality and quantity of consumption?

Situate the notion of potential relative population-density, *per capita* and *per square kilometer*, in respect to investment in maintaining and improving the output of our species, *per capita* and *per square kilometer*.

To this purpose, we must place emphasis upon the demographic characteristics of the population. Rate of growth of the population, is a consideration. Consider life-expectancy, examined for the cost of developing a new individual, as against the loss to society from high rates of infant mortality and lowered life-expectancy in general. For example, consider the

56. E.g., consider Vernadsky's notion of the noösphere.

Basic 'Anti-Entropic' Physical-Economic Constraints

To state the most characteristic feature of a physical economy in the terms of approximation afforded by textbook thermodynamics, agree to define the *necessary* physical costs (input) of an economy's level of productivity (including administration), under the heading of "energy of the system," and to consider the not-wasted, remaining portion of output, as "free energy." "Energy of the system" includes both current new input, and the net replacement cost (in physical terms) of that portion of functionally significant physical capital, the which is stored within the economic process. The latter, stored, net (physical) capital investment, includes basic economic infrastructure, improvements in the physical-economic fertility of land, agriculture, industry, and a restricted portion of actively stored total services: in the form of education and health of the members of households, and science and technology potential of the labor force and enterprises.

Express these, in first approximation, in my own changes in definitions for the symbology for the terms which Karl Marx adopted from his British teachers. Let **V** signify input/output of the labor-force, **C** signify required materials input for the entire economy (functionally defined), **F** net (functional) physical capital, **d** necessary deductions for government and administration otherwise, **S** output in excess of *energy of the system*, and **S'** *free energy* (after deductions for

both necessary administration and waste). Be reminded: read these symbols as defined here, not the Marxist reading. Prepare the way by describing the constraints to be examined, as follows.

The general constraints are:

1. The potential population-density of the economy (as a whole) shall not be decreased, and the demographic characteristics of the population as a whole shall be improved.

2. The inputs and outputs of the "market baskets," and of their contents, shall be increased in absolute (physical) terms, for households, for performance of infrastructure, for agriculture and related, for industry, for education, for health care, and for science and technology services. These increases shall be measured in market-baskets, also as contents of market-baskets, and in terms of *per-capita* (of labor-force), households, *per-square-kilometer* of land area.

3. The ratio of "free energy" to "energy of the system," so defined, shall not decrease, but the relative energy of the system (*per capita* of labor-force, *per* household, and *per* square kilometer) shall be increased through reinvestment of "free energy" generated.

These seemingly paradoxical requirements may then be expressed as:

Population-density (adjusted for demographic parameters):

$$|(F) P_1| \leq |(F) P_2| .$$

"Free Energy" Ratio:

$$\left[\frac{S'_1}{(V_1 + C_1)} \right] \leq \left[\frac{S'_2}{(V_2 + C_2)} \right] .$$

"Energy-Density" Ratio (*per-capita* of labor force):

$$\left[\frac{(V_1 + C_1)}{F_1} \right]_1 \geq \left[\frac{(V_2 + C_2)}{F_2} \right]_2 .$$

But, the physical content of market-baskets (M) for productive functions, *per capita*, for labor-force:

$$(M_v)_1 \leq (M_v)_2 , \quad (M_c)_1 \leq (M_c)_2 .$$

This set of "market-basket" relations overlays a set of constraints defined in terms of divisions in output of employment of the total labor-force's operatives, letting **V** correspond to the operatives' ration of the total labor-force.* In this case:

$$\left(\frac{V}{C} \right)_1 \geq \left(\frac{V}{C} \right)_2 , \quad \left(\frac{S'}{V} \right)_1 \leq \left(\frac{S'}{V} \right)_2 ,$$

and

$$\left(\frac{S'}{V + C} \right)_1 \leq \left(\frac{S'}{V + C} \right)_2 .$$

—from "The Essential Role of 'Time-Reversal' in Mathematical Economics," *Fidelio*, Winter 1996 (Vol. V, No. 4).

* See, *So, You Wish To Learn All About Economics?*, *passim*. [Footnote 8]

quality of development of the physical-economic investment by the society in scientific and technological potential of the new individual as a desired improvement in the physical-economic demographic characteristics of the population.

Consider some elements of basic economic infrastructure: transport, water, and energy. To the extent we can slow down the rate at which water, originating as rain-

fall, is emptied into the seas and oceans: in how many ways can the useful turnover of that water-flow be increased? Can we increase, thus, the effective amount of water available *per capita* and *per* square kilometer? How can we better manage forests, fields, and so forth, to increase and effectively maintain water-tables, streams, and create weather-systems which moderate weather and increase the amount of rainfall regenerated from evapo-

ration? How can we better develop water as a means of relatively low-cost transport, while also using the same water for other purposes? Similarly, how can we increase not only the raw energy supplies *per capita* and *per square kilometer*, but how might we also increase the effective energy-flux density deployed *per capita* and *per square kilometer*, for the benefits expressed in the environment generally, and in *per-capita* productivity?

As we increase the range of applied scientific principles and derived technologies, we increase the complexity of the division of labor. We also increase the level of education required to produce a population which has assimilated a relatively higher level of scientific and artistic principles. This requires an increase in the number of years, prior to biological maturity, devoted to education and related matters; that expenditure for education and Classical culture, is a part of the necessary cost of increasing and maintaining the potential productivity of the population, *per capita*.

For the simplest representation of the result, we divide the physical-economic output of society into three categories: Total useful output, cost of maintaining that magnitude and rate of total output, and the ratio of total output to total required inputs, the latter including the necessary maintenance and further development of basic economic infrastructure. To maintain a culture, is therefore expressed in the following general constraints. The technological level must be raised; total output *per capita* and *per square kilometer*, must increase; yet, the ratio of total output to total required inputs, must increase; meanwhile, the total required inputs, *per capita* and *per square kilometer*, must also increase. *This set of constraints typifies a not-entropic process.* This physical-economic “model” must be used to supply a competent, rigorous definition of the very terms “not entropic,” or “anti-entropic” [SEE Box, page 20].

The physical-economic condition under which that not-entropic requirement is satisfied, expresses the result of applying the creative-mental potential of the species to man’s increasing power over nature. The creative process so realized as applied advances in knowledge, expresses the lawful composition of our universe. That is, the condition under which mankind’s willful actions, to proceed from a previous to a higher quality of hypothesis, satisfy that not-entropic requirement, expresses the power of our species to command such obedience from the universe in general. *In other words, the universe as a whole is lawfully non-entropic.* In competent science, no “law of universal entropy” is tolerated.

Consider two additional implications of this physical-economic expression of “anti-entropy:” first, the form in which anti-entropy is expressed in terms of a Riemannian

n-fold manifold of physical principles; second, a similar expression in Classical art-forms. The simpler case is the straight realization of an *n*- to (*n*+1)-fold progress in discovery of scientific principles as realized technological progress in the productive powers of labor. The second case, is that of increasing density of discovered and realized Classical-artistic principles. In both implications, anti-entropic action is of the form and content of $F[(n+1)/n]$, or $F[(m+1)/m]$. It is through this action upon the universe by the creative powers of the individual human mind, that human activity realizes anti-entropic growth, and related progress, in mankind’s relationship to the universe at large.

Clearly, in addressing the notion of anti-entropy in a more general way than is required by the subject of culture as such, we could not overlook two other cases. First, obviously, we must take into account those characteristics of life as such, which lie entirely outside entropy, as these are expressed, for example, in the development of the biosphere even before the existence of the human species. Second, we must go further, as Plato, Pacioli, Leonardo, and Kepler did, to recognize that the same principle of anti-entropy underlies the deeper principles of ordering in the universe at large.

Pending that attention to these latter two, other expressions of anti-entropy, the crucial fact on which to focus here, is that human creativity occurs solely within the bounds of the individual mental-creative processes, and does not occur as a product of interaction among those individuals. That is to stress, that all evidence of that creative mentation which generates either a validated new physical principle, or comparable principle of Classical artistic development, occurs only within the individual mind. Such discoveries of principle can be spread in society, but only through replicating the original act of discovery, one mind at a time.

The special fact to be stressed here, is that Classical artistic creativity, as typified by Plato’s notion of the *idea*, is the only case in which the creative powers of the individual mind are applied directly to those creative mental processes themselves. It is the study of the progressive development of those social processes associated with progress, in terms of Classical-humanist art-forms which, alone, provides the human mind access to comprehension of the potential of the individual’s human creative processes themselves. Therein lies the manifestly superior position of Classical art-forms over all other forms of knowledge. The treatment of education from the standpoint of Schiller and of his friend Wilhelm von Humboldt, represents, thus, the highest expression of statecraft, the development of those young minds which must supply future progress in statecraft.

5. Education and the Tragic Principle

The essential issue of an individual's personal morality, is posed by the question, whether personal self-interest is located as the fascists such as Nazi existentialist philosopher Martin Heidegger did, in the pettiness of day-to-day and similarly small-minded personal and family responsibilities and gratifications, or, rather, in terms of the outcome one seeks for one's life, from birth to death, taken in the totality of that life's outcome for the past and future existence of the human species in general. This requirement must be read as a life conducted to supply an enhanced role for one's participation in one's culture, one's nation, a life lived as the instrument through which the universal outcomes of one's life are realized.

Restate and amplify that crucial issue of morality as follows. The essence of the individual's life, is the simple fact, that each among us is born and will die. On this account, the fundamental self-interest of each individual is located in the continuing outcome of that mortal life, an outcome which reverberates far beyond the time prior to one's birth, and after one's demise.

The corresponding peculiarity of that individual's self-interest, in absolute distinction from the nature of the beasts, is that our effect upon the importance of the individual for the human species as a whole, is located in the value for all mankind of those Platonic *ideas* which represent the accumulation of valid, discovered principles of the universe which we have assimilated from our forebears, and will thus, and otherwise transmit to our posterity. These ideas include not only the n -fold manifold of physical science, but also the m -fold manifold of cultural principles.

That view of ideas, is the basis upon which the thoughtful persons asks, "What is the outcome of my having lived? Is it, perhaps, the deeds I do, or the pain or pleasure which I experienced? Or, is it something less mortal, less perishable than mere deeds, mere acquisitions, mere pleasures?" What endured when Classical Greece died?

Plato endured.

What was enduring was the efficiency of those *ideas* corresponding to validatable discovery of principle. When we relive the valid discoveries of those who have gone before us, we perpetuate the good they have bequeathed to us, and we relive in ourselves that which is enduring, which they have given to us in this way. Thus, we, the bearers of the gifts of knowledge of *ideas* from past generations, may not only perpetuate the precious ideas passed down to us from earlier generations, even

after the death of those ancients, but we may add something valid and new to that stock of principles to be transmitted to the benefit of the future. In such ways, we may impart living immortality to the gifts of the past, and become also a necessary part of that which follows the end of our mortal existence.

Persons who meet that standard, become *world-historical beings*. They never die, because that which is essential in their having lived, lives on as the benefit which ideas from the past have bequeathed to the future.

Consider the pupil from the elementary and secondary grades of education. Consider the pupil's education from the standpoint just summarized.

Is it important that the student learn in school? Or, is it *relatively* unimportant? Know, that learning is almost nothing; know that knowing is almost everything. The essence of morality in all education of the young, is the replication of the act of discovery of valid ideas. When the student has generated, or replicated the act of a validatable discovery of principle, he or she *knows* that principle, and is able to transmit it to others, not as mere learning, but, rather, as knowledge for practice. A moral educational institution, is one in which the pupils relive the experience of knowing valid principles, both those principles relived, as discovery, from the past, or added to the stock of such principles. That connection to *ideas*, rather than mere learning, locates all of us who follow the path of such ideas, both as students and adults, as a continuation of the history of ideas, as a person embodying the past in acting to create the future.

The order in which notions of principle are generated, is the procession of history. Only persons who locate their personal self-interest and identity in that kind of relationship to ideas, are world-historical individuals.

Consider again the difference between the definition of "morality" in the mouth of a bestialized existentialist, such as a follower of Nazi philosopher Martin Heidegger, or his depraved clone, Jean-Paul Sartre. The existentialist has merely learned; he, or she lacks that notion of morality natural to a world-historical individual. That existentialist, that follower of Thomas Hobbes, John Locke, or Immanuel Kant, has no true morality. It is the continuing outcome of my having once lived, which is the essence of the known self-interest of the world-historical individual. My pleasures, my pains, my losses, my gains, are as nothing compared to what I gain, or lose, in securing, or failing to serve the immortal meaning of my world-historical existence.

Situate Platonic ideas as existing, ontologically, within the domain of *higher hypothesis*. Reality is, thus, that process by means of which man's mind is transformed from relatively lower, to higher states, as from the state of

a relatively valid n -fold manifold of physical science, to a higher one, $(n+1)$ -fold. Or, in respect of moral principles, from m -fold, to $(m+1)$ -fold. The process of change, in Heraclitus' and Plato's sense of *change*, is the location of the continuing substance of change, from relatively lower to higher states.

In this view, every person who meets the moral requirement of being, effectively, a world-historical individual, dwells in the eternity of change. In other words, in the brief time we live and act as world-historical individuals, we exist forever, in *the simultaneity of eternity*. So, each of us must be judged. So, each of us must judge himself or herself. So, our conscience is to be ruled in all matters of moment-to-moment behavior; so, our conscience must situate our notion of our primary self-interest, our interest as efficiently located within the simultaneity of eternity.

That view, which locates the fundamental self-interest of both the individual person, culture, and nation, as its world-historical self-interest, is the standpoint from which Classical tragedy is to be composed, performed, and assimilated; this is the standpoint of Aeschylus' *Prometheus Bound*, and the tragedies of Shakespeare and Schiller. What is the world-historical interest of a Prometheus, enduring immortal torment, that he might keep the secret, and thus ensure the self-induced doom of those common enemies of the Creator and mankind, the ruling oligarchy of satanic Zeus' Olympus? What is the world-historical duty which Hamlet, as Prince of endangered Denmark, must adopt, overriding all merely personal issues to the end of serving that duty? What were the world-historical duties variously shirked by Posa, Don Carlos, and King Philip? It is that world-historical view which must excite our passions to do good, to act as, and to be a world-historical person rooted in the simultaneity of eternity.

Consider a more general expression of the world-historical issues so defined.

Until the revolutionary changes introduced by the Fifteenth-century Council of Florence, and by the ensuing reconstruction of France under King Louis XI, approximately ninety-five percent of mankind, in all cultures, lived in a condition of degradation to the status of virtual human cattle. The society within which these "human cattle" were herded, was a society ruled by an oligarchy. This oligarchy was composed of a blending of several types: a landed aristocracy, such as that of feudal Europe; a financier aristocracy, such as that of Venice or today's London; or an administrative oligarchy of the bureaucratic type. The definition of law under such oligarchies, was, predominantly, a privilege of the ruling oligarchy, an oligarchy which possessed the society and its people, as a feudal landlord of Dr. François Ques-

nay's evil type owned land, cattle, and serfs.

All forms of oligarchical society, including the principle of western feudal Europe, as of Byzantium, were, and are essentially evil. The essential evil in all forms of oligarchical society, is the denial of the individual's right to participate in the rule of society by the process of development of valid ideas. In other words, the essence of evil, is the crime of the very mere existence of satanic Zeus' Olympian oligarchy, or, Olympus' surrogate, the cult of Apollo (Apollo-Gaea-Python-Dionysus). The essence of evil is the denial of the right to be developed, and to become a world-historical individual, a participant in the simultaneity of eternity.

At this juncture, a crucial point must be interpolated. U.S. President Polk was an evil man, and his war against Mexico was a crime against the vital interests of the United States. On these matters, U.S. Representative (and later President) Abraham Lincoln was consistently right; but, on the larger issues of culture, Henry David Thoreau was a wicked man. There was no more evil doctrine ever concocted, than the myth of "the noble savage," or the related notion of the nobility of "the simple life."

Indeed, the role of the British agents, and agents of influence, Philippe Egalité, and the Jacobins Danton, Marat, Robespierre, Saint-Just, *et al.*,⁵⁷ exemplifies the evil which shocked such German apostles of liberty as Friedrich Schiller. The instrument which these sundry British agents and assets mustered to destroy France from within, was the rabble called into Paris for such enterprises as the storming of the Bastille, for Philippe Egalité's raid on Versailles, and the Jacobin Reign of Terror.

Although the philosophical basis for the overcoming of oligarchical society was supplied by Plato *et al.*, the actual transformation was the cumulative result of Christianity, the ministries of Jesus Christ and the Apostles John and Paul most notably. The obvious root of the modern notion of freedom and equality, is the principle first established by Christianity, that all persons are equally made in the image of the Creator, with no preference to one or another national, cultural, or ethnic discrimination allowed. Notable, is the fact that this work of Christianity was undertaken within the scope of a Hellenistic Mediterranean culture which was derived from the Classical Greek of Plato and his influential Academy. The Apostles

57. Danton and Marat were both directly agents trained and deployed, from London, by the head of the British foreign service, Jeremy Bentham. Philippe Egalité was an agent of the pro-London faction, and was the organizer of that farce, known as the storming of the Bastille, which Philippe organized, armed, and led as an election-campaign stunt on behalf of the Swiss banker (and father of the the evil Madame de Staël), Jacques Necker, who had just earlier bankrupted France on behalf of London's strategic interest.

John and Paul made that cultural heritage of Plato the medium in which the Christian mission was continued. It was these Christian Platonic conceptions, typified by the role of the Augustinian tradition, which became the leading edge of the centuries-long struggle out of which the Fifteenth-century Golden Renaissance emerged.

That struggle, typified by the work of Abelard of Paris, of Frederick II Hohenstaufen, of Dante Alighieri, of Petrarch, of teaching orders such as the Brothers of the Common Life, and so on, was a struggle to establish a form of society based upon the nation-state, rather than some oligarchical classes which placed themselves above accountability to the idea of a nation as belonging to its people, rather than some intrinsically oligarchical institution placed above the people. This idea of the nation-state republic had nothing to do with the perverted notions of “democracy” associated with John Locke, but rather, the accountability of the ruling institutions of society to the principle of universal truth and justice, the principle that all persons must have the right to develop and live as world-historical personalities.

There are two great evils predominating in the known existence of our species. One, is the evil of oligarchism, as typified by the administrative oligarchies of ancient Mesopotamia and Rome, the feudal aristocracy of Europe, and the financier oligarchy of such institutions as the Delphi cult of Apollo, Venice, and London today. The other great evil, is the moral degeneracy deeply imbued in those subject populations whose moral condition and impulses have been degraded, by oligarchical rule, into the relative bestiality of human cattle. The practical ordinary person may have the nobler impulses of the human individual, but, under oligarchical traditions, the circumstances of practical life cause that person to be self-dominated by relatively brutish, “practical” considerations. Therein lies that evil among the “ordinary people,” by means of which, usually, oligarchy preserves its control over the popular will.

The great issue of culture, is the task of freeing the majority of the population from that moral and intellectual self-degradation which tradition imbues within prevailing popular opinion.

The issue of individual human freedom, is not the issue of “democracy,” not democracy as the moral degenerates of today’s National Endowment for Democracy misuse the term, not like degenerates such as John Dewey, nor as Nazi-like existentialists such as Schopenhauer, Nietzsche, Heidegger, and Jean-Paul Sartre generally define democracy. The issue is the right of every newborn child to be developed in a way which represents access to, and imposition of the rule of truth and justice, to ensure that quality of progress in the human condition

which meets the need of the individual to be a world-historical personality, to be a resident of the simultaneity of eternity. This means the obligation of society to direct the shaping of the policies of practice of the society to bring about progress in such upward directions of individual world-historical participation in ideas.

The essential feature of persons who lack freedom, is their emulation of the condition of human cattle. They are conditioned to respond to what human cattle would consider the matters of personal self-interest, the motives of the “Seven Deadly Sins,” the motive of my narrowly defined personal and family self-interests, and of society as a whole, either a poor second, or, like the typical existentialist, virtually not at all. It is their attachment to those baser motivations which constitutes the shackles upon the self-enslaved individual degraded to a moral condition like that of virtual human cattle. These are the motivations of the Ku Klux Klanner and similar Jacobin rabble. For such human cattle, the definition of “freedom to choose” is nothing other than those depravities by which they are self-enslaved into the moral condition of virtual human cattle. It is by such libertarian’s moral self-debasement, pursued “in my personal interest,” or, “my freedom to choose,” that the popular masses usually choose the pathway to their own self-debasement and oligarchical enslavement.

It is these world-historical concerns which define morality and true Classical culture. It is those principles of culture, of social and political life, which correspond to advancement of the condition of the individual and society to higher states, to relatively more not-entropic states, which represent the m -fold manifold of culture. The relationship between the m -fold and n -fold manifolds, is that the social requirements of progress in the former respect must direct the practical requirements of the latter respect.

The essence of freedom, is the right to define oneself as a world-historical individual, rather than some self-debased libertarian fool.

The essential difference between the raw, half-educated human being, and what Schiller identifies as “the beautiful soul,” is located in the kind of change in the adolescent personality (for example) accomplished by aid of the kind of Classical-humanist education upon which stress is placed here. The point at which the individual passes over from a raw, morally semi-literate brute, into a “beautiful soul,” is the point at which the student (for example) makes a qualitative transition, from selfishness to the moral impulses of an efficiently conscious world-historical personality. It is at the point, that the moral imperative of judgment, of personal commitment, is located entirely in a sense of devotion to one’s world-his-

torical soul. That transformation in the individual's sense of personal, world-historical identity, is the proper object of education; that transformation represents the threshold at which the immature adolescent (of all ages) is superseded by spiritual metagenesis into emerging as a true, world-historical citizen of a republic.

6. Classical Composition

The general moral requirement which sets Classical forms of artistic culture apart from, and above all alternatives, is the urgency of freeing human beings from the degraded state describable as "symbol-mindedness."

In plastic art, for example, Leonardo da Vinci exemplifies the duality of all Classical art. This duality is expressed, on the one side, as the obligation to subordinate the composition of plastic art to scientific truthfulness. On the other side, truth demands that we recognize the ironies, the metaphors, to which we must be led by any truthful scrutiny of principles of composition. Leonardo's revolutionary view of the vanishing-point, is an example of this ironical principle.⁵⁸ The role of two sources of light in Leonardo's *Virgin of the Rocks*, is a model of such metaphor.⁵⁹ The fact that Raphael Sanzio's *The School of Athens*⁶⁰ and *Transfiguration* must be conceptualized as the integration of the ambiguity of two (lower versus higher) viewpoints, is another.⁶¹

These ambiguities oblige the mind to abandon the literalness of sense-certainty, to subsume contradictory impressions by a resolving metaphor resident within the domain of ideas. In other words, to abandon deceitful sense-certainty, and also the intellectual and moral degradation expressed by the symbolic, or, related, "mannerist" views of art, in favor of truth.

Take the exemplary case of the Acropolis. Studies show that the Acropolis is the result of the unfolding of a single, coherent plan, always subsumed by the Classical Greek notion of Golden-Section-pivotted beauty in plastic art.⁶² In effect, the resulting construc-

tion has the quality of a single, if "polyphonic" act of composition.⁶³

Now, shift the focus: to, first, the principle of Classical tragedy, next, science in its aspect as a moral principle of art, and, finally, the substance which subsumes the process of development of Classical motivic thorough-composition, from J.S. Bach's development of polyphony, through the elaboration which Haydn, Mozart, Beethoven, Schubert, Brahms, *et al.* developed on the basis of the always-polyphonic foundation supplied by the later composers' study of Bach's work.

In their entirety, the dialogues of Plato, are exemplary works of Classical art. When the Homeric epics and the related Classical Greek tragedies are taken as the standpoint of reference for the entire body of Plato's collection of dialogues, we are able to trace the modern tragedies of Shakespeare and Schiller from this route, and also situate, similarly, the role of Plato's and other Classical-Greek models in the late-Eighteenth- and early-Nineteenth-century efforts to revive the Classical tradition in poetry and drama. The most fruitful standpoint from which to view this entire Classical tradition, from ancient Greece into the Nineteenth century, is the standpoint of historian-poet-tragedian Schiller's intended audience, the audience transformed into better people leaving the theater than had entered it a few hours earlier.

The essential feature of the Classical tragedy, and poem, is to induce the members of the audience to situate themselves as world-historical figures, as persons provoked into viewing the Classical performance as the prompting of the viewing of the subject-matter from a world-historical standpoint. In other words, the member of the audience must adopt a sense of world-historical responsibility for the real-life issues addressed by the drama or poem: "Could such characters not see the nature and consequences of their folly, for their society in their time? Must we, in our time, not learn the lesson of this, that we, in our time, must address the issues specific to our historical setting as those should have done in the historic specificity of the time shown on stage?"

To this end, it is essential that a Classical tragedy never be dressed up in modern costume, or otherwise presented

58. See Nora Hamerman, "Leonardo da Vinci and the Scientific Revolution of Renaissance Visual Arts," *Fidelio*, Winter 1993 (Vol. II, No. 4); Karel Vereycken, "The Invention of Perspective," *Fidelio*, Winter 1996 (Vol. V, No. 4).

59. Leonardo da Vinci, *The Virgin of the Rocks*, Louvre Museum, Paris. As noted by art historian D. Stephen Pepper; see Nora Hamerman, *op. cit.*

60. Raphael Sanzio, *The School of Athens*, Vatican Museum. Cf. Lyndon H. LaRouche, Jr., "The Truth About Temporal Eternity," *Fidelio*, Summer 1994 (Vol. III, No. 2), pp. 25-27.

61. Raphael Sanzio, *The Transfiguration*, Vatican Museum; see Nora Hamerman, *op. cit.*

62. On the Golden Section, see *Timaeus*, in *Plato: Vol. IX*, Loeb Classical Library (Cambridge, Mass.: Harvard University Press, 1975); see also, the translation commissioned by Lyndon H. LaRouche, Jr., "Plato's *Timaeus*: The Only Authentic English Language Translation," *The Campaigner*, February 1980 (Vol. 13, No. 1).

63. Pierre Beaudry, "The Acropolis of Athens: The Classical Idea of Beauty," *The New Federalist*, June 24, 1988 (Vol. 2, No. 24). Cf. Lyndon H. LaRouche, Jr., "The Classical Idea: Natural and Artistic Beauty," in *A Manual on Tuning and Registration*, *op. cit.*, pp. xix-xx.

If reason must be controlled by passions, rather than the dead hand of mere logic, what shall govern these passions? How do we distinguish, those passions and forms of passion which are irrational, from those contrary forms which are the seat and substance of reason? This is the issue of culture, the issue which places Classical culture morally and otherwise apart from and above all currently popular misconceptions of culture.



“St. Paul Preaching at Athens,” pen and bistre, wash (c.1637).

© The British Museum. Drawing recently re-attributed to van den Eccléhart, a student of Rembrandt.

as a timeless fable equally appropriate to past or present times.

The essence of history is the history of ideas. History is a record of variously forward, backward, and sideways movements in the course of mankind’s obligation to progress to the level of higher manifolds of both physical-scientific and moral practice. The sundry diverging and intertwining branches of the sundry, forward, sideways, and degenerative developments, are the skein of history, the skein of reality. The essential problem of historiography, as Classical tragedy exemplifies this, is to develop and maintain a sense of historic specificity in respect to the evolving mental, moral, and physical condition of mankind.

This sense of historic specificity, is best conveyed by Schiller’s work in his functioning as both historian and tragedian. Significant ideas, if they are true, are never mere fiction; they are matters of historically specific kinds of ideas as they are situated, as a matter of principle, with respect to specific historical problems. It is a keen sense of the actual history in which these ideas are situated, which enables an audience to adduce a truthful sense of the solution to the paradox presented by the Classical tragedy.

The same rule of historic specificity applies to the history, and prehistory of modern music. Without the influ-

ence of the Fifteenth-century Florentine *bel canto* voice-training, the development of Classical well-tempered polyphony, by J.S. Bach, would not have been possible. Without the indirect influence of J.S. Bach, as through C.P.E. Bach, Haydn’s pre-1782 contributions to musical development would not been possible. All of this is intermingled with the influences of the Italian schools, such as Alessandro Scarlatti *et al.*, on the musical development of pre-Nineteenth-century northern-Germany and southern-Germany music. Without the direct influence of J.S. Bach upon Mozart, Beethoven, *et al.*, from the early 1780’s onward, the post-1781 works of Mozart, Haydn, Beethoven, *et al.* had not been possible.⁶⁴ The entirety of the development of well-tempered, polyphonic forms of motivic thorough-composition, from Bach through Brahms, is a sequentially ordered process of successive developments of musical ideas.

64. Mozart participated in the weekly Sunday afternoon music seminars held at Baron Gottfried van Swieten’s home in Vienna, at which the manuscripts of Bach and Handel were studied and played. See Bernhard Paumgartner, *Mozart* (Zurich: Atlantis Verlag, 1945), pp. 300-308; Hermann Abert, *W.A. Mozart* (Wiesbaden: Breitkopf & Härtel, 1983), pps. 75-79, 117-165; David Shavin, “Mozart and the American Revolutionary Upsurge,” *Fidelio*, Winter 1992 (Vol. I, No. 4).

This process of development, in music, in Classical tragedy, in Classical plastic arts, has a metrical quality. There are sequences, if not always simple, linear ones, and there is also a sense of density. Both notions, of sequence and density, are to be compared with the notion of Riemannian and quasi-Riemannian notions of interacting m -fold and n -fold manifolds.

The Case of Music

In our focussing upon the case of music, here, we emphasize the importance of situating the particular development and performance of Classical musical composition in some medium whose primary content is nothing but sequence and density. This signifies that we must define a specific quality of impassioned idea which parallels and underlies the development of the composition and performance of Classical polyphony. This medium of passion is not hearing as such, but rather an idea of composition, addressed to the medium of hearing, but an idea superimposed upon hearing.

In music, certain things come naturally. Primarily, the human speaking-singing voice is naturally predisposed to what are termed “register shifts.” Although there are additional means which may be developed for the purposes of Classical-poetical coloration and dynamical expression of the human singing voice, natural registration is the dominant feature underlying both polyphony in general and the well-tempered polyphony clearly defined, in exemplary fashion, by Bach’s polyphonic works for both singing and instrumental voices combined.⁶⁵

The Florentine *bel canto* demonstrates the register-shifts most effectively. The effect of *bel canto* development, respecting the ratio of effort to what is heard, demonstrates the unique agreement of the *bel canto* voice-training with the natural potentialities of the voice. Similarly, voices which perform at a *bel canto*-determined $C=256$ survive longer, and better, than those burned out prematurely by overwork at artificially elevated pitches at, or above $A=440$, for example.

Then, once the ranges of the register shifts of the respective species of singing voices are determined, the mere task of employing a relevant counterpoint for such polyphony defines a primary approximation of a *bel canto*-determined well-tempered scale. At that point, a further refinement is required. The mind hears the inversion of any interval (e.g., C-E-G heard as G-E-C), to such effect that a simple Lydian scale is derived as an

inversion of a C-minor, $F\sharp$ pivotted scale. The effort to bring the intervals represented by the scale indicated by the inversion, with the scale which has been inverted, introduces a further degree of refinement of the well-tempering. Add, then, inversions heard across the polyphonic parts to the inversions generated within each part, and a further refinement is introduced. Never is a precise, algebraic frequency determined; the infinitesimal approximation is always a non-linear one.

In other words, if we continue polyphonic and related developmental considerations, there is no simply algebraic determination of a well-tempered scale, but rather a counterpoint-determined interval of *non-constant curvature*, just as Johannes Kepler’s approach, and Plato’s earlier, point in that direction.

Once we pass from the level of considerations posed by J.S. Bach’s *A Musical Offering* and *The Art of the Fugue*, into the generalized use of Lydian intervals by Mozart in the manner epitomized by his K.475 (and, later, Beethoven’s Opus 111), the span of Classical musical development, from Mozart of 1782-1783 through Brahms’ *Vier Ernste Gesänge* [*Four Serious Songs*], is opened up for us as a process of motivic thorough-compositional development, a process of increasing density, in the sense of Riemannian series of the n -fold type. When we combine the apparent, formal considerations with the implications of a new mode of song composition, by Mozart, Beethoven, Schubert, Schumann, Brahms, with all of the resulting interpretive considerations bearing upon the training and use of the singing voice, all Classical musical composition opens up for us through this “Rosetta Stone”-like medium of Classical song.⁶⁶

On this account, the musician must hear with two sets of ears. One is the ear of simple hearing; the other, the mind’s ear, which locates the driving passion of a composition in its developmental processes of change, the latter the ear which, like Wilhelm Furtwängler’s, sings “between the notes.” In music, for Pablo Casals, as for Heraclitus and Plato, nothing is constant but change. It is that principle of change which is the ontological foundation of all Classical art. In music, that foundation is located in the developmental process of constant change, which is the mind’s ear.

Thus, when we sing with Bach, Haydn, Mozart, Beethoven, Schubert, Schumann, Brahms, and so on, we are expressing the essence of that playful domain in which the ontological essence of all art, and all morality, are supplied the ontological medium best suited to their

65. See *A Manual on the Rudiments of Tuning and Registration*, op. cit., Chap. 2.

66. The exemplary case is the conflict between Goethe and Reichardt, on the one side, and Mozart, Beethoven, Schiller, and Schubert, on the opposing side. See *A Manual on the Rudiments of Tuning and Registration*, op. cit., pp. 202-203.

expression. On this account, all great Classical music is, in its own way, sacred music, the soul's yearning toward its rightful, beautiful place in the simultaneity of eternity, as Bach's great student, Ludwig van Beethoven, best understood this.

Truth in Statecraft

At this moment, the world—including the United States itself—is securely embarked on a journey to Hell, and, although the helmsman, including the current President of the United States, might deplore the ruin reaching to engulf us all, that President, thus far, has shown no inclination to reject the course of action, in economic policy, which ensures the impending destruction of both the United States and civilization as a whole. Although the President deplores the injustice and other sufferings into which the current direction of policy is carrying us all, so far he is unwilling to reject any of those of his own current policies which contribute to ensuring the worst result.

Take the case of the modern-day Henry Morgan, British privateer George Soros. Soros is outstanding among those whose predatory role has ruined such nations as Russia, and all among the nations of Southeast Asia, and much of East and South Asia otherwise. Yet, as in the case of looted Croatia, or Russia, the U.S. government repeatedly defends the role of Soros and his kind in destroying these nations—such as Malaysia, Thailand, Indonesia, the Philippines, etc., and in fostering those lunatic policies of the I.M.F. and others which ensure the homicidal ruin of most of those economies—including our own—which the U.S. government professes itself dedicated to defend.

How is such folly possible? How is it possible that a President manifestly inclined to deeds of good will, could act so stubbornly contrary to the vital interests of his own administration, his nation, and civilization as a whole?

Two interacting factors are among those prominently to be considered. One is the political pragmatism of a heavily besieged President. The second, leading, interacting factor, is the President's own laundry-list of chosen agenda items: globalization, democracy, "information economy," "achievements of the Golden Generation," etc. On this account, the prevailing, implicitly suicidal policy-shaping trend is, that the choice of certain policies as "our policies," becomes not merely a substitute for truth, but, in practice, its direct opposite.

For example, for the better part of thirty years, the U.S. physical economy has been contracting consistently at rates averaging in excess of two percent *per year*. Over most of that period, a formerly (1946-1966) prosperous

agro-industrial economy, has been looted by financial parasites, transforming a prosperous economy into what is now threatening to explode, momentarily, as the greatest financial bubble-collapse in world history. During the recent quarter-century, the physical-economic income and output of the U.S. population, *per capita*, has been contracting. The number of jobs taken, *per household*, in a futile effort to maintain a falling income-rate, does not keep up with the rate at which average household income is contracting. Yet, the current administration speaks of the successes of this economy, praising the futility of increasing the number of jobs by methods which reduce the *per-capita* family income for all but the super-rich parasites of Wall Street and like precincts! What happened to the truth?

To make short of a long list of kindred clinical evidence, we have come into a time when "democracy" has become a synonym for a fanatical sort of lying. Whatever is perceived to be popular opinion, whether it is actually popular opinion, or not, becomes the adopted policy which governs practice, that in defiance of all truthful evidence, and contrary to all sane reason.

Down among the *hoi polloi*, this folly is expressed as: "I don't care what you say, I have a right to my personal opinion," even when the evidence is entirely contrary to that misguided opinion. Truth is no longer a standard for policy-shaping practice. Such is the condition of a society which has lost the moral fitness to survive, the condition of a democracy which no longer either deserves to survive, or will survive. Such democracy is the sure road to a hellish tyranny under a regime whose subjects will, for better or worse, do precisely as they are told.

The root of this loss of moral fitness to survive, is readily and accurately traced back to such plainly immoral creatures as Paolo Sarpi's Francis Bacon and Thomas Hobbes, to John Locke, Bernard Mandeville, David Hume, Adam Smith, Jeremy Bentham, Immanuel Kant, Karl Savigny, and John Stuart Mill. On the one side, public and private morality is divorced from science; on the other side, science is divorced from morality. In the meantime, popular morality itself is degraded to the level of Mandeville's followers among the Eighteenth-century British Hell Fire Clubs, the level depicted by Hogarth, the level of Hell as depicted in the most famous triptych of Hieronymus Bosch. The essence of our self-destruction during the recent thirty-five years of our downhill slide, has been the growth of what passes today for "popular opinion" and "popular culture."

Where are the men and women fit to lead us out of this peril? Where are those who will lead in the pathway toward safety, the pathway toward rule by the principles of truth and justice, not "popular opinion"?

