SCIENCE POLICY MEMO

Cold Fusion: Challenge to U.S. Science Policy

by Lyndon H. LaRouche, Jr.

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Cold Fusion: Challenge to U.S. Science Policy

Synopsis

Lyndon H. LaRouche, Jr. proposes that a "mini-crash program" of research into anomalous successes in "cold fusion" experiments, be adopted as a catalyst of a new U.S. national science-educational policy. This report outlines historically the crucial epistemological issues of scientific method implicit in the "cold fusion" anomalies, and examines some of the obvious problems of today's "cold fusion" theorizing in light of relevant plasma-physics work of recent years by Professors Robert Moon, Winston Bostick, Daniel Wells, and others.

Publisher's Preface

This book began to take shape shortly after the convening of the Second Annual Conference on Cold Fusion, held in Como, Italy, June 29-July 4, 1991. At that time it was clearly acknowledged that "cold fusion" was definitely established as a nuclear phenomenon by a number of researchers internationally. It was equally clear that researchers were at a loss for a coherent explanation of all of the anomalies associated with this phenomenon, although Drs. Giuliano Preparata and Martin Fleischmann, collaboratively, were laying the groundwork for such a theory in detail to emerge.

Lyndon LaRouche had been following the growing accumulation of research on cold fusion with great interest, since the first announcement of their discovery, on March 23, 1989, by Martin Fleischmann and Stanley Pons. At that time, he pointed out that their experiment made perfect sense in terms of a body of scientific research in which he had been interested, including seminal work by a team of researchers associated with the Fusion Energy Foundation.

Following the verification at Como, of a number of critical elements of the cold fusion process, such as the emission of a flux of neutrons and the presence of tritium and helium-4 as well as excess heat, LaRouche called for a mini-crash program on cold fusion, as part of his broader program for a trillion-dollar-a-year investment fund in the United States. To date he is the only presidential candidate in the U.S. elections who has supported a research program in cold fusion, far less a crash program for its development. In fact, only in Japan has there been an adequate response to the promise of this exciting new scientific potential, which will also no doubt open up many new technological frontiers.

The Japanese Ministry of International Trade and Industry (MITI) announced on July 10, 1992 their proposed five-year program to support full-scale research and development of cold fusion. Although the MITI release described the funding as amounting to tens of millions of dollars, rumor has it that the actual figure will be in the range of $100 million— half to be contributed by an industry consortium. This was played as front-page news in Japan, with major TV coverage as well. It was barely given mention by the U.S. and European press.

The announcement comes on the heels of the strong confirmation by cold fusion researcher Akito Takahashi, of the dramatic experimental

results of Martin Fleischmann and Stanley Pons. Takahashi is the head of the Department of Nuclear Engineering of Osaka University in Japan. Fleischmann and Pons, who were driven out of the United States by an anti-science witch-hunt, are now working in a Technova laboratory located in Nice, France.

In a four-month experiment, Takahashi achieved 70% excess heat, and excess power densities as high as 100 watts per cubic centimeter. Pons and Fleischmann have estimated that they achieve excess heat in the range of 1 kilowatt per cubic centimeter. While these results are exceptional, nonetheless, Japanese experimenters and Americans at Stanford Research Institute have achieved a high level of repeatable success with excess heats in the range of 20 to 50%. Both of these programs have been noteworthy for the systematic rigor of their research.

Dr. Edmund Storms at Los Alamos National Laboratory has also recently reported achieving excess heat, which confirms the results reported by Japanese cold fusion researcher Akito Takahashi. In an experiment modeled upon that of Takahashi he achieved around 20% excess heat, and a power density of around 23 watts per cubic centimeter. Takahashi himself, in a second series of experiments, has replicated his more dramatic experiment, but at lower power levels and lower excess heats, in the range of those found by Storms.

The promotional note on the poster for the Third International Conference on Cold Fusion, to be held in Nagoya, Japan this October 21-25, reads: "The confirmation of cold fusion has crossed the ridge. We are now in the stage of accumulating experimental results and analyzing the mechanism of these phenomena."

The announcement made by MITI stressed the reality that cold fusion is still in the scientific-theoretical stage of development, and may or may not prove to be a technically feasible method for utility generation of electricity; nonetheless, it is of major scientific importance and could have many possible technical applications, such as water desalination. All of this remains to be seen as the program unfolds. There is, of course, still no adequate theory to explain the anomalous results of the Fleischmann-Pons experiment. How can it be that the nuclei of two hydrogen atoms (actually, the deuterons of heavy hydrogen, which contains a neutron as well as a proton) can fuse together at room temperature?

This is a question that many physicists have found so challenging that they refuse to accept the reality of the experimental evidence put before their eyes. The experiment typically is conducted in a small glass jar (or metal container) in which there is a palladium cathode (negatively charged electrode) of a size under a cubic centimeter in volume, and a platinum anode (positively charged electrode) wound around it. Deuterium is released from the heavy water by electrolysis, and pumped into the palladium, to something close to a one-to-one ratio with the palladium atoms. At these densities, a nuclear process occurs which sometimes produces a release of neutrons, sometimes produces tritium, and sometimes produces heat far in excess of any possible chemical reaction. (These results may or may not occur together.)

According to the MITI announcement, the first phase of the program will be devoted to finding stable experimental methods to create excess heat, and to achieving precise measurements and diagnostics. They will also be trying to answer the question of precisely what the mechanism is by which cold "fusion" occurs. The closest approach to such a program in the United States was that launched by the Electric Power Research Institute (EPRI), which funds Stanford Research Institute (SRI) and some other laboratories. (SRI has a budget line from EPRI of $12 million

over a four-year period, but it is still closed, following an explosion last January.) In a recent visit to Japan, Dr. Thomas Passell of EPRI expressed the wish of many U.S. cold fusion scientists, that there be close international cooperation on this exciting scientific front.

Otherwise, the U.S. Department of Energy and similar institutions in Western Europe, and the majority of "mainstream" scientists in the West, have consistently tried to sabotage cold fusion research, either out of simple stupidity or the most venal reasons—such as unwillingness to part with a portion of their own funding in the dog-eat-dog world of underfunded scientific research. The majority of hot fusion scientists have opposed cold fusion, and the Malthusians have also been outspoken in their opposition to this non-polluting potential energy source.

The following two quotations from an April 19, 1989 article which appeared in the *Los Angeles Times,* are indicative: "Given society's dismal record in managing technology, the prospect of cheap, inexhaustible power from fusion is 'like giving a machine gun to an idiot child,' " said environmentalist Paul Ehrlich. Population-control advocate Jeremy Rifkin said, "It's the worst thing that could happen to our planet."

Cold fusion scientists and supporters around the world have responded to the MITI announcement with enthusiasm. Dr. Giuliano Preparata (who is now suing the Italian newspaper *La Repubblica* for libel for saying that no serious scientist supports cold fusion), was jubilant. "Now we are vindicated," he said in anticipation of a court victory.

—August 1992

Foreword:
The Witch-Hunt Against 'Cold Fusion'

"Since almost all of the books and most of the papers which have been published during the last decade on the subject of atomic structure are the work of physicists, it is but natural that the chemical facts which are of fundamental importance in connection with such a subject have been largely ignored, except in such portions of the field as have been popularized by certain chemists. During the last few years these chemists have succeeded in replacing the physicist's theory that the atom lies in a plane, by the more useful idea of Parson, G.N. Lewis, and other chemists, that it is three dimensional. These theories refer to the structure of the outer part of the atom.

Chemical facts are of prime importance also in connection with the study of the structure and stability of the innermost core, or nucleus of the atom. However, the chemical facts are so numerous and so detailed, that it is difficult for physicists to comprehend them without a careful study, so they are usually disregarded, even so much so that in some cases experimental results have been published which were seemingly not in harmony with the general system revealed by such facts. In such cases later work has shown the original experimental results to be erroneous.

—Professor William Draper Harkins, "The Stability of Atom Nuclei, the Separation of Isotopes, and the Whole Number Rule," from *Journal of the Franklin Institute*, August 1922, page 165.

August 1991

Should our civilization outlive the effects of this U.S. Bush administration, the future's historians would describe the onset of the 1990s as among the remarkably shameful episodes in the history of science. Consider, for example, that tyranny of "New Age" fanatics, the "political correctness" horde now pillaging our universities.[1] Consider, the disgusting behavior of the reigning science mafia on the subject of "cold fusion."

The so-called cold fusion experiments are an important discovery in their own right, important for understanding deeper fundamentals of science, and important for the practical benefits this discovery may bring ultimately to mankind generally. For our purposes, in this report, that topic is a useful point of departure, to trace our progress, step by step, to a deeper, politically urgent issue of science policy in general.

Officially, the present cold fusion controversy began on March 23, 1989, which was, ironically, the sixth anniversary, to the day, of President

Ronald Reagan's earlier announcement of the U.S. Strategic Defense Initiative (SDI). The Professors Martin Fleischmann[2] and Stanley Pons,[3] who revealed this discovery of cold fusion then, had already been in the top rank among the world's specialists in electrochemistry.[4] No political campaigner could have expected a more gratifyingly enthusiastic initial reception than that the announcement received briefly among the leading news media,[5] and the U.S. Congress, too.[6]

The abrupt turnabout came soon. It was as if someone from behind the scenes had barked out a drill-sergeant's "about face": The platoon of leading news media turned on its collective heels against cold fusion, as some among them had praised it earlier.[7] Denunciations were also bellowed out from most of those universities and laboratories which are the customary leading recipients of government science grants.[8] The attacks from among these latter sections of the science community were not only brutish; they were false and reckless. It has not been a scientific debate; it has been a crude political witch-hunt.

More than two years since the first announcement of the cold fusion discovery, the pyrotechnics of the still-continuing political witch-hunt tend to distract attention from the most important among the real issues posed by the experiments' results themselves. Reference to a recent (April 25, 1991) press conference by physicists Dr. Fred Mayer and Dr. John Reitz, helps to bring into focus the theoretical issues posed by these continuing, increasingly successful experiments.[9]

As we stress to laymen and others in the following body of this proposal, the Fleischmann-Pons cold fusion experiment belongs to a special category among scientific experiments in general. This category is a case often identified by the specialist's term, "crucial experiments." We signify by such "crucial" (or "unique") experiments, those whose special essential feature is an authoritative challenge to some broadly applied general principle of currently prevailing scientific opinion. What shows such a test to be a truly "crucial" one, is that some undeniably real effect of that experiment is implicitly in defiance of some generally accepted, virtually axiomatic principle of current scientific work and textbook teaching. Usually, we describe such an experimental feature as an *anomalous* result.

The Fleischmann-Pons cold fusion experiment, now duplicated by many other scientists, is defined as crucial in terms of a stubbornly recurring set of anomalous combinations of results.

In every such case of crucial experiments, our narrower, more immediate, early principal concerns are properly twofold. First, as experimentalists, we must validate the experiment itself, and do this as exhaustively as is necessary to assure ourselves there is no other possible explanation but that the anomalous results do occur in the manner described. Second, as theorists, once we are certain that the experiment itself is soundly designed and conducted, we must concentrate our criticism upon the various hypothetical explanations which appear to be available.

As of late July 1991, more than two years of repeated experiments around the world since the first public announcement of March 23, 1989, there remains no reasonable doubt of the most essential feature of the cold-fusion experiment, its anomalous feature.[10] The leading remaining question henceforth appears to be the question of physical theory. Foremost, at this moment, for example, appears to be the question: Is the cause of the anomalous excess heat some "cold" alternative to high-temperature thermonuclear fusion, or, as some have proposed, is there possibly some other kind of nuclear process at work?

Look at the situation, as of July 1991, from the standpoint of one alternate theory recently proposed, that of experimenters Mayer and

Reitz. Let us reference from their own words extracted from the stenograph of their April 25, 1991 Boston press conference.