The Case of Classical Motivic Thorough-Composition

Music, Education, and Morality

The following report on the subject of the connection between the principles of Classical musical composition and morality, fulfills the requirements specified in “The Substance of Morality.” We add here the following three summary remarks on the subject of the report itself.

Firstly, we stress to the reader, that at the very outset of the report, authors Liliana Celani and Kathy Wolfe restate that report’s primary mission most compactly, in the following words: “Composition of Classical music according to the Italian Renaissance principle of *bel canto* (‘beautiful singing’), is one of the best examples of mankind’s ability to discover an existing physical principle, and to use that discovery to create new works of science and art, which then increase mankind’s power to build civilization.”

The report fulfills that mission by providing the reader what has become, in recent decades, otherwise rarely available essential material on the subject of music itself. This lesson from music is presented by emphasis upon selected material of a type which, otherwise, happens to be essential for two classes of readers. For professional musicians and other educators engaged in programs of teaching music to pupils at the elementary and secondary

schools levels. On the first count, this report guides the reader to reenact, in his or her own mind and experience, that process of discovery of those principles which represents the essential core principles of singing and interpretive performance. In addition, for even those amateurs who previously qualified to follow only parts of the musical concepts presented, this provides much-needed guidance to those parents and others who must choose the kind of musical educational program which must be restored to today’s severely distressed, almost destroyed, public education systems.

Secondly, it is important that the reader be reminded of the purpose and scope of the essay in whose province the present report is situated. Classical musical composition, otherwise termed, generically, “motivic thorough-composition,” was developed chiefly in the span from Johann Sebastian Bach through Johannes Brahms. This form of composition and musical performance, which emerged out of the continuation of the Fifteenth-century practice of *bel canto* singing, has an essentially moral function. This form of development in music traced from Classical Greek roots, uses the special features of the musical medium to cultivate in both the musician and the audience certain moral qualities of passion, qualities which naturally tend to spill over, in other ways, from musical composition itself, into the development of the character of the musical audiences. To accomplish that purpose,

it is necessary to begin regular *bel canto* training of the singing voice with young children; music is a language, which is best learned beginning the age the child should acquire the rudiments of a literate form of native language. Furthermore, it is not possible to account adequately for the moral collapse erupting today among adolescent and younger pupils, without recognizing that much of this moral decay coincides with the recent, virtual eradication of most of what used to be even a minimum standard of literacy for musical programs in public schools.

Thirdly, unlike so-called “popular musical” entertainments, this moral quality of Classical motivic thorough-composition, expresses the same specific kind of principled potentialities of the individual human mind, the which are also expressed by those same cognitive processes without which no experimentally validated discoveries of new physical principles could occur in, or outside of classrooms.

The connections of this third point should be recognized by the reader who compares the case for music developed by the authors of this report with my argument on the subject of mathematical economics, as presented recently in “An American Century Seen as a Modular Mathematical Orbit.”¹

—Lyndon H. LaRouche, Jr.
July 16, 1998

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1. *Executive Intelligence Review*, July 24, 1998 (Vol. 25, No. 29).

The Tradition of Florentine *bel canto*

by Liliana Celani, Kathy Wolfe, and Stephan Marienfeld

Composition of Classical music according to the Italian Renaissance principle of *bel canto* (beautiful singing) is one of the best examples of mankind's ability to discover an existing physical principle, and to use that discovery to create new works of science and art, which then increase humanity's power to build civilization. Today, *bel canto* signifies the physical principle, discovered in the Fifteenth century by Leonardo da Vinci (1452-1519) and his collaborators, that the human singing voice is innately endowed with differentiated voice registers and other qualities, which allow a composer to create a unique density of new ideas in a musical work.

This density of new ideas is essential to Mozart's 1782-1785 "musical revolution" of *Motivführung*, as LaRouche has indicated in a number of writings.¹

Book I of *A Manual on the Rudiments of Tuning and Registration*, Lyndon H. LaRouche's 1991 music textbook, documents that for 400 years, from the 1430 Florentine Golden Renaissance to the death of Beethoven in 1827, the basic principles of *bel canto* were taught as a form of mass literacy to all children who learned to read and write.

Bel canto shows itself in many ways to be a physical principle naturally embedded in the human voice, a physical principle which the Renaissance masters discovered, rather than manufactured. The most familiar example is that of the opera singer, who, with his or her voice alone, fills with sound a hall of 4,000 seats, without amplification. *Bel canto* also exhibits the quality of "least action," in which the smallest physical effort produces the most powerful result. Renaissance teachers would place a candle before the student's mouth, and note that when a *bel canto* tone is produced, the flame does not move, even if

the tone is a very powerful one.

The basic elements of *bel canto* training are elevation, roundness of sound, vibrato, and clear registration. All of these are produced using physical attributes of the universe, including the human mind and body, which exist for us to discover.

Bel canto as a Physical Principle

Contrary to widespread opinion in the music world, *bel canto* is not merely the Italian opera repertoire connected with Vincenzo Bellini (1801-1835), Gaetano Donizetti (1797-1848), up to Giuseppe Verdi (1813-1901); rather, it is a scientific technique of singing, which makes such repertoire possible, and which composers such as Bellini and Verdi, but also J.S. Bach (1685-1750), Wolfgang Amadeus Mozart (1756-1791), Ludwig van Beethoven (1770-1827), up to Johannes Brahms (1833-1897), had in mind when they composed their vocal works—not only choral works and operas but also *Lieder* (art songs)—which latter are the "Rosetta Stone" of music, since they unify the beauty of singing with the beauty of a poetic text, consciously using all characteristics of the human singing voice (its differences in registers, color, dynamics, accents) in order not only to reflect, but even to enrich the poetic text.

The precondition for true *bel canto* is *impostazione*, or placement of the voice (from the Italian word *posto*, "to place"): which means that with *bel canto*, the singer finds the best place to amplify the voice, simultaneously mobilizing all resonating chambers (chest, throat, and, particularly, head). The balance between such resonating chambers will vary according to the natural registers of the voice, the first register (also known as the "chest" register) with more chest resonance than head, the second, or center

register, with a mixture of both, and the third register (also called *registro di testa*, or head register) with a predominance of the head voice. This is the register which requires most elevation of the voice, or singing *in maschera*, in the mask, which means exploiting to the utmost the bones and sinus cavities above and around the eyes.

The Renaissance genius Leonardo da Vinci was the first to study how the voice resounds in the head, in different locations according to the vowels used, which each have a different natural pitch and a different placement in the head, and his drawings were incorporated in a treatise on the voice, "De Vocie," which was unfortunately separated into different sections, some of which are still included in the *Codex Atlanticus*. A famous *bas relief* by another Renaissance genius, Luca della Robbia, kept in the Museo del Duomo in Florence, shows a group of children singing *bel canto*, and one can tell from the expression of their faces which ones are singing in the third, high register, concentrating the sound in the head, and which ones are singing the medium and low parts.

The second element of *bel canto*, besides the scientific use of the natural registers of the voice, and the conscious balance between elevation (singing in the mask) and *appoggio* (support, which means supporting the sound *sul fiato*, "on the breath"), is the ability to obtain a round sound by "covering" it, using round vowels such as "o" (as in "mode") or even "u" (as in "mood") in the third register. *Aperto ma coperto* ("open but covered") used to be the iron rule of the old school of *bel canto* singing—an only apparent contradiction, since it means that the mouth has to be open, but the sound covered.

The third element, which confers particular freedom and beauty to

singing, is vibrato, which should not be confused with either tremolo or the trill. Vibrato, the fleeting oscillation of the voice between two pitches on either side of the conceived tone, is natural to the voice, and is the effect of correct *impostazione* (placement). The trill, which is a true half or whole step sung alternately in very rapid succession, has the same musical meaning in singing as it has in instrumental, or piano compositions; namely, to maintain a certain suspension before going back to the tonic, or as a leading tone just before a modulation. The presence of a tremolo, which comes from the Italian *tremare*, or trembling (of the voice), is a clear indication that the singer is suffering from a vocal-technical problem. Tremolo is diametrically opposed to a normal vibrato, and is

generally caused by a lack of *appoggio*, or support of the voice, and indicates a problem of intonation. (In most cases, singers who “go flat” or whose voices tremble, lack either elevation, or support, or both.)

As Leonardo da Vinci indicated in his treatise on the human voice,² *bel canto* singing can be compared to painting, because of the conscious use of “colors” in the voice, either as natural colors (conferred by the different registers), or as a conscious change of color for purposes of interpretation. (For example, great singers are able to make their voice darker while singing a part in a *Lied* corresponding to a change in the poetic text, or a change from major to minor, or to make it lighter in a particularly joyful part.) Generally, the audience will

perceive a clear register shift from the second to the third, high register (particularly in the tenor voice, which is stronger), as a change of color. Third-register notes, if sung with the right *impostazione*, have a particular brilliance, which they lose if they are shouted, or sung in the throat, where they become opaque. First-register notes, being sung mostly with a chest resonance, are perceived as darker notes. This implies that each note of the scale does not have the same value for singing.

For example, middle C (c') is a high note for a bass singer, who shifts to his high register on d'. The same note is a center-register note for the tenor, and is a low, chest-register note for a soprano or a mezzosoprano, and, as such, it will be perceived differently by the listener, depending on who sings it.

As the following musical examples demonstrate, great composers such as J.S. Bach, Mozart, Beethoven, and Verdi were aware of these differences in registration when they wrote their vocal works, and developed the well-tempered scale based on this palette of vocal colors. Not only notes, but also intervals have a different value according to the register and scale in which they are sung.

For example, the same interval creates more or less musical tension as the distance between the tonic and the note corresponding to the register shift is smaller or greater. In the mode of C major/C minor, a diminished fifth, or Lydian interval (c' to f#'), corresponds to a register shift for a tenor and a soprano, in two different octaves; while the interval corresponding to a register shift for a baritone voice is that of a third (c' to e'). But in another key, the register shift of both voices corresponds to a different interval (closer or more distant from the tonic).

Composers chose the key for their arias or *Lieder* with the awareness that certain intervals would correspond to the natural register shifts of the voice-species of the intended singer. Since instruments are an imitation of the *bel canto* singing voice, they echo the natural registration of the six species of voices, the only difference being that they intro-

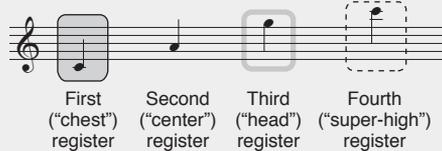
Concerning Musical Terminology

When specific notes are referred to in the text and in the musical examples, the following nomenclature is used:



There are instances when not a specific note in a specific register, but, rather, a general member of the scale is being referred to. In such instances, a capital letter is used.

Vocal registers are indicated in some musical examples. The chart below shows how the first (“chest”) register, the third (“head”) register, and the fourth (“super-high”) register are marked. There is no special marking for the second (“center”) register. See Figure 1.2 for the specific register-shifts in each of the six species of human singing voice.

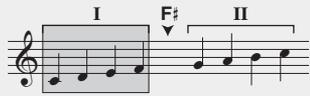


Other passages of special interest in the musical examples, are highlighted by horizontal brackets:



FIGURE 1.1

The child's universal division of the c'-c'' octave



duce a new degree of freedom, often allowing motivic development, by moving from one voice to the next (a 'cello can, for example, start out as a baritone voice, and can then move to a tenor voice, with its different array of registers).

It was found that the average child's voice develops best when taught to shift to a new register on the second half of this scale (Figure 1.1). It was, in fact, in this way that "middle C" became middle C: Only the octave of eight diatonic notes which starts there, will find itself divided in half, by the child's register

shift, between f' and g', at f#'. The register shift is natural, and the scale conforms to nature.

Voices which shift here are called soprano, and all children, if taught to sing from age five as they ought to be, experience this basic register shift for several years, until puberty.

As children mature, girls develop into adult sopranos or mezzosopranos, while boys develop a lower octave and become tenors, baritones, or basses. But the intervals of each voice remain divided into three or four qualities of distinct voice register (Figure 1.2). In addition to the first register, shown here as a solid black bar, and the second register, shown here as a white bar, there are also the higher, third and fourth registers, each with its own different register-shift point.

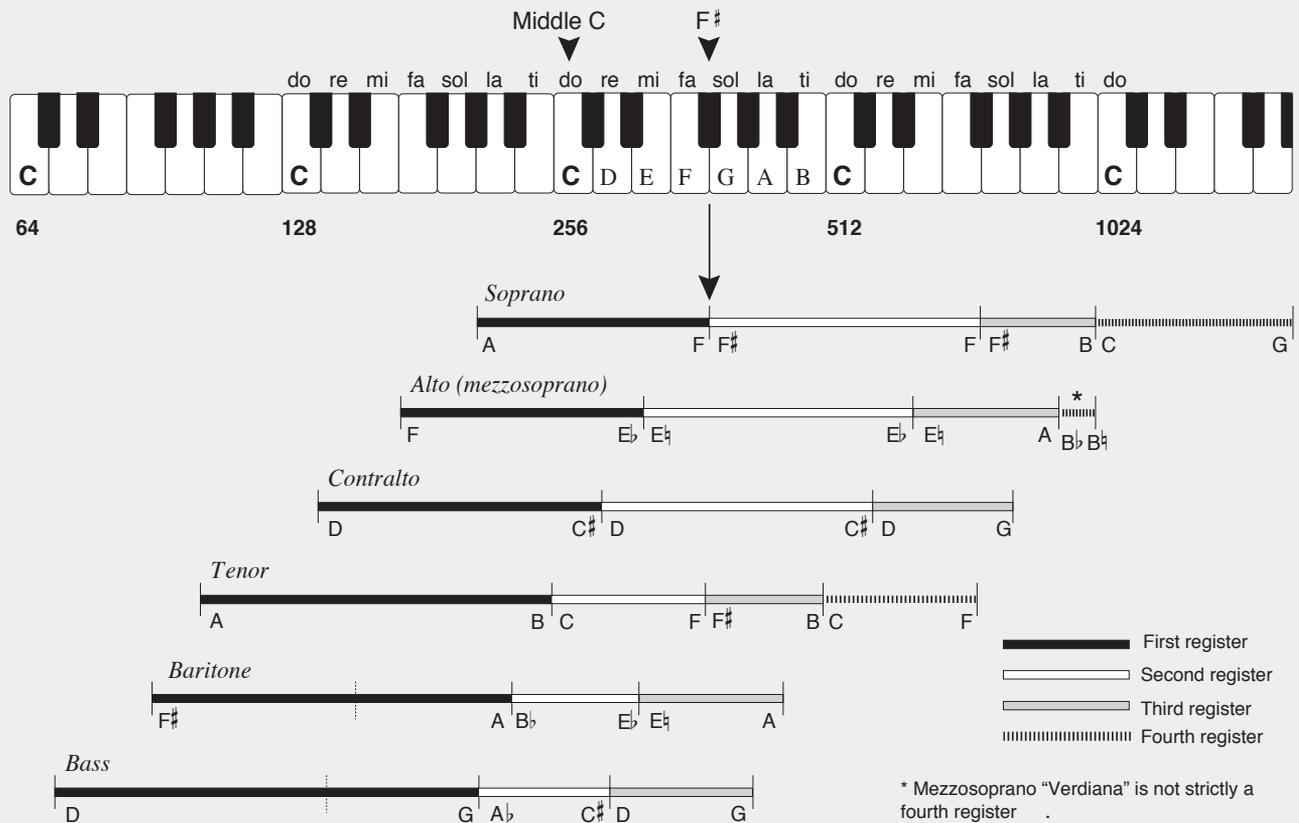
Thus, when a composer goes to construct a musical composition, he has six species of the adult singing voice—

soprano, mezzosoprano, contralto, tenor, baritone, and bass—each containing three or four different registral "voices," a well-defined palette of colors, with which to "paint."

Bach's *St. John Passion* is a good example of both *bel canto* singing and *Motivführung*, since it uses voices and instruments (as imitation of human voices) in a musically dense and profound dialogue, starting with the instrumental and choral introduction, which is one of the most beautiful works ever written. The orchestra and the singing solo instruments (oboe I and II, and transverse flute) introduce the four voices of the choir on the initial invocation "Herr, unser Herrscher" ("Lord, our Ruler"), which already in the first few measures (Figure 1.3a) traverses the entire palette of vocal registers and colors of the four choral voices (soprano, alto, tenor, and bass) in four different combinations of notes and of intervals,

FIGURE 1.2

The six species of human singing voice, and their registers



corresponding to vocal registers. In the first one and a half measures of the choral entrance, four third-register notes are sung, in succession, first by the sopranos (on g''), next by the tenors (on another high g'), and finally by the tenors and basses together (the tenor on f' and the bass on an $e'b'$). The audience will therefore perceive not a simple repetition of the invocation “Lord,” but rather an increasingly dramatic invocation, with the sopranos emerging first on the high note, the tenors most prominent on the second, and the basses on the third. The second invocation, in measure 23 (Figure 1.3b), is again transformed, because of a modulation, with the soprano emerging first on the high g'' , and the tenor jumping at the end from a central-register e' to a very high ab' on measure 24, which will be heard even more by the audience, since high notes in the tenor voice (assuming that the tenors in the choir are singing *bel canto*) have a particular brilliance. The invocation “Lord, our Ruler” will therefore sound different all four times; and if one were to mark the four vocal parts with colored pencil, the vocal palette would shift four times, as if in a time-lapse weather map.

Mozart’s *Lied* “Das Veilchen” is an example of how music can not only reflect, but even enrich a beautiful poetic text, as in this case with a poem by Johann Wolfgang Goethe. In two short pages, Mozart develops almost a small comic opera, based on two main characters: the little violet, described in the “Allegretto” opening, and the shepherdess, passing by “with light step and merry heart, and singing” (at which point the piano accompaniment sings a merry tune for her). The irony of the poem lies in the fact, that the violet falls hopelessly in love with the shepherdess, and wishes to be plucked up by her; but, in the second part of the *Lied*, which suddenly turns dramatic, the shepherdess does not see the violet, and steps right on top of it. The transformation of the poem, and the song, happens at this point (Figure 1.4), because the violet “sinks, dies, but is happy about it nevertheless,” declaiming, in a final “*stringendo*” (which means accelerating in speed),

FIGURE 1.3

Register shifts in opening of J.S. Bach’s *St. John Passion*

Figure 1.3 shows two musical excerpts, (a) and (b), from the opening of J.S. Bach's *St. John Passion*. Excerpt (a) covers measures 19 and 20, and excerpt (b) covers measures 23 and 24. The score is for four vocal parts: Soprano, Alto, Tenor, and Bass. In measure 19, the Soprano sings a high note (circled in red), followed by the Alto and Tenor in measure 20, and the Bass in measure 20. In excerpt (b), the Soprano sings a high note in measure 23, and the Tenor jumps to a very high note in measure 24 (circled in red). The lyrics for all parts are "Herr, Herr, Herr".

FIGURE 1.4

Conclusion of Mozart’s ‘Das Veilchen’

Figure 1.4 shows the conclusion of Mozart's *Lied* “Das Veilchen”. The score is for Voice and Piano. The lyrics are: "Es sank und starb und freut sich noch: und sterb ich denn, so sterb ich doch durch sie, durch sie, zu ih-ren Fü-ßen doch. Das arme Veil-chen! Es war ein her-zigs Veil-chen." The score includes various performance instructions such as *rallent.*, *p*, *scen*, *do*, *f*, *a tempo*, and *(p) arpeggio*. The piano part features a final *stringendo* section.

that “even if I die, so I’ll be dying because of *her*, at her feet!”

Musically, this transformation of the poetic text is emphasized by the main register shift of the soprano, on the $f\sharp''$ of “durch *sie*” (“because of *her*”), which is not justified by a modulation (the key is G major), but simply as an ironic dissonance, resolved immediately afterward by a second “durch *sie*” on a high g' . To make the ironic transformation of the poetic text even more so, Mozart adds a final stanza which is not in the Goethe original: “The poor violet! It was a dear little violet.”

One of the most profound among vocal works is Mozart’s *Lied* “Abendempfindung” (“Evening Sentiment”). Composed after the death of his father, it is a reflection on the meaning of life and death, on what we shall be remembered for after our death. The key to the song is the final metaphor (Figure 1.5), which goes beyond a mere simile (between the tear of the friend crying on one’s grave, and “the most beautiful pearl in my diadem”), by the repetition of the word “pearl” three times, first on a low f' (not shown), then on a g' (a central-register tone for the soprano voice), and finally on an even lower and darker e' , in the first, chest register. This metaphor, the idea that life continues after death, pervades the entire *Lied*, not only in the ending metaphor, but also in the beginning, when the line “Shall you then cry over my grave” (“Werd’t ihr dann auf meinem Grabe weinen”) is rendered musically by Mozart not with sadness, but with joy.

Apart from this shift to the low register, there is no spectacular shift to the high register in this *Lied*, and for a good reason: It is intended to move the listeners, conveying to them the calm metaphor of the evening as the end of life, and the only dramatic jumps are the interval of a minor seventh between the g' and f'' of “fliesset schon” (“[the friend’s tear] is already flowing”), and the major sixth between the a' and the f'' in the crucial, modulation section, “Werd’t ihr dann an meinem Grabe weinen, *trauernd* meine Asche sehn” (“Shall you then cry at my grave, *mourn-*

FIGURE 1.5
Mozart, ‘Abendempfindung’

FIGURE 1.6
Mozart, ‘Abendempfindung,’ registration at $c'=256$ and $a'=440$

(a) At $c'=256$:

(b) At $a'=440$:

ing over my ashes”) (Figure 1.6a). If performed with the modern, high tuning ($a'=440$ Hz to $a'=448$ Hz) (Figure 1.6b), the song is completely disfigured, since all the center f 's become $f\sharp''$'s, and the singer is forced to interrupt those key phrases with an unwanted shift into the high register, thereby completely spoiling the poetic interpretation.

Rather than high notes in the third register, the technical difficulty of this song, which requires a total mastery of *bel canto* technique and breathing, is the frequent rests interrupting the phrases, and in some cases even between syllables of the same word. (For example, on “mir weht, wie West—wind leise, eine stil—le Ah—nung zu,” meaning that a silent presentiment of death comes upon me like a gentle west wind, with the words “silent presentiment” split by two dramatic rests, signifying the dramatic presentiment, which must be sung soft-

ly, but still with a sustained voice right after the rest.)

An example of how the same interval has different values for different voices, is the famous quartet from Beethoven’s *Fidelio*, “Mir ist so wunderbar.” Four of the six protagonists of the opera (Leonore, wife of Florestan, who has been unjustly imprisoned; Rocco, Florestan’s jailer; Rocco’s daughter Marzelline; and Jaquino, Marzelline’s fiancé) sing in canon form, one after the other, the theme of the quartet (Figure 1.7), while the others develop a counterpoint to it, which culminates in the final section, when all four voices crescendo, and then come together on a sudden “*piano*” on “wie gross ist die Gefahr” (“how great the danger is”). The theme “Mir ist so wunderbar,” remains the same throughout, although the words change for each character, but the audience hears the beginning couplets (d'' - b'

FIGURE 1.7

Quartet from Beethoven's *Fidelio*, the four singers' entrances

FIGURE 1.8

'Mir ist so wunderbar,' register shifts in opening interval

Tenor registers II → I
 Bass registers III → II II — II Soprano (no shift)

FIGURE 1.9

Instrumental voices in 'Mir ist so wunderbar' quartet

Introduction, 'cellos and basses:

Andante sostenuto

Clarinets echo Marzelline:

twice, and the inversion $g' - d''$) differently, because they are sung first by the two sopranos (Marzelline being a light soprano, and Leonore a lyric-dramatic one, with a darker timbre), then by the basso Rocco, for whom the $d' - b$ interval is also a shift from the third to the central register (whereas for the other three singers it implies no register shift), and finally by the tenor (one octave lower

than the sopranos). If one places each voice's opening two notes on the same staff (Figure 1.8), it can be seen that they range through two different octaves, and two different register shifts.

A simple interval of a minor third downward, followed by a fifth upward, on which the whole quartet is built in terms of motivic development, thanks to the counterpoint supplied by the orches-

tra introduction, particularly the 'cello and clarinet parts, which sometimes play in counterpoint, or sometimes double the voices (Figure 1.9), already supplies four different colors and two register shifts.

The Songs of Franz Schubert

Every one of Franz Schubert's greatest *Lieder*, beginning with his Op. 1 "Erlkönig" ("The Elf-king") and Op. 2 "Gretchen am Spinnrade" ("Gretchen at the Spinning-wheel"), and ending with his last songs in the posthumously published "Schwanengesang" collection, is, from the first to the last note, a perfect whole. Schubert transforms the metaphor of a poem into a precise musical idea that reveals the true essence of the poem. He composes a perfect musical unity by using the method of motivic thorough-composition of Haydn, Mozart, and, especially, Beethoven.

In his compositions, Schubert not only transforms the score of the poem (strophic form, harmony of vowels and consonants, prosody, declamation, etc.) into music, but also consciously employs the characteristic quality of sound of the human singing voice. Schubert was educated as a singer. He knew the exact nature of the registers of the singing voice, and how to use their different colors in his compositions, to throw a special light on the crucial poetical concepts.

In the second stanza of the song "Gretchen am Spinnrade," Schubert takes the soprano voice into the third register only on the word "Kuss" ("kiss") on the note g' . This "Kuss," compared to the words "Zauberfluss" ("magical flow"), "Händedruck" ("pressure of [his] hand"), and "ach" ("oh!"), has a totally different color and weight. In a musical tuning higher than $a' = 432$ Hz, this difference disappears, because the soprano has to shift into the third register already on f'' .

The use of the shift from the second to the third register within the song as a whole, is very interesting. The ritornello "Meine Ruh ist hin" ("My calm is gone"), which is repeated twice, has no shift into the third register. The first strophe (Figure 1.10a) only touches the third register at "mein armer Sinn"

“my poor mind”); in the second strophe there is only one shift into the third register on “Kuss” (Figure 1.10b), and in the last strophe (Figure 1.10c), the third register is used several times up to “vergehen” (“to swoon”) on the highest note a². Schubert increases the density of the register shifts in each strophe, which perfectly corresponds to the idea of the poem.

In the song “Du bist die Ruh” (“Thou Art Calmness”), only in the final strophe does Schubert take the soprano (or tenor) voice into the third register (Figure 1.11). Only the stressed syllable of the word “erhell” (“illuminated”) in the line “von deinem Glanz allein erhellt” (“illuminated by thy brilliance alone”) on the notes g²-ab² (or, for the tenor, g¹-ab¹) is sung in the third register. In this way, Schubert highlights the idea of the entire poem. “Aug’ und Herz” (“eye and heart”) are filled with the brightness of the voice’s third register.

The first three stanzas of the song “Gute Nacht” (“Farewell”), which is the first in Schubert’s song cycle “Winterreise” (“Winter Journey”), are musically set in essentially the same way (except for some variations in the third stanza). The tenor voice begins each stanza with an *f* in the second register, and takes the phrase down into the first register (Figure 1.12a). But in the fourth and final stanza, this is changed. Schubert sets the last stanza in D major, as opposed to the D minor of the first three stanzas. The tenor must now begin the phrase on f² in the third register (Figure 1.12b). In the first three stanzas, the lonely wanderer looks in wistful resignation at the gloomy world. His “fein Liebchen” (“dear beloved”) loves another, and he was turned out and driven away. In the last stanza, there arises once again a faint glimmer of hope, “damit du mögest sehen, an dich hab ich gedacht” (“so that you might see, that I’ve thought of you”). But it is only a self-delusion, and the wanderer painfully knows it. In the last line of the song, Schubert sets “an dich hab ich gedacht” (“I’ve thought of you”) for the first time on f² in the third register; and then a second time, as a resigned echo of the first one, on the note f¹, back in the tenor’s second register (Figure 1.12c).

FIGURE 1.10

Schubert, ‘Gretchen am Spinnrade’

(a) First strophe:

(b) Second strophe:

(c) Final strophe:

FIGURE 1.11

Schubert, ‘Du bist die Ruh’

FIGURE 1.12

Schubert, ‘Gute Nacht’ from *Die Winterreise*

(a) First stanza:

(b) Fourth stanza:

(c) Conclusion:

As with Mozart,³ Giuseppe Verdi also confided to his contemporaries that, when he was writing a piece of music, the idea of the music first came to his mind as a single thought, as a “one” unifying the “many” aspects of it (voices, instruments, registers, etc.). To cite from a letter by an Italian member of parlia-

ment, Quintino Sella, who was a friend of Verdi’s (besides being a composer, Verdi was also a patriot and a member of the Italian Senate): “One day I asked him, ‘When you compose some of your beautiful pieces of music, how does the thought come into your mind? Do you first have the main theme, then you

FIGURE 1.13

Phases in 'O cieli azzurri' from Verdi's *Aida*

(a) Second register only:



(b) Third register:



(c) Fourth register:



combine it with the accompaniment, and then you study the nature of the accompanying voices, flutes, violins, etc.?’ ‘No, no, no,’ the famous maestro interrupted me with great animation, ‘the thought comes to my mind in a complete form, and I know immediately whether the note should be from a flute or a violin. The difficulty lies in writing it down quickly enough to be able to express the musical thought in its integrity, as it came to the mind.’ ”

Verdi was perfectly aware of the *bel canto* characteristics of the singing voices, and this is why, in 1884, he promoted legislation in Italy to return to the scientific tuning of $c' = 256$ Hz (corresponding to $a' = 430$ -432 Hz), because already then, as today, many opera theaters had tuned up to $a' = 450$.

Many of Verdi's famous opera roles were written for a specific singer whom the composer had in mind. In the case of *Aida*, the aria “O cieli azzurri” (“O azure skies”) (written for a darker, lyric soprano voice) changes completely if it is sung in the modern high tuning. This problem was demonstrated in November 1997 by dramatic soprano Antonella Banaudi, at a presentation of the newly published *Canto e Diapason*, the Italian edition of Book I of the Schiller Institute's *A Manual on the Rudiments of Tuning and Registration*, held at the Casa Barezzi in Verdi's home town Busseto, with the famous Verdi tenor Carlo Bergonzi, the famous Verdi baritone Piero Cappuccilli, the organist Arturo Sacchetti, and Lyndon H. LaRouche as main speakers.

Before going up to a super-high c''' in the fourth register (the so-called “chest C” or *do di petto*), the soprano *Aida* repeats the phrase “oh patria mia” (“oh, my fatherland”) three times on an accented f , always with a crescendo on “patria mia” (Figure 1.13a). The choice of the f on frequent enunciation of the vowel “a”—a vowel which is generally difficult to sing properly in the third register—indicates that Verdi wanted this phrase kept in the center of the voice, and that the shift to the high register should only follow on the third repetition of “oh patria mia” with a jump to the high a'' , sung *forte* (Figure 1.13b). If sung in the modern high tuning, as Antonella Banaudi demonstrated at her presentation in the Casa Barezzi, first on a modern piano, and then back at Verdi's tuning on Verdi's own fortepiano, all those f 's become f'' 's, and are either sung already in the third register, or else are shouted, reducing the possibility of the singer to jump up to the high a'' , and then to the super-high c''' of “mai più” (Figure 1.13c).

1. The notion of *Motieführung* (motivic thorough-composition) was introduced by Professor Norbert Brainin in the early 1990's, in order to characterize the “totally new, special kind” of composition, with which Joseph Haydn had announced his Op. 33 “Russian” Quartets in 1781. Brainin pointed to the fact, that with this method, Haydn had unleashed a true revolution in the mode of composing string quartets, a method which was immediately picked up by Mozart (especially in his six string quartets dedicated to Haydn), and was later per-

fectured by Beethoven (especially in his late quartets). Lyndon LaRouche, with whom Brainin discussed the concept of motivic thorough-composition intensely in the following years, pointed especially to the influence of J.S. Bach on Mozart's deepening of this method of composition of Haydn, and in numerous publications, demonstrated the significance of this concept not only for the entire domain of Classical music, but also for science in general. See Lyndon H. LaRouche, Jr., “That Which Underlies Motivic Thorough-Composition” (EIR, Sept. 1, 1995) (Vol. 22, No. 35); “Behind the Notes” [introduction to the forthcoming Book II of *A Manual on Tuning and Registration*; see reference note 3], *Fidelio*, Summer, 1997 (Vol. VI, No. 2); and other locations.

2. Fragments of Leonardo's treatise on the human voice, contained in the *Codex Atlanticus* (which is kept in the recently restored Biblioteca Ambrosiana in Milan), are observations on acoustics (creation and propagation of sound, how intervals are heard by the human ear), and prove the fundamental principle of the connection between art and science. For example, Leonardo compares sound waves to water waves, or the way intervals are heard not as single notes, but as a harmony between notes, to the way the rays of the sun are held in the eye: “like the note in the ear, which, unless it preserved the impression of the notes, could never derive pleasure from hearing a voice alone; for, when it passes immediately from the first to the fifth note, the effect is as though one heard these two notes at the same time, and thus perceived the true harmony which the first makes with the fifth; but if the impression of the first note did not remain in the ear for an appreciable interval of time, the fifth, which follows immediately after the first, would seem alone, and one note cannot create any harmony, and consequently any song whatsoever occurring alone would seem to be devoid of charm.” See Emanuel Winternitz, *Leonardo da Vinci as a Musician* (New Haven: Yale University Press, 1982), p. 123.

3. Wolfgang Amadeus Mozart, in 1790, described how the idea of a *Lied* came to his mind: “This inflames my soul, whenever I am not disturbed. It grows continuously, and I broaden it even wider and brighter, and the thing becomes truly almost complete in my head, even if it is long, so that from that point on, I view it with a single glance, exactly like a beautiful picture of a pretty girl, from above, in my mind. And in my imagination I don't hear the parts successively, one after the other, but I hear them all at once.” (Quoted in a letter published by Rochlitz.) See *A Manual on the Rudiments of Tuning and Registration*, Book I, ed. by John Sigerson and Kathy Wolfe (Washington, D.C.: Schiller Institute, 1992), p. 204.

2

J.S. Bach and Inversion as A Universal Principle of Development In the Continuum of Musical Composition

by Jonathan Tennenbaum

In his article “The Substance of Morality,” Lyndon LaRouche presents a conception of the Universe as a multiply-connected manifold of the type (N -manifold)/(M -manifold). “ M ” signifies an ever-expanding array of principles of development of human culture, and “ N ” signifies a growing array of principles of physical action. These two sub-manifolds, of order “ N ” and “ M ,” do not exist apart from each other, but are multiply-connected by Man’s culturally-determined action upon the physical Universe, and the impact upon cultural development of changing physical conditions of human society’s existence in the Universe. The inner developmental characteristic (curvature) of physical “ N -manifold” is called *anti-entropy*, and the characteristic curvature of the “ M -manifold” of human cultural development is *agapē*. The two are inseparable, necessary expressions of the Principle of Creation (God).

Before turning to the musical side of this question, it will be useful to clarify the meaning of “multiple-connectedness,” and in what manner we are to conceive of a manifold that is governed by not one, but a growing multiplicity of developmental principles. To make a short work of this, I emphasize only some key points, followed by an elementary illustration from astronomy, which leads us directly to music.

It is impossible to reduce the relationship of events in multiply-connected manifold, by any deductive or similar means, to a single formal principle. Rather, action in the manifold is governed by a multiplicity of principles,

none of which can be reduced to or derived from the others in a formal-deductive manner. Any process in the manifold is simultaneously co-shaped by each and all the principles in any arbitrarily small region of action. The active principles, mutually irreducible and incommensurable in the just-mentioned sense, constitute true *singularities*—individual existences underlying the whole structure of the manifold. We encounter such singularities in physics in the form of creative fundamental discoveries of principle, and in music as entirely analogous discoveries of principle of *bel canto*-anchored motivic thorough-composition. The following sections will review some of them, such as Haydn’s discovery of *Motivführung*, and Mozart’s breakthrough on the significance of the “Lydian” major/minor mode, first explored in the late works of J.S. Bach.

In first approximation, one might be tempted to think of each active principle as analogous to a coordinate axis in an n -dimensional space, n representing the number of an irreducible array of principles governing the manifold at a given stage of development. In reality, however, the principles of development, while mutually irreducible in a formal sense, are never independent of each other in the manner implied by the Cartesian coordinates or the use of “independent variables” in a formal mathematical representation. As an “ n -manifold” develops to an “ $(n+1)$ -manifold” and so forth, the integration of each newly discovered principle modifies the entire previous array of active principles.

Indeed, this process invariably

involves the generation of *paradoxes* and *anomalies*: events are demonstrated to occur in the Universe, which are incompatible with the given set “ n ,” point to a flaw or at least an inadequacy in that existing set of principles. Generally speaking, the newly hypothesized principle does not replace or supersede the existing ones; rather, the latter must be reworked and redefined from the standpoint of the new discovery. Thus, the process of lawful generation and resolution of dissonances through motivic cross-voice development in well-tempered polyphony, mirrors the universal features of development of any multiply-connected manifold.

The growing array of principles is subsumed within a higher principle of generation (a “One”), whose essential characteristic, anti-entropy/*agapē*, is located in the process of *change* from the lower- to the higher-order manifold. Although that process involves the successive integration of singularities, each formally incommensurable with the others, that higher principle of creative self-elaboration remains everywhere self-similar to itself. The proper measure of the ordering of development is not “number of dimensions” in the formal sense, but rather increasing *cardinality* or *power* in the sense developed by Georg Cantor.