> We believe that the experiments that Pons and Fleischmann did were good experiments. They did see new effects that had not been observed before. . . . We think their interpretations of the specific reactions that they identified as cold fusion, were probably not correct, although at higher temperatures they probably would be. They said they thought they were D-D (deuterium-deuterium) reactions. I think they did say something about there may be other nuclear reactions going on, and that is basically what we're saying now: that experiments that have been done so far, primarily are working on the contaminants. And they are a different class of nuclear reactions than the conventional fusion reaction.[11]

Hundreds of scientists working in this field, from many nations, now agree the essential anomalous feature of the Fleischmann-Pons experiment is confirmed. Those successful features of these experiments have but scratched the surface of the matters now being explored, but the most characteristic of the experiment's anomalous features is firmly established. It is established so, that the Fleischmann-Pons experiment is a *crucial* one, a *crucial experiment* which, together with recent years' discoveries in so-called high-temperature superconducting, will force upon us a revolutionary overturn within presently accepted textbook physics doctrine.

The practical question is, what is our next step? What kinds of new hypotheses must we work through, at perhaps tens of millions of dollars of bare cost each, during the next coming months and few years, as the next stage in our search to discover why the observed anomalous results must necessarily have occurred?

To illustrate the nature of that next step, let us suppose that we select for testing two sets of the hypotheses recently advanced in the effort to explain theoretically the anomalous feature of the experiment. The first set which might thus be chosen, is composed of those typified by that of Milan University's Giuliano Preparata et al.,[12] which seeks to explain the experimental results as products of a true fusion process. The second is the set of all those hypotheses which might be typified by the proposal of Mayer and Reitz.[13]

Or different selections might be made to a similar effect.

That summary of the practical situation leaves us with but two leading questions next to be considered. First, what sense of theoretical direction must be supplied to fundamental research? Second, how shall we deal with those factors which, too often, over recent centuries, have prompted leading institutions of scientific authority to respond to an important new discovery with something akin to the kind of brutishly irrational behavior directed lately as a political witch-hunt against cold fusion scientists? We conclude this foreword with a partial answer to the first question. The second question is treated within the body of this proposal.

The Mendeleyev Hypothesis

Dr. Jonathan Tennenbaum has stressed recently a related case, the peculiar, decisive role contributed by eight key women scientists, in forcing through the discovery of nuclear fission principles, over the opposition of a majority of the international physics establishment of that time.[14]

In this connection, focus first upon a crucial hypothesis by the scientists Ida Tacke Noddack and her husband, Walter:

If we choose any material system, sufficiently large and sufficiently free from material differentiation, then we always arrive at the same percentage distribution of the chemical elements. This distribution function is a universal function of matter.[15]

This work of the Noddacks was part of the theoretical directedness of scientific thinking of all who contributed in a leading way to the discovery of principles of nuclear fission and fusion.[16] That work was dominated by the influence of Mendeleyev's virtually single-handed establishment of a systematically comprehensive science of physical chemistry. To underscore the relevant point, Mendeleyev's initial elaboration of the periodic table defined him as the virtual "Johannes Kepler" of physical chemistry.[17]

This puts our discussion of the alternative hypotheses explaining the Fleischmann-Pons experiment, implicitly into proper focus. The relevant line of discussion of this connection is as follows.

From the standpoint of the Noddacks' cited line of approach to nuclear fission, nuclear fission appears first as a necessary feature of physical chemistry. That is to say, that the Mendeleyev periodic table requires the existence of all of the chemical elements and their isotopes to be determined as a whole by some distinct generating and ordering principle which governs the lawful transformation of each and every element and isotope of the table into other elements and isotopes.

Today, of course, nuclear fission and fusion are well-established means by which this transmutation might be accomplished. The hypothesis suggested by Mayer and Reitz relies upon already-established indications of at least one additional route by which a nuclear transformation might be accomplished: *nuclear transfer,* or *nuclear synthesis.*

The obvious question posed by Mayer and Reitz is, whether there is not a third kind of customary nuclear process, complementing fusion and fission, by means of which nature has accomplished what the Noddacks, for example, emphasize as the basis for a standard distribution in nature of the array of elements and isotopes in the periodic table.[18]

If we accept their challenge, the pursuit of the appropriate experimental hypothesis is in order. Thus, we might counterpose experimentally, the set of crucial hypotheses typified by the work of Preparata *et al.*, to the set typified by the suggestion of Mayer and Reitz of nuclear transfer.

So far, so good. However, let us not overlook the forest for the sake of the individual trees. Let us now stand back a bit from the laboratory bench. Let us situate this case of cold fusion in the continuing flow of the development of a physical chemistry which continues to be driven by Mendeleyev's profound principle. As Dr. Tennenbaum has proposed, let us assimilate the lesson given by those eight celebrated women, and the crucial role of those women, from the standpoint of the Mendeleyev thesis, enforcing usually reluctant, leading male scientists of that time to accept the realities of nuclear fission.[19]

On this account, let us turn our attention to uncompleted new work on the periodic table by the late Professor Robert Moon.[20] Let us situate the types of cold fusion hypotheses, those typified respectively, by the theses of Preparata[21] and Mayer,[22] in respect to the Moon updating of the periodic table.

This leads us to focus attention upon, first, the so-called "Coulomb barrier," and second, the quantum-dynamical dogma of "tunneling" a charged particle's sneaky way past the ominously powerful sentinels of this "Coulomb barrier." However in the case of the cold fusion barrier, a simple tunneling hypothesis is simply too improbable to offer even a plausible solution to the problem.[23]

Even if such a tunneling hypothesis were probable, this author would reject it on general principles as a merely textbook-plausible explanation for the phenomenon of fusion, which in reality is no explanation at all. This present proposal objects to simple acceptance of that "tunneling" conjecture. This objection is properly seen as an authoritative one, an objection which is epistemological in nature, and grounded in the most characteristic features of the more than five-hundred-year history of the internal development of modern European physical science. The authoritative grounds, in particular, for this objection to "tunneling" ought to be obvious to anyone familiar with the crucial features of that history.

The objection is summarily this: All of the various "tunneling" hypotheses rely upon certain reductionist, formalist's axiomatic assumptions respecting the curvature of physical space-time on the scale of a few Angstrom units cross-section, or much less. Contrary to the reductionist premises upon which the "Coulomb barrier" models depend, the relevant crucial experimental evidence is, that physical space-time on this microphysical scale is "Keplerian," not the linear space-time of Descartes, Newton, and Maxwell.

On that microphysical scale, space-time is characteristically in agreement with the combined "Keplerian" geometries of Bernhard Riemann and his collaborator Eugenio Beltrami.

This is shown, in significant part, by the work on "force-free" fields by Bostick, Wells, Nardi, *et al.*, and by Bostick's related experimental proof of the intrinsically negentropic characteristics of the Schrödinger Ψ-function. The Moon hypothesis on the geometrical ordering of the nuclei of the periodic table, is directly relevant to the cold fusion case, and is the view of the periodic table consistent with the relevant discoveries of Bostick, Wells, *et al.*[24]

The task assigned to the following proposal, is to situate a proposed "mini-crash program" in terms of such a program's estimable catalytic benefits toward reversing the recently accelerating scientific illiteracy not only among the U.S. population in general, but also among graduates of what are nominally science-educational and related programs of today's universities.

This presentation is made from the standpoint of the almost lost science of epistemology, from the standpoint of an epistemological overview of the most characteristic features of the emergence and progress of modern European science. Thus, since the bare rudiments of epistemology are rarely known even among today's science professionals, the following proposal-report features an early identification of those crucial epistemological issues bearing implicitly upon the domain within which the cold fusion experimental phenomena are situated.

Notes

1. The *Wall Street Journal* for Monday, Nov. 26, 1990, involved a lead editorial and a cartoon which cross-referenced that lead editorial which was on Political Correctness. The point had been reached that the editorial page of the *Wall Street Journal* was horrified by this, and that some people on college campuses had become horrified by it.

2. According to one biographer, Martin Fleischmann was born March 29, 1927, in Karlsbad, Czechoslovakia. His family came to England to avoid persecution by the Nazis. During World War II, Fleischmann went to high school in Sussex, England; and from 1947-50, attended Imperial College in

London. At age forty he achieved the professorial Chair in Electrochemistry at the University of Southampton. Fleischmann is the author of over two hundred scientific papers and a number of portions of textbooks. Fleischmann won the Royal Society of Chemistry's medal for Electrochemistry and Thermodynamics in 1979. He was president of the International Society of Electrochemistry (1970-72). In 1985 he was awarded the Palladium Medal by the U.S. Electrochemical Society. Eugene F. Mallove, *Fire from Ice* (New York 1991), pp. 46-47.

3. Stanley Pons was born in 1943 in Valdese in North Carolina. He attended Wake Forest University in Winston-Salem, North Carolina, graduating in 1965, and began advanced studies at the University of Michigan at Ann Arbor, but left before receiving his doctorate. Later he entered the graduate program in chemistry at the University of Southampton in England and received his Ph.D. there in 1978. After being on the faculty at Oakland University in Rochester, Michigan, and the University of Alberta in Edmonton, Pons came to the University of Utah in 1983 as an associate professor, becoming a full professor in 1986, and Chairman of the Department in 1988. He has authored or coauthored over 150 scientific publications. Eugene F. Mallove, *Fire from Ice* (New York: 1991), p. 47.

The photo shows Fleischmann (right) and Pons with one of their early cold fusion experimental setups, holding examples of the palladium cathodes used in the experiment.

Stanley Pons and Martin Fleischmann

courtesy of University of Utah

4. On October 29, 1990, Dr. Giuliano Preparata, professor of theoretical physics at the State University in Milan, Italy, was interviewed by a *21st Century Science & Technology Magazine* correspondent. Dr. Preparata noted that one reason he took a special interest in the work of Fleischmann and Pons was that a colleague of his told him, "If I were you I would take them very seriously because these are the best that there is in the world in electrochemistry."

5. Favorable notice of the Fleischmann and Pons announcement was given by the *Wall Street Journal* on March 23, 1989, "Development in Atom Fusion To Be Unveiled," and *Financial Times* of London, March 23, 1989, "Test Tube Nuclear Fusion Claimed."

6. On April 26, 1989, Dr. Fleischmann and Dr. Pons testified before the House Committee on Science, Space and Technology on their experiment. They were accorded an enthusiastic welcome as they proceeded to describe the experiment and its results in detail before the Committee.

7. The abrupt turnabout which occurred in the media can be seen in the following: "Nuclear Fusion Confusion," *Christian Science Monitor*, April 11, 1989; "Fear of Fusion: What If It Works?" *Los Angeles Times*, April 19, 1989, in which rabid environmentalist Jeremy Rifkin claimed that cold fusion is "the worst thing that could happen to our planet"; and "Skepticism Grows Over Cold Fusion," *Science*, Vol. 244, April 21, 1989.

In addition, on April 27, 1989, the editor of *Nature* magazine John Maddox wrote: "The Utah phenomenon is literally unsupported by the evidence, could be an artifact, and given its improbability, is most likely to be one. . . . The likelihood of replication fades as the days go by"; while on April 30, 1989, a *New York Times* editorial stated that the University of Utah ". . . may now claim credit for the artificial heart horror show and the cold fusion circus, two milestones at least in the history of entertainment, if

not science. . . . Given the present state of evidence for cold fusion, the government would do better to put the money on a horse."

On May 9, 1989, a commentator on NBC News alleged that "So far, [cold fusion] hasn't been reproduced at any place without a good football team." The *New York Times* continued its attack on June 14, 1989, in an article entitled "Effort to Verify Fusion Experiment Collapses," and on July 6, 1989, *Nature*, Vol. 340, ran the headline "No Evidence for Cold Fusion Neutrons," in which John Maddox editorialized: "It seems the time has come to dismiss cold fusion as an illusion of the past four months or so." As well, *Nature*, on Jan. 4, 1990, in an anonymously authored article claimed that "cold fusion has come and gone in eight months. . . . The international scientific community showed it could take on novel scientific ideas, digest them and dispatch them, all with considerable speed and relatively good humor. . . . The scientific event to be proud of in 1989 was not the announcement by two Utah researchers . . . but the worldwide activity that it stimulated," and followed up on March 29, 1990, with an article in Vol. 344, "Farewell (Not Fond) to Cold Fusion."

The collage gives an additional sense of the second "sudden reverse" phase of the coverage.

8. Attacks in the news media were complemented by attacks from leading scientists like Martin Deutsch, professor of physics emeritus at MIT, who was quoted in *Science News* of May 6, 1989: "In one word, it's garbage"; or the comment in the Summer 1989 *Bulletin of the American Physical Society*, "The corpse of cold fusion will probably continue to twitch for awhile, even after two nights of unrelenting assaults at the APS Baltimore meeting."

As well, Robert L. Park of the Washington office of the American Physical Society told *The Chronicle of Higher Education* April 7, 1989, "These guys called a press conference and didn't even release a scientific report. That's outrageous."

9. A press conference was held following a scientific seminar on April 25, 1991 by Drs. Frederick Mayer and John Reitz, at the Massachusetts Institute of Technology.

For coverage of this seminar, see *21st Century Science & Technology*, Vol. 4, No. 2, Summer 1991, "Hydron Fusion," page 20, and *EIR*, May 31, 1991, Vol. 18, No. 21, pp. 20-26.


Dr. Frederick Mayer

10. Julian Schwinger, a 1965 Nobel laureate in physics, speaking at the first Annual Conference on Cold Fusion held in Salt Lake City, Utah, March 28-31, 1990 said: "It is no longer possible to lightly dismiss the reality of cold fusion." At the same conference, Nate Hoffmann of Rockwell International said, "You can't kill cold fusion by an edict in a newspaper."

11. This statement was made by Reitz in answer to a question, as reported in *21st Century Science & Technology*, Vol. 4, No. 2, Summer 1991, p. 23.

12. An interview with Dr. Giuliano Preparata appeared in *21st Century Science & Technology*, Winter 1990, Vol. 3, No. 4, pp. 24-26.

13. *21st Century Science & Technology*, Summer 1991, p. 21. Further details on nuclear transfer are provided in F. Mayer and J. Reitz, "Nuclear Energy Release in Metals," *Fusion Technology*, May 1991, p. 552.

14. Dr. Jonathan Tennenbaum, "Fission and the Breakthrough of Women in Fundamental Scientific Research," *21st Century Science & Technology*, Vol. 4, No. 1, Spring 1991, pp. 26-29; and Dr. Jonathan Tennenbaum, "How Nuclear Fission Was Really Discovered," *ibid.*, pp. 30-37.

courtesy of Niels Bohr Library, American Institute of Physics
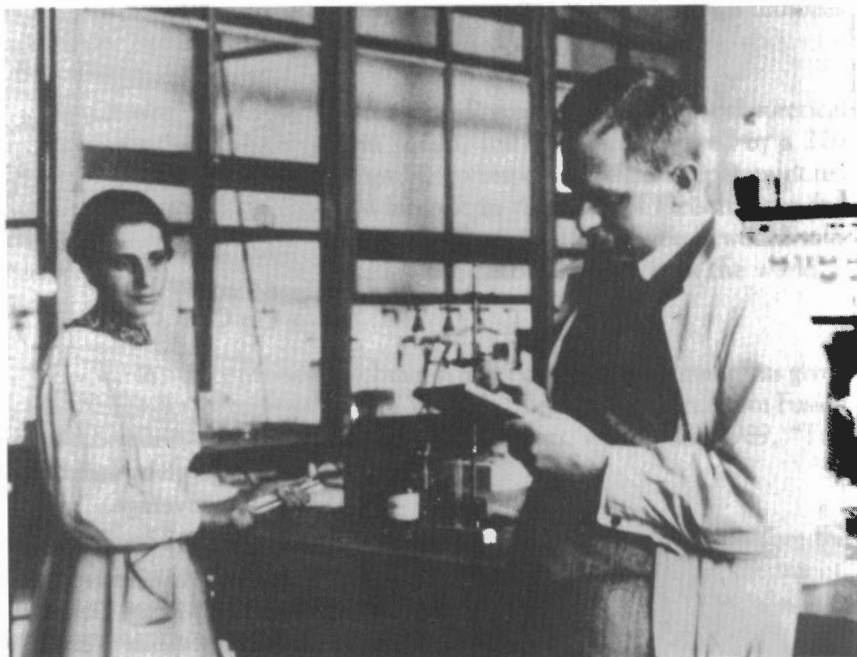
The photo shows Lise Meitner and Otto Hahn in their Berlin laboratory. Meitner persuaded Hahn in 1934 to systematically investigate Fermi's work with transuranic elements by bombarding uranium with neutrons. Hahn and his other collaborator Strassmann received all the credit for discovery of fission.

15. *Ibid.*, p. 35.

16. *Ibid.*, pp. 26-37.

17. *Ibid.*, pp. 31-37.

18. "The Noddacks examined minerals from a large variety of geological formations to determine which elements were present in at least measurable

trace amounts. Soon they framed a general hypothesis called the *Principle of the Omnipresence of the Elements*, according to which *all* minerals contain measurable amounts of *all* the naturally occurring elements. They hypothesized further that 'if we chose any material system, sufficiently large and sufficiently free from material differentiation, then we always arrive at the same percentage distribution of the chemical elements. This distribution function is a universal function of matter.' " Dr. Jonathan Tennenbaum, *21st Century Science & Technology*, Spring 1991, p. 35.

Ida Tacke Noddack (1896-1960), a German chemist, predicted fission in 1934. Her hypothesis, ignored by other researchers at the time, was based on her work with her husband on the origin and distribution of the elements.

19. Tennenbaum, *op. cit.*, pp. 34-37.

20. The hypotheses of Dr. Robert J. Moon (1911-1989) are developed in: Laurence Hecht, "Mysterium Microcosmicum: The Geometric Basis for the Periodicity of the Elements," *21st Century Science & Technology*, Vol. 1, No. 2, May-June 1988.

Moon, a Manhattan Project veteran and professor emeritus at the University of Chicago, proposed the condensation of electrons on protons in the early 1930s. For a personal account of the development of his theory, see the two-part interview with him in *Executive Intelligence Review*, Oct. 30, 1987, p. 31, and Nov. 6, 1987, p. 18.

21. An interview with Dr. Giuliano Preparata appeared in *21st Century Science & Technology*, Winter 1990, Vol. 3, No. 4, pp. 24-26.

22. See footnote 9.

23. See: Laurence Hecht, "Mysterium Microcosmicum: The Geometric Basis for the Periodicity of the Elements," *21st Century Science & Technology*, Vol. 1, No. 2, May-June 1988, p. 18;

Robert J. Moon, "The Gifts of Louis de Broglie to Science," *International Journal of Fusion Energy*, Vol. 3, No. 2, April 1985, p. 63;

Daniel R. Wells, "How the Solar System Was Formed," *21st Century Science & Technology*, Vol. 1, No. 3, July-August 1988, p. 18;

Winston H. Bostick, "On the Controversy over Whether Classical Systems Like Plasmas Can Behave Like Superconductors (Which Have Heretofore Been Supposed to Be Strictly Quantum-Mechanically Dominated)," *International Journal of Fusion Energy*, Vol. 3, No. 2, April 1985, p. 47; and Bostick, "Morphology of the Electron, Photon, and Neutron: The Plasmoid Construction of the Superstring," *21st Century Science & Technology*, Vol. 3, No. 4, Winter 1990, p. 58.

24. Lyndon H. LaRouche, Jr., *The Science of Christian Economy and Other Prison Writings* (Washington, D.C.: Schiller Institute, 1991).

Ida Tacke Noddack

courtesy of Niels Bohr Library, American Institute of Physics

I. A Challenge to Science Policy

> " 'Only 4 percent of high-school graduates really know algebra, although 96 percent of those who took the SAT reported taking an algebra class. . . . So you either have to say it's too early and reforms haven't been in place long enough, or all the things we put in the schools were wrong and we need a radical change. My own view is the latter is the case,' said Albert Shanker, president of the American Federation of Teachers.
>
> " 'The simple fact is that even our best students generally don't know enough and can't do enough to assure success in tomorrow's world,' U.S. education secretary Lamar Alexander said in a statement responding to test scores."
>
> —Gary Putka, "Concern Goes Up as SAT Scores Go Down," *Wall Street Journal*, August 27, 1991.

More than two years after the first public announcement of the cold fusion experiments,[1] with approximately six hundred scientists in numerous quarters of the world now working in this field,[2] the original experimental claims of Professors Martin Fleischmann and Stanley Pons are confirmed essentially beyond reasonable doubt.[3] There are perplexing difficulties; theory still has a difficult way to go, and experiments refined accordingly, before it could be shown what is happening during these tests, inside a palladium electrode, for example. Most important, to the lasting shame of cold fusion's defamatory opponents from locations such as *Nature* magazine and the *New York Times*,[4] it is established fact as Fleischmann and Pons claimed at the outset, the experimental results are, overall, highly anomalous, and unquestionably *crucial*.

This reporter proposes, that these cold fusion experiments, taken together with other experiments exhibiting related kinds of anomalous results,[5] should become featured elements of a special research project—a "mini-crash program" of fundamental research—enjoying the moral and material support of appropriate public and private institutions of the United States and other nations.

Four types of general short- to medium-term public benefits are foreseen:

1. A significant contribution to general scientific progress. These experiments demonstrate that there are principled nuclear and

sub-nuclear features of the *periodic table taken as a process*[6] which are apparently beyond the scope of established textbook doctrines. A solution for these experimental anomalies would therefore represent a significant advance within physical science as a whole.

2. The mobilization of educational and related resources for such crucial-experimental studies, would contribute significantly toward restoring a now rapidly vanishing scientific and technological literacy to the U.S. population and labor force.

3. The shifting of U.S. national policy back toward emphasis upon a form of economy whose rising productive powers of labor are catalyzed by emphasis on a high density of fundamental scientific research.

4. We should exploit the shame of those powerful agencies which participated in the political witch-hunt against the cold fusion scientists, to uncover the way in which such anti-scientific *pogroms* as these fraudulent libels, are enabled to exert such significantly damaging influence over both misguided public opinion and the shaping of science policy of public and leading private institutions.

It is proposed that these four benefits be fostered by aid of a focusing of professional efforts upon two more narrowly defined project goals.

First, professionals should be mustered for the obvious task of formulating a valid general hypothesis, the which will be shown to account more or less adequately for the crucial among the experimental results shown by cold fusion and related kinds of experiments.

Second, professionals should participate in a self-critical way in the search for those flaws in currently accepted scientific education and policy-shaping, which have effectively condoned a recent atrocity such as the all too influential witch-hunt against the cold fusion scientists.

These two narrower, project-like goals of the science professionals' participation might appear, mistakenly, at first glance, to be either not related, or not very significantly so. Consider next the historical evidence, which shows that the witch-hunt and the cognitive obstacles to an earlier theoretical mastery of cold fusion, have common roots.

The Historical Roots of the Conflicts

The common general problem to be overcome, in both projects, is a conflict introduced to modern science's institutional form during the seventeenth century. Those essential facts of that history which bear twofoldly on the exemplary cold fusion case before us, are summarily as follows.

The type of modern European science which would become associated with the image of an integrated, comprehensive mathematical physics, was begun approximately six hundred years ago, by the Italy-centered Golden Renaissance of Cardinal Nicolaus of Cusa[7] and Leonardo da Vinci.[8] For nearly two centuries, from the second quarter of the fifteenth century, into the time of the accession of England's King James I, the founders of modern science, such as Cusa, Leonardo, and Johannes Kepler,[9] shared a common, Augustinian kind of Christian Platonic method of scientific reasoning, the which was virtually unchallenged from within the contemporary authoritative institutions of science itself.