The *ordering* of the process of development of the manifolds by increasing Cantorian cardinality, does not at all coincide with *time* in the ordinary chronological (i.e., clock-time) sense. On the contrary, *time* and *space* are merely subsumed physical principles, which are

ironically multiply-connected with the Cantorian axis of development. We know this negatively, from the sad witness of rise and decline of civilizations or even human culture as a whole. We also know this positively, by the fact that all acts of creative discovery involve some or another degree of apparent “time reversal.” Rigorous composition always proceeds *backwards* from the effect to be achieved—which exists, as it were, outside ordinary time—to the means and temporal pathway of events required to achieve that effect. Thus, music and drama are typified by ironic anticipations and premonitions, and other expressions of *temporal inversion*.

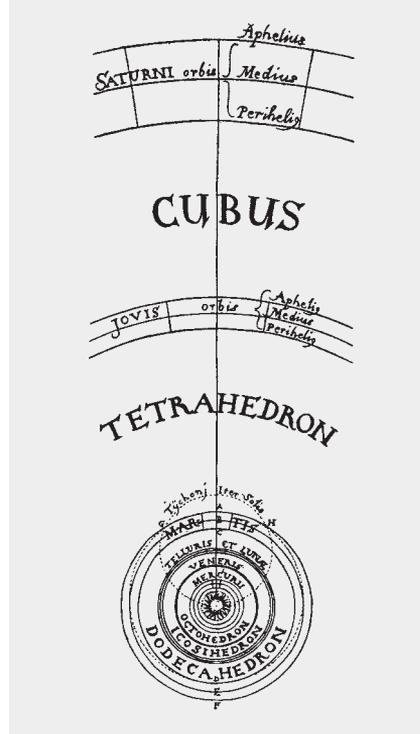
Music and Keplerian Astronomy

The development of astronomy, from the most ancient times up to Kepler and Gauss, provides the most direct access to the notion of a multiply-connected manifold, just sketched above.

The study of the motions in the heavens leads to the discovery of more and more *astronomical cycles as principles of motion*. Thus, observing the rising and setting of the sun and the stars, we conceive the cycle of the *day*. Noting, however, that the path of the sun shifts slightly from day to day, we discover the longer cycle of the *year*. What at first glance appear to be very slight discrepancies in the yearly cycle of the sun with respect to the stars, reveal a much longer cycle of the *precession of the equinoxes*. Later, additional cycles emerge, connected with the non-uniform (elliptical) motion of the Earth around the sun. In addition to these solar-terrestrial and stellar cycles, we must also take into account the cycles associated with the motions of the planets. The latter reveal themselves, upon closer examination, to involve more complex considerations, going beyond the principle of simple circular action.

Thus, as astronomy develops, we discover new principles of motion not only as new cycles per se, but also as internal principles of organization of the cycles, and principles of multiple-connectedness or “colligation” among the cycles. Thus, Kepler’s discovery of the “area law” of motion in conic-section orbits,

FIGURE 2.1
Kepler's determination of the harmonic ordering of the solar system, from his *New Astronomy*



and his discovery of the harmonic principles underlying the entire array of orbits.

The observed motion of any planet or other heavenly body is the resultant of all cycles and related principles acting conjointly. So, for example, even though the equinoctial cycle has a length of some 26,000 years, it acts efficiently within any arbitrarily small time interval, to produce a distinct, implicitly measurable modification of any observed motion. The manner in which the characteristics of any planetary orbit are reflected in any arbitrarily small interval of the observed motion, was demonstrated by Carl Friedrich Gauss in 1801, when he determined the orbit of the unknown planet Ceres from only three, very close-spaced sightings.

This concept of “curvature in the infinitely small” of astronomical motions, has an unavoidable, paradoxical feature: The motions we observe,

embody not only the cycles which are *known* to us at any given time, but also those *we do not yet know* explicitly—cycles whose future discovery is inherent in the self-similarity of the principle of creation underlying the Universe as a whole. Hence, the curvature in the small, as reflected in the fine “articulation” of the heavenly motions, contains an element of *creative tension*, associated with the anti-entropy/*agapē* of a Universe constantly developing $M \rightarrow M+1, M+2, \dots; N \rightarrow N+1, N+2, \dots$.

As Kepler demonstrated in detail for the case of the solar system, the higher coherence of the astronomical “*n*-manifold,” is reflected in *harmonic orderings*, of the same type as characterize *artistic beauty* in the domain of human Classical culture. In the dialogue *Timaeus*, Plato refers to this common higher principle underlying astronomy and Classical art, by declaring the Universe to be a continuously unfolding composition of “God the Composer.”

Reflecting this, Kepler’s determination of the harmonic ordering of the planetary orbits specifies certain band-like regions or corridors as the location of the planetary orbits, and not fixed algebraic values (Figure 2.1). The exact orbits of the planets, while remaining within their harmonically “quantized” corridors, are constantly changing and evolving together with the Universe as a whole, in a manner Kepler likened to the performance of a polyphonic composition.

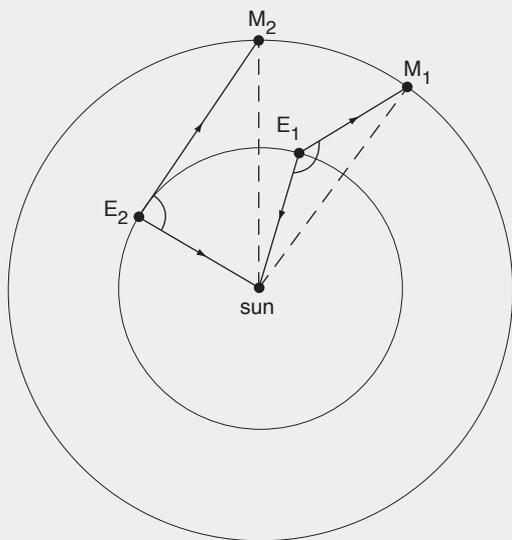
Kepler’s Astronomical Inversions

In his *New Astronomy*, Johannes Kepler presented a series of devastating anomalies which overturned the prevailing assumption, that the planetary motions were based on nothing but the Ptolemaic-Aristotelean notion of uniform circular motion as the basic physical principle. In order to determine the actual motions of the planets, however, Kepler had to overcome the difficulty, that the orbital motions of the planets, including of the Earth itself, cannot be adduced in any direct manner from the observed motions as they appear to an observer on the Earth. Indeed, as already remarked above, the *apparent* motion of any plan-

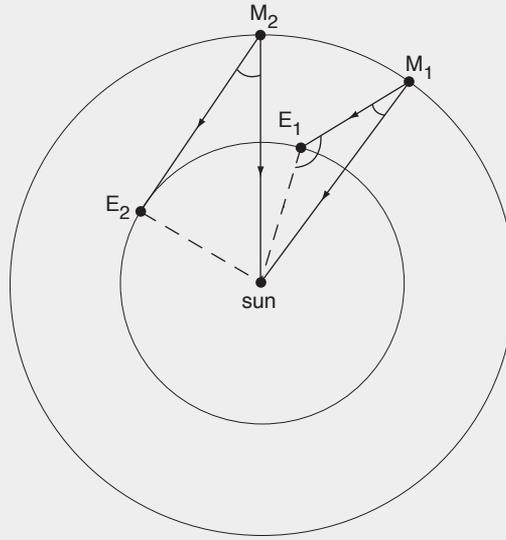
FIGURE 2.2

Transformation of angular intervals by change of locus of observer

(a) Mars and the sun, as observed from Earth



(b) Earth and the sun, as observed from Mars



et, is the resultant of a complex combination of motions, including the Earth's rotation, the Earth's motion around the sun, and the true orbital motion of the planet. The true motion of the Earth around the sun, which we can neither see nor sense in any direct way, can only be determined by reference to the actual motions of the other planets; but, to disentangle the real from the apparent motions of those planets, it would seem necessary to first know the motions of the Earth, from which we observe the planets. How do we get out of this circular paradox? Kepler's ingenious solution was based on a method of inversion, closely akin to J.S. Bach's method of well-tempered polyphony.

Kepler asked the hypothetical question: How would the Earth's motion appear, relative to the apparent motion of the sun, if we were to observe the Earth and the sun from Mars? An observer would have a different solar calendar, whose basic cycle (the Mars year) makes a specific ratio to the Earth year. At first glance, such a hypothetical shift of *locus of action*—analogous to a modulation or more general *inversion* in music, as we shall see below—seems only to compound our ignorance.

Kepler, after all, had no means to actually place himself on Mars! Yet it was exactly by juxtaposing the motion of Mars as seen from the Earth, with the motion of the Earth as seen from Mars (all relative to the sun as “tonic”), that Kepler was able for the first time to determine the orbits of *both* the Earth and Mars! (Figure 2.2) By thus exploiting the additional dimensionality provided by the Mars orbital cycle, Kepler was led to the discovery of the elliptical form of planetary orbits, and a revolution in astronomy. The key here is the *transformation* between two or more sets of angular intervals (e.g., observations referenced to the Earth's cycle, versus observations referenced to the Mars cycle).

Kepler was fully aware of the kinship of his method with the Platonic dialogue and the polyphonic principle in music. Just as one can only know one's own mind and the assumptions which shape it, in the mirror of our interaction with other minds; so, in well-tempered polyphony, the motivic idea emerges only through a process of contrapuntal inversions; and so in astronomy, the motion of our Earth would never be known—Kepler loved to say—had God

not given us Mars and the other planets as celestial companions.

The Well-Tempered System, Briefly

Turning to musical composition, remember that the “*n*-manifold” of musical development lies entirely *outside* the audible domain of musical tones per se. One might say, that musical ideas themselves *are soundless*. Yet these soundless entities generate all the events in the audible domain and rule over it absolutely. For example, as the performances of Wilhelm Furtwängler and Pablo Casals demonstrate most forcefully, a musical interval is not something determined by a pair of tones, like a line segment drawn to join two points. Rather, the interval *precedes* the tones, both ontologically and in the consciousness of the composer and great performer, just as the idea of the composition precedes the ordering and shaping of all intervals in a composition. Lyndon LaRouche emphasizes that the least “unit” coherent with the expression of a musical idea, is a *pair of intervals* in the sense of an *interval between intervals*.

The mere acoustician will puzzle over the paradox: What could be the dif-

ference between merely *playing tones*, playing intervals, and *playing the intervals between intervals*, in the manner Furtwängler brought his orchestras to do? Where resides the difference, given that the instruments themselves produce nothing but tones? The “extra” which distinguishes the performance of *intervals between intervals* from the mere sounding of a succession of tones, is clearly heard in the mind, but is otherwise a virtual *infinitesimal* in acoustical terms—often nothing more than a barely perceptible, specific shaping of the tones in a musical line.

That shaping of the tones by musical intervals, and intervals by intervals of intervals, embodies the same principle by which the well-tempered system as a whole is determined by the *curvature* of the evolving manifold of *bel canto*-based motivic thorough-composition. That development is bounded by the requirement, that the creative principle embodied in the conception of the *bel canto* singing voice, be extended in a self-similar manner to an *ensemble of bel canto voices* having differing registration. In this process, the harmonic principles of *bel canto* vocalization, investigated by Leonardo da Vinci and described in part in the preceding section of this report, are “turned inside-out,” as it were, to become principles of well-tempered vocal polyphony.¹

The result, evolving in the course of a long, implicitly still-ongoing historical development, is the Classical well-tempered system, with its various species of harmonic intervals (octaves, fifths, fourths, thirds, etc.).

The mature chorus and orchestra ensemble, as understood by Beethoven and Brahms, must sing as a *single voice*, even while performing the most intricately articulated polyphony. Conversely, instrumental and choral polyphony are nothing but a self-similar extension of the polyphonic principle inherent in the single *bel canto* human voice with its characteristic registral differentiation.

This is exactly the conception underlying Johannes Kepler’s famous derivation of the musical intervals and scales, by harmonic division of the circle and

sphere, which were crucial to his investigation of the musical principles governing the multiple-connectedness of the planetary orbits (see Kepler’s *Harmony of the World*, Book III).

Unfortunately, Kepler’s constructions are often misread to signify nearly the opposite of what they were originally intended to demonstrate.² The modern reader must never forget, that the *circle* and *sphere* of Kepler signify something very different from the mere geometrical shapes which carry the same names. Kepler explicitly refers to Nicolaus of Cusa, and the latter’s discovery of the *ontological* significance of the circle’s relationship, as a higher species, to its inscribed and circumscribed polygons. Cusa and Kepler stressed two elementary points in this context: First, the polygons and the discrete whole numbers associated with them, do not exist self-evidently, apart from circular action; and there is no valid determination of the polygons which does not originate in the circle. Second, while the polygons are generated and everywhere bounded by circular action, it is impossible to go backwards and derive the circle from the polygons, even if the number of their sides were increased beyond any limit.

Exactly in this sense, the generative principle or *curvature* of the *n*-manifold of *bel canto*-based motivic thorough-composition, bounds the process of successive discovery of principles of composition, including the system of harmonic intervals, tuning, keys, modes, and everything else. There can be no self-evident algebraic determination of musical intervals, nor any valid construction based on “empirical facts” concerning acoustics and the physiology of hearing, as Helmholtz claimed. The well-tempered system is everywhere bounded by the creative process of musical development.

Thus, contrary to a nearly universal misunderstanding, the well-tempered system not only does not prescribe an algebraically-fixed set of pitches and intervals, *but it absolutely forbids any such “fixing”!* *Bel canto*-based well-tempered composition dictates the *necessity* for a specific “shaping” of each and every

tone and interval in a composition—including lawful *variations of pitch* within the harmonically-ordered “corridors” identified with the scale-steps, in such a way that the infinitesimal “curvature” of each moment of articulation expresses the creative tension underlying the composition as a whole.³ Unfortunately, the capability of distinguishing such small but crucial nuances, possessed by composers and to a large extent even the educated musical audiences of Beethoven’s time, has virtually died out.

By contrast, the concept of strict mathematical equal-tempering, is a fallacy rooted in the vain attempts to collapse a multiply-connected manifold into the “flat” space of a single (monophonic) formal principle.

Inversion of Intervals

As indicated, *inversion* is a universal principle of musical development. To gain some insight into this, we can start by examining the manner in which Classical composers employ elementary inversions of *intervals* as instrumentalities of the process of motivic-polyphonic development. As we move forward in this series of articles, we will work upward from the simplest cases, discussed here, to the higher conception of inversion which underlies the late compositions of Mozart and Beethoven. In the process, we must constantly reflect on the way our minds “hear” both the explicitly stated intervals, and those which are only implied by the composer, and which are often even more important than the stated ones. These distinctions, reflecting changes in assumption governing any given phase of a composition, must be expressed in performance, by the articulation and “shaping” of tones and intervals “in the small” (including lawful nuances in pitch intonation).

In its very simplest formal manifestations, inversion involves one of three forms of *transformation* of an interval subsuming two tones:

(1) By sounding one or both of the tones in a different octave, voice, or register; usually in such a way, that the higher of the two becomes the lower in pitch, and the lower becomes the higher,

while retaining their values within the scale (inversion of order in pitch). So, for example, a soprano and bass singer. In this case, the magnitude of the interval is changed; a fifth becomes a fourth, a major third becomes a minor sixth, and so forth.

(2) By reversing the *direction* of the interval's motion, as taken from either of the tones regarded as the origin, i.e., from upward to downward and vice-versa, while retaining the relative magnitude of the interval. In this case, not only the relation of higher and lower in pitch is reversed, but also the scale-value of one of the tones. So, the fifth from middle *c'* upward to the *g'* above it, inverts to the *downward* fifth from middle *c'* to the *f* below it. (Note: this kind of inversion is more than a simple transposition of the interval; the *directionality* is also changed.)

(3) By reversing the *temporal order* of the two consecutive tones, so that the later now becomes the earlier, and vice versa, while maintaining their pitch values.

It is important to bear several things in mind: First, each event of inversion, constituting a *transformation of intervals*, involves no less than a pair of intervals—the original and its inversion. Inversion can thus be considered as a special type of *interval between intervals*. In many cases (see below) the original interval is merely implied, but not explicitly stated; or vice-versa, the original interval may be stated explicitly, and the inversion only implied. Sometimes *neither* of the two are stated explicitly, but are unmistakably implied. Related to this, inversions can occur for intervals which span entire sections of a composition, rather than merely consecutive tones, and so forth.

Now let us look at some examples of elementary forms of inversion in compositions of J.S. Bach. I want to emphasize that the following remarks by no means amount to an adequate analysis of any of these compositions. They are intended to open doors for an appreciation of the role of inversion in composition, starting from the very simplest sorts of cases, and working upward toward the more complex and profound. [text continues on page 43]

FIGURE 2.3a

J.S. Bach, *Jesu, meine Freude*, opening chorale

The musical score is presented in four systems, each with four staves (Soprano I & II, Alto, Tenor, Bass). The key signature is one sharp (F#) and the time signature is common time (C). The lyrics are in German. Interval markings are placed above the notes in the Soprano I & II part.

System 1: Measures 1-4. Interval markings: 1 (7), 2 (8), 3 (9), 4 (10).
 Lyrics: Je - su, mei - ne Freu - de, mei - nes Her - zens Wei - de,
 ach wie lang, ach lan - ge ist - dem Her - zen ban - ge

System 2: Measures 5-15. Interval markings: 5 (11), 6 (12), 13, 14, 15.
 Lyrics: Je - su, mei - ne Zier, Got - tes Lamm, mein Bräu - ti - gam, au - ßer dir soll
 und - ver - langt nach dir! \

System 3: Measures 16-19. Interval marking: octave.
 Lyrics: mir auf - Er - - den nichts sonst Lie - bers wer - - den.

FIGURE 2.3b

Schematic of J.S. Bach, *Jesu, meine Freude*, opening chorale

The musical score for the opening chorale of J.S. Bach's *Jesu, meine Freude* is presented in two systems. The first system covers measures 1 through 6, and the second system covers measures 13 through 19. The Soprano and Bass parts are shown in a grand staff, while the inner voices (Soprano and Bass) are shown in a separate grand staff. The score includes various intervallic annotations: 'downward 5th b' ↘ e'' (measures 1-2), 'upward 4th b' ↗ e'' (measures 3-4), 'unison' (measures 5-6), 'upward 5th e ↗ b' (measures 4-5), 'downward 4th e'' ↘ b'' (measures 16-17), 'downward 5th b' ↘ e'' (measures 17-18), and 'octave e'' ↘ e'' (measures 17-18). A diagram at the bottom illustrates the intervallic relationships: b' ↘ e', b' ↗ e'', e' ↗ e'', and e'' ↘ b' ↘ e'.

J.S. Bach's Motet *Jesu, meine Freude*

The first two measures of the opening chorale of J.S. Bach's motet *Jesu, meine Freude* (Figures 2.3a and 2.3b), present us with an anomaly: The soprano voice describes in stepwise motion, the *descending fifth* $b'-e'$, while the bass moves downward from e , and then back to e . Consistent with this and the motion of the inner voices, we hear e as the base-tone and the downward fifth $b'-e'$ as a return (from where?) to the base tone. The whole motion of the voices is more like the *end* of a statement, than the beginning.

Now glance at the intervening development. From measure 3 to the beginning of measure 4, the soprano voice goes upward from b' to e'' , spanning an *upward fourth* $b'-e''$, which is the *inversion* of the *downward fifth* $b'-e'$ of the initial measures. Thereby, in our mind we "hear" the octave $e'-e''$ as confirming an implicit development $e'-b'-e''$, in which the first interval has been time-inverted in the opening statement.

The movement $e'-b'-e''$ would have achieved a certain closure, but that the soprano, instead of resting at the newly gained e'' , falls back to the adjacent $d\sharp''$; while the bass voice articulates the *upward fifth* $e-b$, which is an *inversion* of the soprano's *descending fifth* in measure 1. At this point, we reach a maximum

tension, associated with the unresolved juxtaposition of the intervals $b'-d\sharp''$, $b-f\sharp'$ (in the tenor voice), and the expected closure $e'-e''$. The resolution to $e'-e''$ is achieved in measures 5-6, by the soprano—anticipated already by the tenor's motion in measure 4—breaking into the third register to reach e'' from above, via the g'' and $f\sharp''$.

With the consolidation of the octave $e'-e''$, the chorale moves downward to its conclusion. Then, after some preparation in measures 13-15 (themselves expressing an inversion), in measures 16-17 the soprano moves stepwise down to b' (inverting the upward fourth $b'-e''$ of measures 3-4), from which it descends the remaining downward fifth $b'-e'$ to close the descending octave $e''-e'$ and end the chorale. That downward fifth, quoting the initial statement of the chorale—albeit with a shift in meter and a significant change in the tenor voice—resolves the original paradox: The beginning originated from the end!

All of this is nothing more than the most elementary kind of intervallic inversion, associated with the natural strophic organization of the chorale. The point is to see how the counterpoint developed by Bach in the bass and inner voices, defines and brings out the *changes in meaning* associated with the indicated inversions of what is at first glance one and the same interval.

J.S. Bach's *The Art of the Fugue*

We concentrate first on just a few measures of the opening statement of the fugue. (See **Figure 2.4a** for the entire fugue, and **Figure 2.4b** for conceptual sketches of it.) What we are about to point out would be immediately perceived by any musical audience in Beethoven's time. Today, however, the same things would pass unnoticed by most listeners, on account of their lack of grounding in composition. Hence the need for the following, relatively minute examination.

The fugue begins with a first statement of the theme (measures 1-5) with an initial contrapuntal elaboration through measure 8. Our initial hearing of the fugal theme is dominated by the statement of the *upward fifth d'-a'* in measure 1. In measure 2, the upward motion is reversed; a *downward third f'-d'* is stated, closing back to what we have already sensed to be the base-tone (tonic) D. At that moment, we "hear" in our mind *two additional, implied intervals*: first, an implied *unison* between the initial d' of the first measure and the final d' of the second measure; and second, an implied *downward fifth a'-d'*, which is the reversal of the upward fifth d'-a' of the first measure. This is the *first reversal/inversion*.

Our initial hearing of the following two measures 3 and 4, is dominated by the *downward half-step d'-c#'*, from the end of measure 2 to the beginning of measure 3, and the fact that the reversal of that interval (i.e., c#'-d'), which the earlier reversal d'-a', a'-d' makes us expect to hear, is not really accomplished until we reach d' in measure 5. Indeed, although c#'-d' occurs nominally already in measure 3, the d' is sounded off the beat, as a quarter note—too short and with too much the character of a passing note, to fully resolve the preceding d'-c#', which was stated strongly in half-notes and with c#' on the beat. In any case, the relationship between d'-c#' (measure 2 and 3), and the c#'-d' implied between the c#' of measure 3 and the d' at the beginning of measure 5, constitutes a *second inversion*.

The intervening passage, from mea-

FIGURE 2.4a

J.S. Bach, Fugue I from *The Art of the Fugue*

The image displays a musical score for the first fugue of J.S. Bach's *The Art of the Fugue*. The score is presented in a grand staff format, with a treble clef on the upper staff and a bass clef on the lower staff. The key signature is one flat (B-flat major), and the time signature is common time (C). The score is divided into measures, with measure numbers 1 through 41 indicated at the top of the staves. The notation includes various rhythmic values such as quarter notes, eighth notes, and sixteenth notes, as well as rests and accidentals. The score shows the initial statement of the theme in measures 1-5, followed by contrapuntal elaboration through measure 8. The score is marked as 'continued on following page' at the bottom right.

continued on following page

FIGURE 2.4a (continued)

sure 3 to the beginning of measure 5, is somewhat inconclusive at first hearing; what stands out is a *third reversal/inversion* implied between the sequences $c\#'-d'-e'-f'$ upward, $g'-f'-e'-d'$ downward, in measures 3 and 4 respectively. The latter is clearly heard as quoting the *downward third* $f'-d'$ of measure 2, and the former as stating its reversal/inversion. However, the sense of reversal is “modulated” by the intervention of neighboring tones $c\#'$ in the first case and g' in the second, plus the syncopation and acceleration of motion. Many things are suggested by this articulation, which are only actualized later in the fugue, and in later fugues of the entire *Art of the Fugue* cycle. Finally, note that all three reversals/inversions pivot on the common d' (as, in a sense, a pedal-point), strengthening our sense of d' as the hypothesized pivot or base-point of the whole composition.

All of this is preparatory to the second entrance of the theme, in measure 5. At the sounding of the a' , we immediately “hear” an implied unison with the a' of measure 1, and recall the initial upward fifth $d'-a'$, which the initial (lower) voice now once again quotes in stepwise motion from the beginning of measure 5 to the beginning of measure 6.

At this point a potential conflict appears.

In the original theme, the upward fifth $d'-a'$ subsumes an implied register shift (relative to soprano registration), from first to second register, establishing a' initially as the dominant tone in that register. This already creates the sense of a' as a second potential pivot-point or focus of the developmental action. This potential focal-point function is strengthened by the reversed pair of intervals $d'-a'$ upward, $a'-d'$ downward, which can be heard from the standpoint of either d' or a' as the pivot-point. As a result, our mental ear already “hears” as a strong implication the *upward fifth* $a'-e''$; it is implied as the inversion of the *downward fifth* $a'-d'$ and as the transposed quotation of the *upward fifth* of the fugal theme to a' as a new focus.

On the other hand, other strong reasons point to an *upward fourth* $a'-d''$ as

FIGURE 2.4b

Two key passages from Fugue I of J.S. Bach's *The Art of the Fugue*

The figure consists of three musical staves. The top staff shows a sequence of intervals: unison (d'-a'-d'), upward fifth (d'-a'), upward fourth (a'-d''), and octave (d'-d''). The bottom staff shows measures 48-50 for Alto and Soprano voices, with annotations for 'conflict' and 'resolution' between the two voices, and a comparison to the original theme in measures 2-4.

the lawful sequel at this point. In fact, if d' remains the focal-point, then already the first upward fifth $d'-a'$ in the very first statement of the fugue, calls for its continuation in the upward fourth $a'-d''$, which would thereby complete the octave $d'-d''$. In this way, the original reversal, namely:

$d'-a'$ (upward fifth) reversed to $a'-d''$ (downward fifth) in the statement,

would be quoted via the second voice as:

$d'-a'$ (upward fifth implied by placing the second entrance the theme at a' , against d' as a pedal-point), inverted to the upward fourth $a'-d''$ as the first interval stated by the second voice.

In other words, the original motion $d'-a'-d'$ becomes $d'-a'-d''$.

We therefore have a *dissonance* between two (as yet unheard!) inverted intervals: an upward fifth $a'-e''$, and an upward fourth $a'-d''$, both of which are inversions of the interval that commences the composition. Which of them will actually occur? Bach, in fact, chooses $a'-d''$; but the dissonance with the implicit $a'-e''$ is still heard in the mind, and acts to drive the development forward.

Let us briefly note some features of the rest of the fugue, which confirm this reading of the indicated passage.

First, the upward fourth $a'-d''$, which is an inversion of the original interval of the theme $d'-a'$, becomes the ever-more-dominant motif throughout the subsequent development. It is first echoed in the counterpoint in measure 7, and is taken up as a subsumed motif in subsequent counterpoints and especially the interludes of measures 17-21, 36-40, and 44-46. It evolves into the increasingly powerful counterpoints of the second half of the fugue, in the turning-point in measures 48-53 (and sequel), as well as the final development of measures 66-70, leading to the coda, where it is compressed to a new figure in the soprano voice.

Second, the turning-point beginning in measures 48 and 49. Here, the original upward fourth $a'-d''$ is stated again, as if to repeat the fugal statement at a' . But the listener is surprised: what follows instead is the dramatic entrance of the soprano voice with a second upward fourth $e''-a''$, reaching into the soprano's third register and initiating the statement of the fugal theme in the highest register-range of the fugue. The dissonance between the intervals $a'-d''$ and $a'-e''$, now explicitly re-created by the juxtaposition of the fourths $a'-d''$, $e''-a''$, is effectively resolved by the f'' in the upper voice of measure 50, by completing the upward sequence $d''-e''-f''$. Note how the alto counterpoint adds $c\sharp''$ to yield $c\sharp''-d''-e''-f''$, which is exactly the original statement of the third measure

of the fugal theme, stated one octave higher.

J.S. Bach's *Mass in B minor*

One of Bach's most condensed masterpieces of vocal counterpoint, is the six-part double fugue "Gratias agimus tibi" in the "Gloria" of Bach's *Mass in B minor* (the four-part vocal chorus is expanded, in the second half of the fugue, by two trumpet voices). The same figure recurs in slightly altered form as the final section of the mass, "Dona nobis pacem."

The initial statements of the fugue, introduced in a "canon of canons" between the two sets of voices (bass-tenor and alto-soprano), appear at first glance to be dominated by the notion of d as the base-tone, the upward major third $d-f\sharp$ and fourth $d-g$ in the fugal theme, and the rising fifth $d-a$ between the bass entry and tenor entry. (See Figure 2.5a, and Figure 2.5b for conceptual sketches.) The inversion $a-d'$ of the latter interval, is stated by the tenor (measure 2) itself, and between the tenor and alto entry in the same measure, and is then repeated in different registration between the alto and soprano entries (measures 2 and 3).

However, the rhythmic and contrapuntal arrangement of the voices also implies *other* intervals and inversions. Prominent among these are the intervals $d'-b$ and $b-d'$, implied, for example, in the tenor voice line (measure 2) and variously in other registers between the bass, tenor, and soprano (measures 3 and 4). All these intervals are heard in the initial section essentially from the standpoint of d as a kind of pedal-point. However, beginning in measure 10, and decisively in measure 13, the appearance of b in the bass line, redefines the entire set of relationships, now obliging us to hear the original sequence $d-e-f\sharp-g$ from a completely different standpoint, defined by an *inversion* of the original relationship of d and b which places b as the pivot in the bass (see also the discussion below).

The moment of this redefinition coincides with an implied bringing-together of the two double-fugal themes, already implied by the bass line's reference to the second fugal

FIGURE 2.5b

Schematic of ‘Gratias’ from J.S. Bach, *Mass in B minor*

Those compositions embody a fundamental discovery, which integrates the major and minor modes of the well-tempered system into a *new principle of composition*, sometimes called the “Lydian major/minor mode.” That discovery, which involves not one, but many principles of composition, will be elucidated from various angles in the following sections. Here, we focus on one aspect of the relationship of major/minor with the principle of inversion.

First, we should emphasize, that the entities we call “keys” and “modes” are not formal constructs, but—to the extent they mean anything at all—signify sets of assumptions or hypotheses governing specific phases of composition. The difficulty is, that the assumptions involved, cannot be identified with specific scales or other literal feature in some formal, “algebraic” fashion. Thus, it is easy to demonstrate that the most elementary and ubiquitous features of J.S. Bach’s music are incomprehensible from the standpoint of any formal notion of musical key. The assumptions and hypotheses are not located in the notes, but in the thinking process “behind the notes.”

That said, the characteristic distinction of hypothesis between (for example) C major and C minor would seem to lie in the different manner of forming thirds from C and its closest relations, F and G. So, C major features the major thirds (more appropriately termed in German “*große Terzen*” or “great thirds”) C-E, F-A, G-B; while C minor

features the “*kleine Terzen*” (“small thirds”) C-E \flat , F-A \flat , G-B \flat . Looking at the intervals between these intervals, note that E, A, and B are neighbors by fifths, as are E \flat , A \flat , and B \flat . Moreover, the first group is related to C by a series of successive upward fifths:

$$C-G-d-a-e'-b',$$

while the second group is related to C by a downward or inverted series of fifths (i.e., by fourths):

$$c''-f'-bb-eb-Ab.$$

Related to this, the *downward* tetrachord in C minor, C-B \flat -A \flat -G, is the exact inversion of the *upward* tetrachord in C major: C-D-E-F. In this sense, C major and C minor appear related to each other by a series of inversions.

The crucial missing singularity, needed to bring together C major and C minor in a closer unity, is expressed in F \sharp , or rather the *interval* C-F \sharp , which is the pivotal singularity of the whole musical system, corresponding to the arithmetic-geometric mean of the octave C-c and the anchor for the whole array of *bel canto* register-shifts. If we adjoin F \sharp , then we obtain a notion of C major/minor as a multiply-connected manifold which “grows” from C in both directions, ascending and descending fifths, as follows:

$$\begin{aligned} & \text{(ascending)} \\ & C \rightarrow G \rightarrow d \rightarrow a \rightarrow e' \rightarrow b' \rightarrow f'' \end{aligned}$$

$$\begin{aligned} & \text{(descending)} \\ & c'' \rightarrow f' \rightarrow bb' \rightarrow eb' \rightarrow ab \rightarrow db \rightarrow Gb, \end{aligned}$$

the latter (F \sharp and G \flat) belonging to the same tonal corridor in the well-tempered system. Thus, the coherence and connectivity of the manifold lies in the so-called Lydian interval, C-F \sharp , which is the anchor of our new major-minor mode.

The ascending set of tones forms a scale

$$C-D-E-F\sharp-G-A-B-c,$$

which coincides with the so-called *Lydian mode* in the ancient Greek musical system, and is characterized by the crucial interval C-F \sharp . The descending set of tones forms a second scale

$$C-D\flat-E\flat-F-G\flat-A\flat-B\flat-c$$

which is the exact inversion of the first, Lydian scale.

Now, some might shrug their shoulders at this, pointing out that all this is nothing more than the “circle of fifths” producing a perfectly symmetrical, chromatic, twelve-tone scale. This absurd conclusion completely ignores the *bel canto* principles determining a non-algebraic, non-equal-tempered system, principles which determine the unique, pivotal role of C-F \sharp .

The result, as the use by Mozart and Beethoven of this “Lydian major/minor mode” demonstrates, is not to *lessen* the sense of *tonality* in music, but actually to greatly *strengthen* it. This remark is

extremely important, owing to the widespread, but totally fallacious claim, that Classical music evolved “naturally” toward the atonal cacophony of so-called modern music. In fact, far from being a step *toward* arbitrary chromaticism, the C-F#-based Lydian mode, as understood by Mozart and Beethoven, achieves an enormous increase in the “Cantorian” ordering-power of tonal composition. Thereby it became possible to eliminate any remnants of arbitrary chromaticism that might otherwise be hiding between the toes of the earlier major-minor system.

1. What is commonly referred to as “melody,” including so-called solo melody, is nothing but a derived feature of vocal polyphony. Strictly speaking, *monophonic*

melody does not exist. What we call the melody of a solo voice, for example, is nothing but that voice’s singing of an intrinsically polyphonic composition. A relevant reflection of J.S. Bach’s views on the polyphonic principles of so-called melodic (or better, motivic) development, is contained in the first biography of Bach, written by Nicolaus Forkel [“On Johann Sebastian Bach’s Life, Genius, and Works,” in *The Bach Reader*, ed. by Hans T. David and Arthur Mendel (New York: W.W. Norton, 1966)]. Otherwise, the cases of Gustav Mahler and Richard Wagner typify the way in which, as soon as composers depart from the rigorous principles of well-tempered polyphony, their melodies degenerate into nothing but ugly groaning.

2. In Book III of his *Harmony of the World*, Kepler polemicized against the empiricist, mechanical theory of musical consonance and dissonance, which had been

put forward by Vincenzo Galileo, the father of Galileo Galilei. Vincenzo is regarded as the pioneer of the reductionist musical theory later associated with Jean Le Rond d’Alembert (1718-1783) and Jean-Philippe Rameau (1683-1764), which became virtually hegemonic by the end of the Nineteenth Century, thanks to Hermann Helmholtz (1821-1894).

3. Further exploration of this point might usefully focus on the significance of vibrato in the *bel canto* singing voice—a vibrato which, in strong contrast to the Romantic’s pathetic tremolo, is defined as a variation of pitch within a well-tempered pitch-corridor. Apart from the role of vibrato in the technique of *bel canto* singing, one can demonstrate how passages sung without the vibrato, i.e., at a “mathematically fixed” pitch, are correctly heard as *wrong*, destroying the fabric of explicit and implied cross-voice relationships.

3 The Scientific Discoveries of Bach’s *The Art of the Fugue* by Renée Sigerson

Johann Sebastian Bach’s *The Art of the Fugue* forces us to become aware of the ontological character of the relationship, in musical composition, between the principle underlying generation of the Lydian mode, and broader applications of the principle of inversion. To most readily appreciate this, it is important to grasp the term “principle” in respect to LaRouche’s conception of revolutionary axiomatic progress, whereby the development of man’s knowledge of discovered and realized Classical-artistic principles advances, anti-entropically, as expressed by the function $(m+1)/m$.

Usually, musicians only consider inversion as a “technique” of counterpoint, or as an “element” of composition, and not as bearing upon *principles* of discovery. Thus, the import of Bach’s work in *The Art of the Fugue* has until now been appreciated only by a few great composers. While there are certain diffi-

culties that need to be overcome to know this composition, it is nonetheless a transparent composition, which excellently illustrates LaRouche’s discussion of the generation of new, valid metaphorical principles.

The progress of hypotheses in the composition occurs, in first approximation, as one moves from one fugue to the next in the series, and from one set of fugues to the next. The current discussion focusses on the discovery unveiled in Fugue IV, relative to Fugue I, with some reference to Fugue III.