The putatively authoritative political opposition to Cusa, Leonardo,

Kepler, Leibniz,[10] Monge,[11] Gauss,[12] Riemann,[13] *et al.* was first established within the institutions of science itself, with the rise of such "anti-Keplerians" as Francis Bacon,[14] Fludd,[15] Galileo,[16] Descartes,[17] and Isaac Newton's sponsors at the London Royal Society.[18] Or to focus the imagery in a more precise way: that opposition arose from the influence of *Francis Bacon's Rosicrucian cult* in the establishing of the seventeenth-century British empiricism cult, and the *gnostic* Descartes into bringing the corruption of *the same paganist "Enlightenment"* into power in France.[19]

Since that seventeenth century, the internal history of the institutions and doctrines of modern science continues to be dominated by a crucial political conflict between the original Christian-Platonic philosophical current of Cusa, Leonardo, Kepler, and Leibniz, and the opposing, gnostic, neo-Aristotelian current, the latter traced from Francis Bacon, Fludd, Descartes, and Immanuel Kant,[20] into contemporary radical positivism.

Knowledge of leading features of this continuing political conflict is indispensable to an adequately efficient comprehension of the political witch-hunt conducted lately against the cold fusion scientists. The same knowledge is also indispensable to understanding the deeper *epistemological* issues of *the periodic table as a process*. As much as is possible, without losing transparency of argument, treatment of that history is limited here to the identification and summary explication of three of the most relevant issues of the continuing conflict between the original and the positivist currents of modern science:

1. *The Baconian assault against the principle of hypothesis.*
2. *The three-body paradox inhering in the inductive method.*
3. *The Cathar precedent inhering in Baconian empiricism and Cartesian dogma.*

Although the subject of the principle of hypothesis is the most profound among the three selected topics, the offsetting advantages of treating it before the other two, include the consideration that once the principle of hypothesis is understood, the remaining two topics fall readily into place, with relatively little added mental exertion required.

The Principle of Hypothesis

Isaac Newton's celebrated motto, "I don't make hypotheses," prefixed to his *Principia*,[21] contains implicitly, axiomatically, "hereditarily," every characteristic, distinguishing feature of seventeenth-century British empiricism, and is also consistent with the axiomatic foundations of radical positivism generally. This pervasive implication is brought to the foreground, once the student has taken into account the way in which Newton and his fellow empiricists derive their "inductive method."

Look back once more to the birth of modern science, during the second quarter of fifteenth-century Italy. Place Nicolaus of Cusa's *De Docta Ignorantia*[22] at the central position of that Raphaelite mural. Applying the advantages of hindsight, ask, which, most narrowly, are the special features of that fifteenth-century Renaissance setting which caused the initiation of an integral, comprehensive form of mathematical physics then, rather than at some earlier or later point, or in a different place in the history of Christian civilization. Two relevant features of the intellectual life of A.D. 1439 Florence are outstanding.

First, we observe there, in Cosimo de' Medici's Florence, a proliferation of copies of those precious classical manuscripts accompanying Nicolaus of Cusa and others, during that decade, in their return voyages from Byzantium. It was upon a mastery of these works of, especially, Plato and

Archimedes, that Cusa and others laid the rigorous foundations of modern science.

Second, there is a feature of Cusa's reworking of theorems of Archimedes[23] which is of specific, major, and multifarious relevance to this question.

Within the manuscript of one among his sermons, Cusa has identified the origin of a key feature of his *De Docta Ignorantia,*[24] that latter the single writing to which we have owed the most for the Renaissance founding of a comprehensive mathematical physics. This concerns what had been a perplexing and crucial problem of geometry, the squaring of the circle by construction. In the sermon, Cusa reports that he has discovered an approach to the problem alternate to that embodied in Archimedes' theorems.[25] Cusa's discovery of his new approach to the conception of the circle, is formally the germ of everything mathematical which makes possible an integrated, comprehensive mathematical physics. This germ is expressed in the later development of mathematics by the terms *non-algebraic, transcendental,* and *transfinite functions.*[26] The connection of this to physics is underscored famously by Professor Bernhard Riemann in his 1854 (1853) habilitation dissertation:

> The question of the validity of the postulates of geometry in the indefinitely small is involved in the question concerning *the ultimate relations of size* in space. In connection with this question, which may well be assigned to the philosophy of space, the above remark is applicable, namely that while in a *discrete manifold* the principle of metric relations is implicit in the notion of this manifold, it must come from somewhere else in the case of a *continuous manifold.* Either then the actual things forming the groundwork of space must constitute a *discrete manifold,* or else the basis of the metric relations must be sought for outside that actuality, in colligating forces to operate upon it. . . .
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> This path leads out into the . . . realm of physics. . . (emphasis added—LHL).[27]

It were a most pleasant diversion to note, as an aside, that if the referenced dissertation is read as it should be read today, in the relevant settings provided by Riemann's successors Beltrami[28] and Georg Cantor,[29] the quoted passage bears significantly, and not by mere coincidence, upon the crucial implication of the cold fusion experiment. It were urgent at this stage of this report, to allow no diversion, even that one, to impair sustained concentration upon a crucial question of history being answered here.

The connection to be stressed now, is that without the ability to derive a *discrete manifold,* and its metrical characteristic, from nothing more than a *continuous manifold,* and *to accomplish this in an ordered way,* the development of any *valid,* integrated, comprehensive mathematical physics were an impossibility. The fact that Cusa's germ roots implicitly *successive development of notions of non-algebraic, transcendental,* and *transfinite functions,* shows implicitly why the valid development of an integrated, comprehensive mathematical physics occurred historically in the Renaissance setting of the A.D. 1439 Council of Florence.[30]

On the precondition that one employs Plato's principle of hypothesis,[31] as did Georg Cantor,[31] Cantor's work, up through his *Contributions to the Founding of the Theory of Transfinite Numbers,*[32] shows how and why the process leading from Cusa's germ to the rigorous notion of transfinite function, is, formally, a prerequisite for the needed notion of the ordered

subsuming of *any coherent discrete manifold* by the corresponding, adequate notion of *a continuous manifold*. This subsumption requires the included determination of the *metrical characteristics of the discrete by the continuous manifold*.

Consider next, first, a summary, from a formalist standpoint, of the representation of a process of successive, valid, revolutionary scientific discoveries.[33] Next, define the notion of ordering of such a sequence by a *transfinite* function.[34] Next, consider Plato's rigorous distinction between *the higher hypothesis* and the *absolute good*; consider, similarly, Cantor's contrast between *the transfinite* and *the absolutely infinite*.[35] Next, finally, consider the "hereditary" characteristics of the fatal corruption introduced to modern science by means of arbitrary superimposing of the *political* authority of the Newtonian inductive method.

Scientific Revolutions

In his *In Defense of Common Sense*, this author has presented in a simplified way a notion of a sequence of successive, valid, revolutionary scientific discoveries. The pedagogue's ruse employed for this simplification, is the utopian formalist's ideal deductive mathematics: *a deductive theorem-lattice generated "hereditarily" by a fixed, integral set of axioms and postulates.*[36]

This mathematical scheme is supplied a physics basis in the form of successive advances in science and technology, to the effect of increasing the *potential population-density* of the society as a whole.[37] The examination of this construct here is limited to the effects of successful crucial experiments. *A crucial experiment is defined here, as a valid experiment for which the existing deductive theorem-lattice can generate no appropriate theorem.*

Such a crucial experiment requires an alteration in the underlying set of mathematical-physics assumptions. In the given pedagogical model, that signifies a change in the composition of the existing, integral set of axioms and postulates.[38] That change must satisfy two conditions; it must generate a theorem appropriate to the crucial experiment, and must also satisfy implicitly a series of crucial experiments, each corresponding to the physical process addressed, one by one, by each of the theorems of the old theorem-lattice.[39]

The result is as follows. Let the original theorem-lattice, before this change, be designated A. Then, the result of the change made in the integral set of theorems and postulates, is a new theorem-lattice, B. By the "hereditary principle," no theorem of theorem-lattice A will be deductively consistent with any theorem of theorem-lattice B, and vice versa. No deductive theorem could exist which would define deductively the relationship of either A or B to the logical discontinuity separating absolutely each and every possible theorem of A from B, and vice versa. This logical discontinuity is thus of the form of a formal mathematical discontinuity.[40]

Now, develop theorem-lattice C from B, as B was derived from A. In the same way, develop next, D from C, then E from D, and so on. Now, designate the "mathematical discontinuities" separating successive theorem-sets, by a general symbol, identifying the individual case by an appropriate subscript affixed to that symbol.

In the given pedagogical example, the successive theorem-lattices are each greater in value of associated potential population-density than each immediate predecessor. Thus, the series is determined by some function, a function expressed in terms of the discontinuities, subject to the ordered negentropic directedness of the series.[41] This function must be non-linear and negentropic.[42] Such a series of formally described, valid scientific revolutions is effected by means of the unfolding of a coherently directed development of a specific scientific method. Let the successive revolutions

be denoted as such a series: A, B, C, D, E . . . ; then, the discontinuities separating the terms of that series also form a series, of such formal mathematical discontinuities. Since the method deriving this is *coherent,* the terms of both ordered series, taken together as a combined ordered series, represent a function which is both *non-linear* and *continuous. If the function is negentropic, that is, corresponding to an increase in potential population-density,* then the function associated with the series is *non-linear, continuous,* and *negentropic.* [43]

Also, the series of discontinuities is a transfinite function, such that, at a minimum, *any partial series of successive such discontinuities is equivalent to the entire series. The whole continuous, non-linear, negentropic function, is therefore also a transfinite function.*

On this point, the most crucial propositions are therefore the following ones.

The general form of this series of interlinked propositions is: *How might we know, that a discernible directedness in the ordering of successive scientific revolutions is valid?*

The first question is: *How do we define two expressions of modern science as "relatively distinct," "relatively prime,"* for the purpose of distinguishing three or more such as meaningfully a sequence? The answer is typified by a solution already given here: Formally, that theorems in one case, related to the same subject matter in another case, are inconsistent in ways which correspond to an inconsistency between underlying "hereditary" principles (integral sets of axioms and postulates of a formal theorem-lattice).

The second question is: Once we may have established, so, that there are three or more sequential cases satisfying the formal requirements for defining sequential theorem-lattices A, B, C, . . . *how might we know, that a discernible directedness in the ordering of such apparently successive scientific revolutions, represents physically a valid choice of directedness of change?* This second question demands implicitly that those changes in society's productive and related behavior, which correlate with that succession of scientific revolutions, also correlate with a similar succession of *rises in the potential population-density of the human species as a whole.* [44]

The third question is: *How might we distinguish the notion of such a successfully ordered succession from an accidental series of successions?* Primarily, implicitly, *each revolution must be generated by the same method of willful human agency as the others.* The generation of a succession of *valid* new members of a sequence of scientific revolutions by such constant method of willful change, is the bare definition of *the principle of hypothesis.* [45]

The Musical Parallel

Consider this interpolation of an analogous case to that of mathematical physics: the development of classical musical polyphony, upward from remote historical origins, through Orlando di Lasso, J.S. Bach, Wolfgang Mozart, Ludwig van Beethoven, *et al.* In addition to affording us an analogous case to consider, there are several other relevancies to that conflict within modern science under consideration here. Notably, most importantly, the same sovereign creative potential of the individual person[46] which is the source of valid discoveries in physical science, is the principal source of all creativity meeting the standard of classical art-forms, music included. Also, the worst damage which the Kantians[47] and modern radical positivists have done to scientific creativity, outside the domain of physics most narrowly defined, is the fraudulent positivist

assertion, contrary to such as Plato, Leonardo, and Kepler,[48] that there is properly an hermetic separation between natural science (*Naturwissenschaft*) and art (*Geisteswissenschaft*).[49]

The proximate, ancient, and continuing root of all classical polyphony is classical poetry, ancient and more recent strophic forms more emphatically.[50] The deeper root of such classical poetry, in turn, is the naturally tuneful *vocalization* of human speech,[51] a natural tuning inhering in the characteristic, harmonically ordered,[52] features of the interior regions of the human head, from, most emphatically, *immediately above* the vocal cords.[53] This vocalization is best accomplished by means of what is called today *bel canto* voice training.[54]

In addition to the common features of all human musical potential, the totality of human voices is divided biologically among distinct voice species such as soprano, mezzosoprano, tenor, baritone, and bass. Adult representatives, in particular, of these naturally determined voice-species differ from one another in upper and lower range, but the essential thing which distinguishes them precisely from one another, is what is called *registration*. Natural singing voices have commonly three or four distinct levels of voice registration, of which the second-highest is commonly the most used. These different levels of voice coloration are called *registers*. The frequency range at which any properly developed human voice passes from a relatively lower to higher registration (or vice versa), is fixed *biologically* for all members of the same species of singing voice.[55] The bringing together of two or more species of singing voice, is *vocal polyphony*. This signifies a determined relationship among different voice-species, each species with its own, distinct spectrum of register-shift frequencies (tones). If we situate this challenge in respect to the second register of the voices, the most popular species being naturally the sopranos and tenors, the mid-point of the C-scale octave is the soprano's passage to the second register, on the F♯ of the C scale. Thus, the natural registration has situated the value of *Middle* C at approximately 256 cycles per second, and A at approximately 430.[56]

In singing of classical poetry, the crucial feature of coloration associated with the meaning of (for example) a strophic poem as a whole, is affected by the meaningful placement of register shifts, typically between the second and first, and second and third registers. Thus, in vocal polyphony, it is important that the composer situate the relationship among different species of singing voices with this in mind.

It is also essential for vocal polyphony, to eliminate the distraction and disorder of accidental dissonances, that the musical scale be *well-tempered.*[57]

On the subject of the history of earlier music, much of the detail is lost in the dust of past time, although the principles remain clear. For example, we know from studies at India's Poona Center for Sanskrit Studies, evidence to the included effect, that the principles of traditional singing of Vedic hymns from as distant as beyond B.C. 4000 coincide with the modern Italian *bel canto* notions of musical vocalization of classical poetry. We also know, for example, that ancient attempts at establishing a standard well-tempering antedate al-Farabi's work by more than a thousand years.[58] In modern times, we know with the certainty of a fact engraved in stone, that the *bel canto* program and standard of voice-training was firmly established in Florence, Italy by no later than the early fifteenth century.[59] Coming, then, into more recent times, we witness the successive development of new characteristic features of *classical music*, from Orlando di Lasso through Johannes Brahms; we meet thus, an ordered historical sequence of successive, revolutionary developments,

the sequence produced by means of a constant method of willful changes, a method guided by adherence to firm principles governing allowable changes.

As in the case of the internal activity of fundamental scientific discovery, so it is among leading composers and performers, as the history of J.S. Bach's *Musical Offering* aptly illustrates.[60] Originally, this composition was Bach's own solution to a crucial form of problem in counterpoint. Later, from among several of Mozart's 1783 compositions onward, the subject of Bach's *scientific discovery* represented by that *Musical Offering*, appears as a recurring subject of Mozart's, Beethoven's, Schubert's, and also Chopin's compositions—for example.[61] This Bach composition, and its crucial example, did much to shape the entirety of the continued development of classical composition, from the 1783 Mozart, through the Brahms of the 1890s.[62]

Classical music also parallels modern science in the latter's least fortunate historical feature. The authoritative institutions of music have been invaded by cult-motivated and advantageously moneyed political vandals; as a result, much of the teaching and practice of music have come under the dictatorial political authority of a widely irrationalist pack of what are fairly described as a paganist priesthood, akin to Francis Bacon's Rosicrucian empiricists. Chiefly, the same political institutions behind the cults of British empiricism and post-Enlightenment positivism in respect to matters of modern science, are the source of the superimposition of the same philosophical dogma as the moneyed political authority over most of the institutions of music today. Exemplary of this continuing connection, since the eighteenth, and actually also the seventeenth century, is the link between the two sets of issues specified by Immanuel Kant's *Critique of Judgment*.[63] The references on this feature of music here, are limited to three musical issues bearing most directly on the same *Enlightenment* faction's continuing political assaults upon modern science. These three political attacks upon music are the following.

First, the attack upon setting Middle C at approximately 256 cycles per second, an attack conducted by the political authorities behind the Holy Alliance, during the 1814-15 Congress of Vienna. These political authorities decreed, with relatively little success at that time, that the musical "A" should be elevated arbitrarily to the A = 440 cycles of the Russian Tsar's military bandmasters.[64] The later decrees in favor of A = 440 came in a similar political form: one by *political authorities* in the setting of the infamous Versailles peace conference; and similarly, again, at a London conference on the eve of World War II.[65]

The second example, is the attempt launched from empiricist Britain by two hoaxsters, Helmholtz[66] and his disciple Ellis, to ban the principles of well-tempered polyphony and also *bel canto* voice training, the latter to be replaced by the sterile "blank voice" fad then recently introduced to Victorian England.[67]

The third example is the attempt, beginning approximately 1848-49, to force a rise in pitch upon the singers and instrumentalists generally, by eliminating gradually voice registration from emerging modes of keyboard instruments, and by developing designs for construction of wind instruments, to prevent those wind instruments from performing much below tuning pivoted upon A = 440.[68]

None of these travesties was generated by musicians out of musical considerations. They were each and all superimposed upon the institutions of teaching and concert halls by external *political* force.

Today, the classical musical instruments—and their designs—from the period A.D. 1650-1850, are classed under the highly misleading term,

"ancient instruments." These are the instruments upon which the musicians from Bach's, Handel's, Haydn's, Mozart's, Beethoven's, Schubert's, Mendelssohn's, Schumann's, Chopin's, Verdi's, and Brahms's lifetimes were trained, and for which they composed. What is to be stressed, bearing upon the principle of hypothesis, is that these classical musical instruments, such as the famed Stradivari, were designed not only to be performed upon at Middle C = 256; they were perfected to imitate, and to conform to the principles of *bel canto* human voice production, *to be integrated into the thus-enlarged domain of bel canto vocal polyphony.* Thus, the classical oboe, with its crucial, modified-conical bore, is intended, when employed by a true master, to be the ideal human soprano voice within the chest of classical instruments as a whole.

Classical instrumental composition is in accord with this. The classical violinist does not render a composition's soprano-species instrumental voice upon a single string of the instrument, but a minimum of three, corresponding thus to the first, second, and third registers of the human *bel canto* soprano voice. Contrary to the hoaxster Ellis, the pitch at which Bach set a key-signature on an off-key organ, was consistent with the natural Middle C = 256 at which human choruses could be capable *physically* of performing his polyphony: To meet this requirement, where necessary, Bach, like all other master musicians of his period, would *transpose* his keyboard score to sound in the scales of Middle C = 256.

This is not to suggest that musical instruments are simply copies of the human singing voice. Rather, by being designed to conform to the principles of *bel canto* voice-species, they augment not only the range of vocal polyphony, but introduce new registral colors which function as added species of singing voice within a thus-expanded domain of vocal polyphony. Interesting is to observe a modern pianist in performance, to distinguish those pianists whose insightful "shaping of tone" causes the instrument to sing polyphonically, as opposed to the poor players thumping out a banal "pianistic interpretation."

That essential historical background so summarized, we focus upon the two critical features of the musical example which facilitate understanding of the indicated crisis within 1990s modern science generally. The first such musical feature, is the role of the Platonic principle of scientific hypothesis in music. The second is the equivalence of the "science mafia" controlling *Nature* magazine, for example, to the "music mafia" controlling such purveyors of widespread musicological holocaust as New York City's Juilliard School, and the notorious, anti-science, *satanic* "Frankfurt School" of Georg Lukacs,[69] Theodor Adorno, Herbert Marcuse, Hannah Arendt, *et al.*, the latter "school" a leading influence in "New Age" musicology in the United States today.

Formally, classical music and Keplerian mathematical physics are parallel and also overlapping activities. Both are based on excluding from asserted knowledge anything arbitrary, such as Cartesian *deus ex machina mystery-religionizing.* Like Cusa, modern science and classical music demand that nothing be constructed or asserted which is not derived entirely from *clearly intelligible, known principles.*[70] For music, these principles include *bel canto vocalization of classical poetry,* the *derivation of song,* and *vocal polyphony* from the *vocalization of classical poetry by two or more voice-species,* the *derivation of counterpoint* and the *well-tempered system* from *vocal polyphony,* and so on.

In music, as modern science, we increase creative productivity by discovering more rigorous lawfulness. So, Haydn made a revolution in the symphony/concerto/sonata forms, defining an integrated architecture for derivation (implicitly, at least) of all primary thematic materials for

all movements, from a single germ for the composition as a whole, with a specific conceptual identity. This took the relevant material contributed by Italy and the Bach family, and put it all into a more rigorous, more coherent framework. Thus, we have a cascade of, quite literally, successive scientific revolutions in symphonic, concerto, and sonata forms, by Mozart and Beethoven, most notably. For example, Mozart's symphonies 39, 40, 41, which are, in themselves, a scientific revolution, are followed by such successive revolutions in the method of symphonic composition as Beethoven's Third, Fifth, and Ninth Symphonies. Similarly, Mozart invented the German *Lied* with such creations as the early *Das Veilchen*, out of which comes Beethoven's *Lieder*, and then, the perfection of *Lieder* composition by, of course, Schubert, Schumann, and Brahms. Similarly, as Jenner reports Brahms, the work of composing successfully a coherent set of variations upon a theme, is governed also by scientific principles.

So, the Platonic principle of hypothesis is the core of classical music, a conscious principle (in the case of great composers) which generates all great classical compositions in a coherent way. So, as the Rosicrucian empiricists and Descartes employed a gnostic's neo-Aristotelian ruse to attempt to uproot the generative principle of hypothesis from modern science, forces of the same gnostic persuasion as Bacon, Descartes, and Kant sought to destroy classical musical composition by way of the politically motivated superimposition of Romanticism, and later modernism.

Perhaps the most commonplace among those revealing behavioral pathologies which display the scope and brainwashing effects of the "music mafia's" corrupting political power today, is the sickening folly of those musicologists and others who refer groundlessly, contrary to all reason, to the division of modern music among such categories as a "Baroque," "Classical," "Romantic," and "Modernist" era.

Johann Sebastian Bach, born before the eighteenth century, is the prototype of classical composers, as is also the aging Johannes Brahms of the 1890s. The so-called "romantic" current in nineteenth-century musical life, was the faction of Franz Liszt, Hector Berlioz, Richard Wagner, *et al.*, which coexisted with, and in active factional affray with that faction of classical composers which included Mendelssohn, Chopin, Schumann, Verdi, and Brahms. There was no "romantic period" in nineteenth-century music; there was a nineteenth-century Romanticist *faction*, which flourished solely because it was set into motion by the powerful political backing of those same founders of the Holy Alliance who are responsible for the Congress of Vienna's political decree demanding the adoption of the Tsarist bandmaster's A = 440. Notably, the same dupes who professed the existence of a "Romantic era" in art, often used to teach very credulous university students that Heinrich Heine was among the "Romantic poets."[71]

The Common Political Origins

During the course of the eighteenth century, *Romanticism* is associated with that sickening quality of sentimental, neurotic irrationalism which is typified by Voltaire, by the French Physiocrats, Rousseau, Klopstock, Phillip L'Egalité, Robespierre; the British agents of the Jacobin Terror, Danton and Marat;[72] the Marquis de Sade; the Swiss banker who bankrupted France, Jacques Necker, and his notorious daughter, the Madame de Staël; the Goethe of his *Sorrows of Young Werther*; and the gushing admirers of such pathetic trash in England, France, Switzerland, Italy, Germany, and the United States.[73]

Behind that sickly, pornographic aesthetical facade, *Romanticism* signifies a utopian gnostic's yearning for a return to the kind of world order which eighteenth-century *Romantics* such as England's Gibbon associated with the lost pagan glories of the Imperial Rome of Augustus, Tiberius, Nero, Caligula, and Diocletian. This Romantic movement began during the late fifteenth and early sixteenth centuries, in the guise of the neo-Aristotelian gnostic reaction against the Florence-centered Golden Renaissance.