Preliminarily, it is possible to summarize that discovery as follows: Bach demonstrates, in the “unfinished business” left over from Fugue I and realized in Fugue IV, the generative significance for *all* keys, of the F# major/minor mode, which is derived from the register shift of the soprano voice. The F# major-minor modality is demonstrated as an

extension of the simple Lydian modality. In other sections of this report, we show that the simple Lydian modality, centered on F \natural , arises from inverting the C major scale. In Fugue IV of *The Art of the Fugue*, Bach demonstrates that there is a higher principle involved, in the deceptively simple effort to shift the F \natural Lydian modality to the locus of F \sharp , the soprano register shift.

As W.A. Mozart clearly grasped (although he reportedly never saw *The Art of the Fugue* manuscript itself), Bach’s conception of inversion, exemplified in this extension of the Lydian principle, allowed for a much greater density of lawful change. Bach’s use of inversion *across voices*, incorporating the significance of registral transformation and inversion as a unified, single type of principle embedded within the well-tempered system, had a far-reaching impact upon Mozart’s own ideas.

The introduction of a manifold of keys around F# minor occurs in the critical passage beginning measure 72 of Fugue IV, resolving to C major in measures 86-87 (see below). The discovery and situating of the F# mode, is the product of a revolution of axiomatic principles, which begins with the paradoxical implications of a discovery in Fugue I. Any ensemble of musicians attempting to play Fugue IV necessarily experiences the referenced passage as having bearing upon Ludwig van Beethoven's late string quartets.

As we present the musical demonstration of this discovery, it will be useful to keep the following excerpts from Lyndon LaRouche's main essay, "The Substance of Morality," in mind:

"With Plato, one begins with propositions being entertained as prospective theorems, and then follows the approach taken in his dialogues, as a way of searching out discoverable fallacies in those underlying presumptions. . . . The challenging of such prejudices, provides the user of Plato's method with what appears to be, for the moment, a

refined array of mutually non-contradictory definitions, axioms, and postulates; this refined array, taken as a whole, is an *hypothesis*. . . .

"The method of Plato starts with the recognition that all . . . hypotheses, including what were previously the most refined ones, must include some significant, axiomatic fallacy of some kind. . . .

"Truth, then, does not lie in any one choice of hypothesis. . . . Truth lies in the always radically revolutionary process, by means of which valid new

Comments on Bach's Fugues by His Contemporaries

'He who is not acquainted with Bach's fugues cannot even form an idea of what a true fugue is and ought to be. In fugues of the ordinary kind, there is nothing but a certain very insignificant and sloppy routine [*Schlendrian*]. They take a theme, give it a companion, transpose both gradually into the keys related to the original one, and make the other parts accompany them in all these transpositions with a kind of thorough-bass chords. This is a fugue; but of what kind? . . . Bach's fugue is of quite another kind." (Johann Nicolaus Forkel, "Biography of J.S. Bach," in *The Bach Reader*, ed. by Hans T. David and Arthur Mendel [New York: W.W. Norton, 1966], p. 324.)

'In composition, [Bach] started his pupils right in with what was practical, and omitted all the *dry species* of counterpoint that are given in Fux and others. His pupils had to begin their studies by learning pure four-part thorough-bass. From this he went to chorales; first he added the basses to them himself, and they had to invent the alto and tenor. Then he taught them to devise the basses themselves. He particularly insisted on the writing out of the thorough-bass in parts. In teaching fugues, he

began with two part ones and so on." (Letter from Carl Philipp Emanuel Bach to Forkel, in *The Bach Reader*, *op. cit.*, p. 279.)

'The true fugue is two sorts, distinguished according to their treatment of the fugue subject:

"(A) A strict fugue, *fuga obligata*, is one in which no other material than the subject is treated throughout, i.e., in which the subject after the exposition . . . makes its appearance in one entry after another, so to speak, and in which, consequently, all the counterpoints and interludes are derived from the principal subject or from the counterpoint that first appears against the answer, by means of division, augmentation, diminution, contrary motion, etc.; all this however, being bound together through imitation and a coherent and solid harmony. When such a strict fugue is worked out at length, and all kinds of other artifices (made possible by the many kinds of imitation, double counterpoint, canon, and change of key) are introduced in it, such a piece is called by the Italian name of *Ricercare* or *Ricercata*—an art fugue, a master-fugue. Such is the nature of most of the fugues by the late Capellmeister Bach.

"(B) A free fugue, *fuga libera*, solu-

ta, sciolta, is a fugue in which the principal subject is not continuously treated; that is, in which it does not make its appearance in one entry after another, although often enough, and in which, when the principal subject is abandoned, a brief, well-chosen interlude is worked out by imitation and transposition—which has a similarity to the principal subject or to the counterpoint that first appears against the answer, and is related to the same, even though it is not always derived from it. Such is the nature of most of the fugues by Handel." (Friedrich Marpurg, 1753, quoted in *The Bach Reader*, *op. cit.*, p. 254.)

[**Note:** Marpurg was no friend of Bach's. While his distinction between free and strict fugue is somewhat useful, he, a typical musicologist, thinks in terms of form, not ideas. In fact, *A Musical Offering* is of the character he indicates, but the fugues of *The Art of the Fugue* are much more groundbreaking and complex. The useful distinction to be made, is between Bach's type of thinking, and the sort of fugues Haydn wrote, before 1782. Examine, for example, Haydn's String Quartet in F minor Op. 20, No. 5: Every entrance is on a Lydian interval, but the principle associated with the Lydian mode is not even referenced.]

3.4a—or, when all four voices have finally entered, on measure 15, the voices form a double Lydian interval of f-g#-d'-b' (Figure 3.4b).

The tension between the original idea, rooted in D minor, and the Lydian intervals, which imply motion toward any number of potential modes, requires the introduction of a new idea, to forge progress. The idea introduced by Bach is a rising fourth, which begins to predominate and shape the direction of the earlier material. The rising fourth becomes pervasive throughout the entire fugue.

The passage beginning measure 36 (Figure 3.5) exemplifies this approach, in the way the bass voice is organized. Do not think that this is somehow the first time the fourth appears in the score, for it is not. That is not the point. Rather, the emerging predominance of the fourth occurs in the same way that, in a drama, a character in the background—perhaps a member of a crowd—suddenly steps forward and plays an important role. Bach's determination that a *third* idea must always be introduced in these fugues, underlines the difference between his concept of fugue, as well as of music overall, relative to lesser composers.

Prior to Bach, many other composers “used” the Lydian interval, but only as “another” device, or “element” of composition. The underlying principled importance of the Lydian as discussed in other sections of this report, eluded them. Unlike Bach, they confined themselves to writing “strict” fugues, where the theme would be repeated, then inverted, or changed rhythmically; but there was no ordering principle governing the *ideas* of the composition.

Let us take another example, in which the role of the fourth becomes even more significant. The passage in measures 36-40 (Figure 3.5) concludes with a very strong resolving interval: in which e in the bass voice moves *downward* by a *fifth* to A. This is very important, for the following reason: The *inversion* of that interval, e moving upward a *fourth* to a, is the high-point of the movement. In measure 49

FIGURE 3.4

Lydian intervals introduced in Fugue I

(a) Musical notation for measures 9-11. Measure 9: Treble clef, G4, A4, B4, C5. Bass clef, F3, G3, A3, B3. Measure 10: Treble clef, A4, B4, C5, D5. Bass clef, G3, A3, B3, C4. Measure 11: Treble clef, B4, C5, D5, E5. Bass clef, A3, B3, C4, D4. A Lydian interval (F-G#) is indicated between measures 10 and 11.

(b) Musical notation for measures 14-15. Measure 14: Treble clef, G4, A4, B4, C5. Bass clef, F3, G3, A3, B3. Measure 15: Treble clef, A4, B4, C5, D5. Bass clef, G3, A3, B3, C4. A double Lydian interval (F-G#) is indicated between measures 14 and 15.

FIGURE 3.5

Fugue I, measures 36-40

Musical notation for measures 36-40. Measure 36: Treble clef, G4, A4, B4, C5. Bass clef, F3, G3, A3, B3. Measure 37: Treble clef, A4, B4, C5, D5. Bass clef, G3, A3, B3, C4. Measure 38: Treble clef, B4, C5, D5, E5. Bass clef, A3, B3, C4, D4. Measure 39: Treble clef, C5, D5, E5, F6. Bass clef, B3, C4, D4, E4. Measure 40: Treble clef, D5, E5, F6, G6. Bass clef, C4, D4, E4, F4.

FIGURE 3.6

Fugue I, theme introduced in highest voice

(a) Musical notation for measures 49-52. Measure 49: mi. Measure 50: la. Measure 51: fa. Measure 52: re mi fa. The notes are G4, A4, B4, C5, D5, E5, F6, G6.

With soprano register shifts:

(b) Musical notation for measures 49-52. Measure 49: mi. Measure 50: la. Measure 51: fa. Measure 52: re mi fa. The notes are G4, A4, B4, C5, D5, E5, F6, G6. A soprano register shift is indicated by a box around the note G4 in measure 49.

FIGURE 3.7

Conclusion of Fugue I

Musical notation for measures 75-78. Measure 75: Treble clef, G4, A4, B4, C5. Bass clef, F3, G3, A3, B3. Measure 76: Treble clef, A4, B4, C5, D5. Bass clef, G3, A3, B3, C4. Measure 77: Treble clef, B4, C5, D5, E5. Bass clef, A3, B3, C4, D4. Measure 78: Treble clef, C5, D5, E5, F6. Bass clef, B3, C4, D4, E4.

FIGURE 3.8

Art of the Fugue theme and elementary inversion

FIGURE 3.9

Fugues and fragment counter-subjects, III and IV

(Figure 3.6a), the topmost voice introduces the theme, though this time introduced by the interval of the fourth, situated as *e*" moving upward to *a*". Thus, the soprano *inverts* the earlier bass voice resolution, referenced above (the last beat of measure 39 going into measure 40). This soprano *inversion* of the bass voice resolution is a turning point in the movement. These are the "highest" tones on which the soprano voice introduces the theme. Even more significantly, in this position, the uppermost voice is presenting the theme, for the first time, in such a way as to *cross* from the second to third register of the human soprano singing voice (Figure 3.6b).

This coupling of inversion with registral differentiation—including across two different voice species, namely bass to soprano—is essential to what is meant by *ontological principle* in musical composition. Although these fugues

are "instrumental" works, the underlying conception is entirely consistent with the *bel canto*-trained "chest" of human voices. Vocal registration is an ontological characteristic of musical art (see Chapter 1). As we shall see, Bach was intently focussed on the implications of the *difference* implied between a particular interval, that interval in respect to its inversion; and that pair of inverted intervals relative to changes of vocal registration, in different voice parts, as reflecting *ontological principles* of musical composition.

The importance Bach attributes to the shift in soprano vocal registration, is indicated by the final four measures of Fugue I (Figure 3.7), in which the soprano voice evokes a *cadenza* passage. Though there is a *d* pedal-point in the bass, the soprano voice is spelling out an ascending C minor "scale." This "scale" is actually composed of the identical material upon which the *Musical Offer-*

ing is based, namely, the paired Lydian intervals of C-F# and Eb-A. (Note, furthermore, the downward diminished seventh from the high *b*'' to the *c*'' at the end of the phrase, again an interval readily identified with the *Musical Offering*.)

Now, to have a clearer view of the principle indicated—and to experience its profound implications—we turn to Fugue IV.

First, a chart which simply situates the reader in respect to the material (Figure 3.8). In Fugue I, the theme is ascending. In Fugues III and IV, the theme is *inverted* to assume its *descending* form. The *inversions* denote the onset of more developed hypotheses, inclusive of the emergence of new constructive principles of composition. Bach's recognition that *inversion* required such a development of new hypotheses, is what distinguishes his concept of fugue, from schoolbook versions of "strict fugue."

In private discussion, Lyndon LaRouche has pointed out that *The Art of the Fugue* properly situates what is often called "chromatic" motion. Throughout the composition, Bach shows that "chromatic" motion is not some kind of sensual effect, but rather is a necessary *theorem of inversion*. This is particularly evident in the canonical duet, Fugue XV, not shown here.

Important to our investigation, is that both Fugues III and IV, which are inversions of the opening idea, introduce as companions to the root theme, *chromatic* countersubjects, that is, phrases based on motion by half-step.

To make this clear, we show again the opening measures of Fugues III and IV (Figure 3.9), accompanied by their *fragment* countersubjects, which are quite different from the fragment discussed in respect to Fugue I. Consider for one moment the "chromatic" fragment attached to Fugue IV: Implicitly this is a statement of inversion. The middle tone is a root. The half-step above and below the middle tone are moving in inverted directions from one another (i.e., the *g*# at the end of measure 5 moves back *up* to the *a*).

Immediately, the propositions being presented in Fugue IV are more densely organized, per interval of action, than those in Fugue I. That should not surprise us, since what Bach is pursuing here, is to further develop the “unfinished” question left over from Fugue I.

This greater density of principles is exemplified by the soprano voice in measure 13 (Figure 3.10). At this early point in the composition, the soprano voice moves into the third register, directly referencing the poetic high-point of Fugue I. The reference to the Fugue I is explicit. The soprano moves exactly as before, upwards by a fourth, from *e*'' to the third-register *a*'.

From this point on, there is a much greater density of interaction between colligating principles, relative to Fugue I. The reason for that will become clear.

For example: As in Fugue I, Bach will introduce a “new” interval, to re-situate the paradox created by the fugue theme placed against its countersubject (in this case, the step-wise [chromatic] motion). Here, the “new” interval is not a rising fourth, but rather a *descending* third, consistent with the fact that throughout Fugue IV, the overall direction of everything (except the soprano voice!) is *downward*.

Note, however, that this descending third is an interval of a more complex type than the fourth in Fugue I. Why? Because Bach always presents the third in duplicate, across two voice parts. For example, in measures 19 through 23 (Figure 3.11), the soprano and alto voices are in such a dialogue. Implicitly, the paired dialogue of descending thirds is spelling out an inverted fifth, or, sometimes, Lydian interval. Thus, implicitly, the paired thirds occur as an inversion of the fourths and fifths up to this time.

There is an additional clue concerning the purpose of this process. In both fugues, there is a significant occurrence of Lydian intervals. In this fugue, however, Bach meticulously *postpones* the introduction of the interval F#-C, until well into the development of the compo-

FIGURE 3.10

Soprano and alto voices, Fugue IV, measures 13-14



FIGURE 3.11

Pairs of descending thirds in Fugue IV

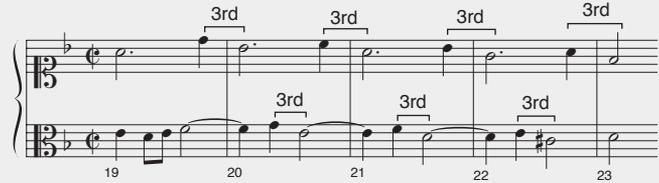


FIGURE 3.12

Fugue IV, measures 34-37



FIGURE 3.13

Fugue IV, measures 63-64



sition. Despite one early reference to C-G_b, the interval F#-C *only* occurs in respect to the soprano voice entering the third register!

For example, the passage beginning the second half of measure 34, through 37 (Figure 3.12), illustrates this pairing of the Lydian interval *c*''-*f*#' with the evoking of the soprano third register. In the course of measure 37, for the first time, the double Lydian sequence *a*'-*e**b*'-*c*''-*f*#' occurs, explicitly spelled out in the bass and alto voices. The soprano

voice, meanwhile, is entirely in the third register!

This occurs yet again, in measure 63-64 (Figure 3.13). The soprano is crossing back and forth between the second and third registers. As it does so, the *tenor* voice executes a remarkable Lydian interval: *e**b*' down to *a*' (obviously closely related to the ascending soprano *e**b*' up to *a*''). As it enters on the *a*, the same double Lydian sequence occurs across the four voices: *f*#-*a*-*c*'', with the *e**b*' from the tenor's

FIGURE 3.14

Fugue IV, measures 72-87

previous tone implicitly included in the paired Lydian intervals.

Now, we have arrived at the “*punctum saliens*” of this fugue. Something fairly remarkable is about to occur.

According to different source materials, Ludwig van Beethoven copied several measures from this section of Fugue IV into a notebook associated with his late string quartets. His entry includes measure 61, then a double slash on the staff to indicate a jump, and then three and a half measures beginning with the second half of measure 72. (See Figure 7.2 for a transcription of these passages from Beethoven’s notebook.)

The passage beginning with measure 72, through to the C-major resolution in measures 86-87 (Figure 3.14), records a demonstration of the process whereby a new principle is introduced to the manifold of validated metaphorical discoveries $[(m+1)/m]$, not merely as

such discoveries have bearing within a particular musical composition, but, rather those higher order discoveries which bear upon the entire domain of musical art.

What Bach shows, is that the “solution” to the unresolved crossroad of the relation of the soprano register shift to the set of contrapuntal problems posed thus far, lies outside the domain of what might be called “contrapuntal” considerations. Beginning with the measure copied by Beethoven, the bass voice descends to the lowest pitch for its voice in this composition, a low D. Against the backdrop of two references to the interval C-F#, for the next seven measures, the composition becomes, in stages, increasingly “blurry.” It is almost as if each of the voices “has a mind of its own,” typified by the soprano in measure 75 sounding c”, against the c# in the bass.

For several measures, there is a key-

less mode, until the soprano enters, asserting the opening theme, in the mode of A minor. However, the outcome of this placement of the theme in the soprano voice, is the exact opposite of what one would expect. Rather than the composition becoming more simply ordered, the opposite occurs.

As the soprano moves upward, to a third-register g”, coming down to a second-register f#, all of the other voices are emphasizing F#, the precise value at which the third register shift occurs. The blurring motion intensifies, and a heretofore unknown mode, F# major/minor, against B minor, takes over. After five measures of this treatment, everything comes together around C major!

This passage evokes precisely the “eerie” quality LaRouche discusses in respect to great tragedy—where one becomes conscious that it is the ideas hovering above the individual elements of composition which are governing the development. In the case of music, at this precise moment, one cannot help but think of Beethoven’s late quartets, even if one knew nothing of the passing reference to this fugue passage found in Beethoven’s sketchbook.

What is Bach proving to us? Do not look for the root of great musical composition in the formalities of counterpoint, or in any one of the principles. Rather, seek the root of composition in the generative capacity to improve the principles which bring these elements together. It is actually the irony of the soprano register shift, emphasized here by the interplay across the passage of F# against F#, relative to other colligating principles, which is driving Bach to focus on the underlying method of ordering these principles. Density is demonstrated by the very compact way Bach moves from the “eerie” realm of F# major/minor to the resolution of C major. In so doing, he has extended the notion of Lydian principle, in a most profound, and scientifically valid way, by emphasizing its ontological root in the soprano register shift. This also has extended his conception of inversion.

4

The ‘Royal Theme’ from *A Musical Offering* In Dialogue among Bach, Mozart, And Beethoven

by Ortrun Cramer

The idea of creative contributions by sovereign individuals of any historical era, which act upon all other contributions of the past, present, and future, can be wonderfully studied in a kind of “dialogue” among the three greatest musical composers, Bach, Mozart, and Beethoven—a dialogue on one subject, which is discussed by all of them, and where new contributions and new solutions for a discovered problem are provided by each of them, on each level. (There exist more contributions to the dialogue, both from the three composers discussed, and from other composers as well, than the examples we will discuss here.)

This chapter will investigate three compositions: Bach’s *A Musical Offering* (1747), Mozart’s C minor Fantasy for Piano K. 457 (1784) and C minor Sonata K. 475 (1785), and Beethoven’s Sonata for Piano Op. 111 (1821/22). For reasons of clarity, Beethoven’s Sonata for Piano Op. 13, the so-called “Pathétique” (1798/99), is briefly referenced. All these works are composed in (or, as the earlier composers would have said, “out of”) the key of C minor.

‘Setting the Theme’:

J.S. Bach’s *A Musical Offering*

After some hesitation, in 1747 Bach accepted an invitation of the Prussian King Frederick II (“The Great”) to visit Potsdam, where Bach’s son, Carl Philipp Emanuel, had been serving as music master to the court since 1740. Bach’s older son, Wilhelm Friedemann, accompanied his father on the visit, and the descriptions of the course of the visit are based on his eyewitness reports. On the first day of the visit, Frederick intro-

duced Bach to his collection of the newly developed Silbermann fortepianos. Bach was invited to try them, and to improvise new compositions. After a while, he asked the King to give him a subject, which he started to execute immediately, without preparation.

Later, after Bach’s return to Leipzig, he elaborated the subject into a 13-section composition, which he titled *A Musical Offering* (BWV 1079) and dedicated to Frederick, with the following words: “In deepest humility I dedicate herewith to Your Majesty a musical offering, the noblest part of which derives from Your Majesty’s Own August Hand. . . .” With respect to the subject and its elaboration, Bach wrote: “I noticed very soon, however, that, for lack of necessary preparation, the execution of the task did not fare as well as such an excellent theme demanded. I resolved therefore and promptly pledged myself to work out this right Royal theme more fully and then make it known to the world. . . .”

The work, which carries the inscription “Regis Iussu Cantio Et Reliqua Canonica Arte Resoluta” (“At the King’s command, the song and the remainder resolved with canonic art”), whose first letters are an anagram spelling out the word “Ricercar,” of which we find one in three parts, and later one with six parts, composed in a much freer manner. The work also includes a number of “various canons on the Royal Theme” (two of these are shown in **Figure 4.1**), which are indicative of Bach’s mastery in the art of inversion. Then, finally, there is an extensive, three-movement trio sonata for flute (the instrument played by the King),

violin, and bass continuo.

A Musical Offering later became known also as the “Prussian Fugue.” A letter by J.S. Bach to his cousin Elias Bach, written in 1748, indicates, how the piece was later distributed: “I cannot oblige you at present with the desired copy of the Prussian Fugue, the edition having been exhausted just today, since I had only 100 printed, most of which were distributed gratis to good friends.”

From a letter of the Austrian ambassador to the Prussian court, Gottfried van Swieten, from 1774—that is, more than 25 years after Bach’s visit at Potsdam—we learn that Frederick the Great told him about Bach’s visit, and “sang, in a loud voice, a chromatic fugal subject, which he had given this old Bach, who immediately made from it a fugue in four, then five, and finally in eight parts.” Thus, we know, that van Swieten, who hosted Haydn, Mozart, and, later, Beethoven in his Vienna salon, knew of the *Musical Offering*.

For a better understanding of the key part of the *Musical Offering*, the six-part Ricercar, it is helpful to introduce some comments from the first biography of J.S. Bach, published in 1802, which was written by Johann Nicolaus Forkel in close cooperation and correspondence with Bach’s sons Wilhelm Friedemann and Carl Philipp Emanuel. In this book, Forkel writes about Bach’s method of composing: “Now, when Bach began to unite melody and harmony so that even his middle parts did not merely accompany, but had a melody of their own, when he extended the use of the keys, partly by deviating from the ancient

FIGURE 4.1

Two canons from J.S. Bach's *A Musical Offering*

Canon 1. a 2



4. a 2. per Augmentationem, contrario Motu



The various clefs indicate the inversions intended by Bach, in both horizontal and vertical directions.

modes of church music, which were then very common even in secular music, partly by mixing the diatonic and chromatic scales, and had learned to tune the instrument so that it could be played in all the 24 keys, he was at the same time obliged to contrive another mode of fingering, better adapted to his new methods, and particularly to use the thumb in a manner different from that hitherto employed.”

Bach “considered music entirely as a language, and the composer as a poet, who, in whatever language he might write, must never be without sufficient expressions to represent his feelings.”

On Bach’s polyphonic setting, Forkel—who often literally quotes from the letters of C.P.E. or Wilhelm Friedemann—writes: “Very different is the case when two melodies are so interwoven with each other that they, as it were,

converse together, like two persons of the same rank and equally well informed. . . . [T]his kind of union of two melodies gives occasion to new combinations of tones and consequently to an increase of the store of musical expressions. In proportion as more parts are added and interwoven with each other in the same free and independent manner, the store of musical expressions increases, and finally becomes inexhaustible when different time and the endless variety of rhythms are added.” And later, Forkel elaborates: “But to produce such harmony, in which the single parts must be in the highest degree flexible and yielding towards each other if they are all to have a free and fluent melody, Bach made use of quite peculiar means, which were not taught in the treatises of musical instruction of those times, but with which his

great genius inspired him. These means consisted in the great liberty which he gave to the progress of the parts.”

A little further on: “Hence, in the modulation of his instrumental works, every advance is a new thought, a constantly progressive life and motion within the circle of the keys chosen and those nearest related to them. Of the harmony which he already has, he retains the greatest part; but at every advance, he mixes something related to it; and, in this manner, he proceeds to the end of a piece so softly, so gently and gradually, that no leap or harsh transition is to be felt; and yet no bar is like another. With him, every transition is required to have a connection with the preceding idea, and to appear to be a necessary consequence of it.” And: “A single part never needs to force itself through, but several must, in their combination, occasionally turn, bend, and yield in a very intricate and delicate manner. This of necessity causes uncommon, strange, and entirely new, hitherto unheard-of turns in the melodies.”

Concerning the composition of fugues, we read: “It fulfills all the conditions which we are otherwise accustomed to demand only of freer species of composition. A highly characteristic theme; an uninterrupted principal melody [*Gesang*], wholly derived from it and equally characteristic from the beginning to the end; not mere accompaniment in the other parts, but in each of them an independent melody, in accordance with the others, also from the beginning to the end; freedom, lightness, and fluency in the progress of the whole; inexhaustible variety of modulation combined with perfect purity; the exclusion of every arbitrary note not necessarily belonging to the whole.”

Concerning this latter point, the “exclusion of every arbitrary note,” Forkel writes of Bach’s method of teaching composition: “Every note was required to have a connection with the preceding: if any one appeared concerning which it was not apparent whence it came, nor whither it tended, it was instantly banished as suspicious. . . . The confused mixture of the parts, so

that a note which belongs to the tenor is thrown into the alto and the reverse; further, the untimely dropping-in of several notes in certain harmonies—notes which, as if dropped from the sky, suddenly increase the established number of the parts in a single passage, to vanish in the next one following, and in no manner belong to the whole; in short, what Bach is said to have called ‘*mantschen*’ [daubing, or mixing notes and parts together in a disorderly manner]—is not to be found either in himself or in any of his pupils. He considered his parts as if they were persons who conversed together like a select company. If there were three, each could sometimes be silent and listen to the others until it again had something useful to say. But, if in the midst of the most interesting part of the discourse, some uncalled for and importunate strange notes suddenly rushed in and attempted to say a word, or even a mere syllable, without sense of vocation, Bach looked on this as a great irregularity, and made his pupils comprehend that it was never to be allowed.”

Forkel’s treatise represents an almost contemporary document, and it gives today’s readers beautiful insights into how Bach’s music and composition generally were thought about, in the time of Mozart, Haydn, and Beethoven.

Now, let us turn to a brief examination of the six-part Ricercar from *A Musical Offering*. This is a six-part fugue, composed in a rather free manner, in which the parts (or voices) enter pairwise, and—as is typical for Bach’s treatment of the middle voices—with the third and second voices followed by the fifth and fourth. Only after a brief interlude, do the soprano and bass voices enter, and here, we can already observe a first change in the continuation of the soprano voice after the opening statement. In the subsequent development, new subjects are introduced in the various parts, which are nonetheless all derived from the original theme; they are all changed through inversion and modulation. At the end, all are interwoven, until the bass voice finally, in conclusion, re-presents the theme in its orig-

FIGURE 4.2a

J.S. Bach, six-part Ricercar from *A Musical Offering*, open-score version

The entrance of the second voice creates all the crucial intervals, which Mozart later picked up on in his K. 475 Fantasy: the diminished seventh from the “modulated” theme, the minor third, the Lydian, and the augmented second.

FIGURE 4.2b

J.S. Bach's own keyboard reduction of the six-part Ricercar from *A Musical Offering*

The musical score is presented in two systems. The first system contains measures 1 through 8. The second system contains measures 9 through 13. The third system contains measures 14 through 19. The fourth system contains measures 20 through 24. The notation includes treble and bass clefs, a key signature of three flats (B-flat, E-flat, A-flat), and a common time signature. Specific annotations include 'dim. 7th' above measure 11, 'min. 3rd' below measure 10, 'Lydian' below measure 11, and 'aug. 2nd' below measure 12. Measure numbers 2 through 24 are indicated above the notes.

inal form. A wonderful example of a predecessor of *Motivführung*.

For the sake of later discussion, let us briefly look, close up, at the characteristic conflict, or paradox, that is created right at the beginning, when the second voice enters, and the first shifts to sing an additional part. The second voice, which presents the theme in a modulated form, runs into a conflict with its companion, when the modulated falling interval from $e\flat$ to $f\sharp$ is contrasted to a longer c of the companion first voice. Here, we observe a pair of two intervals, which create a shift, from the $e\flat$ - c minor third, to the c - $f\sharp$ Lydian interval, which indicates a way out of the C minor key of the composition. Also note, that at the beginning of the next measure, we find another characteristic interval $b\flat$ - $c\sharp$, an augmented second, which we will meet again later on.

This paradoxical result of juxtaposing two voices—of two compositional levels, or “keys,” if you wish—is also what we will meet again later, as we

move on to Mozart and Beethoven.

Bach originally wrote the six-part Ricercar, as shown in Figure 4.2a, on six different staves, without indicating which instruments are to play them. He himself re-wrote it also, on two staves (Figure 4.2b), so that it could be played on keyboard instruments. In the original open score, each staff has a different clef, indicating a different implied species of human singing voice. With the exception of a few notes in the extreme high and low registers, the fugue can be readily sung by a *bel canto*-trained six-part choir.

In general, the distinguishing characteristic of the theme lies in the connection of the minor-triad with the chromatic line, which opens up a great number of options for development—as Bach proves in his *Musical Offering*. It is an outstanding theme, especially for a musical amateur like Frederick the Great. However, C.P.E. Bach was in his service, and many researchers consider it a possibility, that he may have helped the King to formulate the theme. In

1774, C.P.E. Bach wrote in a letter to Forkel, about his father: “When he listened to a rich and many-voiced fugue, he could soon say, after the first entries of the subjects, what contrapuntal devices it would be possible to apply; and to which of them the composer by rights ought to apply, and on such occasions, when I was standing next to him, and he had voiced his surmises to me, he would joyfully nudge me when his expectations were fulfilled.”

Mozart: ‘Nothing Is Played, But Handel and Bach’

We know for a fact, that Mozart studied Bach’s works in the house of Gottfried van Swieten, the already-mentioned Austrian diplomat, whose father, an immigrant from The Netherlands, had been the personal physician of Empress Maria Theresa. In 1782, Mozart wrote to his father in Salzburg: “Every Sunday at noon, I visit the Baron van Swieten—and there, nothing is played but Handel and Bach.—I am just now making a collection of the Bach fugues, of Sebastian and Emanuel and Friedemann Bach” A few days later, he writes to his sister Nannerl: “The cause of his fugue’s coming into the world is really my dear Konstanze. Baron van Swieten, to whom I go every Sunday, has let me take all the works of Handel and Sebastian Bach home, after I played them through for him. When Konstanze heard the fugues, she fell quite in love with them. She will hear nothing but fugues, especially (in this field) nothing but Handel and Bach. Now, since she had heard me frequently improvise fugues, she asked me whether I had never written any down, and when I said ‘No,’ she gave me a proper scolding for not wanting to write the most intricate and beautiful kind of music, and she did not give up begging me until I wrote her a fugue, and that is how it came about.” In the same letter, Mozart described van Swieten’s musical library as “although in quality a very large store of good music, yet in quantity a very small one.”

The proof that Mozart must have known the *Musical Offering*, or at the

very least its subject, is in his piano sonata in C minor, K. 457, to which he later added the C minor Fantasy K. 475.¹ The Fantasy was written in 1785, less than three weeks before the composition of the *Lied* “Das Veilchen” (see Chapter 1), which also represents a milestone in the development of musical composition.

In the opening section of the sonata’s first movement (**Figure 4.3**), we find all the elements of the “Royal Theme,” but in a changed presentation and registration. We also find, more elaborated, the conflict of the two parts of Bach’s composition, which is now presented in the horizontal development also: a juxtaposition of the opening arpeggio in C minor, and the “repetition” a fourth lower, starting from G, and appearing as if in G major!

In the course of the exposition, one can also study how a “second subject” of the sonata is derived—according to the *Motivführung* principle—from the first, but in such a way, that it can hardly be recognized at first. In this piece, we again find the chromatic element, in inversion and rhythmically changed (**Figure 4.4**).

The opening motif of the third movement (**Figure 4.5**) represents a direct quotation from the opening theme of the first movement, but in a doubly-inverted way. In addition, we are led to our conflict of two keys and modes, the C minor–“G major” confrontation, leading into the presentation of our “old acquaintance” interval e^b – $f\sharp$, now presented as a melodic line (**Figure 4.6**).

In the sonata’s second movement, Mozart again presents the *Motivführung* elements of the entire sonata, which we recognize this time in inversion and modulation of the intervals of the opening theme, and we find the chromatic element, used as a means of expression (**Figure 4.7**, measures 21–22). The second theme introduced in the movement (**Figure 4.7**, measures 5–6)—again through inversion—is later picked up, almost verbatim, as the leading theme in the second movement of Beethoven’s “Pathétique” sonata. It is indicative, both for understanding the movement

FIGURE 4.3

W.A. Mozart, Sonata K. 457, opening of first movement



The opening of the first movement shows the “Royal Theme,” in a different gestalt.

FIGURE 4.4

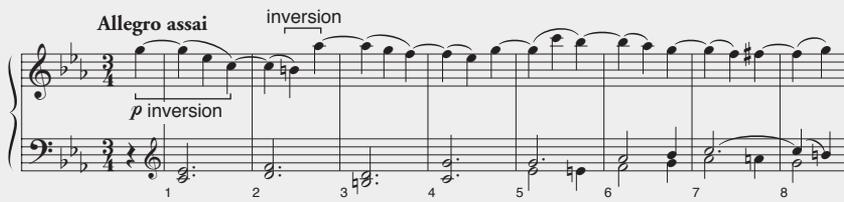
Ascending chromatic sequence in Mozart’s Sonata K. 457



A seemingly new element, in the exposition of the first movement, is generated by inverting the chromatic descending line from the “Royal Theme.”

FIGURE 4.5

Opening of third movement of Mozart's Sonata K. 457



The opening motif of the third movement consists of an inversion of the first movement's opening theme.

FIGURE 4.6

E^b-F[#] interval in third movement of Mozart's Sonata K. 457

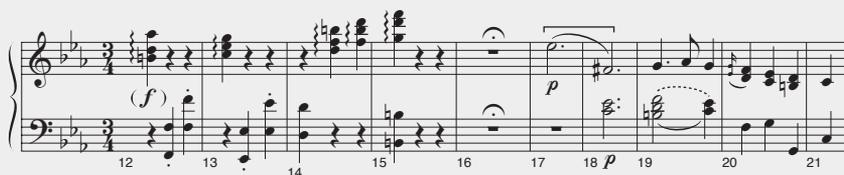


FIGURE 4.7

Opening, and second theme, of second movement of Mozart's Sonata K. 457



The second theme of the slow movement of this sonata was chosen by Beethoven as the theme for the second movement of his Sonata for Piano Op. 13, "Pathétique."

in respect to clear voice registration, and for the conception of the expression, that Mozart added the indication "sotto voce" at the beginning of this movement, as a hint to the performer and listener.

Before undertaking a brief examination of the opening of the Fantasy K. 475, let us keep in mind C.P.E. Bach's short definition of the intervals, from his famous *Essay on the True Art of Playing Keyboard Instruments* (New York: W.W. Norton, 1949): "The comparison of one tone with another, is called an *interval*" ("Die Vergleichung eines Tons mit dem anderen heißt ein Intervall"). In other words, it is the *relationship* of the tones, and not their distance, which is heard by the mind.

In the C minor Fantasy, Mozart adds qualitatively new steps, which put this piece above the K. 457 sonata, which was already a milestone in Mozart's works, in respect to its density and coherence. Here, we find him examining a problem, which we have so far met only in the interweaving of two voices: the importance of the F[#], not only as the "leading tone" to the dominant key of G minor/G major (as seen from C major/C minor), as it is usually taught, but in its importance for the C minor/C major mode, and the incredibly complex potentialities of development, which includes the entire sphere of the 24-key well-tempered domain. [text continues on page 62]

In hearing the opening (**Figure 4.8**), it is more difficult to recognize the “Royal Theme,” because it is changed, in a characteristic way, already at the beginning, and the chromatic line appears “only” in the harmonic progression.

We find that Mozart has integrated the F \sharp , which we know from Bach, and from the third movement of the sonata, into the theme itself—i.e., the paradox is now in the theme. We find the Eb-F \sharp interval, now in its inversion an augmented second. The irony of the integration is underlined by the short two figures, which again repeat this interval, accompanied by half-steps in different directions, underlining the principle of inversion.

We now recognize in this opening part how this integrated F \sharp becomes the pivot-point of constant change, through which the complexity of the 24-key well-tempered domain is explored: We find the F \sharp , and its “well-tempered twin” G \flat ; we find the F \sharp in the context of C major/C minor, of B major, of F \sharp major, and then, through a new, and surprising turn, showing up briefly as part of a clear D major (**Figure 4.9**)! Each time, the F \sharp is involved, and each time, its surrounding has changed. Keep in mind the fact, that there is a scale from C, which contains the F \sharp —namely, the famous “Lydian mode,” which Beethoven so obviously picked up in all of his late works, not only in the “Heiliger Dankgesang” of his Op. 132 string quartet.