Behind this gnostic, anti-Renaissance section, was the wealthiest concentration of usury-practicing financiers of Europe, then centered upon a faction known into the eighteenth century as "the Venetian Party."[74] The issue was that quarrel which Friedrich Schiller identifies as shaping all of European history, the quarrel between two, opposing forms of society, the constitutional republicanism of Solon's and Plato's Athens, and the oligarchical slave-system of Lycurgan Sparta.[75] The modern heirs of Solon's and Plato's republican Athens, the Christians of the Golden Renaissance, are pitted against the usury-practicing oligarchs funding the gnostic, neo-Aristotelian counter-Renaissance, the latter coming to be known as *the Enlightenment.*

Now, to sum up this lesson for science from the history of music. The point is, that a gnostic, neo-Aristotelian cult, typified by the Rosicrucian cult's role in founding British empiricism, has established a foisted political authority over the administration of both the public and internal affairs of all leading aspects of institutional forms of creative activity, both modern science, and the classical art-forms. Among the weapons of the arsenal of this cult's "priesthood," is the use of the political lynch-mob, the kind of political witch-hunt we have seen deployed lately against the cold fusion scientists, or in music, against those who attempt to defend *bel canto* voice training and classical tuning.

It has been noted thus far, that this modern conflict between Christian Platonism[76] and the gnostic-pagan neo-Aristotelianism, is congruent with Schiller's emphasis upon the fact that European history thus far has been essentially a continuation of a conflict between two irreconcilably opposing conceptions of man, nature, and society, a conflict typified anciently by the opposition between Solon's and Plato's Athenian republicanism, and the slaveholding Sparta's Lycurgan (Aristotelian) oligarchism.[77] We complete the summary of that picture.

"Renaissance" signifies literally "rebirth." One might inquire of a gentleman from the piazza of A.D. 1439 Florence, Italy: "Rebirth from what?" That gentleman's reply would be of considerable relevance to the aspects of cold fusion research under consideration: from that cultural and physical hecatomb known as the fourteenth century's "New Dark Age." During that "New Dark Age," half of the preceding century's European parishes were obliterated biologically by the kind of combined effect of those wars, that famine, that epidemic disease unleashed by the worst orgy of financial usury, not to be experienced again by European civilization as a whole until the Anglo-American financiers' looting of the world during the 1970s and 1980s.

During the middle of the fourteenth century, there had been a general ruin of the power of the leading banking families of Europe in a sweeping, and richly earned, general bankruptcy. This bankruptcy weakened the evil Levantine financial oligarchy sufficiently that the Christian-humanist faction's forces could begin to function openly, taking more and more leadership, reaching a brief high point of power at the Council of Florence. The reviving, gnostic financier oligarchy was merely the more murderously enraged by the achievements of that Renaissance period.[78]

The reviving fifteenth-century Levantine oligarchy, operating out of Venice and other principal trading centers of the eastern Mediterranean region, regained the strategic political initiative by cooperating with Mount Athos' gnostic spokesman, the later Ottoman Patriarch Gennadios, in betraying the city of Constantinople to the Ottoman Conquest.[79] Thus, the old Byzantine Empire became the new Byzantine Empire under an Ottoman dynasty. This successful betrayal of the Greeks by Gennadios, Venice, *et al.*, virtually nullified the strategic, political, and economic benefits effected through the Renaissance reunion of the Eastern and Western branches of the Christian church at the ecumenical Council of Florence.[80] From the time of that treason, of A.D. 1453, the oligarchical sponsors of the neo-Aristotelian gnostic cults were—with brief exceptions—on the offensive, to the brink of another threatened "New Dark Age" of Kissingerian usury, at the present day.

The ancient Aristotle, like his contemporary Persian Magi and Delphic priests of Apollo, was as evil as his *Ethics* and *Politics* show him to be: But, he was no typically shallow-minded, empiricist sort of modern university liberal arts professor. Like the Magi and the priests of Apollo, he understood the tricks by means of which Sophist rhetoricians have so often ruined nations, by inducing a foolish majority of a nation to welcome its own intellectual and moral depravity, as the United States, for one case, has depraved itself to the brink of total ruin during the recent twenty-five years of the rock-drug-sex and neo-Malthusian "counter-cultures."

That neo-Aristotelian gnostic understood, that if one controls the axiomatic assumptions of belief respecting those facets of judgment associated with science and the classical art forms, one can induce the more suggestible majority of any highly educated portion of the population, to tolerate almost any level of self-induced depravity. That is exactly what the Rosicrucians, Baconian empiricists, for example, did. The oligarchical forces of financial usury deployed the "neo-Bogomils" (*Les Bougres*)[81] of the Baconian, Cartesian, and Kantian tribes, to assail and to occupy key positions of political oversight over matters of "faith and morals" in religion, science, and classical art forms. That is what has happened under the auspices of the so-called Frankfurt School's *Weimarization* of the United States and Western Europe today.[82]

In music, look at the way in which the distribution of music is controlled, both psychologically and physically. What financial interests control the concert halls, the leading tour arrangements, the recording industry's distribution channels? What control is concentrated in the hands of a relatively tiny number of musical reviewers for the *New York Times* and other key general and specialist periodicals? The situation is such, that even a musician whose professional conscience knows that well-tempering at Middle C = 256 Hz, and *bel canto* principles of vocal polyphony, are true, will rarely defend those principles openly, and if pressed on his or her hypocrisy, will explain, with at least pragmatic justification, that the possibility of his or her career depends absolutely upon submitting to the current whims decreed by the entrenched "music mafia."

The same is true in physical science. The leading science publications, the publishers of textbooks, the gnostic high priests entrenched within the bodies which have oversight over the budgets and appointments of key educational institutions and relevant controlling financial agencies of the universities and leading laboratories, constitute a brutish "science mafia" of the same evil origins and disposition as the music mafia.

For that reason, it is like the babbling of terrified children, not to speak of the crucial roles of the ruling financial oligarchy's ideological "mafia"

in the domains of science, music, and so forth. Those of us who have been privileged to deal with the relevant kinds of problems of the interior of the communities of scientists, musicians, and so forth, know that it is usually nothing but fear of the mafia's malevolent power over professional reputations and careers, which habituates a professional into babbling hysterically some opinion directly opposite to what his or her professional competence shows to be true beyond reasonable doubt. "If you say that, you will see soon enough what doors are suddenly closed to you."

Notes

1. The cold fusion breakthrough was announced on March 23, 1989 at 1:00 p.m. (local time) at a press conference held by Martin Fleischmann and B. Stanley Pons at the University of Utah, Salt Lake City, Utah. See also Martin Fleischmann and Stanley Pons, "Electrically Induced Nuclear Fusion of Deuterium," *J. Electroanalytical Chemistry and Interfacial Electrochemistry*, Vol. 261 (10 April 1989): 301-08; Errata: Vol. 263 (10 May 1990): 187-88.

2. Second Annual Cold Fusion Conference held in Como, Italy from June 20 through July 4, 1991. A detailed report on this conference can be found in *21st Century Science & Technology*, Vol. 4, No. 3, Fall 1991.

3. At a certain point during the Lake Como conference, Pons turned the microphone over to Dr. Wilford Hansen, a physicist from Utah State University, who had been commissioned by the Fusion Energy Council of the State of Utah to conduct an independent study of unreleased data of Pons and Fleischmann. Reflecting on the witch-hunt against cold fusion, which is continuing in the United States, he began with the comment: "Last January I was asked to do an independent study, an analysis, of some unreleased data of Pons and Fleischmann. My colleagues warned me not to do this—it was a no-win situation. Whatever that might be, I now have a report, and I have brought copies of that for Pons and Fleischmann to read. It is also being reviewed by some other people. I would like to tell you about it before the world grabs it and burns it, and me with it. But soon it will be out."

He then proceeded to verify the statistical methods used by the team to determine the production of "excess" heat—as much as 100 times more than any which could be attributed to a known chemical reaction. He chose eight cells; two were controls, which used hydrogen and showed no excess heat. The rest were intended to be heat cells and used deuterium as an electrolyte. Of these, five of the six, in his words, "showed definite excess heat." He determined that the whole set of experiments was impressive: In one cell, 6,000 electron volts of power were generated per palladium atom—1,000 times beyond any effect known to chemistry. As a point of comparison, with only 5 electron volts, a palladium electrode will be heated to its boiling point and vaporize.

4. *Nature*, April 27, 1989 in an editorial by editor John Maddox: "The Utah phenomenon is literally unsupported by the evidence, could be an artifact, and given its improbability, is most likely to be one. . . . The likelihood of replication fades as the days go by."

The April 30, 1989 editorial of the *New York Times* noted that the University of Utah ". . . may now claim credit for the artificial heart horror show and the cold fusion circus, two milestones at least in the history of entertainment, if not science. . . . Given the present state of evidence for cold fusion, the government would do better to put the money on a horse."

5. See Winston Bostick, "The Plasmoid Construction of the Superstring," *21st Century Science & Technology*, Vol. 3, No. 4, Winter 1990; and "How Superstrings Form the Basis of Nuclear Matter," *21st Century Science & Technology*, Vol. 3, No. 1, Jan.-Feb. 1990, pp. 54-57.

6. See *21st Century & Technology*, Spring 1991, pp. 31-32.

Until the discovery of radioactive transmutation, it was believed by many that the chemical elements represented the eternal, unchangeable building blocks of matter, the "givens" upon which all of chemistry was based. Related to this was the "law of conservation of mass," according to which the total mass of a system of material bodies like atoms and molecules does not change in the course of their interaction. This "law"—which we now know to be false—was supported by seemingly overwhelming evidence, including elaborate experiments designed to detect changes in mass as the result of chemical reactions.

Not surprisingly, a view developed that we could call "the chemists' Big Bang," the idea that a certain mass of each of the chemical elements was created at the beginning of the universe and that subsequent development consisted only in combinations and recombinations of those fixed quantities of elements.

The development of the periodic table embodied a different view of matter. If, as the Russian chemist Mendeleyev demonstrated, the chemical elements are themselves ordered in a lawful way, this suggests that the elements all arise from a unitary generation process, a kind of universal substance underlying all particular forms of substance. This would also imply that the particular elements must be mutable.

7. Nicolaus of Cusa (Nicolaus Cusanus), German clergyman, natural philosopher; born in Kues, Rhineland, 1401; studied law at Padua; became cardinal, 1448, Bishop of Brixen, and was named papal legate circa 1450.

Author: *Concordantia Catholica* (The Catholic Concordance) (1431), Trans. by Paul E. Sigmund (Cambridge, U.S.: Cambridge University Press, 1992); *De Docta Ignorantia* (On Learned Ignorance) (1440), trans. by Jasper Hopkins, Second Edition (Minneapolis: Arthur J. Banning Press, 1985). *Idiotae Libri Quatuor* (The Idiot in Four Books) (1450). He wrote works on calendar reform, improvement of the *Alphonsine Tables*, and theory of numbers. Cusa thought the Earth might rotate on its axis and that an observer on the Sun would see the Earth revolving about him. He also proposed the weighing of earth, seeds, the plants that grew from them, and then the plant ashes and earth in which they had grown; emphasized significance of weight measurements and timing; suggested pulse count be used as diagnostic technique; and was among the first to work on exposure of false decretals.

Among the most important is his work on the quadrature of the circle, in the course of which he reworked entirely Archimedes' treatment of the quadrature of the circle. Cusa announced that he had found a superior approach. This discovery, Cusa's "mininum-maximum" method, was later elaborated as the isoperimetric theorem of topology. The proof shows that the only self-evident form in visible space is circular action, and that neither "points" nor "straight lines" are self-evidently forms of existence. This is the foundation of what is called synthetic geometry, in which the only method of proof permitted, is construction beginning with nothing but circular action: deriving all possible geometrical forms by construction, permitting no other method.

Died in Todi, Italy, August 11, 1464.

8. Leonardo da Vinci (Leonardo di Ser Piero da Vinci), Italian artist,

Cardinal Nicolaus of Cusa

EIRNS/Nora Hamerman

scientist; born in Vinci, April 15, 1452 to Ser Piero da Vinci and Caterina. Leonardo was raised by his father and then apprenticed under painter Andrea del Verrocchio, circa 1466-77. Under the patronage of Lorenzo de' Medici, he studied anatomy, astronomy, botany, mathematics, engineering, music, 1477-82. Then, as protégé of Ludovico Sforza, Duke of Milan, he served as court painter, chief engineer, director of public works, pageant-master, and may also have been director of academy of arts and sciences founded by the Duke, 1482-99. In 1499, when Ludovico was expelled from Milan by King Louis XII of France, Leonardo became architect, and engineering general for Cesare Borgia, Duke of Valentinois, traveling through most of central Italy as Borgia's chief military engineer during Romagna campaigns, 1502-03. He returned to Florence in 1503. He again went to Milan (by invitation of Charles d'Amboise), in 1506. He was appointed painter, engineer in ordinary by Louis XII, 1507-13. In 1513 Leonardo entered the service of Medici in Rome. From 1516 until his death in 1519, he lived in France, where he had been invited by King Francis I.

Much of Leonardo's work disappeared after his death, and has turned up in fragmented form in various places, including *Sul volo degli uccelli; Del motu e misura dell' acqua; De ludo geometrico; Tratto di anatomici;* and *Trattato della pittura.* Leonardo's inventions and accomplishments are too numerous to name here. Among his many significant discoveries was his discovery that energy (such as light and sound) is radiated at a definite speed of propagation, and that the radiation is in the form of transverse wave-motion. He insisted that all wave-motion was transverse, including sound waves. The latter was assumed to have been an error until Bernhard Riemann's 1859 treatise on the propagation of acoustical shock waves. He died in France at Chateau Cloux, near Amboise, May 2, 1519.

9. Johannes Kepler (also Keppler), astronomer; born December 27, 1571, Weil-der-Stadt, a free imperial city in Duchy of Württemberg, Swabia; son of Heinrich and Katharina (Guldenmann) Kepler. He was educated at Latin School in Leonberg. Thanks to the good educational system in Württemberg at the time, Kepler was able to attend the University of Tübingen, where he became acquainted with philosophy, and studied astronomy under Michael Maestlin. Above all, it was philosophy which he seized on, reading, among others, "the divine Cusa" and Plato.

Kepler worked as an assistant to Tycho Brahe at Benatky Castle, near Prague, 1600-01; and succeeded Brahe as Imperial Mathematician (to Emperors Rudolph II and Ferdinand II). He died at Regensburg (Ratisbon), Bavaria, November 15, 1630.

Kepler's main works are *Mysterium Cosmographicum* (The Secret of the Universe) (1596), trans. by A.M. Duncan (New York: Abaris Books, 1981); *Harmonices Mundi* (Harmonies of the Universe) (1609); and *Astronomia Nova* (The New Astronomy) (1609), published in French as *Astronomie Nouvelle,* (Paris: Librairie Scientifique et Technique Albert Blanchard, 1979); *De Nive Sexangula* (On The Six-Cornered Snowflake) (1611), trans. by Colin Hardie, with the Latin text on facing pages and introductory essays by F.J. Mason and L.L. Whyte (Oxford: Clarendon Press, 1966).

10. Gottfried Wilhelm Leibniz, German mathematician, physicist, philosopher; born Leipzig, July 1, 1646; taught himself Latin at eight years of age, then Greek; studied law, mathematics, and philosophy at University of Leipzig, 1661-63, the University of Jena, 1663-66, the University of Altdorf (where he received a doctorate in law, 1666), and the University of Nuremberg. He served as diplomat in Paris, 1672-76, where he met Huygens, Arnauld, Malebranche; also visited London, 1673 (met Oldenburg) and

Johannes Kepler

Gottfried Wilhelm Leibniz

15

Gaspard Monge

Carl Friedrich Gauss
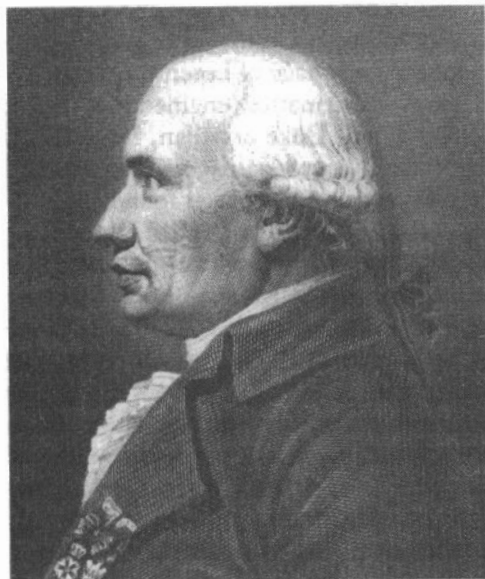
1676; was privy councillor, court adviser, librarian, historian to Dukes of Braunschweig-Lüneburg (Johann Friedrich, Georg Ludwig, Ernst August) at Hanover, 1676-1716; visited Vienna, 1712-14; became imperial privy councillor. Given title Freiherr; Fellow, Royal Society, 1673; member of French Academy of Sciences, 1700; member and instrumental in founding Berlin Academy of Sciences.

Author: *De principio individui* (1663); *Dissertatio de arte combinatoria* (1666); *Hypothesis physica nova* (1671); *Discours de métaphysique*, (written in 1686, published in 1846); *Système nouveau de la nature* (1695); *Nouveaux essais sur l'entendement humain* (1704); *Essais de théodicée sur la bonté de Dieu, la liberté de l'homme et l'origine du mal*, 2 vols. (1710); *La monadologie* (written in 1714, published in Latin in 1721); *Principes de la nature et de la grace fondées en raison* (1714); hundreds of other articles and thousands of letters. Died in Hanover, Germany, Nov. 14, 1716.

11. Gaspard Monge, French mathematician; born Beaune, France, May 10, 1746; son of Jacques Monge; educated in Oratorian schools in Beaune and Lyons; student at practical school attached to Mezières School of Military Engineering, 1762. Physics teacher, Lyons, 1762, mathematics teacher, Mezières, 1768, physics, 1771-82; appointed professor of hydraulics, Lycée, Paris, and member of the French Academy of Sciences, 1780; examiner of naval candidates Ecole de Marine, 1783; minister of navy, 1792-93; a founder and director of the Ecole Polytechnique, 1794-95, Professor of Mathematics; Professor of Mathematics at Ecole Normale; appointed member of Senate, 1799. Stripped of all honors in Bourbon restoration after Treaty of Vienna, 1815.

Author: *Traité élémentaire de la statique* (1788); *Feuilles d'analyse appliquée à la géométrie* (1795); *Essais sur la Géométrie descriptive* (1799); *Application de l'analyse à la géométrie des surfaces du 1er and 2e degré* (1807); *Géométrie sur les plans et les surfaces courbés* (1812). Inventor of descriptive geometry; began study of perspective and polarity; the discoverer of the method of topographical mapping; undertook important researches in differential geometry, especially in the theory of curvature; also provided solutions to partial differential equations by means of his theory of surfaces. Teacher of Lazare Carnot. Died in Paris, France, July 28, 1818.

12. Carl Friedrich Gauss; born in Braunschweig, Germany, April 30, 1777. A member of most of the leading scientific societies of Europe, he was an integral part of the cultural renaissance in Germany, which included Wilhelm and Alexander von Humboldt—both close friends of his—and the poet Friedrich Schiller. Like all of the great figures of his day, Gauss was an ardent supporter of the American Revolution.

He was Professor of Astronomy, and Director of the Observatory at the University of Göttingen, 1807-55; in charge of the government project for the triangulation of Hanover, 1821; built (with W. Weber) one of the first observatories for magnetic studies at Göttingen, 1833.

During his long and productive life, Gauss authored numerous works on number theory, analysis, geometry, the method of least squares, mathematical physics, astronomy, complex numbers, electromagnetism, elliptical functions, topology, electricity, geodesics. Among the most significant was his reworking of the leading accomplishments of Kepler, Leibniz, et. al., superseding simply isoperimetric notions of least action with a notion of conic, self-similar-spiral action as the elementary form of least action in the universe.

He died in Göttingen, February 23, 1855.

Bernhard Riemann

Francis Bacon

Galileo Galilei

13. Georg Friedrich Bernhard Riemann; born near Hanover, Germany, September 17, 1826. Bernhard was the second of six children, all of whom the father himself instructed. Young Bernhard had a happy and harmonious childhood in his parents' home. At age thirteen, he left Quickborn in order to attend the lyceum in Hanover, where he lived with his grandmother. The lyceum was one of the best schools in Germany. Riemann's form-master, Dr. Georg Friedrich Grotefend, who had introduced the Humboldt-Süvern curriculum into the school, contributed decisively to the school's reputation. At that time, Riemann's school week consisted of thirty-four hours of instruction, and included the following subjects:

- eight hours of Greek
- six hours of Latin
- two hours of Hebrew or Sanskrit
- three hours of French
- two hours of English
- two hours of physical science
- two hours of singing and
- two hours of (geometrical) drawing.

More crucial than the amount of instructional material, however, was its outstanding quality, which is indicated by the fact that Grotefend himself was active in intellectual research, and produced the first catalogue for deciphering Babylonian cuneiform. At Easter 1846 Riemann enrolled in the University of Göttingen in theology and philosophy, but signed up as well for scientific subjects. Doctorate from the University of Göttingen (approved by Gauss), 1854.

The events of the Revolution of 1848 occurred while Riemann was in Berlin. Riemann immediately embraced, as did Dirichlet and Jacobi, the republican side. He even served in the militia, a paramilitary group which sought to defend constitutional institutions against radical-democratic forces.

In 1862, while a Professor at Göttingen, he became seriously ill and moved to Italy. There he created a famous group of mathematicians, the Italian Riemannian school, that included Enrico Betti, Felice Casorati, and Eugenio Beltrami.

Riemann died in Lago Maggiore, Italy, July 20, 1866.

14. Francis Bacon (Lord Verulam, Viscount of St. Albans); born 1561. Studied law at Cambridge; 1576 attached to British embassy in France. In 1591 he became a confidential advisor to the Earl of Essex, and was later involved in having Essex convicted of treason. Solicitor General, 1607; Attorney General, 1616; Lord Chancellor, 1618; convicted for bribery and corrupt dealing and forced to retire in disgrace in 1621. He died in 1626.
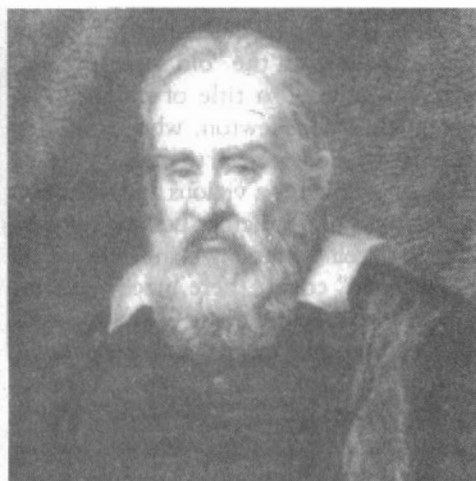
15. Robert Fludd; born in England in 1574. He received his master's from Oxford University in 1598, and medical degree from there in 1605. Studied medicine, chemistry and the occult sciences. Authored many books, including *Apologia Compendiaria Fraternitatem de Rose Cruce . . .* (1616) where he defends the Rosicrucians. A *bona fide* kook, Fludd defended the use of a magical weapon salve, wrote works on the mystical anatomy of the body, and strongly supported sympathetic medicine. He died in 1637.