In conclusion, there is a contemporary report, which is very important, concerning the relationship of Mozart and J.S. Bach: During Mozart’s last visit to Berlin, in 1789, he traveled through Leipzig, where he immediately visited the cantor at St. Thomas Church, Johann Friedrich Doles, who had been a student of Bach. A witness (most probably J.F. Reichardt) later says of this visit: “On April 22, he was heard without prior announcement, and without financial compensation, on the organ in the St. Thomas Church. He played there, for one hour, beautifully and artistically, for many listeners. The organist Görner and the late Cantor Doles were with

FIGURE 4.8

Opening of Mozart’s Fantasy for Piano, K. 475

The musical score for the opening of Mozart's Fantasy for Piano, K. 475, is presented in a grand staff format (treble and bass clefs). The piece begins with an 'Adagio' tempo. The first measure shows a melodic line in the treble clef and a bass line in the bass clef. The second measure features a 'minor 3rd' interval in the treble and an 'aug. 2nd' interval in the bass. The third measure is marked 'dim.' and contains a '7th' interval. The fourth measure features an 'aug. 2nd' interval. The score includes dynamic markings such as 'f', 'p', 'pp', and 'f'. The piece continues with a series of measures, each containing a specific interval or dynamic marking, as indicated by the annotations above the notes.

The opening of Mozart’s Fantasy K. 475 integrates the Lydian C-F \sharp interval. It contains all key intervals generated by Bach in the interaction of the first two voices in the six-part Ricercar.

FIGURE 4.9

Pivot around F# in Mozart's Fantasy K. 475

Musical score for Mozart's Fantasy K. 475, measures 22-27. The score is in G major and 3/4 time. It shows a pivot around the F# note. Dynamics include *fp*, *f*, *p*, *pp*, *cresc.*, *sf*, and *calando*.

him, pulling the stops. I saw him myself, a young man, dressed according to the fashion, and middle-sized. Doles was excited about the playing of the artist, and thought that the old Seb. Bach, his teacher, had been resurrected." At the end of his visit, Cantor Doles and the St. Thomas choir sang for Mozart Bach's motet "Singet dem Herrn ein neues Lied." According to the report, Mozart listened with concentration, and then said: "This is something to learn from!" He asked for the parts—a full score did not exist—spread them all out before himself, and studied them carefully. [text continues below]

FIGURE 4.10

Beethoven Piano Sonata Op. 111, opening of first movement

Musical score for Beethoven's Piano Sonata Op. 111, opening of first movement. The score is in G major and 3/4 time, marked *Maestoso*. It shows a pivot around the F# note. Dynamics include *f*, *sf*, *p*, *cresc.*, and *sf*. There are also markings for *dim. 7th* and *tr*.

Beethoven chose the key interval from Bach and Mozart as the opening of his own last piano sonata.

Beethoven: 'He Could Become A Second Mozart'

There is a well-known pun by Beethoven, on J.S. Bach: "Nicht Bach—Meer sollte er heissen" ("He shouldn't be called Brook ["Bach"]; his name ought to be Ocean").

Already in his early education in Bonn, Beethoven had been introduced to Bach's works—at that time a rather exceptional experience—through his teacher Christian Gottlob Neefe. Neefe had studied law in Leipzig, but had then switched to music, and became a student of the later Cantor at the St. Thomas Church, Johann Adam Hiller. Hiller himself had been a student of Doles. In 1783, Neefe wrote in an article in Cramer's *Magazin der Musik*: "Louis van Bethhoven, son of the above-mentioned

tenor, a boy of 11 years, who has a talent that promises much. He plays very fluently and powerfully on the clavier, reads very well at sight, and, to say everything in a word, he plays most of the *Well-Tempered Clavier* by Sebastian Bach, which Mr. Neefe has placed in his hands. Anyone who knows this collection of preludes and fugues in all the keys (which one could almost call the *non plus ultra*) will know what that means. . . . This young genius would deserve support so that he might travel. He would certainly become a second Wolfgang Amadeus Mozart if he were to continue as he had begun.”

Later, in Vienna, Beethoven was among the guests in van Swieten’s salon, and he dedicated his First Symphony to him. Through his entire life, he considered Bach to be one of the greatest composers. In his conversation books, there is an exchange, where Beethoven ironically asks a visitor: “Bach, is he dead?” He asked his publishers for copies of Bach’s works, and included also Bach’s sons in his high estimation. In a letter to his publisher Breitkopf und Härtel in Leipzig, in 1809, he wrote: “Generally, I would appreciate, if you would gradually send me most of the scores, which you have, for example Mozart’s *Requiem* etc., Haydn’s masses, Bach, Johann Sebastian Bach, Emanuel, etc. I have only a few of Emanuel’s piano works, but some of them must not only serve the artist for his pleasure, but also for his studies.”

But Beethoven speaks out most clearly in his compositions, which stand in the context of the Bach-Mozart treatment of the “Royal Theme.” We find elements of the problem treated in many works, but most directly first in his Piano Sonata Op. 13 in C minor, the famous “Pathétique.” While the first movement, with its “*Grave*” introduction, and then the jump into the “*Allegro molto e con brio*,” appears to be a sort of synthesis of Mozart’s Fantasy and the sonata’s first movement, the second movement quotes explicitly from the second theme of Mozart’s second movement.

Thus, Beethoven, already relatively early on, deals with the Bach-Mozart

FIGURE 4.11

Beethoven Piano Sonata Op. 111, opening theme

Allegro con brio ed appassionato

Measures 17-23. Dynamics: *cresc.*, *sf*, *f*, *ff*, *mezzo p poco ritente*.

FIGURE 4.12

Opening of second movement of Beethoven Sonata Op. 111

Arietta
Adagio molto semplice e cantabile

Measures 1-18. Dynamics: *p*, *cresc.*, *sf > p*, *dolce*, *sempre legato*.

FIGURE 4.13

Triple trill in Beethoven's Sonata Op. 111

The musical score for Beethoven's Sonata Op. 111, measures 104-124, is presented in two systems. The first system (measures 104-112) shows a triple trill in the right hand starting at measure 104, marked with a *cresc.* and *sf*. The left hand has a steady accompaniment with a *tr* marking. The second system (measures 113-124) continues the triple trill, marked with *p cresc.*, *sf*, and *p cresc. dim.*. The left hand has a steady accompaniment with a *tr* marking. The third system (measures 120-124) shows the triple trill continuing, marked with *espressivo*, *p*, *dim.*, and *pp*. The left hand has a steady accompaniment with a *tr* marking. The fourth system (measures 124-128) shows the triple trill continuing, marked with *sempre pp*.

Immediately after the highest point of tension and condensation, in the triple trill, Beethoven introduces a remembrance of the opening of Mozart's Fantasy K. 475.

material, and the sonata marks a key point in his own development.

The high point of the dialogue among the three geniuses, however, is found in Beethoven's final piano sonata, No. 32, Op. 111 in C minor, composed in 1821/22. Already the opening (Figure 4.10) attacks the core, the *punctum saliens* of the dialogue. We meet again our familiar interval Eb-F#, this time in a falling line, played in all voices, *forte* and in unison, in the "Maestoso" introduction of the first movement, before the theme is introduced in the "Allegro con brio ed appassionato" section (Figure 4.11). Thus, this movement again, like the Pathétique, appears to be a kind of synthesis of Mozart's C minor Fantasy and Sonata. One is obliged to understand the entire sonata from the standpoint of Bach's and Mozart's dealing with the given problem; and, at the same time, to re-examine them from the new, higher standpoint of Beethoven, which adds new value to their effort!

In conclusion, a brief examination of the second movement of Beethoven's Op. 111 sonata provides some striking elements, in the context of the "C minor issue." The sonata has "only" two movements. The second one is a large-scale integrated variations movement, which in the course of development become more and more complex, but also free. The movement is called "Arietta," to be played "Adagio molto semplice e cantabile" (Figure 4.12). Thus, we again find explicitly the demand, which we know from Bach's "playing in a singable fashion," something strongly reiterated by C.P.E. Bach in his book on playing keyboard instruments.

At the end of the second movement's fourth variation, which also marks the beginning of an extremely free, coda-like end section, we have the incredible triple trill, never heard before, and right afterwards, with a brief shift in the key signature to the "C minor coding," we find reference to an old acquaintance: a modified form of the opening of the Mozart fantasy (Figure 4.13)! [text continues on page 66]

From there, Beethoven proceeds to the final development of the movement (Figure 4.14), which ends in a unique way: We find variants of the movement's theme presented under and above a long, pedal-point-like trill, which, although the same tones are always played, is constantly changing its voice and registral characteristic. Thus, an old means of fugal polyphonic composition, the pedal-point, concludes the fugue, by giving a clear bass orientation to the conclusion of the modulations. Here, we find a “pedal-point,” which itself becomes a kind of pivot-point.

Much remains to be discovered in the dialogue among these works. And, many later composers have gotten involved: even Chopin, for example.

It was not an arbitrary choice by Lyndon LaRouche, to repeatedly insist in the unique importance of the “C minor series,” for understanding of the development of Classical composition. It was the process of “standing on each other’s shoulders,” of looking a little further or deeper, that made the successive qualitative steps possible. It will be the intense, in-depth re-living of these experiences, that will enable us, in the future, to bring forth new “partners in the dialogue.”

1. The original manuscript of the fantasy and sonata was re-discovered in 1990, in Philadelphia. A facsimile of the manuscript has been published by the Internationale Stiftung Mozarteum Salzburg, and by Bärenreiter-Verlag (ISBN 3-9500072-1-2 [Internationale Stiftung Mozarteum] and ISBN 3-7618-1041-5 [Bärenreiter]).

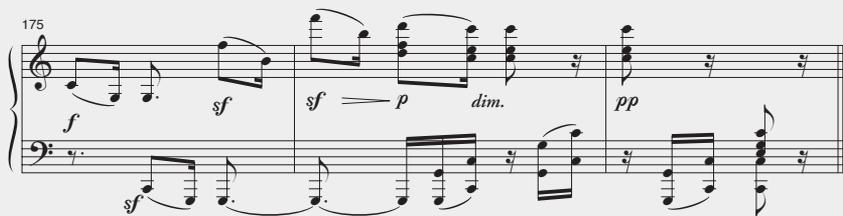
FIGURE 4.14

Conclusion of Beethoven Sonata Op. 111

The musical score for the conclusion of Beethoven Sonata Op. 111, measures 160-173, is presented in a two-staff format. The key signature is one flat (B-flat major/D minor) and the time signature is 3/8. The score begins at measure 160 with a trill in the right hand and a dynamic marking of *f*. The left hand features a dense, rhythmic accompaniment. The score continues through measures 163, 165, 167, 169, and 171, with various dynamic markings including *pp* and *cresc.* The piece concludes with a final flourish in measure 173.

continued on following page

FIGURE 4.14 (continued)



The trill forms a higher-order “pedal point,” which becomes a pivot-point of the conclusion.

5

W.A. Mozart’s Fantasy in C minor, K. 475, And the Generalization of the Lydian Principle Through Motivic Thorough-Composition

by John Sigerson

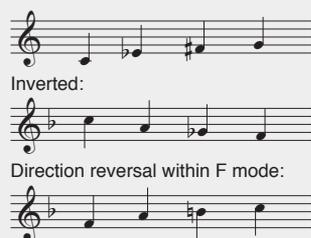
FIGURE 5.1

Opening of K. 475 Fantasy



FIGURE 5.2

Derivation of Lydian scale



Let us take as our point of departure, the following passage from Lyndon LaRouche’s main article, a passage that has specific bearing upon Mozart’s composition of the Fantasy in C minor, K. 475, in May 1785:

“A further refinement is required. The mind hears the inversion of any interval (e.g., C-E-G heard as G-E-C), to such effect that a simple Lydian scale is derived as an inversion of a C-minor, F# pivotted scale. The effort to bring the intervals represented by the scale indicated by the inversion, [into coherence] with the scale which has been inverted, introduces a further degree of refinement of the well-tempering. Add, the inversion heard across the polyphonic parts to the inversions generated within each part, and a further refinement is introduced.”

Mozart opens the K. 475 Fantasy with a bare statement of just such a “C-minor, F# pivotted scale” (Figure 5.1). But before we plunge into the work itself, let us first see precisely what kinds of inversions are required to derive a “simple Lydian scale” from it. Let us represent the leading features of

the original scale as C-E \flat -(F#)-G. The intervals described are an ascending minor third, followed by an ascending augmented second, and then an ascending half-step. Now, using C as our pivot, invert the direction of the intervals from ascending, to descending. The result is C-A-(G \flat /F#)-F, a kind of F major with a G \flat hovering just above the tonic. Finally, taking F as our point of departure, take the C-G \flat /F# interval and reverse the direction again, projecting it upward (Figure 5.2). The result: F-A-(B \flat)-C, a simple Lydian scale. That the mind hears such relations implicitly, is proven beyond a doubt by the power of Mozart’s K. 475 Fantasy.

Another unique property of Lydian intervals should also be touched upon before we begin to grapple with Mozart’s compositions in detail. Disregarding different spellings for the moment (in actual composition, they are crucial for the shaping of tone), one quickly discovers that there exist six, and only six, unique Lydian intervals in the well-tempered domain, namely: C-F#, D \flat -G, D-A \flat , E \flat -A \sharp , E \sharp -B \flat , and F \sharp -B \sharp

(Figure 5.3). These intervals are not “all alike,” but flow in a certain hierarchy as we move away from C-F \sharp , upon which the entire well-tempered domain is pivotted. After C-F \sharp , come the pair F-B \natural (as we saw derived above), and close after it, E \flat -A \natural , by virtue of the close relation of the E \flat major scale to the C major/minor mode. (Beethoven, in the opening of Act II of his opera *Fidelio*, goes so far as to tune the two kettle-drums to precisely those two tones, E \flat and A \natural !) Next we have another pair, each pivotted on other members of the C-major triad: E \flat -B \flat , and G-D \flat . And finally, there is D \flat -A \flat , the most “distant” Lydian.

Just as with the hierarchy of the register-shifts of the six species of *bel canto*-trained voices, so the mind hears this implicit hierarchy of Lydians. But the relationship between Lydians and register-shifts is far more profound than that: If one makes a list of the six Lydian intervals, and cross-grids this with the six human voice species, one finds that every Lydian interval crosses at least one vocal register of each of the six voice species. Or, put another way: The introduction of any one Lydian interval, implies a register shift for *every* species of singing-voice. Other intervals larger than the Lydian also share this property; but the next *smaller* interval, the fourth, does *not* have that property. E.g., for the ascending fourth C-F, the soprano never shifts registers across this interval.

The Lydian interval, therefore, represents the minimum action required to move into the domain of multiply-connected, polyphonic vocal registration. And conversely, the interval of a fourth represents the threshold of that domain, just as the soprano’s and tenor’s F \natural is the threshold of the F \sharp register shift.

It was implicit principles such as these—and not the mere form of fugal

FIGURE 5.3
The six Lydian intervals

writing—that struck Mozart like a bolt of lightning when he was introduced to J.S. Bach’s works by Gottfried van Swieten and his circles, beginning around 1782. From this standpoint, let us take yet another look at one of the works which Mozart studied intensively, the six-part Ricercar from Bach’s *A Musical Offering*. Focus on the end of the opening statement (measures 9-11 in Figure 5.4): As the second voice enters, the first voice continues with a sequence of *ascending fourths*. On the first beat of measure 11, the new voice creates a Lydian interval C-F \sharp with the first voice; this is followed by a series of *descending fourths*. As Bach proceeds through each successive variation, he uses inversion to increase the density of sequences of fourths; in measure 89 (Figure 5.5), he also introduces a rhythmic shift, such that the first note of the pair is shifted from the “strong” beats of the measure (beats 1 and 2), to the off-beats (beats 1 $\frac{1}{2}$ and 2 $\frac{1}{2}$). The density of rising and descending fourths reaches its greatest in measures 180ff., where the derived cross-voices all focus to form the Lydian interval C-F \sharp .

The revolution in Mozart’s mind, consisted in making these discovered principles into the explicit, primary subject of the composition, using the new method of motivic thorough-composition as pioneered by his friend Josef Haydn. The fruit of Mozart’s compositions of those years, quickly ripened into

a new *modal* method of composition, in which the Lydian-register shift plays the pivotal role. In his explorations, Mozart stuck close to the key of C minor in order to maximize his focus on working out the implications of his discovery. Examples of these efforts are the Fugue in C minor for Two Pianos, K. 426 (which he reworked five years later for string quartet), and his unfinished Great Mass in C minor, K. 427.

But greatest of them all, is his C minor Fantasy K. 475, and its companion work, the Sonata in C minor for solo piano, K. 457. Without additional commentary, Mozart had both works published together; to the educated audiences of his day, he did not need to explicitly state the obvious point, that the Fantasy was his own investigation into the principles employed in his composition of the earlier sonata. And, as we shall see below, the Fantasy indeed picks up exactly where the Sonata leaves off. (Beethoven, in many of his later works, took this approach one step further, interrupting the composition in mid-stream if necessary, in order to force the audience to turn their attention away from the rich externalities of the composition, to the discoveries of principles implied therein. One of the most accessible examples of this, is the baritone’s recitative “O Freunde, nicht diese Töne!” (“Not *these* tones, my friends!”) in the fourth choral movement of his Ninth Symphony.)

In order to even reach the doorknob of Mozart’s Fantasy, therefore, we must first, at very minimum, take a “guided tour” of the companion sonata. For, just as it is impossible to grasp the significance of Gauss’s discovery of the orbit of Ceres without working through the problem step-by-step, so it is with Mozart’s discoveries here. The toil will be well worth it. [text continues on page 69]

FIGURE 5.4
Entrance of second voice in the six-part Ricercar from J.S. Bach’s *A Musical Offering*

FIGURE 5.5
Displacement of fourths in *A Musical Offering*

FIGURE 5.6

Opening of Mozart Sonata in C minor, K. 457

The musical score for the opening of Mozart's Sonata in C minor, K. 457, is presented in four systems. The first system (measures 1-6) begins with a piano introduction marked *p* and *tr*, featuring a trill on G in the right hand and a descending fifth (G-C) in the left hand. The second system (measures 7-11) starts with a forte arpeggio (C-Eb-G) marked *f*, followed by a piano sequence marked *p* consisting of a descending fifth (G-C) and a diminished seventh (Ab-Bb). The third system (measures 12-15) restates the piano sequence starting on G, marked *f* and *tr*. The fourth system (measures 16-18) continues the piano sequence, marked *p* and *f*.

The K. 457 Sonata

The K. 457 sonata consists of three moments: the first a “*Molto allegro*” in C minor; the second, an extended “*Adagio*” in E \flat major, and the third, an “*Allegro assai*”—to which Mozart later added the word “*agitato*”—once again in C minor.

The first movement opens with a simple ascending C minor arpeggio, played *forte*, followed by a contrasting *piano* sequence consisting of a descending fifth G-C (inversion of a fourth), and a descending diminished seventh Ab-B \flat —the same interval which marks the opening motivic statement of Bach’s *A Musical Offering* (Figure 5.6). The first Lydian interval is formed with that B \flat , but its significance does not go much beyond its cadential function. This is followed by a restatement of the same sequence, but beginning on G, with the B \flat changed to a B \sharp , in order to keep it in the mode of C minor, once again ending in a cadentially-used F-B \sharp Lydian. The paradoxes only really begin with the following, second poetic couplet of the opening (measures 9-12): against an ostinato G-g in the bass, are descending fourths in two voices. The first voice descends in half-steps: G-F \sharp -F \flat -E \flat -E \flat -D—again an explicit reference to the descending line in the opening of Bach’s *A Musical Offering*. And, as with Bach’s work, it is introduced as a mezzo-soprano voice. The second descending fourth is E \flat -D-C-B \sharp —a *diminished* fourth, introduced in the soprano voice but with strong registral implications for the *tenor* voice. (This is probably why Beethoven focussed on this very interval in his Sonata Op. 5, No. 2 for Piano and Violoncello, since the predominant vocal reference for the ‘cello is the tenor voice.) Mozart repeats this double figure an octave higher, in such a way that the mezzo-soprano line is now sung by a soprano voice—once again in keeping with Bach’s treatment. To conclude the opening idea, Mozart repeats the descending half-step interval a \flat ’-g” twice, as an inversion of the implicitly stated G-A \flat of the opening measures 3 and 4.

Let us now skip to the second part of

the first movement, beginning at the double-bar on measure 75 (Figure 5.7). Here the opening arpeggio is re-introduced, but now in *C major*. Mozart almost immediately moves us to the implied inversion of *C major*, which is *F minor*, with many mentions of the Lydian $B\flat$. The passage ends on measure 98 with the same $a\flat$ - g as in the first section, only shifted down two octaves to precisely the location where the bass voice shifts between the second and first registers; the interval is suspended against the $B\flat$ (Figure 5.8).

The original *C-minor* arpeggio is now restated, but now it is enriched with a canon focussing on $A\flat$ (measures 118-120), and a sudden shift into $D\flat$, with the implicit, rising figure *C-D \flat* being heard as the inversion of the falling *C-B \flat* (Figure 5.9). The density of Lydians and inversions reaches a high-point at measure 125, where *C-F \sharp* is superimposed right on top of $B\flat$ - F . (Beethoven clearly recognized the significance of this passage, and in Mozart's honor, made them into the high-point of the *Kyrie* section of his *Mass in C major*, Op. 86.)

The extended "*Adagio*" of the sonata's second movement creates the necessary attention span for working through the paradoxes introduced in the first movement. As is the hallmark of Mozart's motivic thorough-composition, no additional musical material is really added. The opening (Figure 5.10) is a descending fourth, $b\flat'$ - f' , ending with a rising fourth $b\flat''$ - $e\flat''$, and then a descending combination of both, ending with a very prominent dwelling on the Lydian $e\flat'$ - $a\flat'$. The introduction is then repeated, but with an added element: a descending *diminished* fourth $e\flat''$ - $b\flat''$, which was also briefly referenced in the first movement but not explored. In this movement, it is explored exhaustively, through multiple inversions.

The implications of the first movement's $A\flat$ - G are now also intensively worked through in a section in $A\flat$ (Figure 5.11). Against an ostinato $A\flat$ - $a\flat$ (as opposed to G - g in the first movement), two other voices are at work: the first descends from $e\flat$ - $d\flat$ - c - $B\flat$, while in the

FIGURE 5.7

C major restatement in first movement of K. 457



FIGURE 5.8

$A\flat$ - G suspended over $B\flat$ in K. 457, first movement



FIGURE 5.9

High-point of inversions and Lydians in K. 457, first movement



FIGURE 5.10

Opening of second movement of Mozart Sonata K. 457

The score shows the first six measures of the second movement, marked 'Adagio'. The key signature is two flats (B-flat major/C minor). The time signature is common time (C). The piece begins with a piano introduction in the right hand, marked 'sotto voce', followed by a forte (f) entry. The left hand provides a steady accompaniment. Dynamic markings include *f*, *p*, *cresc.*, and *f*. The texture is primarily dyadic, with occasional triplets and sixteenth-note patterns.

second, Mozart simply reverses the order of the first and second pair of notes, thus: $c' - b\flat - e\flat - d\flat'$. And—should we be surprised by now?—Beethoven celebrates his great teacher here as well, by quoting this passage “verbatim” in the second “*Adagio cantabile*” movement of his C minor sonata for Piano, Op. 13 (Pathétique).

Mozart now introduces the most “distant” Lydian, $A\flat - D\flat$, into the musical fabric (measure 27), and in short order (measure 32, **Figure 5.12**), leads us into what can only be described as “ontological surprise”: the same $A\flat$ material is begun again, but in $G\flat$. Aha! $F\sharp!$ [text continues on page 72]

FIGURE 5.11

Second idea in K. 457 second movement

The score shows measures 24 through 28. The right hand features a melodic line with a triplet of eighth notes. The left hand has a rhythmic accompaniment of eighth notes. Dynamic markings include *p*, *cresc.*, and *f*.

FIGURE 5.12

‘Ontological surprise’ in second movement of K. 457 sonata

The score shows measures 31 and 32. Measure 31 features a melodic line with a triplet of eighth notes, marked *fp* and *cresc.*. Measure 32 shows a key change to G-flat major (three flats), with the melodic line marked *p* and *cresc.*.

A series of arpeggios (measures 38-40) leads us to g'' , $a\flat''$, $a\sharp''$, and $b\flat''$, and back “home” to the opening statement, but now highly ornamented (Figure 5.13). The registral shifts implied by $E\flat-A\sharp$ and $A\flat-D\sharp$ are now brought out clearly, both in measure 49, with the sudden drop into the “chest” register (Figure 5.14), and in the two grand scales in measures 51 and 52, moving from the soprano’s high $b\flat''$ to the bass’s low $A\flat$, and then back up a high $a\sharp''-a\flat''$, with each note suspended by a fermata (Figure 5.15). [text continues on page 73]

FIGURE 5.13

Return to opening theme of second movement of K. 457 sonata

Musical score for measures 39-41 of the second movement of K. 457 sonata. Measure 39 shows a piano introduction with a *cresc.* marking. Measure 40 features a grand scale with dynamics *f*, *calando*, and *pp*. Measure 41 continues with a piano introduction and dynamics *p*, *f*, and *p*.

FIGURE 5.14

A drop into the ‘chest’ register

Musical score for measure 39, illustrating a drop into the ‘chest’ register. The score shows a piano introduction with a *p* dynamic.

FIGURE 5.15

$B\flat-A\sharp-A\flat$ near conclusion of K. 457 second movement

Musical score for measures 51-52, showing a grand scale with dynamics *f*, *p*, and *pp*. The score illustrates the registral shifts from the soprano’s high $b\flat''$ to the bass’s low $A\flat$, and then back up a high $a\sharp''-a\flat''$.

FIGURE 5.16

Opening of third movement of Mozart Sonata K. 457

Allegro assai agitato

FIGURE 5.17

E \flat major section of third movement, with Lydian A \natural reference

The third and final movement of the sonata is organized as a kind of rondo, where the same theme repeatedly returns, unaltered. Each time, one moves farther afield, only to be jolted back, as in Poe's refrain "Nevermore." In the opening (**Figure 5.16**), we are back to the same material as the first two movements, but now the F \sharp is more prominently ending the phrase on f \sharp -g". A very rapid descending fourth f-c" is followed by repeated g"s, ending with a series of double Lydian, arpeggiated chords focusing on B \natural ; followed by a pregnant silence. And quietly (measure 26), we hear what everything seems to have been driving at all along: eb"-f \sharp -g'-ab'-the beginnings of Mozart's explicitly F \sharp -pivoted C minor. However, an uneasy paradox remains: by placing the eb" above the f \sharp ', implicitly in the soprano voice, there is no register shift. This absence of register-shift is what makes the passage so haunting each time it recurs in the rondo. Indeed, the paradox is never really satisfactorily resolved in the sonata itself—which is probably why Mozart added "agitato" to the description, and which is decidedly part of his motivation for composing the Fantasy later on.

We move into a passage in E \flat major, with its A \natural Lydian reference (**Figure 5.17**), harkening back to the second movement, ending with a sequence of rising fourths B \flat -C-D-E \flat in three different voices, all harkening back to the opening of the second movement. [*text continues on page 74*]

The rondo returns, and now we move to the F minor of the *first* movement, with the added figure $c''-d\flat''-c''$ bringing to mind the first movement's $g-a\flat$ and $a\flat-g$ (Figure 5.18). The suspicion is confirmed when the same material is repeated in C minor (measures 168-169), and $g'-a\flat'-g'$ is heard explicitly. Yet another shift, and this is inverted as $F\sharp-G$ in five different voices (Figure 5.19).

A new round of the rondo, and further aspects of the preceding movement are brought into focus. Then, with a final reference to F minor, Mozart proceeds to his remarkable coda, which starkly presents two sequences. The first is a descending scale (measures 293-300) which seems oddly bent out of shape: $c'''-b\flat'''-a\flat'''-f'''-e\flat'''-d\flat'''-c'''-(b\sharp')$ (Figure 5.20). But in the domain of the mind's hearing of implicit inversions, it is not "bent" at all, for, if one inverts it, it is a simple C major sequence: C-D-E-G-A-B-C. But there is a note missing: the fourth degree, F. The final sequence (Figure 5.21) solves that problem, not with F, but with $F\sharp$. First $c'''-e\flat'''$ is stated high in the soprano's fourth register, followed by a huge leap to an $F\sharp'$ at the very bottom of the piano's range, below the regular singing ranges; and ended with $G'-A\flat'$, then $F\sharp'$, and a final C. Which is precisely where Mozart begins in the Fantasy. [text continues on page 75]

FIGURE 5.18

F minor section of K. 457 third movement



FIGURE 5.19

F \sharp -G in five octaves



FIGURE 5.20

'Odd' descending scale is inverted C major sequence



FIGURE 5.21

Final sequence in Sonata K. 457



FIGURE 5.22

Opening of Mozart Fantasy for Piano, K. 475

Adagio

The musical score consists of seven systems of piano and bass staves. Measure 1 is marked *f* in the bass and *p* in the treble. Measures 2-4 show a sequence of notes in the bass: Eb, F#, G, Ab. Measures 5-7 continue the bass line with dynamics *f* and *p*. Measures 8-10 feature a dense texture with rapid sixteenth-note patterns in the bass, alternating between *f* and *p*. Measures 11-13 show a similar texture with a more active treble line. Measures 14-16 continue the sixteenth-note patterns. Measure 17 concludes the opening with a final chord in the bass.

The K. 475 Fantasy

It is impossible to reduce the opening of the Fantasy to a “theme.” The opening represents a multiple dimensionality, whose implications only begin to unfold as one ponders over the kaleidoscopic sequence of all sections of the Fantasy, taken as a whole; the which, obviously, can only be done if one has worked through it in a good deal of detail.

The most immediately evident feature is Mozart’s inclusion of the F# into the very first measure (Figure 5.22). This F# has a register shift “written all over it”: The shift from Eb to F# is a register shift for the four most common of the six voice species: soprano, mezzosoprano, tenor, and baritone.

The Promethean challenge posed by this included F# is then underlined, quietly, in the second measure, with a sequence of double Lydians, all revolving around F#-G. It is essential that these two pairs be performed as true *appoggiaturas*, with the emphasis on the *first* member of each pair. If this is done correctly, the second pair leads as a cross-voice into the silence of the measure’s final beat; if it is performed incorrectly, the pairs degenerate into perfunctory, meaningless cadences.

But we must also consider the following dimensionality: The opening measure has three parts: (1) the opening C; (2) the four subsequent notes Eb-F#-G-Ab, which describe a rising fourth which has been oddly “bent out of shape”; and (3) the leap back into the “chest register” on C-B#, with its implications for the simple F-based Lydian.

And, as yet another dimensionality, we should consider the downward, G-pivotted *inversion* of the opening sequence: G-Eb-Db-C-G-Ab, with its included prominent G-Db Lydian. Already in measure 4, this interval is brought out explicitly as well, and beginning with measure 6, the opening, descending C-B# is inverted into a rising C-Db. In measure 10, Mozart re-inverts this relationship into B# again, this time referencing the full B# mode. But we remain there only momentarily, as the bass descends by half-steps from there down to Gb (measure 15). And, surprise!

In measure 16, $G\flat$ is transformed into $F\sharp$, in a passage which is an unmistakable reference to the surprising $G\flat$ passage in the second movement of the sonata. Only here in the Fantasy, it took Mozart only sixteen measures to bring us there!

$F\sharp$ remains the focus of the following measures, leading to measure 25 (Figure 5.23), where repeated $f\sharp$'s move into the key of D major—a key which was entirely absent from the K. 457 sonata. It is also striking that the Lydian $G\sharp$ is entirely absent from opening bars of this D major section; Mozart's focus here, rather, is on the motivic thorough-composition associated with $C-B\flat$, but this time transformed into descending whole-steps, such that the entire melody is constructed from nothing but these descending and ascending whole steps.

The situation is entirely reversed, with a vengeance, in the following “*allegro*” passage (measures 36ff.), where a repeated $E-F\sharp$ is played against repeated $d''-g\sharp''$ (Figure 5.24). The same sequence is then repeated one step lower, on $D-E\flat$ and $c''-f\sharp''$, in such a way that we are led directly into an F major/minor section with a stress on the $B\flat$ -F Lydian (Figure 5.25). But not for long, as we are pressed back to a grand sequence of double-Lydian arpeggios, against a descending bass line from $F\sharp$ to the lowest $F\sharp'$ on the piano keyboard (Figure 5.26). We go a half-step lower still, to $F\flat'$, and then swing with arpeggios and scales from the bottom to the top of the vocal range, finally descending slowly to two long, held notes, $e\flat''$ and $e\flat''$ —a reference to the held $a\flat''$ and $a\flat''$ in the sonata's second movement. [text continues on page 77]

FIGURE 5.23

Focus on $F\sharp$ in K. 475 Fantasy

FIGURE 5.24

$C-B\flat$ descending interval inverted into $E-F\sharp$ ascending

FIGURE 5.25

F major/minor with $B\flat$ Lydian

FIGURE 5.26

Grand sequence through all registers

Quite an adventure! We have already worked through the content of the entire sonata. But it is far from over. Mozart now focusses on an ascending sequence of four descending fourths, such that the sequence itself describes a fourth (measures 86-88, **Figure 5.27**), after which he repeats the sequence down an octave, and then down another octave. Of all the subsections of the Fantasy, Mozart carries here the longest; the descending fourths are filled out with half-steps, are complemented by parallel sixths, and are repeated in all registers. All of this occurs in B \flat major. [text continues on page 78]

FIGURE 5.27

Ascending sequence of descending fourth sequences

6

The Principle of ‘Time-Reversal’ In Mozart’s Works

by Mindy Pechenuk

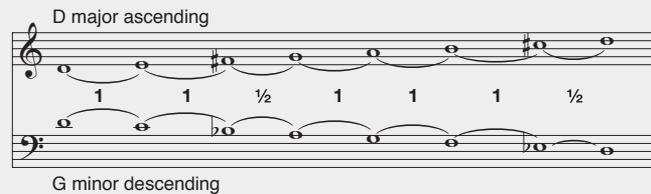
Beginning in 1782-83, Mozart revolutionized the concept of modality, and its relationship to motivic through-composition. As two of his most profound religious works demonstrate, the motet *Ave verum corpus* and his *Requiem*, great musical compositions do not develop in a linear, mechanistic way, from an initial theme, but are conceived from the beginning as a whole, in which it is often the end of the composition, or a key part of it, which determines the beginning. In the case of the motet *Ave verum corpus*, it is the final statement about Christ dying on the cross to save humanity (“in cruce pro homine”) which determines the opening statement “Ave.” In the *Requiem*, one of the most poetic parts is the soloists’ quartet “Recordare” (“Recall”), which again forces the listener to go back to the beginning of the *Requiem* from a different standpoint, that of remembering Christ’s sacrifice on the cross. How the profound moral and religious content of these works of art and their musical motivic development coincide with the idea of “time reversal,” of the future determining our present and past, is the subject of this investigation.¹

Mozart’s *Ave verum corpus*

Beginning in 1782, Mozart made a fundamental creative leap: the treatment of the major and minor modes as a “One,” and not as separate major and minor modes. The “one-ness” of the major and minor, for Mozart, has the following significance. Take the case of the modality of the *Ave verum corpus*, D major/D minor. Think how D major generates G minor, by taking the same intervals of the D major ascending scale, and *changing their direction*, playing the intervals downward, instead of upward, from D (Figure 6.1).

FIGURE 6.1

G minor is derived, by inversion, from D major



D major generates G minor, by taking the same intervals of the D major ascending scale, and changing their direction.

‘Recordare,’ from Mozart’s *Requiem*

STROPHE 1

Recordare, Jesu pie,
Quod sum causa tuae viae:
Ne me perdas illa die.

Recall, merciful Jesus
That I was the reason for Thy journey;
Do not destroy me on that day.

Quaerens me, sedisti lassus:
Redemisti crucem passus:
Tantus labor non sit cassus.

Seeking me, Thou didst sit down weary,
Thou didst redeem me, having endured the cross;
Let not such great pains have been vain.

STROPHE 2

Iuste Judex ultionis,
Donum fac remissionis
Ante diem rationis.

Just Judge of vengeance,
Give me the gift of redemption
Before the day of reckoning.

Ingemisco tanquam reus:
Culpa rubet vultus meus:
Supplicanti parce, Deus.

I groan as one guilty,
My face blushes with guilt;
Spare the suppliant, O God.

Qui Mariam absolvisti,
Et latronem exaudisti,
Mihi quoque spem dedisti.

Thou who didst absolve Mary,
And hear the prayer of the thief
Hast given me hope, too.

STROPHE 3

Preces meae non sunt dignae:
Sed tu bonus fac benigne,
Ne perenni cremer ignae.

My prayers are not worthy,
But Thou, O good one, show mercy,
Lest I burn in everlasting fire.

Inter oves locum praesta,
Et ab haedis me sequestra,
Statuens in parte dextra.

Give me a place among the sheep,
And separate me from the goats,
Placing me on Thy right hand.

Such explicit or implicit *changes of directionality* are crucial, both for the discovery of the paradoxes of the “new modality,” and for Mozart’s development of motivic thorough-composition.

Now, think about all the potentialities that exist in the entire composition—major and minor—as a *One*, and you begin to grasp the higher hypothesis which governs the composition as a whole.

The question is, *What governs the shift which Mozart has made?* To find the answer, we must consider, in succession, each section of the *Ave verum corpus*, in the same way as Plato treats the idea of hypothesis, higher hypothesis, and hypothesizing the higher hypothesis. For example, to begin with, consider the opening interval pairs as a paradox derived from this process. In order to focus us upon the very first interval pair, Mozart departs from the standard Latin text of the poem, by repeating the first word, “Ave” (“Hail”) a second time; instead of “*Ave verum corpus*,” Mozart composes “*Ave, ave verum corpus*.” In this way, Mozart sets up the opening paradox, which is crucial to the development of motivic thorough-composition.

There is only one other place in the entire composition, where Mozart repeats the text: the concluding line, “in mortis examine”—“in the test of death.” The second “in mortis examine” is totally *different* than the first. What is Mozart saying about how creativity works, and about how the human mind works? How do you reflect on your life, so that you live your life in order to cheat death, by being a creative person? That is why Mozart repeats this “in mortis examine” differently (**Figure 6.2**).

Bach’s *A Musical Offering*

Let us take a brief look at what Mozart was looking at in J.S. Bach’s *A Musical Offering*. As Lyndon LaRouche states in the main article: “J.S. Bach’s development of a form of polyphony situated with respect to the Florentine ‘*bel canto*’ voice-training standard, led into a determination of both pitch and of counterpoint derived from a rigorous application of the principle of a multiply-con-

FIGURE 6.2

Opening and final hypotheses in Mozart’s *Ave verum corpus*

(a) Musical score for Soprano, Alto, Tenor, and Bass, measures 38-43. The lyrics are: in mor - - - - - tis ex - a - mi - ne.

(b) Musical score for Soprano, Alto, Tenor, and Bass, measures 3-6. The lyrics are: A - ve, a - ve ve - rum cor - pus,

(c) Interval comparison: ascending 5th. The notes are In and mor.

(d) Interval comparison: ascending 4th. The notes are A and ve.

Compare the very last phrase of the work, sung on the words “in mortis examine” (a), with the very opening bars (b), sung on “Ave, ave.” Note the greater density of Lydian intervals in (a). Mozart’s transformation of the soprano line, leaping a fifth upward on “in mor-” (c), is an inversion of the ascending fourth in the soprano opening “Ave” (d).

FIGURE 6.3

Opening of six-part Ricercar from J.S. Bach’s *A Musical Offering*

Musical score for six-part Ricercar, measures 1-19. The score is in G minor and 3/4 time. It shows the first six parts: Soprano, Alto, Tenor, Bass, and two other parts.

FIGURE 6.4

High-point of final strophe of 'Recordare' in Mozart's *Requiem*

The musical score for Figure 6.4 shows measures 105 through 110 of the 'Recordare' section. The instrumentation includes Basset Horn I (F), Basset Horn II (F), Bassoon I, Bassoon II, Violin I, Violin II, Viola, Soprano Solo, Alto Solo, Tenor Solo, Bass Solo, and Violoncello/Contrabass. The key signature is C major, and the time signature is 3/4. The lyrics are: 'ne per-en-ni cre-mer i-gne!'. The score features dynamic markings such as *sf* (sforzando) and *f* (forte) for the woodwinds and strings, and *p* (piano) for the strings in measures 108 and 109. The vocal parts enter in measure 106.

nected manifold. The related treatment of the principle of polyphonic (e.g., 'cross voice') inversions led into such crucial of Bach's works as his *A Musical Offering* and *The Art of the Fugue*."

The entire six-part Ricercare of the *Musical Offering* is a series of hypotheses, which are progressing to higher orders of changes. Bach unfolds the paradox of the Lydian interval, i.e., the soprano register shift $c'-f\sharp'$ (Figure 6.3). Compare the rates of change throughout the piece as Bach, unfolds each voice entrance, which itself changes the entire ordering of the composition and the different levels of hypothesis, which unfold throughout the entire composition.

Mozart takes his discovery of Bach's discovery, with the insight he has discovered from Haydn's work, in motivic thorough-composition, and creates a

revolution in music. Mozart discovers a new higher modality, the "Lydian" modality, in which the new modality redefines all the relationships of the intervals, including the major/minor, which Mozart now treats as a "One"—and, once again, it is based on inversion. So, intervals are not fixed distances, but are themselves undergoing a constant process of change; a change, which is governed by a valid axiomatic-revolutionary discovery of principle, which also represents elevation to a "higher cardinality."

As Lyndon LaRouche states in the main article, for Bach, Mozart, et al.: "We must never hear intervals merely within voice parts, or even merely across voices, except that we also hear the totality of the implied, complementary inversion within and across the voices, as these unfold in the course of that motivic development which is the unity of the composition as an indivisible whole."

Mozart's *Requiem*

Another such example of "time-reversal" is Mozart's *Requiem*. Key to the understanding of the whole work is the soloists' quartet "Recordare" (the fourth item within the "Sequence" section of the mass, coming after "Dies irae," "Tuba mirum," and "Rex tremendae"). Mozart, treats the entire Recordare as a poem [SEE Box, page 79].

As in the case of the *Ave verum corpus*, so, too, in the "Recordare," Mozart increases the density of singularities in the final strophe, subsuming all previous hypotheses. Within the space of only five measures (Figure 6.4), Mozart develops through inversion, what he has been playing across the entire "Recordare"; this time, it is C major and its inversion F minor (note the play between the strings and the voices, where the voices are unfolding the Lydian pair of $b\flat-f'$ and $a\flat-d''$). The Lydian pairs unfold, $d\flat'$ to g' , across the bass's $d\flat'$ and the tenor's g' , and it is this unfolding which is primary and governs the bass voice and part. The point being that the bass line, starting in measure 110, is not a series of ascending and descending half steps, but is generated

from the Lydian modality and the inversion of the interval pairs.

Finally, look at the opening of the “Recordare” (Figure 6.5). Here we have the unfolding of our paradoxical interval pair: in this case, the two basset horns are an inversion of one another. Here, Mozart generates the paradox of the Lydian/fifth between the two voices, unfolding the possibility of the F major/B \flat minor, C minor/F major, G minor/C major, D minor/G major. This is a far cry from the evil textbook approach, which claims this opening as a simple series of suspensions at the second, totally denying the question of the Lydian modality and the generating principle of hypothesis.

It is time to throw out the textbooks of counterpoint, harmony, and Helmholtz’s crazy ideas of chords, notes as vibrations per second, intervals as measurement of distance. Mozart has revolutionized the axioms of those who came before him, i.e., Bach and Haydn, and for all those after, Beethoven, Brahms, Schubert, Schumann. As Lyndon LaRouche says in the main article: “[I]f we continue polyphonic and related developments, there is no simply algebraic determination of a well-tempered scale, but rather a counterpoint-determined interval of non-constant curvature.”

FIGURE 6.5

Instrumental opening of ‘Recordare’ in Mozart’s *Requiem*

In each measure, Mozart increases the density of singularities of our original, paradoxical interval pair.

1. In an article on “The Essential Role of ‘Time-Reversal’ in Mathematical Economics” (*Fidelio*, Winter 1996, Vol. V, No. 4), Lyndon LaRouche referred to Mozart’s *Ave verum corpus*, and “a presentation by Mindy Pechenuk, with chorus directed by John Sigerson, during the Labor Day weekend conference of the Schiller Institute on August 31, 1996,” as follows: “This highly sophisticated, compact, and beautiful work, is among the most convenient illustrations of the same principle of ‘time-reversal’ otherwise underlying both experimental physics in general, and physical-economic processes specifically. Any master’s Classical composition according to the principles of motivic through-composition, such as those of Wolfgang Mozart, L. van Beethoven, F. Schubert, R. Schumann, Johannes Brahms, et al., must be performed by applying the developed conception reached at the close of the composition, from the beginning of the performance of the composition. The modification so imposed by the intent of such a composer, results in what the celebrated conductor Wilhelm Furtwängler identified as ‘playing between the notes.’ Video recordings of the Aug. 31 pedagogical presentation of the motet are available through the Schiller Institute.”

7 On Questions of Motivic Thorough-Composition in Beethoven's Late Works

by Anno Hellenbroich and Bruce Director

In his late works, Ludwig van Beethoven (1770-1827) developed the “science of composition”—the mastery of which Josef Haydn once spoke in lauding tones, in reference to Wolfgang Mozart¹—to a theretofore unattained degree.

In Beethoven's late works, motivic thorough-composition, as a unity creating the idea of the development of the whole, has opened up utterly new horizons of thinking, not only as a musical metaphor, but as a compositional method.² In the words of Prof. Norbert Brainin, who dedicated 40 years with his colleagues of the Amadeus Quartet, struggling to achieve an adequate performance of the late quartets, Beethoven is here very advanced, not only as a composer, but as an artistic personality: “Beethoven's late quartets are something very special. They are the fruit of the development which Beethoven underwent, in the last ten years of his life and creative activity. During those last years, Beethoven went through a development—I can only treat it as a spiritual development—which from that time on, placed him above all other artists. Up until that time, there were many artists of his rank, Mozart and Bach, of course, Handel, Shakespeare, Dante, Goethe, and Schiller. . . . I believe, from that point on, he is alone, all, all alone. And it was in this spiritual condition, that he created the last quartets, the *Missa Solemnis*, the Ninth Symphony, and some of the piano sonatas, such as Op. 109 and 111. In these works, Beethoven is unequalled as an artist, as a mind.”³

What should be considered as late works, are particularly the works beginning with Op. 102, the Sonatas for Vio-

FIGURE 7.1

From Beethoven's sketchbooks: two passages from the B \flat minor fugue in Part I of J.S. Bach's *Well-Tempered Clavier*



FIGURE 7.2

From Beethoven's sketchbooks: two passages from Fugue IV of J.S. Bach's *The Art of the Fugue*



lonecello and Piano, that is, works that were composed sometime after 1815 according to a “new manner.” To this group of works, belong the great piano sonatas Op. 106, 109, 110, and 111. Among them should also be counted the great choral works, the *Missa Solemnis* Op. 123, as well as the Ninth Symphony Op. 125, and the late quartets, Op. 127, 132, 130, 133, 131, and 135.

In his late works, Beethoven struggled increasingly intensively with the *Freiheit/Freude* (freedom/joy) paradox, as an impulse to new musical works. In the Ninth Symphony, Beethoven elaborated his more than twenty-year involvement with Schiller's work, “the great song of joy,” which was to become the kernel of a new “double fugal” mode of composition in the fourth movement. Here, the concept “*tantôt*

libre, tantôt recherchée,” “as free, as it is strict,” which Beethoven wrote on the piece originally composed as the last movement of the Op. 130 string quartet, the “Große Fuge,” is a key to understanding how Beethoven, in a creative way, so magnificently further developed the discoveries made by Bach, Haydn, and Mozart.

As one can perceive from Beethoven's sketches and other evidence of his work methods, in each new great work, the artist engaged himself intensively, in the detailed solutions of his esteemed musical predecessors, especially Bach and Mozart; at times, he copied out in his own hand, decisive passages of surprising progressions. Thus, in the Poldrini sketchbook (dating around 1824/25, with 128 pages), next to notes on the first movement of the Ninth

Symphony and on the “Hammerklavier” Sonata Op. 106 in B♭ major, containing a great fugue, there are two passages copied from the fugue in B♭ minor from Book I of J.S. Bach’s *Well-Tempered Clavier* (Figure 7.1), two passages copied out of Bach’s *The Art of the Fugue* (Fugue IV, which shows the elaboration of the theme in reverse) (Figure 7.2), as well as a passage copied from a treatise on the fugue by F.W. Marpurg. There are also sketches for the unfinished string quintet fugue Op. 137 (D major).

Here, the modal possibilities, for example in the C major/C minor relationship, and somewhat special singularity passages for creating new “development paths,” always provided Beethoven the incentive for new experiments. A typical example is Beethoven’s intensive involvement with and search for new “combinations,” during his work on the Fifth Symphony in C minor, when he copied a passage from Mozart’s great G minor Symphony K. 550, from the last “*Allegro assai*” movement, measures 146-174; here, in his motivic thorough-composition of the theme through bold progressions, Mozart also plumbs precisely the use of the particular possibilities of Lydian intervals (Figure 7.3). [text continues on page 86]

FIGURE 7.3

From Beethoven’s Fifth Symphony sketches: part of the final movement of Mozart’s Symphony No. 40 in G minor, K. 550

The musical score for Figure 7.3 is organized into three systems of staves. The first system, measures 146-150, includes parts for Oboe I & II, Bassoon I & II, French Horn (B♭ alto), Violin I, Violin II, Viola, and Violoncello/Contrabass. The second system, measures 151-155, includes Horn (B♭), Violin I, Viola, and Violoncello/Contrabass. The third system, measures 157-161, includes Flute, Oboe, Horn (B♭), Horn (G), Violin I, Viola, and Violoncello/Contrabass. The score features various musical notations including notes, rests, dynamics (f), and articulation marks.

continued on following page

FIGURE 7.3 (continued)

162

Fl.
Ob.
Bsn.
Vi.
Vla.
Vc.
Cb.

This system of musical notation covers measures 162 to 165. It features six staves: Flute (Fl.), Oboe (Ob.), Bassoon (Bsn.), Violin (Vi.), Viola (Vla.), and Violoncello/Double Bass (Vc. Cb.). The key signature is two flats (B-flat and E-flat). The Flute part has a dynamic marking of *f* in measure 163. The Viola and Violoncello/Double Bass parts have dynamic markings of *f* and *p* in measure 163. The score includes various note values, rests, and articulation marks.

166

Fl.
Ob.
Bsn.
Vi.
Vla.
Vc.
Cb.

This system of musical notation covers measures 166 to 170. It features the same six staves as the previous system. The key signature remains two flats. The score continues with complex rhythmic patterns and dynamic markings, including *f* and *p*.

171

Fl.
Ob.
Bsn.
Vi.
Vla.
Vc.
Cb.

This system of musical notation covers measures 171 to 174. It features the same six staves. The key signature remains two flats. The score includes dynamic markings of *f* and *p*, and concludes with a double bar line in measure 174.

In Beethoven's late works, motivic thorough-composition is constantly worked through rigorously to the "form stretching," boundary-crossing "extreme."⁴

Thereby, the musical process itself becomes a complete expression; it is not merely an "elaboration" of the "particle themes," but is rather actually transformation and creation of higher orders of the musical metaphor, a very special challenge to performers.⁵

How else could one explain the magnificent effect of the "Credo" fugue in Beethoven's *Missa Solemnis*, in which he seems on the one hand to work rigorously with the techniques which Bach created in his fugal works—the reversal, backward reading of the theme, the shortening of the note values—and yet so reshaped, that something new and profound about the nature of man is created, which is really "moving," in Schiller's sense?

Here, a tremendous struggle with the musical substance, that is, the generative interval structures, is involved. [text continues on page 80]

Sketches, for instance on the reworking of the "joy" theme of the Ninth Symphony (Figures 7.4) or the double-fugal subject of the "et vitam venturi" fugue, document this (Figures 7.5 and 7.6). [text continues on page 88]

FIGURE 7.4

Beethoven's working sketches of the generative theme of his Symphony No. 9

Br. Solo
 Dei - ne Zau - ber bin - den wie - der, was die Mo - de streng ge - teilt, al -

1 etc.
 2 etc.
 3 etc.
 4
 5
 6
 7

FIGURE 7.5

Beethoven's 'experimental' sketches for the 'et vitam venturi' section of the 'Credo' in his *Missa Solemnis*

FIGURE 7.6

'Et vitam venturi' double fugue from 'Credo' of Beethoven's
Missa Solemnis

Soprano
Alto
Tenor
Bass

309 310 311 312

p Et vi - tam ven - tu - ri sac - - - - cu - li,

p a - - - - men, a -

313 314 315 316

S. a - - men, a - men, a - men, a - - - -

A. *p* Et vi - tam ven - tu - ri sac - - - - cu - li,

T. - - - - men

B. a - - - - men, a -

The subject (sung by the sopranos) is counterposed to the countersubject (sung by the tenors).

FIGURE 7.7 (continued)

The musical score is arranged in a standard orchestral format with seven staves. The key signature is one sharp (F#) and the time signature is 4/4. The instruments and their parts are as follows:

- Violin I (Vi.):** Features two dynamic markings, *sf* (sforzando), at the beginning of the second and fourth measures.
- Viola (Vla.):** Provides harmonic support with a series of chords, marked with *f* (forte).
- Soprano (S.):** Sings the lyrics "Freu - de, Freu - de,".
- Alto (A.):** Sings the lyrics "um - schlun - gen, Mil - li - o - nen,".
- Tenor (T.):** Sings the lyrics "um - schlun - gen, Mil - li - o - nen,".
- Bass (B.):** Sings the lyrics "Freu - de, schö - ner Göt - ter - fun - ken, Toch - ter aus E - ly - si - um,".
- Violoncello/Double Bass (Vc. Cb.):** Plays a rhythmic accompaniment of eighth notes, marked with *f*.

FIGURE 7.8

Beethoven sketch for Op. 133 'Große Fuge'



Two examples from the late quartets Op. 132 and 130 may be able to open access to Beethoven's thinking, to Beethoven's motivic thorough-composition. These belong to the three quartets which Beethoven dedicated to the St. Petersburg Prince Galitzin: Op. 127, Op. 132, and Op. 130, completed in this order. The Op. 127 E \flat major quartet was composed mainly in the period between 1822 and 1825, and belongs therefore to the composition phase of the *Missa Solemnis* (between 1819 and 1823) as well as the Ninth Symphony (begun 1822-1824); the Op. 132 A minor quartet was completed between 1824 and 1825, and performed in September 1825; and Op. 130, with the concluding "Große Fuge" movement, composed between May and December of the same year. Beethoven later published the powerful concluding fugue separately as Op. 133, and composed a new finale to Op. 130 (sometime in October-November 1826, one year before his death). This extremely intense creative process, often involving several works simultaneously, poses a challenge to people today, to comprehend the spiritual struggle with the "musical thought-object" in its diversity and method.⁶

The late quartets, above all Op. 127, 130, 132, and 133, but also in another form, Op. 131 and 135, show in increasingly strong measure that an overlapping musical idea-substance binds them together; not in the reduced sense of "the same four-note chromatic motif involving a sixth," but rather as a discussion process, a fly-wheel of new musical thinking in expanding the heretofore explored well-tempered "space" of the 24-key domain. Such are the sketchbook entries, which were apparently noted down three-fourths of a year apart, for example, in a Berlin sketchbook (aut11/2), in the sketches for Op. 127, for a planned overture on the theme B-

FIGURE 7.9

Opening of Beethoven's Op. 133 'Große Fuge'

 A musical score for the opening of Beethoven's Op. 133 'Große Fuge'. The score is in G major and 3/4 time. It is divided into three sections:

- Allegro (measures 1-10):** Features four staves (Violin I, Violin II, Viola, and Violoncello). The music is characterized by dynamic markings of *f* (forte) and *sf* (sforzando). The first measure shows a half note G in all parts, followed by a quarter note A, a quarter note B, and a quarter note C. The texture is dense and rhythmic.
- Meno mosso e moderato (measures 11-16):** The tempo and mood change. The music is marked *p* (piano). The texture becomes more sparse and lyrical, with a focus on the melodic lines of the Violin I and Violin II.
- Allegro (measures 17-24):** The tempo returns to *Allegro*. The music is marked *f* (forte). The texture becomes more rhythmic and driving, with a focus on the bass lines of the Viola and Violoncello.

A-C-H (B \flat -A-C-B \sharp), as well as sketches for Op. 132 and 133. Here Beethoven transposed a fugal theme not used in Op. 127 into B \flat major, and conducted some work with it and a countersubject (Figures 7.8 and 7.9).

Beethoven's mode of composition which breaks through form, is already recognizable alone in the expansion of the general four-movement form of the quartet, handed down by Haydn and Mozart. Thus, Op. 127 does have four

movements; however, Beethoven introduces the first movement with a “*Maestoso*” (slow), a path which he also treads as introduction to Op. 130, Op. 132, and then as an independent movement in Op. 131. The movement structure itself must bend to the succession of ideas. Thus, Beethoven writes six movements in Op. 130: first movement: “*Adagio, ma non troppo—Allegro*” in B♭ major; second movement: “*Presto—L’istesso tempo*” in B♭ minor; third movement: “*Andante con moto, ma non troppo*” in D♭ major; fourth movement: “*Alla danza tedesca. Allegro molto espressivo*” in G major; fifth movement: “*Cavatina. Adagio molto espressivo*” in E♭ major; sixth movement: “*Finale*” in B♭ major, which Beethoven added later. Originally, Beethoven conceived for the Finale what was later published separately as the “*Große Fuge*” Op. 133, appearing in the original manuscript under the title “*Overture*.” Beethoven developed this double-fugal movement, internally with multiple movements, “*Overtura. Allegro—Meno mosso e moderato—Allegro; Fuga. (Allegro)—Meno mosso e moderato—Allegro molto e con brio*,” into a major work of over 740 measures, which remains unparalleled in Classical music creations.

There are conversations with Beethoven from around the time of the composition of Op. 132 and 130, on musical generative interval-groups. For example, there is an entry by Karl Holz, a violinist friend of Beethoven’s, in a conversation book from 1825, in which Holz talks about the “*Kyrie-fugue theme*” from Mozart’s *Requiem* (Figure 7.10). Holz says he thinks Haydn also worked on this as a fugal theme in his quartet Op. 20, No. 5 in F minor, and he cites this passage, which is very closely related to the C minor theme from J.S. Bach’s *A Musical Offering*. Figure 7.11 shows the Holz entry, showing some errors in his memory of Haydn’s quartet.

Beethoven took great care in these late quartets to emphasize the *cantabile* (song-like) presentation, and thus names the second movement in quartet Op. 127 “*Adagio, ma non troppo e molto cantabile*”; in Op. 130, he characterizes

FIGURE 7.10

‘Kyrie’ double fugue opening from Mozart’s *Requiem*



the fifth movement as “*Cavatina. Adagio molto espressivo*,” and adds for each instrument “*sotto voce*”; and in the most moving part, Beethoven writes “*beklemmt*” (tormented, constricted). Professor Brainin, when asked about the presentation of this difficult piece, makes clear why “*knowledge*” is not to be won from the musical text alone, but that one has to be in a position to be able to “*read between the notes*” in order to really grasp the composer’s expression and then transmit it adequately:

“I have a special way of doing this [passage in Op. 130 where Beethoven has written “*beklemmt*”]. . . . Oppressed, really oppressed . . . constricted, that is, struggling for breath. . . . I play it like a *ponticello*, that is, high up on the bridge. There is a little whistle in there, too. A couple of people mocked the way I play it. There are always some, who are annoyed by one thing or another that I do, and don’t like it. It is either too hard for them, too soft, too sweet, or I don’t know what. But they have not the slightest idea what they are talking about, because they do not understand anything about Beethoven. I play it as it really is; I do not improve anything and I do not worsen anything. If it is hard, then I play it hard, if it is not so hard, then I do not play it so hard. That is in fact what is magnificent about Beethoven, that he has this incredible tenderness in himself and this incredible severity. This, I would almost say, Old Testament severity. It is like, when Moses is on Mount Sinai and receives the tablets with the commandments from God. That is what it is like!”⁷

FIGURE 7.11

Holz’s entry in Beethoven’s conversation book, showing Haydn fugue theme



Beethoven’s Opus 132 String Quartet

Beethoven’s String Quartet No. 15, Op. 132 in A minor, illustrates the essence of the higher development of musical composition represented in his late works. In these compositions Beethoven expands, in an entirely new way, man’s conception of the well-tempered system of polyphony, and in so doing extends what LaRouche has identified as the *m*-fold manifold, to an (*m*+1)-fold manifold.

Beethoven’s advance was to reconceptualize the relationships of the well-tempered system into a new higher modality (the equivalent of what Georg Cantor would define as a new transfinite ordering), by locating the crucial singularities of the well-tempered system, particularly the Lydian interval, and the principle of inversion, in a new domain. To communicate this new idea, Beethoven took the ironical step of setting this quartet in the key of A minor, while setting the third movement in the Lydian mode. But, as a simple comparison of the first and third movement will show, Op. 132 as a whole, or these two movements individually, is not written in either A minor, or the Lydian mode, but in the new higher modality, which Beethoven had discovered.

While a more detailed examination of this quartet can be found in other locations,⁸ for pedagogical purposes here, we apply the principle, at work in all musical compositions, of the simultaneity of the whole, and, juxtapose the first and third movements as a “One”; first in broad overview, then in more detail.

The first movement is set in the key of A minor (no sharps or flats), the second in the Lydian mode, also devoid of sharps and flats. (The Lydian mode is an F major scale with a B \sharp instead of B \flat .) By the ironical combination of these two similar, yet different, modalities, Beethoven provokes the mind of the listener to re-discover for himself this new, higher modality.

To grasp the conception of the new higher modality of Beethoven’s late quartets, it is necessary to think of the entire well-tempered system, and the characteristics of the *bel canto* human singing voice, as a One. From this standpoint, think now of the various keys and modes as sub-divisions whose characteristics are merely reflections of the ordering of the entire system.

As an example, look at the modes of the first and third movements of Op. 132 (Figure 7.12). The key of A minor is distinguished by the half-step intervals characteristic of the minor mode—between the second and third (B-C) and the fifth and sixth (E-F). In the Lydian mode, these two half-steps are displaced to occur between the fourth and fifth intervals (B-C) and the seventh and eighth (E-F). This difference shifts, and inverts, the Lydian interval from second to sixth (B-F) in A minor, to the tonic to the fourth (F-B) in the Lydian mode.

As previously discussed, this Lydian interval is a crucial singularity in the domain of well-tempered polyphony, evidencing the boundary between the neighboring keys that sub-divide the well-tempered system as a whole. This interval is embedded in minor keys, between the second and sixth, and, in major keys between the fourth and seventh, but, it is “transcendental” with respect to the tonic in any given key. That is, the Lydian interval, formed by the tonic of any given key, is outside that key, but lies on the boundary between

FIGURE 7.12

Modes of the first and third movements of Quartet Op. 132

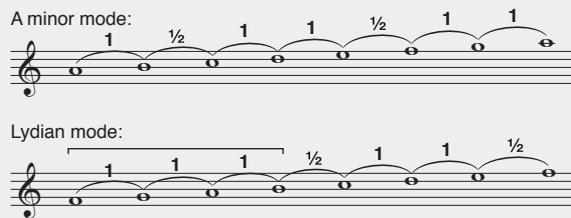


FIGURE 7.13

Opening of Quartet Op. 132 in A minor



that key and the neighboring one. Again, to grasp this point, the reader must abandon the formal assumptions of generally accepted musical theory, and recognize that the well-tempered system of *bel canto* polyphony is not built up from the keys, but, instead the various keys, modes, and their inversions, are determined by the universal characteristics of the system as a One.

The Lydian mode is therefore distinguished by the positioning of the Lydian interval on the tonic itself, giving this mode an unstable quality with respect to the 48 well-tempered keys.

Yet, in Op. 132, it is the third movement, written in the Lydian mode,

which “appears” stable, while the first movement in A minor seems highly turbulent. Beethoven demands the listener forsake all previous assumptions about what is possible in musical composition, exciting in the listener’s mind those very qualities of creative discovery which most listeners may not even know they had.

Both movements begin with the string quartet playing a chorale, as if they were a quartet of human voices, calling to mind the primacy of the human singing voice as the basis of well-tempered polyphony. Both choral openings are formed as a Classical canon with staggered voice entrances that imi-

FIGURE 7.14

Opening of third, 'Lydian' movement of Quartet Op. 132

Heiliger Dankgesang eines Genesenen an die Gottheit, in der lydischen Tonart.
Molto adagio

The score shows the opening of the third movement of Quartet Op. 132. It is in the Lydian mode and marked 'Molto adagio'. The title is 'Heiliger Dankgesang eines Genesenen an die Gottheit, in der lydischen Tonart.' The score is for Violin I, Violin II, Viola, and Violoncello. The first system (measures 1-9) features a canon with 'sotto voce' dynamics and a crescendo leading to a piano (p) dynamic. The second system (measures 10-19) continues the canon with dynamics ranging from p to f. The third system (measures 20-29) shows further development of the canon with dynamics from p to cresc. and back to p.

FIGURE 7.15

'Transfinite' motivic idea in first movement of Op. 132

The notation shows a 'Transfinite' motivic idea in the first movement of Op. 132. It consists of two measures, 11 and 12, in a single staff. Measure 11 starts with a quarter rest followed by an eighth-note pair (A, G#) and another eighth-note pair (F, E). Measure 12 continues with an eighth-note pair (D, C#) and another eighth-note pair (B, A#).

tate, invert, and project the intervals of the previous voices. Each opening choral canon is based on the characteristic singularities of the other, and each opening states these singularities in a highly ambiguous way. Upon hearing the first notes, a quizzical thought is coaxed in the listener's mind, that something very new is about to be stated.

The opening eight measures of the first movement (Figure 7.13) are composed almost entirely of ascending and descending half-steps, played canonically, as inversions and projections of each other. The listener hears each half-step note pair and the intervals between the intervals, of the half-step note pairs. For example, the 'cello's opening G#-A, f-e.

The listener hears these intervals in sequence, while also hearing the intervals of the minor sixth, A-f and G#-e, diminished seventh (major sixth) G#-f, and fifth A-e. With the entrance of the viola's descending a-g# in the second measure, these fifth and sixth intervals are heard in sequence, and at once, teasing us into the frame of mind from which we can see this newly discovered conception.

As the opening eight measures unfold, by a series of ascending and descending half-steps, separated by the fifth-sixth relationship articulated in the opening two measures, the string choir generates lawfully, by the principle of inversion, virtually the entirety of all possible Lydian intervals. These Lydian intervals are not heard as dissonances, as transitions in the development from one mode to another, but, as, so to speak, development of development.

But this is not just an opening shot: Beethoven maintains this quality of development throughout this composition, and throughout the late quartets as a whole.

Turn again to the opening of the third movement (Figure 7.14). Beethoven titled this movement, "A convalescent's holy song of thanks to God, in the Lydian mode." In contrast to the first movement, Beethoven unfolds the choral opening in the Lydian mode, directly, without introducing any sharps or flats. Here the canon proceeds by the characteristic intervals of A minor, even though the movement follows strictly the ordering of a simple Lydian scale. Unlike the first movement, where virtually every Lydian interval is generated, the only Lydian interval generated here is the f''-B on the last beat of measure 7. But, as in the first movement, this Lydian interval is not heard as a dissonance, but as internal to the modality of the composition.

After these choral introductory settings, both movements proceed in an entirely unexpected way. In measure 11 of the first movement (Figure 7.15), the 'cello, which stated the original opening half-step, now states, in its high register, a motivic idea (a'-b'-c''-b'-a'-g#) that embodies, transfinitely, the conception underlying the opening eight-measure

FIGURE 7.16

Development of opening theme of Op. 132



chorale. This motivic idea is then developed, within this new musical domain, with frequent reference to the opening eight measures. See measures 103-106 (Figure 7.16) and measures 193 and 202 (Figure 7.17).

The third movement proceeds in a different but complementary way. The opening choral canon is followed by a contrasting “*Andante*” labeled “*Neue Kraft fühlend*” (“Feeling new strength”). The new power is obviously a reference to the higher powers of the human mind which Beethoven has achieved by his new discovery, powers that transform the universe as a whole. The “*Andante*” is introduced with the change from the Lydian mode to the key of D major, formed by changing F to F# and C to C#.

The opening chorale section returns twice more, each time in a more condensed way; and, the third time, it is labelled, “*Mit innigster Empfindung*” (“With utmost fervent sentiment”) (Figure 7.18).

Each time, the listener is brought to new powers of cognition, as the potential of a new, higher modality is unfolded. The summit is articulated in the most beautiful manner in measures 191-192 (Figure 7.19).

The contrasts between the opening of the two movements demonstrates, that the new, higher modality of these late quartets, is not representable by some formal structure, akin to a mathematical formula, but, as in all true human knowledge, lies outside the confines of such formalism, and is expressible only metaphorically, i.e., through beauty.

FIGURE 7.17

Development of both themes of first movement of Op. 132



FIGURE 7.18

Third chorale variation in third movement of Op. 132

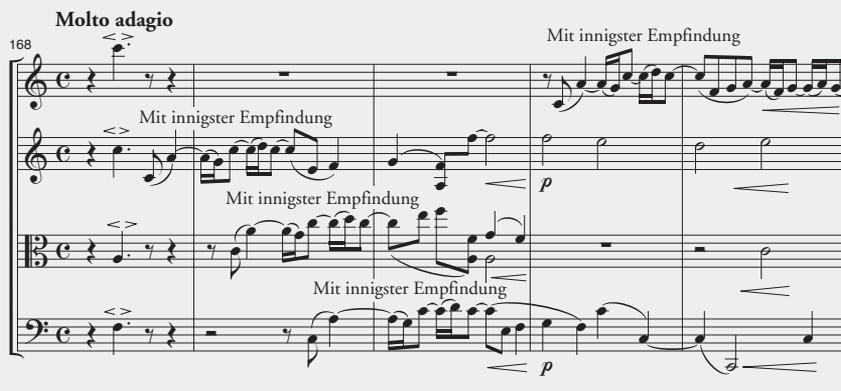


FIGURE 7.19

High-point of Op. 132 third movement



FIGURE 7.20

Opening of Beethoven String Quartet Op. 130

Adagio ma non troppo

Allegro

Beethoven's Opus 130 String Quartet

In one of the first mentions of this quartet, Beethoven notes in May 1825, “letztes Quartett mit einer ernsthaften und schwegängigen Einleitung” (“last quartet with a serious and difficult introduction”).

It is noteworthy here, that the first sketches indicate a C major setting, and only later did Beethoven transpose the thematic material one whole-step lower to B \flat major.⁹ The first seven measures of the introduction, the opening steps, will provide multiple opportunities for development. Thus Beethoven, having established the register with the choice of the key B \flat major, introduces as a singularity the characteristic of the mezzo-soprano voice, the register shift on e \flat ''-e \sharp '''. On the first beat of measure 6 (Figure 7.20), the new register of the voice carried by the first violin, is underlined in its meaning also through dynamics, as the move to e \sharp '' is played with a *crescendo* moving to *forte*.

At the beginning of his “serious and difficult” introduction, Beethoven has the step-wise descending line played in unison, from B \flat down to G. The 'cello—an octave lower—ends the first measures with a descending fifth G-C, and leads in ascending scale steps up to F, then—now displaced an octave higher—to follow up the next descending fifth f-B \flat with an upwards-striving scale in B major (which are elements of the later development): this, though, as a countervoice to the first violin, which in measure 1 in the same place sings an ascending g-e \flat ' sixth, and the second violin, which sings an ascending g-c' fourth. In measures 2-4, Beethoven displaces the violin voice one octave, in order to let the registral possibilities of the opening unfold in as differentiated a way as possible, simultaneously, in the few interval steps: the potential of the falling fifth and the relative rising fourth, the alliteration or projection of the rising sixth g-e \flat ', and the implied descending third g'-e \flat ', simultaneously the shift from e \flat '' to e \sharp '''.

Now, what should be recalled, is which peculiarities in B \flat major/B \flat minor, and reversals, Beethoven uses as the occasion for bold expansions of the

modality. (For example, the backward inversion of B \flat major/E \flat minor, a combination in which, in the famous “*be-klemmt*” “Cavatina” passage, E \flat minor should be heard in connection with the first movement (Figure 7.21). One should note the determining role of the Lydian intervals in the major/minor possibilities: B \flat major/B \flat minor-E \natural , or G minor/G major-D \flat , or D \flat major/C \sharp minor-G \natural , and so on. Already, in the “serious, difficult” introduction, Beethoven uses the introduction of the A \flat , also in regard to B \flat minor, when he later has the ‘cello play A \flat in measure 12.

In measure 7, Beethoven leads the ‘cello, playing *piano* in the tenor clef, into the next singularity, the shift from f'-f \sharp '-(g'), and develops the countervoice with the second violin—now singing as a mezzosoprano—which again the ‘cello answers, with reversals and expansions of the first measures. Thus the “*Allegro*” “double-fugal head” (sixteenth notes descending d''-b \flat '-g'-e \flat '-c'-g), now played *forte*, with the countervoice of the ascending fourth b \flat '-e'' (measures 14-16), is prepared as the beginning of new development possibilities, such that Beethoven now introduces the sharp “*Adagio/Allegro*” contrast and the “fourth motif” with the “sixteenth-note counterpoint.”

In the later development phase, Beethoven works this quartet motif into a shortened, anapest-like motif (Figure 7.22, measures 118-122). The sixteenth-note motif is also shortened to three sixteenth notes, an incredible concentration of the musical elaboration process (measures 64-70 in Figure 7.23). These measures follow an idea of the sixteenth-note motif transformed through D \flat (measures 53-63 in Figure 7.23). Here, the process of coming into being of the change beginning the opening measures 4-6, lends itself wonderfully to study. (Example: The first violin summarizes measures 4-6 in one single measure (49), introduced by a falling sixth, over two octaves, striving toward the violin’s g'' in measure 50, with the ‘cello counterpoint in measures 7-9 summarized here, and then, in unison, the chromatic ascent from F-d \flat , and so forth.) [text continues on page 98]

FIGURE 7.21

E \flat minor is inversion of B \flat major

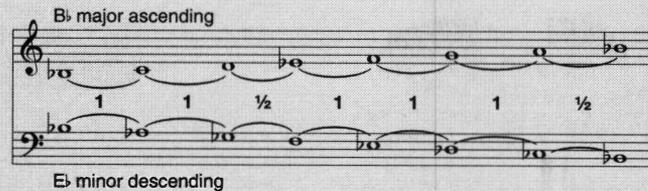


FIGURE 7.22

Anapest-like motif introduced in Op. 130 quartet

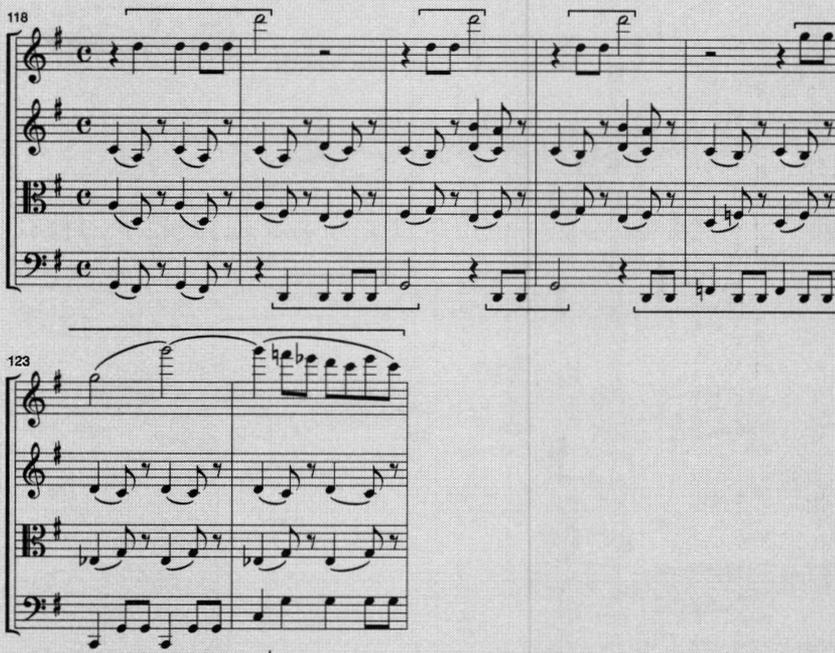


FIGURE 7.23

D \flat section in Op. 130 first movement

49

Musical score for measures 49-52. The score is in D \flat major and 3/4 time. It features four staves: two treble clefs and two bass clefs. The first two staves have dynamics *sf* and *dim.* leading to *p*. The last two staves have dynamics *sf* and *dim.* leading to *p*.

53

Musical score for measures 53-58. The score is in D \flat major and 3/4 time. It features four staves. The first two staves have dynamics *p*. The last two staves have dynamics *p*. The instruction *corda C sotto voce* is written below the first two staves.

59

Musical score for measures 59-63. The score is in D \flat major and 3/4 time. It features four staves. The first two staves have dynamics *p*. The last two staves have dynamics *p*.

64

Musical score for measures 64-67. The score is in D \flat major and 3/4 time. It features four staves. The first two staves have dynamics *pp ben marcato*. The last two staves have dynamics *pp ben marcato*.

68

Musical score for measures 68-71. The score is in D \flat major and 3/4 time. It features four staves. The first two staves have dynamics *pp*. The last two staves have dynamics *pp*.

To conclude the first movement, Beethoven presents once again the increasingly developed “face” of his idea discovery, so to speak, in retrospect, in a manner similar to that in the Ninth Symphony, such that the musical beauty becomes truly real only now, as thought process and recollection of the growing and developing process (Figure 7.24).¹⁰
 [text continues on page 100]

FIGURE 7.24
 Conclusion of first movement of Op. 130 quartet

The musical score is presented in four systems, each with four staves (Violin I, Violin II, Viola, and Cello/Double Bass). The key signature is B-flat major (two flats), and the time signature is common time (C).
 - **System 1 (Measures 207-210):** Features a strong dynamic of *sf* (sforzando) in the first three measures, followed by a *p* (piano) dynamic in the fourth. The tempo is marked *Adagio, ma non troppo*.
 - **System 2 (Measures 210-215):** Continues the *Adagio, ma non troppo* tempo. It includes *dim.* (diminuendo) markings in the first three measures and *p* dynamics in the last two. The tempo changes to *Allegro* in the final measure.
 - **System 3 (Measures 216-219):** Starts with *cresc.* (crescendo) markings in the first three measures, followed by *p* dynamics. The tempo is *Allegro*. The fourth measure is marked *Adagio, ma non troppo* and features *f non legato* dynamics.
 - **System 4 (Measures 220-223):** Continues with *Allegro* tempo. It features *f* (forte) dynamics in the first and third measures, and *p* (piano) dynamics in the second and fourth. The score concludes with a double bar line and a repeat sign.

continued on following page

FIGURE 7.24 (continued)

223

Musical score for measures 223-227. The score is written for four staves: two treble clefs and two bass clefs. The key signature is two flats (B-flat and E-flat). The music features a complex texture with many sixteenth and thirty-second notes. Dynamics include *p* (piano) and *cresc.* (crescendo). The first two staves have a melodic line with many accidentals, while the bottom two staves provide a rhythmic accompaniment.

228

Musical score for measures 228-230. The score is written for four staves. The key signature remains two flats. Measure 228 shows a melodic line in the top staff and a rhythmic accompaniment in the bottom two staves. Measure 229 features a *pp* (pianissimo) dynamic. Measure 230 has a *p* dynamic. The music includes a variety of note values and rests.

231

Musical score for measures 231-234. The score is written for four staves. The key signature remains two flats. Measure 231 starts with a *p* dynamic. The music continues with a mix of melodic and rhythmic elements across the four staves, including some rests and a final cadence in measure 234.

In his essays, Wilhelm Furtwängler, in reference to the work of Heinrich Schenker, spoke about the need to “listen from afar” in interpreting Classical works, and especially Beethoven’s. This listening from afar, reflects Beethoven’s compositional method of motivic thorough-composition, since even with several melodic lines that initially seem very different—when one listens to them over a longer period of time, repeatedly, particularly over long stretches of the development—only then is the “origin,” the “historical root” unlocked. Only with this comprehension, are the performer and the listener of today in a position to be able to come somewhere close to grasping the whole. In the context of this chapter, it is impossible to cite every single example, but it is important to challenge the reader to develop this “listening from afar” and “comparative listening” regarding Beethoven’s late works. Thus, one must compare the second movement of the Op. 130 (Figure 7.25), despite its “presto” (very quick) tempo, with the beginning of the first movement, not only because of the B \flat major/B \flat minor shift, but also to study the downward move of the first and second violins and their motifs, f’-e \flat ’-d \flat ’-f’ (violin I) and d \flat ’-c’-b \flat ’-a (violin II), and to try to understand the variational motive as coming out of the beginning of the first movement. The scale projections in measures 48-63 (Figure 7.26), first from B \flat , then C (minor), followed by chromatic descents from c’’, then from e \flat ’’, and finally from g \flat ’’, leading back to the original B \flat minor theme, demand special attention to Beethoven’s manner of “path-finding” to reach new manifolds. For the “scherzo” character, one must focus on the target note g \flat ’’ (enharmonically f \sharp ’’) in reference to the C major/C minor domain, or also, of course, in reference to keys “related” to B \flat minor. [text continues on page 102]

FIGURE 7.25

Opening of second movement of Op. 130 quartet

The musical score for the opening of the second movement of Op. 130 quartet is presented in two systems. The first system (measures 1-8) is marked *Presto* and *pp* (pianissimo). It features four staves: Violin I, Violin II, Cello/Double Bass, and Bass. The second system (measures 9-16) begins with a *cresc.* (crescendo) marking and ends with a *f* (forte) dynamic. This system includes double bar lines and repeat signs. The notation includes various note values, rests, and dynamic markings.

FIGURE 7.26

Scale projections in Op. 130 second movement

48

p *p* *p* *p*

ri - tar - dan - do

54 *L'istesso tempo*

f *p*

60

f *p* *pp*

f *pp*

f *pp*

f *pp*

Detailed description: The image shows a musical score for the second movement of Op. 130. It is divided into three systems. The first system (measures 48-53) features a vocal line with the lyrics 'ri - tar - dan - do' and piano accompaniment in 6/4 time. Dynamics are marked 'p' (piano). The second system (measures 54-59) is marked 'L'istesso tempo' and shows a piano solo with a scale projection. Dynamics range from 'f' (forte) to 'p' (piano). The third system (measures 60-65) continues the piano solo with a scale projection, with dynamics ranging from 'f' (forte) to 'pp' (pianissimo). The score is in a key with two flats and a 6/4 time signature.

Similarly, the relationship of the three quarter-note descending lines in the 'cello and viola (measures 17, 19, etc.) as well as the second violin in its answer (measures 19, 21, etc.) in the "trio" section of the second movement (Figure 7.27), must be heard in connection with the shortened theme of the three sixteenth notes from the development of the first movement (see measures 64ff., "ben marcato," in Figure 7.23). The opening of the third movement (especially measures 1-5) (Figure 7.28) must be compared with measures 53ff. and especially 59ff. from the first movement (Figure 7.23), as well as the 'cello line in measure 106 (Figure 7.29).

Thus, the "legacy" of the double-fugal "head" of the "Große Fugue," the coming into being of the fugue theme in B \flat (bb-bb-b \flat -ab'-g'-b \flat -c'-a'-bb'-a'), as well as the countersubject d'-f', will be more readily understood (Figure 7.30). Even the opening of the Overture with the sixteenth-note ascent of over two octaves to g''' (Figure 7.9, measure 1, Violin I) must be heard with the "serious and difficult" beginning of the first movement (the first violin) (Figure 7.20, measures 1 and 6) (including also the octave transposition in measures 2-4 of the first movement), where the relations to the beginning of Op. 132 and also 131 (Figure 7.31) are more obvious).

For Beethoven, the voice-leading of all compositions, whether purely instrumental or with choral voices, is truly "human song" and—as the "Holy song of thanks to God" marking prefixed to the third section of Op. 132 indicates—not merely metaphor. Rather, Beethoven's studies were involved with the working-out of ideas into "developable material"—for example, even in the small form of singable canons, precisely in the late phase of his creative work, and not merely because he wanted to write something ironic to a friend. For example, sketches for the canon, "Schwenke dich ohne Schwänke" (woO 187) (a pun on the name of an acquaintance, C.G. Schwenke with the word "Schwänke," meaning a cheap joke), are found among Beethoven's sketches for the Op. 127 and drafts for an overture on the B-A-C-H theme from about 1824. Typical of Beethoven in his working

FIGURE 7.27
'Trio' section of Op. 130 second movement

FIGURE 7.28
Opening of third movement of Op. 130 quartet

phase, was the desire he often expressed to interlocutors, to examine compositions of Bach or Mozart. Thus, in his 1824 letter to the poet Nageli, he asked not only for Nageli's own lectures on music, but also for the score of Bach's five-voice mass in B \flat minor. Nageli had also sought out contributors in 1818 in order to have the Bach mass printed, but at the time it did not succeed for lack of support, and the first part appeared only in 1833.

Thus, not only for the performer, but also for the educated, sensitive listener, Beethoven's late works are a challenge, to recognize the often strongly paradoxical

FIGURE 7.29
'Cello figure references back to first movement

ideas as "the derivation of a musical creative principle of a whole." In this context, it is significant that, as emerges from his sketchbooks, precisely in the working group of the late quartets, Beethoven also proposes score sketches, alongside single-

FIGURE 7.30

'Head' of Beethoven's Op. 133 'Große Fuge'

FIGURE 7.31

Opening of Beethoven String Quartet Op. 131 in C# minor

voice drafts; this signifies that the progress of all single voices and their cross voices, that is, the unity in multiplicity, became more and more strongly Beethoven's chief compositional consideration.

Norbert Brainin also stresses this in a recent interview on the question of "Beethoven's Art of Four-Voice Composition": "In his late quartets, Beethoven writes a kind of four-voice counterpoint, in which the four voices must be played or sung together, and yet each voice is treated very individually. All voices sing something very important—and in fact everything is equally important. The balance is perfect; the voices need not bother to worry, how loudly they are singing, or how softly, because everything is so perfectly composed. The most important element in this is the motivic thorough-composition, because the motifs which Beethoven uses all come out of the piece itself, and are connected. One finds this above all in the late quartets, but naturally also, in part, in his earlier works. The same applies here and there to Mozart. In Mozart, too, the four voices sing, and it is so perfectly composed, that one ought actually only to sing it—but: It must be correctly sung, with the right voice, correctly produced, and it must really come out of the body. I am not a singer, but I assume that a *bel canto*-trained singer would be able to do it right away."¹¹

Beethoven's late work will only be understood, when one takes to heart the advice given by Socrates to Protarchos, on the One and the Many, in the dialogue *Philebus*: "A gift of the gods to man, as I consider it, was once hurled down from the gods through some Prometheus together with a fire of the most brilliant kind, and the ancients, who were better than we and were closer to the gods, handed it down as a legend, that everything which we say, is, consists of One and Many, which, however, has limitation and unlimitedness growing together within it. Let it be our affair, now, since this was once so ordered, to assume an idea and seek it out, in every single case in everything, and one will find one, since it is therein."

1. "I say to you before God, as an honest man, your son is the greatest composer that I know by person or name: he has taste and above that the greatest science of compo-

sition.” Statement by Josef Haydn, Feb. 12, 1785, after the performance of six quartets dedicated to Haydn, which introduced the revolution in Classical composition through motivic thorough-composition. See videotape, “*Motivführung* bei Josef Haydn und Wolfgang Amadeus Mozart,” with Professor Norbert Brainin and the Henschel Quartet, February 1993, Dr. Böttiger Verlag, Wiesbaden, Germany.

2. See Lyndon H. LaRouche, “That Which Underlies Motivic Thorough-Composition,” *Executive Intelligence Review*, Sept. 1, 1995 (Vol. 22, No. 35).

3. Norbert Brainin, video, *op. cit.*

4. On “form breaking”: Even the neo-Kantians stood up in their own defense against the Romantics very early, who wanted to characterize this characteristic of Beethoven as the “destruction of every musical form,” that is, the intercession of total arbitrariness. Thus, Paul Natorp wrote in his 1920 speech on “Beethoven and Us”: “It is fully erroneous, to consider that the decisive aspect of his last period of creative activity ought to be recognized in the destruction of musical form. It has as little to do with destruction, as so-called non-Euclidean geometry had to do with overthrowing only one, single sentence or proof of Euclid. It is far more a question of going out *beyond* one or some of its binding assumptions, which had unexpected and unintended results, not overthrowing Euclid, but rather—in one blow—letting not only one or two, but an unforeseeable multiplicity of new geometries come into being, above Euclid’s; each, under its assumptions, with the same, much higher certainty and strictness—because based on more general ground—as the old one. So is the relationship between Beethoven’s expansion of form and what had been considered theretofore as the only possible musical form.”

5. Cf. Professor Norbert Brainin: “In Beethoven, it started with Op. 59. Of course, he had always composed very well, but up to then he had not applied motivic thorough-composition deliberately, only unconsciously. I believe that it was first consciously applied in Op. 59. Perhaps it was similar in the case of Haydn, since his last quartet composition before Op. 33, was Op. 20. And, if I did not know that these works had been written before the development of motivic thorough-composition, I would merely say, ‘There, perhaps, it is not so fully explicit.’ The fact is, that he applied it first consciously in Op. 33. With Beethoven, it is similar. But he did not only apply a method: He brought new elements in, but always used the old ones again.”

In response to the question of the “new” with reference to the great model, J.S. Bach,

Professor Brainin said: “Freedom lies in expression. It is a matter of other things, than with Bach. In Bach, it is pure spirit, in Beethoven, it is interpretation. Beethoven even said, ‘It is not enough to write fugues.’ What does that mean? It means he did not want to write fugues in the manner of Bach; he had learned from him how one writes fugues. But the way in which he wrote fugues, is always directed at an aim.” Quoted from videotape interview, “*Motivführung*: Prof. Norbert Brainin, Primarius des Amadeus-Quartetts, erläutert und demonstriert die Kompositionsmethode der späten Quartette Ludwig van Beethovens. Meisterklassen im Schloß Dolna Krupa, 20-22 Sept. 1995, mit dem Moyzes Quartett (Bratislava) und dem Auer Quartett (Budapest),” available through the Schiller-Institut Vereinigung für Staatskunst e.V., e-mail info@schiller-institut.de.

6. See Lyndon H. LaRouche, Jr., “Mozart’s 1782-1786 Revolution in Music,” *Fidelio*, Winter 1992 (Vol. I, No. 4): “In its most essential features, what we may say of thought-objects, as in scientific work, we may say also of musical thought-objects. The J.S. Bach *Musical Offering* underscores the place of a major/minor-key cross-over *dissonance*—e.g., a formal discontinuity—in the process of composition. The subsumption of many resolved discontinuities under the governance of a single, well-defined ordering-principle for that succession as a whole, presents us, in the instance of any single such composition, with a process analogous to the idealized theorem-lattice, *A, B, C, D, E, . . .* .

“The definitional significance of such a musical thought-object as musical, rather than simply a thought-object, is the following. Firstly, even the individual thought-objects, *of a series*, within a succession, are provoked, in the individual’s sovereign creative mental processes, by the polyphonic lawfulness of the Classical, well-tempered musical medium. Secondly, the ordering of a series of such thought-objects, as a composition, or part of it, is a higher-order thought-object, which latter is defined, generated by a negative feature of a process of composition. The natural rules of polyphony flowing from singing voices of the most natural training (i.e., *bel canto*) are the basis for defining an anomaly, and, thus, are the basis for the generation of a musical thought-object. In other words, the thought-object is referenced in respect to its place in the development occurring in the musical medium. Since only the Classical mode of composition permits this determination, those musical thought-objects are defined in respect to the Classical form of the medium.”

7. Norbert Brainin, interview, *Ibykus*, Vol. 5, No. 15, 1986.

8. Bruce Director, “What Mathematics Can Learn from Classical Music,” *Fidelio*, Winter 1995 (Vol. III, No. 4).

9. Jelena Wjaskowa, “Das Anfangsstadium des schöpferischen Prozesses bei Beethoven—Eine Untersuchung anhand der Skizzen zum ersten Satz des Quartetts Op. 130,” in *Beethoven, Aufsätze und Dokumente, Vol. III*, ed. by Harry Goldschmidt (Berlin: 1988).

10. Cf. Lyndon H. LaRouche, “That Which Underlies Motivic Thorough-Composition,” *op. cit.*, on the question of memory in musical performance: “. . . what we have just said, obliges us to examine this matter of memory on a time-scale. We discover, immediately, that there is something essential in the influence of the musical idea upon the performance, the which can not be explained as an attributed epiphenomenon on the tone’s sensation. There is a contradiction, a devastating paradox, which can be, and is heard as a musical idea, an idea which can not be attributed to the senses as such.

“The devastating paradox is situated thus: See how the idea of the performance as an entirety, shapes the performance of the intervals addressed within each moment of the performance. We are confronted immediately with the existence of two musical ideas, both representing the composition taken as an entirety.

“One of these two is efficiently superior to the other. The first of these two, is the performer’s earlier grasp of the perfected idea of the composition as a finished whole; that is the idea which should never change in the musician’s mind during the execution of the performance. This idea, the musician brings to the performance from an earlier, relatively perfected experience of the composition’s completed performance.

“The second idea, also pertaining to the composition as an entirety, is the notion of the incompleting idea of the same whole, in process of emergence, not yet *reperfected*: at each point mid-performance. The same principle governs not only the performance, and the practice leading to the performance of that composition; it is also the experience of the hearer.

“The first must control the second. The tension between these two, axiomatically distinct qualities of idea of the composition as a whole, is readily recognized as the motivating ‘tension,’ that sense of ‘suspension,’ which supplies a quality of psychic intensity, which is to be perceived as the ‘energy’ of the successful performance.”

11. Norbert Brainin, “‘As free, as it is rigorous’—Beethoven’s Art of Four-Voice Composition,” *Fidelio*, Fall 1998 (Vol. VII, No. 3).

8

Brahms' Fourth Symphony: A Masterpiece of Motivic Thorough-Composition

by Hartmut Cramer

Brahms' Fourth Symphony, which shows such a high degree of inner mental "logical" rigor, formal completeness, and creative freedom—in short, perfection—is one of the best examples of *motivic thorough-composition*, and it demonstrates, that as late as the end of last century, musical work in the "old forms"—which by then were widely slandered—was still being mastered.

Brahms' accomplishments in this field were, by the way, also—albeit enviously—acknowledged by his foes. Even from his "neo-German" antagonist Richard Wagner, who, during their only personal encounter (in Vienna, in February 1864), after Brahms had delivered a convincing proof of his art with the performance of his *Variations on a Theme by Handel*, was so astonished, that he declared: "One sees what can be accomplished in the old forms, if there is someone who knows how to use them."¹ But that didn't pull Wagner—let alone his many followers—back from continuing their practice, of loudly crying out against Brahms, as well as infamously conspiring against him behind his back.

Although Brahms' Fourth Symphony was initially met with a lot of non-understanding by the "great mass" of his contemporaries, and even by his Vienna circle of friends, his closest artistic companions, such as Clara Schumann and Joseph Joachim—and Brahms himself, naturally—knew very well, what a masterpiece he had created. "My heart is full to overflowing over your symphony," wrote Clara Schumann to Brahms from Frankfurt on Dec. 15, 1885, after she had initially studied the piano edition. "It created a beautiful hour for me, captivating me through its richness in colour and its beauty otherwise. I almost

don't know, which movement I should prefer: the first, dreaming one, with its marvellous development part and the wonderful points of rest, and its soft waving inner movement flowing with it . . . or the last one, grandiosely constructed, with its enormous manifoldness, and despite its such great work so full of passion . . . which lies already in its main motif (one could not really call it a theme). . . . I wish I could personally speak with you about it, with the score before us!"²

With the violinist Joseph Joachim, his closest friend since the beginning of the 1850s, who in the meantime had become the director of the music conservatory in Berlin, Brahms corresponded concerning this, as also in all other cases, in detail about many technical musical questions, especially concerning the strings. Joachim thus already knew parts of the symphony before it was published. Directly after the dress-rehearsal, and just before he was about to perform the Berlin debut of Brahms' Fourth at an academy concert on Feb. 1, 1886, Joachim wrote to his "highly esteemed master": "If I didn't express my, in fact, extreme enthusiasm about your newest symphony immediately after the first rehearsal, it is solely due to the gigantic work load of the past few days. . . . We now have played through your magnificent creation in our dress rehearsal today, and I may hope, that tonight it can be performed with certainty and passion. It really sank ever deeper down into my soul and that of the orchestra. The gripping character of the whole, the density of invention, the wonderfully intertwined growth of the motifs, even more than the richness and the beauty of single parts, I like very much, so that I

almost believe, the E minor is my favorite among the four symphonies. . . . It is not so easy, though, to *beautifully* play the variation of the theme divided among the two violins; but if one wants to change it, and believes to have accomplished it in one bar, the very next bar then creates a problem—you really invent in such a logical way, everything is so fully in place, that one ought not touch it in the least. The *pizzicati* are shown to full advantage everywhere."³

The judgment of these two great artists and friends is no surprise, however; especially, as both—even if only indirectly and without knowing it—had a certain "part" in developing the *concept* of this magnificent symphony, in which Brahms unmistakably demonstrated, what enormous, freedom-creating potential is contained in the method of motivic thorough-composition, which he took over from his Classical forebears in whose tradition he consciously placed himself.

As in all great Classical works, the key to understanding lies in the *entire process of development* of the piece, so, too, for this symphony; i.e., the process of musical development expressed therein is best approached "backwards." One starts with the last movement: that part of the whole, which was constantly going through the head of the composer as the "final goal." As is well known, Brahms—like Beethoven—meticulously changed and fine-tuned every detail of a composition when near completion for quite some time; but he also—like Mozart and practically all other great composers—had already worked out the whole composition *conceptually* in his head before writing it down.

The Finale of the Fourth Symphony,

which has no instructions other than the tempo marking “*Allegro energico e passionato*,” is the best proof of this. Brahms had written down the first and second movements during his summer “vacation” of 1884 in Mürzzuschlag (at Semmering); the other two—as Brahms explicitly noted in his 1885 calendar, first the Finale, and then the Scherzo—were written in the summer the year after, also in Mürzzuschlag. Brahms, who never released a musical piece unfinished, and who always insisted with his pupils (and himself) that it should be considered as a complete whole in content and form, steadily rejected all the requests of his friends, that he present them with some “juicy appetizers” during the process of creation—and sometimes brutally so (“I just put together a polka and waltz party,” or, “Just a few *entr’actes* . . . what together usually is called a symphony”). The only thing that his friends could get out of him during this time, as far as the “content” of his great composition was concerned, was the poetical comparison with the “climate” in Mürzzuschlag: “The cherries here are not going to get sweet; you wouldn’t eat them!” he wrote during the summer months of 1885 to the conductor Hans von Bülow, with whose orchestra in Meiningen he would be rehearsing and performing this symphony later that year. So, Brahms knew perfectly well the kind of mental work he was about to impose on his contemporaries.

His preliminary studies of the last movement, however, go back more than 10 years. Even though people were trying to figure out the form of the last movement for quite some time after the very first performance, Brahms himself, as usual, didn’t comment publicly on his works; besides, he believed what he wrote to Hans von Bülow after the “mishap” of the first performance of this symphony at the end of September 1885 in Vienna (Brahms and the pianist Ignaz Brüll performed it on two pianos among a few close friends): “I am not really interested in a premiere. More in a performance after 10 or 20 years—which for an artist the likes of us means immortality”⁴—it is obvious that this

final movement is clearly a *chaconne*, or a *passacaglia*. Joachim recognized this at once—no wonder, being a violinist who masterfully performed the famous *Chaconne* from J.S. Bach’s Partita No. 2 in D minor for unaccompanied violin. (In order to make the audience of his above-mentioned academy concert aware that he had concluded this symphony in an unusual and very special form, Brahms added an asterisk to the “*Allegro energico e passionato*,” and the words “Variations on the theme:” followed by the theme as shown in **Figure 8.1**.)

Brahms, who had intensively studied the works of J.S. Bach from his early youth on, and who held Bach’s art of composition in exceptionally high esteem, not only knew this extraordinary final movement of Bach’s D minor Partita very well through the interpretations of his friend Joachim,⁵ but also, because he had arranged this piece (like most of the other sonatas and partitas for unaccompanied violin) for study purposes, and for “simply pure pleasure,” for piano for *one hand*, as is made clear by a letter from him to Clara Schumann (June 1877):

“To me, [Bach’s] Chaconne is one of the most wonderful, unbelievable music pieces. In one system, for a small instrument, the man writes a whole world of deepest thoughts and most powerful emotions. If I were to imagine that I would have been able to make, to receive this piece, I know for sure, that I would have become mad because of the enormous excitement and shock. If one doesn’t have the greatest violinist around, then it is well the most beautiful pleasure, to simply listen to its sound in one’s mind.

“But the piece demands that one must work with it in all ways. And one also doesn’t want to hear music simply sounding in the air; Joachim is not here so often, and therefore I try this and that. But whatever I take, orchestra or piano—the pleasure is always spoiled.

“In only one way, I find, can I create for myself a much smaller, but approximating, and wholly pure pleasure of this piece—if I play it with the left hand alone! Even the history of the egg of Columbus then comes to my mind! A

FIGURE 8.1

Fourth movement theme of Brahms’ Symphony No. 4



similar difficulty, the kind of technique, the process of making the *arpeggios*, everything comes together, so that I—feel like a violinist! Try it, I wrote it down only for you.”⁶

Working with this piece “in all ways”—that’s what Brahms wanted to accomplish almost a decade later by way of composing a symphony, proving with that, the enormous creative potentialities the proper use of this “old,” tremendously strict (but also free) form would allow. Naturally, composers had already previously concluded a symphony with a variations movement—the most famous among them being Beethoven with his “Eroica” Symphony No. 3, as Brahms constantly pointed out to his skeptical Viennese friends; but the exact form of a chaconne as the concluding movement—and climax—of a great symphony? This, before Brahms, had never been tried.

By choosing the form of the chaconne, or the passacaglia,⁷ Brahms had defined the—“old,” and always “new”—problem: How can the basic principle of musical (and human) development—change, variation—be demonstrated by way of a “fixed” musical line? How can creative freedom be unified with lawful necessity? How can such music—and art generally—be “rigorous and free” at the same time?

Conceptually, this movement is fully equivalent to Bach’s *Chaconne* (**Figure 8.2**). Bach varies a theme (motif) of four bars, i.e., its supporting bass line; and he does it in such a way, that with practically every new four-bar section, a new variation begins, practically without changing the bass-line harmonically. All in all, Bach is very careful in changing the harmonics during the composition; the first, elaborated part of variations is in D minor, the second in the related D major mode; then comes a part—which

FIGURE 8.2

Opening of the ‘Chaconne’ from J.S. Bach’s Partita No. 2 for Unaccompanied Violin in D minor

FIGURE 8.3

Opening of fourth movement of Brahms’ Symphony No. 4

is equally strictly composed, i.e., starting every four bars with a new variation—again in D minor, until Bach concludes this immense work with a cadenza. The “trick” which Bach uses to create changes throughout the composition, and even *changes of the changes*, despite the “fixed” theme, or motif, is to vary the other voices, to change the theme itself *rhythmically*, to place it into other registers, and to “disguise” it, or “adapt” it to its environment in such a way, that partly a “logical,” partly a surprising process of development takes place. And, when this can lead to such a magnificent result with *only four voices on a “small” string instrument*, what then can be accomplished with a big orchestra with many voices?

That is exactly what Brahms demonstrated with the final movement of Symphony No. 4 in E minor: With 8 bars, his theme/motif takes exactly twice the number of bars, as does Bach’s Chaconne. The other basic difference: Brahms theme is placed in the soprano (instead of the bass) voice. Otherwise, the formal architecture is the same: The theme is in 3/4 time, and is varied—with only a few exceptions—exactly every eight bars, itself *remaining completely unchanged harmonically*. Naturally, Brahms can let the theme roam through all the voices of the orchestra, a fact which he exploits freely, although he adheres to the Classical tradition, insofar as the four string voices—the orchestra’s inner “core”—bear the main burden of the thematic work. After having first presented the theme with the woodwinds and brass alone (**Figure 8.3**), beginning in measure 9 (**Figure 8.4**) the first violins takes up the theme (*pizzicato*); in measure 17 the ‘cellos (also *pizzicato*). In measure 25, the first violins take over again, but this time with plucked *chords*; and then, in measure 33, the contrabasses (supported by the bassoons) sing the theme (changed rhythmically by way of octaves) strongly with the bow (*arco*), while the middle voices of the string section accompany this (likewise *arco*) with a rhythmically displaced counterpoint, and the first violins (“*ben marcato largamente*”) with a “lyrical” one.

After a rather free variation of the theme by the flute, which is only “supported” by the first French horn and the upper strings, comes—as in Bach’s work—an equally rigorously (and freely) composed series of variations in the related E major mode, in which Brahms takes the liberty to present the theme not only by one group of instruments alone, but lets it roam through all the voices.

In measure 129 (not shown) the *reprise* begins, where the theme is quoted “verbatim” by the brass and woodwinds, but is varied contrapuntally starting with the upbeat to measure 133, played *fortissimo* by the upper strings, and starting with the downbeat of measure 134, also by the ‘cellos and contrabasses.

During the following part of variations, Brahms exploits the freedom which he has accomplished so far: He varies the variations using the entire orchestra in a rhythmically very free manner, and concludes this movement with a 58-measure-long coda, beginning with measure 253 (not shown).

That is the formal architecture of this last movement, which *conceptually* follows Bach’s Chaconne, but, in its extension—as intended—naturally far exceeds this great example. The way in which Brahms presents this theme *harmonically*, demonstrates above all, that he quite consciously walked in the footsteps of other Classical examples. What is striking about this rather “harmless” E minor motif, is the fact, that in measure 5 (Figure 8.1), Brahms uses an A#, a tone totally alien to this mode. That this is not just meant as a characteristic of this motif, is made clear by the fact that Brahms emphasizes this place with a tympani (kettledrum) (Figure 8.3); and he does this, not only when presenting this motif, but again and again during the whole movement. This interval of E-A#, which is heard clearly by way of this suddenly introduced roll of the kettledrum (with the e being additionally strengthened by the trumpets and the two first French horns, while the a# is played by the upper winds (two flutes, one oboe, and one clarinet), as well as also the fourth French horn and the first

FIGURE 8.4

Strings take up theme in fourth movement of Brahms’ Fourth

The musical score for Figure 8.4 is divided into three systems. The first system (measures 9-16) features Violin I, Violin II, Viola, Violoncello, and Contrabass. All parts play a pizzicato theme starting at measure 9. Dynamics range from *f* to *dim.*. The second system (measures 17-23) features Viola, Violoncello, and Contrabass. All parts play a *mp ma marc.* theme starting at measure 17. Dynamics range from *mp ma marc.* to *cresc.*. The third system (measures 24-32) features Violin I, Violin II, Viola, Violoncello, and Contrabass. All parts play an *arco* theme starting at measure 24. Dynamics range from *f* to *cresc.*.

FIGURE 8.5

Conclusion of fourth movement of Brahms' Symphony No. 4

The musical score for the conclusion of the fourth movement of Brahms' Symphony No. 4, measures 296-304, is presented in a multi-staff format. The instruments included are Tympani, Violin I, Violin II, Viola, Violoncello/Contrabass, and Violas. The key signature is one sharp (F#) and the time signature is 3/4. The score features dynamic markings of *ff* and *sf*, and a trill in the Tympani part at measure 304.

trombone, is nothing but the “Lydian interval.” It interrupts the line of development of the E minor motif, creating an “unclear” in the key, even “lifting it off its hinges” (since modulations in all directions become thinkable), and makes clear from the very beginning: *nothing is constant, but change itself!*

The other interval which Brahms uses predominantly at this prominent place, is the third, and its inversion, the sixth. The fact that this is no accident, is demonstrated by the use of *pizzicato* in the strings beginning in measure 9 (Figure 8.4); almost all the chords of the strings contain both complementary intervals. The prominent and characteristic use of these intervals—third, sixth, and Lydian interval (highlighted by the tympani)—shows itself throughout the entire movement, until the very end (Figure 8.5). [text continues on page 110]

This results—apart from the very free, but equally strict usage of the chaconne form—in the stunning completeness of the whole movement. But on this rests the no-less-surprising conceptual unity of the entire symphony. The aforementioned intervallic relationships mark the opening of the symphony (Figure 8.6), dominate the first movement (Figure 8.7), and are equally prominent throughout the second and third movements (which, as already mentioned, according to Brahms’ notebook, he composed, or rather wrote down, as the very last piece of the symphony).

Even more revealing is the fact, that Brahms took the idea of the opening motif, rhythmically and harmonically, from no less a composer than Beethoven, as the following measures (Figure 8.8) from the “*Adagio sostenuto*” of the piano sonata Op. 106 demonstrate. (As is shown in Chapter 7, we find evidence in Beethoven’s sketchbooks, that Beethoven in turn sought the help of J.S. Bach, copying down key passages from *The Art of the Fugue* (see Figure 7.2). And as pointed out in Chapter 3, in Fugue IV of that work (see Figure 3.11), a sequence of descending thirds become a crucial characteristic of the musical development.) Brahms studied these examples of his forerunners intensively.

Returning to Figure 8.8: In this passage, Beethoven makes extremely dense key changes (in the course of only 12 measures, he explicitly points to a change in key *three times*), with the climax without any doubt reached in measures 78-84, which are nominally in C minor/C major, but which are, in fact, from measure 80 onward, in a keyless mode, a harmonic “no man’s land,” where Beethoven intensifies the density of key changes to the extreme, so that no mode dominates at all.

Exactly this kind of ambiguity is what Brahms creates at the very beginning of the first movement, by his extensive use of D#—a tone extraneous to the natural E minor scale—and the Lydian interval a-d#’ created thereby, which surfaces in the violas’ echoing of the entrance-motif (and three times, at that),

FIGURE 8.6
Opening of first movement of Brahms’ Symphony No. 4
Allegro non troppo

The score shows the following parts and dynamics:

- Flute I & II: *p dolce*
- Clarinet I & II (A): *p dolce*
- Bassoon I & II: *p dolce*
- French Horn I & II (E): *p*
- French Horn III & IV (C): *p*
- Violin I: *p*
- Violin II: *p*
- Viola: *p*, *div.*
- Violoncello: *p*
- Contrabass: *p*

FIGURE 8.7
Second motivic element in first movement of Brahms’ Fourth

The score shows the following parts and dynamics:

- Oboe I & II: *f marc.*
- Clarinet I & II (A): *f marc.*
- Bassoon I & II: *f marc.*
- French Horn III & IV (C): *f marc.*

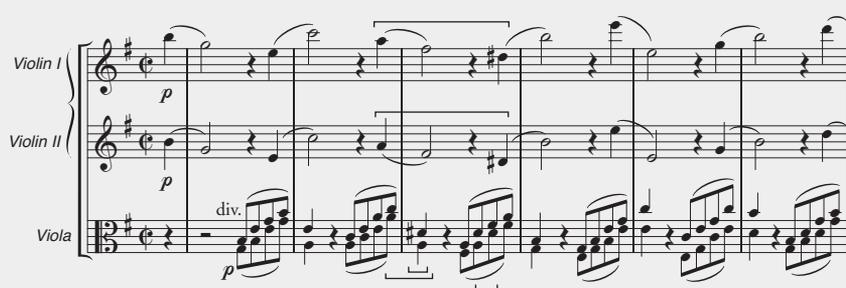
FIGURE 8.8

Passage from the ‘Adagio Sostenuto’ of Beethoven’s Piano Sonata Op. 106



FIGURE 8.9

Lydian intervals among the strings in opening of Brahms’ Fourth



as well as in both the first and second violins, playing in octaves, between their a'-a'' in measure 2, and their d#'-d#'' in measure 3 (Figure 8.9).

It is quite obvious, that Brahms developed the second theme (motif) of this movement, which is presented by the winds *in unison* (Figure 8.7), out of the material of the opening motif; repeatedly he uses (besides the already known pair of third/sixth intervals), the Lydian interval to the (E minor) basic note, the A#, which in turn plays such a prominent role in the motif of the final movement. Thus, Brahms maintains the practice, which Norbert Brainin has indicated in all his discussions of the compositional method of motivic thorough-composition, by writing “monothematically”; i.e., he always sticks to the theme.

It is impossible to deal with the close

motivic relationship of the first and fourth movements with the second and third ones, in this article, but they are so obvious, that the reader can easily determine them for himself.

In conclusion, it remains to be said, that such a dense and perfect (in the truest sense of the word) composition, requires a corresponding level of performance, by way of which the “sour cherries” can become edible. And, since we unfortunately have no recordings by Brahms himself, or by his friend Joachim (who, as we know from his letters to Brahms, was very careful in performing such works), we have to listen to those conductors, who considered the performance of Classical music an endeavor coming truly from the heart. And among them, Wilhelm Furtwängler, in whose maternal family Johannes Brahms was often received as a guest, is

surely the best, as he expresses the increasing “density of inventions” (Joseph Joachim) and “enormous manifoldness” (Clara Schumann) of the Finale both energetically and passionately. Especially his live recordings with the Berlin Philharmonic Orchestra, some of which can luckily still be heard (among them, the one from Oct. 24, 1948), since they are available on recordings and CD’s, are still (and especially!) today a measure of the fact, of how extraordinarily alive (“*Energico e passionato*”) Classical works sound, if performed with “heart and mind,” as well as with “certainty and passion.”

1. Karl Geiringer, *Brahms, His Life and Work* (New York: Oxford University Press, 1982), p.83.

2. *Letters of Clara Schumann and Johannes Brahms, 1853-1896*, ed. by Berthold Litzmann (London: 1927; reprint, Westport, Conn.: Hyperion Press, 1979).

3. *Johannes Brahms im Briefwechsel mit Joseph Joachim*, ed. by Andreas Moser (Berlin: 1908).

4. Max Kalbeck, *Johannes Brahms* (Tutzing: Hans Schneider, 1976; reprint of 1904-14 edition), Vol. III, p. 455. Pages 445ff. contain a detailed account of this “unfortunate” performance.

5. That Joachim took the interpretation of Bach’s Chaconne extraordinarily seriously, is demonstrated by the fact, that during his years in Berlin, he performed this piece only on a Stradivarius violin, which he considered especially well suited for this kind of music because of its exceptional tonal qualities. On all appropriate occasions, he borrowed this particular violin from a Berlin violinmaker who owned it. This Stradivarius, which because of this fact was named the Chaconne, was played for many years by the first violinist of the Amadeus Quartet, Norbert Brainin.

6. Berthold Litzmann, *op. cit.*

7. The chaconne was a originally a form of aria—not a dance—of the Seventeenth Century, which allowed the *bel canto* singer to improvise freely. Its “support” was a bass line, which repeated a certain pattern: It started on the tonic, moved slightly downwards, and then upwards again to the tonic. While initially different concerning the characteristics of their respective bass lines, the terms “chaconne” and “passacaglia” became increasingly interchangeable during the Eighteenth Century.

LaRouche in Europe: 'Dump Globalism, Or Crash Is Unstoppable'

Addressing a gathering of 400 notables from Europe, Asia, Africa, and the U.S. at a conference of the Schiller Institute and International Caucus of Labor Committees entitled "History as a Principle of Action," held in Bad Schwalbach, Germany on November 21-22, American statesman Lyndon H. LaRouche, Jr. warned, that unless Western leaders dramatically reverse their current policies, Europe and the United States are doomed to be crushed by the worst financial and monetary crash in history.

LaRouche singled out the Japanese banking system, which is carrying \$2 trillion in non-performing debt, as the number one threat to blow out the global financial system. Brazil, which is in the process of negotiating a disastrous "bailout" package with the International Monetary Fund (I.M.F.), could also trig-



Lyndon H. LaRouche, Jr.,
keynotes conference in
Germany.

Europe, the United States, Canada, Australia, or New Zealand, LaRouche declared, because none of these nations have been able to produce competent governments since the 1964-66 period.

No U.S. Growth Since 1971

LaRouche gave an in-depth account of what went wrong with the world economy, following the break-

up of the Bretton Woods system of fixed exchange rates in 1971. Under Bretton Woods, cheap credit had been made available for productive investment, and there was, for the most part, genuine economic growth.

This came to a screeching halt, with the end of the fixed-exchange-rate system. Suddenly, Third World countries

Continued on page 117

ger the next phase of the collapse.

LaRouche told conference attendees that the only nation on the planet today that has demonstrated the capacity to survive the onrush of the financial crash is China, which could also help some of its neighbors, and, perhaps, Russia, to avoid the worst consequences of the first "planetary financial collapse ever."

No such prospects exist for Western

LaRouche Must Advise Clinton on the Economy

During the second week of October, the Schiller Institute began to circulate an Appeal to President Clinton to appoint Lyndon LaRouche as his economic adviser. This initiative was undertaken, once it became clear that the Group of 7 (the world's seven leading industrial nations), which met in Washington, D.C. October 1-7, had declared themselves bankrupt in the ideas necessary to solve the worst financial and economic crisis to confront mankind since the Fourteenth century.

As of November 24, endorsers of the appeal included: a shadow U.S. Senator from Washington, D.C.; eight former

Appeal to President Clinton. Facing page, right: Rally at the U.S. Capitol. Facing page, left: Petitioning outside Philadelphia City Hall.

Right: Lafayette Park rally, across from the White House.



EIRNS/Stuart Lewis

members of the U.S. Congress; 135 current and former state legislators from 36 states; 55 other elected officials; 80 trade union officials; 70 Democratic Party officials; and about 154 religious, civic, and Civil Rights leaders. Internationally,

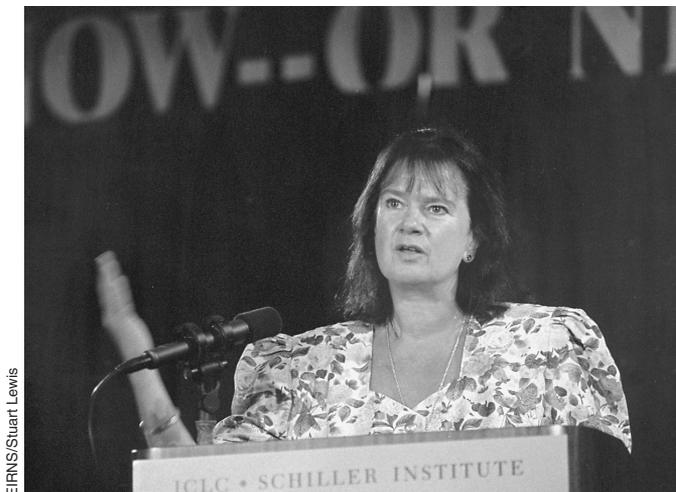
the appeal has been endorsed by 21 current and former members of federal parliaments; a former Prime Minister; a former Vice Prime Minister; and a former Minister of Justice.

In addition to these endorsements,

Washington, D.C. Conference

Defining the Challenge of Global Leadership

Last Chance for Global Civilization: Now—or Never in Your Lifetime,” was the theme of the semi-annual conference of the Schiller Institute held on Labor Day weekend in Northern Virginia. More than 900 citizen-activists gathered to discuss what must be done to meet the challenge of the worldwide financial collapse, which threatens to unleash chaos that would destroy the planet for generations to come.



Helga Zepp LaRouche addresses Labor Day conference.

Lyndon LaRouche key-noted the conference through an audio-taped address on the subject of “The Challenge of Global Leadership.” The second keynote was given by Schiller Institute founder Helga Zepp LaRouche, who spoke on the topic, “Who Lost Russia? Toward a Union of Sovereign Nation-States.”

Providing background to the keynote presentations, were panels on the subjects of American Exceptionalism, the current worldwide need for

LaRouche’s New Bretton Woods System, and the principles of Classical musical composition.

Transforming Souls

LaRouche’s speech was concise and hard-hitting. He began:

“The world is now in a crisis which is best compared to a world war. We must win the world war. If we do not win the war, everything else we do will be, in effect, a waste of time, and a

waste of effort. So, we must concentrate, always, on *winning the war*; that is, to exert the leadership which results in a transformation of the world as a whole, from a world dominated by what has led to the present crisis, the present threatened New Dark Age, into a new world, which is a world of reconstruction and recovery. We must win that war, and we must keep our eye on that

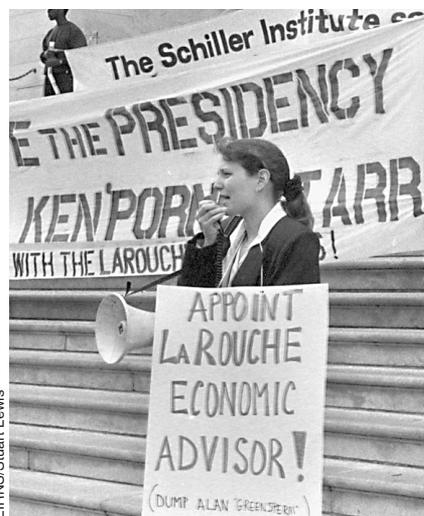
ball, and not be diverted by so-called ‘other questions,’ or ‘questions which must also be considered.’

“Now, how are we going to win the war? It’s impossible to change the world in time to save humanity, including the people of the United States, or East Oshkosh, for example, from a New Dark Age, unless the President of the United States changes his mind and behavior, from what he’s been doing up until now, to provide the world the kind of leadership role of the United States and its President which echoes the role performed by Franklin Roosevelt in the late 1930’s, and during the war.

“We have the tools, we have all the knowledge needed, as to *how*, what blueprints are needed for rebuilding this world economy. But we will fail, unless we mobilize the inside of the heads of individual people, starting with the President of the United States, to cause each to provide the leadership, or play the other crucial roles that each must play, in order to make this attempt at a global reconstruction of civilization work.”

New World Economic Order

Zepp LaRouche’s presentation began with the state of the global financial breakdown, and how this desperate crisis came about. What must be learned, she emphasized, are the lessons of the



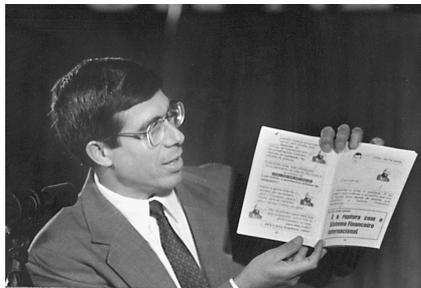
over 50,000 signatures have been gathered from ordinary citizens throughout the United States. The goal of the Schiller Institute, is to collect a total of

500,000 endorsements—an achievement which would, in itself, require the creation of a mass political movement that the President could not ignore.

missed opportunity of 1989, the period when the Berlin Wall came down, and there was an opportunity to forge a new relationship between East and West around LaRouche's proposals for economic reconstruction.

Instead, what was done was, in Lyndon LaRouche's words, "a crime against humanity." Through the imposition of the Bush-Thatcher-I.M.F. program on Russia, in particular, a horror was created, which could lead to a total breakdown. The solution must be a shift to

the policies LaRouche has laid out, in the tradition of FDR—and more, a cultural renaissance as well.



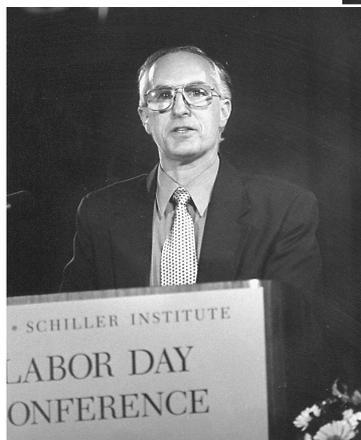
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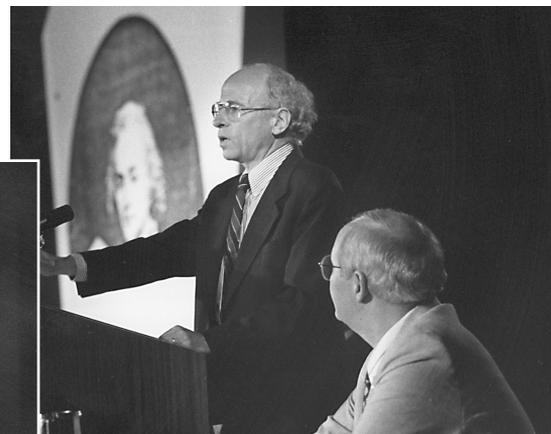
"Economic Chaos, or Global Reconstruction": EIR editors Dennis Small (Ibero-America) and Rachel Douglas (Russia and Eastern Europe) contrast the current collapse, with the potential for growth through massive development projects.



EIRNS/Stuart Lewis



EIRNS/Stuart Lewis



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"American Exceptionalism": Historians Anton Chaitkin (above, podium), Graham Lowry (above), and Jeffrey Steinberg (left) present the real history of the American Republic, as the cutting edge of a global movement based on republican principles.



EIRNS/Stuart Lewis

Music workshop: Anno Hellenbroich conducts demonstration of the principles of Classical motivic thorough-composition.

Institute Sparks Offensive 'To Save the Presidency'

On Thursday, October 22, Debra Hanania-Freeman, acting on behalf of the initiators of Americans To Save the Presidency, delivered the signatures of approximately 30,000 Americans to the White House Office of Public Liaison.

Americans To Save the Presidency was formed September 6, by a group of current and former elected officials who were in the Washington area attending the semi-annual conference of the Schiller Institute. In response to reports that a group of prominent

Democrats were planning to pressure President Clinton to resign, the assembled legislators drafted a statement blasting the assault on the Presidency as not only illegitimate, but as "conceived and nurtured outside the borders of the United States." The statement identified Ambrose Evans-Pritchard, a British so-called journalist with close ties to British Intelligence and the financial establishment, as a key organizer of the assault. The statement expressed support for President Clinton, and urged him to focus his energies

on finding a solution to the break-up of the global financial system.

The initiators included State Rep. Ed Vaughn (Mich), State Rep. Thomas Jackson (Ala), State Rep. Joe Towns (Tenn), State Rep. Charles Quincy Troupe (Missouri), State Rep. Harold James (Penn), State Rep. Roland Hemon (NH), State Rep. Charles Hudson (La), State Rep. John Martinez, Congressman James Mann (SC)*, State Sen. Theo Walker Mitchell (SC)*, State Sen. Herbert Fielding (SC)*, State Rep. Dennis Dellwo (Wash)*, and James Barnett, President of

Schiller Delegates at China Land-Bridge Meeting

A top-level Schiller Institute delegation, led by Helga Zepp LaRouche, participated in a six-day conference on the “Second Eurasian Bridge,” which took place in four cities in China between October 27 and November 1. The conference, sponsored by the Foreign Affairs Bureau of the Chinese Academy of Social Sciences, was titled: “Asia-Europe Economic and Trade Relations in the 21st Century and the Second Eurasian Bridge.” Mrs. LaRouche addressed the conference on its first day, October 27, in Beijing. The assemblage then travelled to Nanjing, capital of Jiangsu Province; to Lianyungang, the Jiangsu Province port city on the Yellow Sea, which is the eastern terminus of the Eurasian Land-Bridge; and finally to Qinhuangdao, China’s second-largest port, in Hebei province, where the Great Wall meets the Bohai Sea.

The conference involved participants from Russia, Slovakia, Hungary, the Czech Republic, The Netherlands, Japan, and South Korea, as well as from the Schiller Institute in Germany. Reflecting the growing collaboration between China and Russia on economic and other matters, the high-ranking Russian delegation included Professor M.L. Titarenko, the Director of the Institute of Far Eastern Studies of the Russian Academy of Sciences, and the

the Coalition of Black Trade Unionists, Northwest Alabama (*denotes former).

The 30,000 signatures, which were gathered over a period of approximately a month, included those of a former U.S. Senator; a former Governor; seven former members of Congress; 300 state legislators from 41 states; 240 other elected officials; 225 trade union leaders; 330 Democratic Party officials; and about 350 religious, civic, and Civil Rights leaders, as well as tens of thousands of ordinary citizens.



EIFRS/Richard Magraw

Chinese news crew interviews Helga Zepp LaRouche at the port of Lianyungang, the eastern terminus of the Second Eurasian Land-Bridge.

Chairman of the Russian-Chinese Friendship Association, and Dmitri Lvov, head of the Economics Division of the Russian Academy of Sciences.

Mrs. LaRouche was a featured speaker at the conference, and gave numerous interviews to regional and local officials and newspapers at each of the conference locations, as did the other members of the Institute delegation. Accompanying Mrs. LaRouche were Jonathan Tennenbaum and Mary Burdman, who presented speeches to the conference in Nanjing and Qinhuangdao, respectively.

The ‘Silk Road Lady’

In her speech, Mrs. LaRouche discussed the global paradigm shift that began in the West with the “post-industrial society,” leading to the abandonment of proven economic and political methods which had formerly served so well—especially under the leadership of U.S. President Franklin D. Roosevelt—in favor of a “globalization” which “is nothing but a neo-feudal world system.”

Universal history proves that it is in “the most fundamental self-interest of each sovereign nation-state, to develop all potential of all of its citizens,” said Mrs. LaRouche, and that “in modern times, it has been the American economist Lyn-

don LaRouche who developed a scientific measurement for the intelligibility of the common good, and for what are the necessary criteria for development.”

In conclusion, she urged that mankind draw from “the best of Chinese, European, and other cultures . . . and let our own culture, enriched though the genius of the others, come back to us and inspire us to contribute to a new golden age of mankind.”

Conference participants toured and inspected the ports of Lianyungang and Qinhuangdao, both “bridgeheads” of the Second Eurasian Land-Bridge. In Nanjing, the delegates were guests of the provincial government of Jiangsu, one of China’s leading industrial and agricultural regions. Here, Jonathan Tennenbaum’s speech, “A Project-Oriented Approach to International Economic Relations,” laid out the alternative to the ongoing collapse of the British “free-market” system, in the form of LaRouche’s American System economics, featuring state-promoted great projects for infrastructure and advanced science. He called for joint cooperation to develop the Eurasian infrastructure corridors, mass-produce HTR reactors, and build a series of model cities along the route of the Land-Bridge.

Brazil: Zepp LaRouche Issues Challenge for New

Schiller Institute founder Helga Zepp LaRouche visited the nation of Brazil during August 8-14, participating in public and private meetings in both Rio de Janeiro and Sao Paulo, through which she addressed more than 500 people overall.

Mrs. LaRouche's presence in Rio was noted by the influential financial newspaper *Monitor Mercantil*, which in its August 11 edition observed: "During her discussions with the press, Helga Zepp LaRouche expressed the great disappointment in Europe and in United States concerning Brazil. The country which held the promise of being an emerging power at the end of the century, is in a process of Africanization. Deindustrialization, and automatic alignment with the policies of the financial sector, have relegated Brazil to a secondary and declining role in the world picture."

In its August 18 edition—one day after the explosion of the Russian crisis, which Mrs. LaRouche had forecast repeatedly in her discussions with Brazilians—the same newspaper carried



EIRNS/Steven Meyer

Helga Zepp LaRouche attends Sao Paulo City Council awards ceremony for presidential candidate Dr. Eneas Carneiro (far right).

an exclusive interview with Mrs. LaRouche.

At a crowded press conference in Rio, Zepp LaRouche launched the Portuguese-language edition of her husband Lyndon LaRouche's book, *The Science of Christian Economy*, which she emphasized was written to reaffirm the principles of economy based on *the*

human being, requiring a kind of society that supersedes the oligarchic system.

It is for this reason, said Mrs. LaRouche, that she was issuing the challenge to forge new alliances among nations, like those once established by Abraham Lincoln. We need a New Bretton Woods System, she added, promoted by a new Non-Aligned Movement

Fight Launched in Mexico for Classical Music Education

Demonstrating just how *revolutionary* the times are, hundreds of participants turned out in Mexico City on October 11-12 for a Schiller Institute seminar and concert organized to launch a movement in defense of "Classical Music and Excellence in Education."

The central idea of both the seminar and concert, was that it is only through a Classical Renaissance, that mankind can find its path out of the holocaust of the global I.M.F. system. The discussion of how to create such a Renaissance, by waging a fight to secure a Classical music education for all Mexico's children, generated tremendous enthusiasm. Plans were made for a national organizing drive to ensure that Classical education, including musical education, "reaches even the most

humble of homes" in Mexico.

The musical weekend was planned last February, after several Mexicans attended the Schiller Institute-organized concert of Leipzig's historic St. Thomas Boys' Choir (*Thomanerchor*) in Washington, D.C., and its accompanying seminar on "Classical Music and Excellence in Education." The Schola Cantorum of Mexico, the country's foremost children's music school—which is directed by its founder, Alfredo Mendoza, who participated in the Washington events—joined the Schiller Institute in organizing the Mexico City events.

Organizing for this project was exploded by the Mexican government's decision to eliminate music from secondary school education altogether. In

this heated environment, the invitation for the seminar and concert set off a storm in Mexico City's music establishment. Among those who responded were forty musical "inspectors" from the Bellas Artes National Institute, who are responsible for supervising the 1,200 music teachers in the primary and secondary schools of Mexico City, both public and private.

Creating a Movement

Speaking at the seminar were Mendoza, and Marivilia Carrasco and Hugo Lopez Ochoa of the Schiller Institute, joined by four leading Mexico City music teachers, including the director of the National Music School Children's Choir.

The concert the next day was per-

Alliances

established through an alliance of sovereign nations. Brazil, India, China, and other nations must play a key role in this new configuration, she urged.

In Sao Paulo, at a seminar organized by the Institute for Freedom and Economic and Social Development, Mrs. LaRouche was greeted by the Institute president Dr. Jose Carlos Graca Wagner with praise for her contributions, as well as those of her husband. She then participated in a forum sponsored by the city council of Sao Paulo to honor Dr. Eneas Carneiro, presidential candidate of the Party of National Reconstruction (PRONA), who was being made an Honorary Citizen of the city. Mrs. LaRouche, who was introduced by Dr. Carneiro, addressed 350 people at this solemn ceremony. In her speech, she stressed the need to generate a cultural renaissance as the *sine qua non* of the survival of nations: "We must establish the goal that every child in the world, each in the image of God, receive a Classical education. Only in this way can we guarantee the permanent eradication of the oligarchic system."

formed entirely by children engaged in music studies: the Schola Cantorum, the National Music School's Children's Choir, students of the Violin School of Maestro Yuriko Kuronuma, and other instrumentalists.

At the concert's end, Mendoza told the audience, that the primary obstacle to restoring Classical music education is I.M.F. policies, and, therefore, that the Schiller Institute and Schola Cantorum plan to organize a concert for a just, new world economic order. He called on the audience to join in singing "Va, Pensiero," the chorus of the Hebrew slaves from Verdi's opera *Nabucco*—famous as the Italian hymn of liberation from foreign occupation. The audience burst into song.

European Conference

Continued

were flooded with credit aimed, not at infrastructure development, but at trapping nations in a vicious circle of ever-increasing indebtedness.

As the result of the same policies, the U.S. physical economy began to contract. Since 1971, there has been no economic growth in the United States, LaRouche told the audience. The degree of collapse, he explained, has been covered over by the fact, that there has been no investment in merely replenishing dilapidated infrastructure.

The total debt worldwide is now several orders of magnitude larger than the value of all the goods and services produced globally. This means that the world economy, as a whole, is bankrupt.

LaRouche emphasized that it is not too late to avert disaster for the West. He cited the World War II mobilization of America's dormant industrial might, under the leadership of President Franklin D. Roosevelt, to defeat the Nazis. FDR's efforts produced the greatest industrial expansion in history. Those same methods, LaRouche insisted, can and must be used today.

Schiller and the Liberation Wars

In a second keynote address, Helga Zepp LaRouche presented a detailed history of Friedrich Schiller and the German Liberation Wars, showing that the present period of grave global crisis is, in many respects, parallel to that period, when all European republicans engaged in a war to destroy Napoleon's drive to reconstitute a European imperium. Lazare Carnot, the French "author of victory," joined forces with German

republicans, such as the Humboldt brothers, vom Stein, Scharnhorst, and others, to defeat Napoleon, and lay the foundations for an American-style revolution on continental Europe.

Earlier, the Jacobins had quashed the prospects of an American revolution in France, but the spirit of the American events of 1776, and the direct ties to leading American figures, gave rise to the European effort.

Today, as well, Mrs. LaRouche emphasized, republican forces worldwide must join forces to defeat a financial oligarchy, hell-bent on creating a new Dark Age of death and destruction.

Other panels included a series of presentations detailing Carnot's role as one of Europe's leading military strategists, scientists, and republican leaders; and a panel, chaired by Lyndon LaRouche, presenting the implications of the attempted circumnavigation of the world undertaken by associates of the great Greek mathematician Eratosthenes, who proved the Earth was spherical, and accurately calculated its circumference. According to groundbreaking archeological investigations, Eratosthenes' students succeeded in sailing from the Mediterranean to the South Pacific via the Red Sea and Indian Ocean, and, eventually, to the Pacific coast of South America, in 231 B.C. LaRouche pointed to the fact that the next successful voyage to the Americas was in 1492 A.D., more than 1,700 years later, to demonstrate that great achievements are made when individuals fight for great ideas, and that human progress is not a linear process, but can be set back by regression into oligarchical forms of society, when crises in civilization—such as those facing us now—are not surmounted.

On the Back Cover (clockwise from top left): Johann Sebastian Bach; Leopold Mozart, with his children Wolfgang and "Nannerl," in Paris, 1764; Mozart plays the score of his opera *Don Giovanni*, Vienna, 1787; W.A. Mozart at the keyboard; Johannes Brahms, 1893; Brahms at the piano; Ludwig van Beethoven, 1815; Beethoven at the piano, while W.A. Mozart looks on, Vienna, 1787; Beethoven, the "Promethean," 1819-20; J.S. Bach at the organ. Background scores: Autograph ms., J.S. Bach, *St. Matthew Passion*, 1736 revision; autograph ms., W.A. Mozart, *Requiem*, 1791; autograph sketches, Ludwig van Beethoven, Fifth Symphony in C minor, Op. 67. **Credits:** Brahms at the piano, Corbis-Bettmann; all others, The Granger Collection, New York.

Schiller Birthday Celebrations

Cultural celebrations of the 239th birthday of Friedrich Schiller, the great German “Poet of Freedom,” held across the U.S. and Germany by the Schiller Institute in early November, had a special focus on Schiller’s insights into the role of Classical drama in crucial periods of political crisis, such as our own.

As Lyndon LaRouche has recently emphasized, Schiller used “the awfulness of the tragic failure on stage, to fill the audiences emerging from the theater with the joy of knowing that they had become better people leaving the theater, than had entered it before. . . . In that more fortunate state of mind, we are committed to discovering the right thing to do, to avert that doom which the unchecked fatal passion might bring upon our society.”

In Germany, where Schiller is as beloved as Shakespeare is in the United States, the Schiller Institute’s *Dichterpflänzchen* (poetry recitation group) presented special celebrations featuring “The Song of the Bell”—Schiller’s poetic commentary on the tragedy inherent in the French Revolution—in Mainz and Wiesbaden, drawing an audience of over a hundred in each city.

In the U.S., events were held in Chicago,

Los Angeles, Philadelphia, Baltimore, New York, Houston, San Francisco, Seattle, Norfolk, and Reston, Va.

Ennoblement of Character

The most elaborate event took place at the Community Center in Reston, a suburb of Washington, D.C. The three-hour program was devoted to what Schiller called the “ennoblement of character” of the audience, through staging of the *punctum saliens*, or turning-point scene, of each of three of Schiller’s most powerful tragedies: *Don Carlos*, *Maria Stuart*, and *The Virgin of Orleans*.

In *Don Carlos* and *Maria Stuart*, we see the failure of the tragic hero to overcome his or her passions, to rise to the level of agapic, creative reason. In the *Virgin of Orleans*, we witness the peasant girl, Joan of Arc, make the heroic decision to accept God’s calling, and lead her nation to battle the invading English—an effort later tragically betrayed by the French nobility.

In addition to the dramatic scenes, the Reston program, which was viewed by an audience of about 100 children and adults, included excerpts of Schiller’s aesthetic writings, letters on Classical tragedy, numerous poems, and several performances of Classical music.



EIRNS/Stuart Lewis



EIRNS/Debra Jambor



EIRNS/Debra Jambor

Top: King Philip/Marquis of Posa scene, “*Don Carlos*,” Reston, Va. **Center:** Camp scene, “*Wallenstein’s Camp*,” Houston.

Above: Baritone Dorceal Duckens, accompanied by Ya Mao, performs Brahms lieder and Spirituals, Houston. **Right:** Chorus takes a break, as emcee Lynne Speed displays one of three volumes of Schiller translations published by the Institute, New York City.



EIRNS/Charles Hughes

Focus on Classical Tragedy

U.S. Celebrations

Highlights of other U.S. celebrations included:

- **Houston:** performances of poetry, music, and scenes from Schiller's *Wallenstein's Camp*. Pianist Ya Mao and baritone Dorceal Duckens also performed.

- **Chicago:** excerpts of Mozart's opera *The Magic Flute*, performed by children of Schiller Institute members, opened the event. Scenes from *Don Carlos*, *Maria Stuart*, and *The Virgin of Orleans* were interspersed with poems recited and sung in both English and German musical settings.

- **Philadelphia:** two musical settings of Schiller poems by Franz Schubert, "Unending Joy" and

"The Punch Song," performed in traditional German Mannerchor (men's chorus) style.

- **Baltimore:** recitations of Schiller's poetry were followed by an exposition on "Beethoven's *Christ on the Mount of Olives: Gethsemane*, as Schiller Would Treat It."

As Schiller Institute president Will Wertz said in introducing the Reston program, "There is no better way to become a true, world-historical citizen of a republic, than to celebrate the birthday of Friedrich Schiller, by passing his gift to us, on to our fellow citizens. For, as Schiller correctly maintained, it is only through beauty that we proceed to freedom."



EIRNS/Stuart Lewis



EIRNS/Christopher Lewis



EIRNS/Stuart Lewis

Top: *Joan of Arc, Prologue, "The Virgin of Orleans," Reston, Va.* **Above:** German "Dichterpflänzchen" group, Mainz performance. **Left:** *Queen Elizabeth/Mary Stuart scene, "Mary Stuart," Reston, Va.* **Below, left:** Schiller Institute Children's Chorus, Reston, Va. **Below:** Schiller Institute String Trio performs movement from Beethoven *Trio in C minor, Op. 9, No. 3, Reston, Va.*



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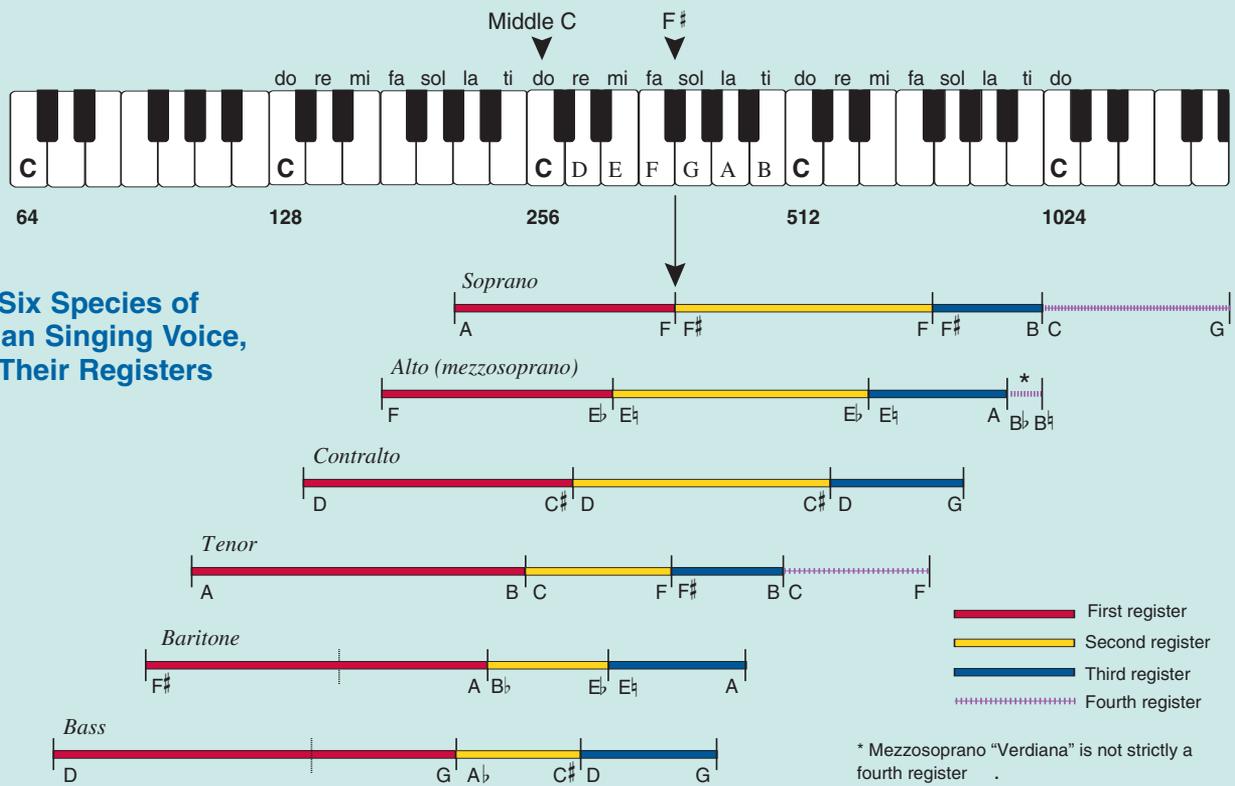
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The Six Species of Human Singing Voice, and Their Registers

The Tradition of Florentine *bel canto*

Composition of Classical music according to the Italian Renaissance principle of *bel canto* (beautiful singing) is one of the best examples of mankind's ability to discover an existing physical principle, and to use that discovery to create new works of science and art, which then increase humanity's power to build civilization. Today, *bel canto* signifies the physical principle, discovered in the Fifteenth century by Leonardo da Vinci (1452-1519) and his collaborators, that the human singing voice is innately endowed with differentiated voice registers and other qualities, which allow a composer to create a unique density of new ideas in a musical work.

As Leonardo indicated in his treatise on the human voice, *bel canto* singing can be compared to painting, because of the conscious use of

'colors' in the voice, either as natural colors (conferred by the different registers), or as a conscious change of color for purposes of interpretation. (For example, great singers are able to make their voices darker while singing a part in a *Lied* corresponding to a change in the poetic text, or a change from major to minor, or to make them lighter in a particularly joyful part.) Generally, the audience will perceive a clear register shift from the second to the third, high register (particularly in the tenor voice, which is stronger), as a change of color. Third-register notes, if sung with the right *impostazione*, have a particular brilliance, which they lose if they are shouted, or sung in the throat, where they become opaque. First-register notes, being sung mostly with a chest resonance, are perceived as darker

notes. This implies that each note of the scale does not have the same value for singing.

Great composers such as J.S. Bach, Mozart, Beethoven, and Verdi were aware of these differences in registration when they wrote their vocal works, and developed the well-tempered scale based on this palette of vocal colors. Since instruments are an imitation of the *bel canto* singing voice, they echo the natural registration of the six species of voices, the only difference being that they introduce a new degree of freedom, often allowing motivic development, by moving from one voice to the next.

Thus, when a composer constructs a musical composition, he has six species of the adult singing voice—soprano, mezzosoprano, contralto, tenor, baritone, and bass—each containing three or four different registral 'voices,' a well-defined palette of colors, with which to 'paint.'

[SEE 'The Case of Classical Motivic Thorough-Composition']

‘The great issue of culture, is the task of freeing the majority of the population from that moral and intellectual self-degradation which tradition imbues within prevailing popular opinion.’

The Substance of Morality

by Lyndon H. LaRouche, Jr.

In this challenging work, Lyndon H. LaRouche, Jr., deepens the search for solutions to today’s global financial and monetary crisis, by addressing those ‘cultural factors’ which necessarily govern the physical well-being of society, as that is defined by scientific and technological progress as such. To the question, ‘What endured when Classical Greece died?’, a wholesale reprise of man’s history, and the history of man’s *ideas*, leads to an affirmation of the essential principles of goodness upon which human civilization is founded: ‘Justice, truthfulness, and those creative powers by means of which we may discover valid, revolutionary principles of our universe, form a seamless whole, in which Classical culture, morality, and physical science, are united by a common passion for universal justice and truth.’

In striking proof of the principles so adduced, ‘The Case of Motivic Thorough-Composition,’ a book-length presentation of crucial experiments of musical development from J.S. Bach, through Mozart, Beethoven, and Johannes Brahms, is appended to LaRouche’s groundbreaking essay.