In his appendix to the *The Harmony of the Universe*, Kepler points out that one of the reasons for his having to write the appendix, is that Robert Fludd had just come out with a series of works purporting to deal with the same subject—one of which even had the same title as Kepler's, *Harmonices Mundi.*

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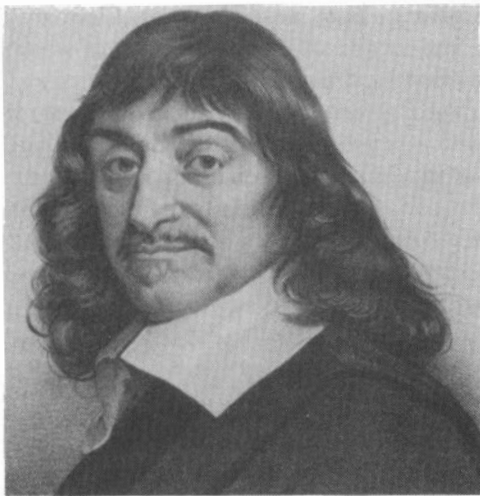
René Descartes

François Voltaire

Immanuel Kant

He says of Fludd's work: "One can also see that he takes his chief joy from incomprehensible riddle-images about reality, while I proceed precisely from the standpoint of throwing the bright light of knowledge upon things in nature that are wrapped in obscurity. The former is the business of the chemist, the hermetic, and the Paracelsists, the latter, on the other hand, the task of the mathematician." Johannes Kepler, *Harmonices Mundi*, trans. by Max Caspar (Munich and Vienna, 1982), p. 362.

16. Galileo Galilei; born near Pisa, Italy 1564. Studied medicine and physics at the Univerity of Pisa. Became professor of mathematics there, 1589-92; professor of mathematics at the University of Padua, 1592-1610. In 1610 he became the chief mathematician and philosopher to the Grand Duke of Tuscany. He died near Florence in 1642.

Although the telescope had been developed by others in the Netherlands, he took the credit for this; and it seems he was the first to use it for astronomical observations, which is how the four closest satellites of Jupiter (invisible to the naked eye) became known as "the Galilean satellites." Galileo is best known for supposedly dropping two cannonballs of different weights from the leaning tower of Pisa, to prove that acceleration due to gravity is independent of mass; but, even if it might be true that Galileo did this experiment, it had already been done fifteen years earlier, by Jan de Groot (Hugo Grotius' father) in Delft, the Netherlands.

17. René Descartes (1596-1650). He studied at the Jesuit Collège Royal de la Fleche; studied law and medicine at the University of Poitiers; licensed in law 1616. He lived in Holland from 1629 to 1649, and died on a trip to Sweden.

18. For sponsors of the London Royal Society, see Carol White, *The New Dark Ages Conspiracy* (New York: New Benjamin Franklin House, 1980), Chapter 8.

19. The so-called "Enlightenment" (the name not accidentally reminiscent of the "Illuminati") pretended to be a movement of "enlightened" people who believed in "reason" (read, "logic") against the "superstitions" of religion. It began in France under the sponsorship of the British Royal Society, spread to the rest of Europe, destabilized the France that had helped the United States win its independence from the British Empire, and culminated in the Reign of Terror.

The most trumpeted and popular pen in the service of the Enlightenment was François Arouet, who surely did not believe in the "old superstitions," but nonetheless found it necessary to buy himself a title of nobility, "de Voltaire." Voltaire was *the* leading popularizer for Newton, who found that the existence of God was a hypothesis that he did not need to make. Voltaire is most infamous for his little work *Candide*, which is a vicious and dishonest attack on Leibniz, where Voltaire caricatures and ridicules Leibniz's notion that the universe is ever-developing and self-perfecting—the best of all possible worlds. But behind the "enlightened" cover, there breed the most irrational, Dionysian, and cultish beliefs of Freemasonry—Voltaire was a member of the "Nine Sisters" Lodge—structured by magical freemasonic formulae and ritual.

Since the Enlightenment denied the existence of God, denied man's connection to universals, denied the existence of the soul, what was left but the instincts and the passions? All is permitted—witness that quintessential Enlightenment man, the Marquis de Sade.

Sir Isaac Newton

20. Immanuel Kant (1724-1804). Born in Königsberg, East Prussia, where he lived all his life and where he was professor at the University. After Leibniz, in his *New Essays on Human Understanding,* had demolished empiricism, Kant led the effort to undermine Leibniz and rehabilitate empiricism, by seeming to make it coherent with "rationalist" (Cartesian) thought. Although Kant, in the preface to the first edition of his *Critique of Pure Reason,* features a devastating attack upon (British) philosophical (moral) "indifferentism," he himself supplies the theorem upon which the nineteenth-century positivism depends for a mere show of philosophical credibility.

His works include: *The Critique of Pure Reason* (1781), the *Critique of Practical Reason* (1788), the *Critique of Judgment* (1790), and the *Prolegomena to Any Future Metaphysics* (1783).

Many of Friedrich Schiller's writings on aesthetics are implicit or explicit attacks on Kant, especially where Kant echoes the Roman Empire: There is no objective basis for judging beauty (*De gustibus non est disputandum*).

21. *"Hypotheses non fingo"* ("I don't make hypotheses"). Sir Isaac Newton, *The Mathematical Principles of Natural Philosophy,* trans. of *Philosophia naturalis principia mathematica* (New York: The New York Philosophical Society, 1964).

22. Nicolaus of Cusa, *De Docta Ignorantia, op. cit.*

23. For Archimedes' theorems, see T.L. Heath, ed., *The Works of Archimedes* (New York: Dover Press, 1897): "Measurement of a Circle," pp. 91-98; and "Quadrature of the Parabola," pp. 221-32.

24. Nicolaus of Cusa identified the importance of his crucial discovery of what was later termed "the isoperimetric theorem," by saying that he had found a new approach to the problem upon which Archimedes had worked, that of "squaring the circle." Cusa defined the circle as that curve which enclosed the greatest area (or accomplished the greatest work), with the minimum circumference (the minimum action). Cusa thus defined the circle as, not in any sense a *limit* of inscribed and circumscribed polygons with a greater and greater number of sides; but a *relatively more perfect existence, or action,* than that of the inscribed and circumscribed polygons, an existence which is transcendental to them. In *On Learned Ignorance,* Cusa works from this point to demonstrate, in effect, an "infinite triangle," or more generally, an "infinite polygon," and shows that the existence of the straight line is derived from circular action. In other locations he shows (as discussed in detail later in this book) that the idea that the inscribed or circumscribed polygons of increasing numbers of sides approach the circle as a limit, actually generates mathematical paradoxes.

25. See footnote 24 above.

26. Dino De Paoli, "Georg Cantor's Contribution to the Study of Human Mind—A Refutation of Artificial Intelligence," in *21st Century Science & Technology,* Summer 1991.

27. David Eugene Smith, ed., *A Source Book in Mathematics* (New York: Dover Press, 1959), pp. 424-25.

28. Eugenio Beltrami was born in Cremona, Italy, on November 16, 1835. He enrolled in the faculty of Mathematics at the University of Pavia, from 1853 to 1856, but then was forced to discontinue his studies because of

actions against him by the police of the Austrian occupiers of Italy. On his own, while working at an administrative job, he studied arithmetic, algebra, geometry, trigonometry, higher algebra, and the calculus, focusing especially on the works of Monge, Jacobi, Abel, and Gauss. Two memoranda written by him and published in the *Annali di Matematica* resulted in his appointment to the position of Associate Professor of Complementary Algebra and Analytic Geometry at the University of Bologna, and then the chair of geodesy at the University of Pisa where he formed a lifelong friendship with the Italian mathematician Betti, and met frequently with Bernhard Riemann, who had established himself in Pisa for reasons of health. He later taught again at the University of Bologna, the University of Rome, and then at the University of Pavia. Beltrami died on February 18, 1900.

He had a rare scientific knowledge of music, of which he was also a competent and inspired performer. His mother had taught him from the most tender age; then he practiced with Amilcare Ponchielli, who was his contemporary and from the same town. This musical talent he hid with shy modesty, as if he feared being accused of infidelity towards the jealous goddess mathematics, to whom he was completely consecrated; but his very few close and intelligent friends attest that he was able to masterfully execute at the pianoforte the masterpieces of Bach, Beethoven, Mendelssohn, and Schumann.
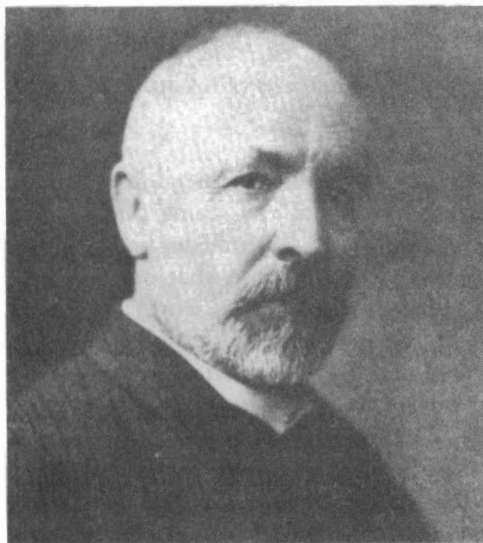
Georg Cantor

29. Georg Ferdinand Ludwig Philipp Cantor was born in St. Petersburg, Russia, March 3, 1845, to a Jewish father (who converted to Lutheranism) and a Catholic mother. The family moved to Frankfurt, Germany in 1856. Cantor studied philosophy at the University of Zürich and then studied mathematics under Weierstrass at the University of Berlin, where he received a doctorate in 1867.

Until 1878, his works were on classical mathematics; then he began to develop what today is called the Cantor Theory of Numbers.

For decades, beginning the 1870s, Cantor was the target of a continent-wide campaign of defamation, a campaign ostensibly radiating from Professor Leopold Kronecker at Berlin. The scope and character of these coordinated, far-flung operations against Cantor, are among the most disgusting, but, unfortunately, most revealing, aspects of the recent history of the scientific community generally. The Mittag-Loeffler archive in Sweden has been most instructive on this account. A nearly total "controlled psychological environment" was created around Cantor. Under these hideous pressures, Cantor's morale collapsed. He recuperated and went on to produce his major work in 1895-97, his *Contributions to the Founding of the Theory of Transfinite Numbers*.

He died in Halle, Germany in 1918.

30. The Council of Florence represents the spiritual high point of the Italian Renaissance. Not only did it realize the Union of the Eastern and Western Churches on the basis of the highest common denominator; but also, the various elements which contributed to its success were the same that contributed to overcoming the Dark Age of the fourteenth century. These included such diverse components as the economic policy of the Medici, the philosophical method of Nicolaus of Cusa, and the conceptual discoveries of Brunelleschi, to pick out just a few. But all the geniuses who participated in the Council of Florence and were caught up by its spirit had one thing in common: their love for humanity, inspired by their love of God, and a boundless cultural optimism which derived from it.

On July 6, 1439, in the city of Florence on the Arno river in north-central Italy, the assembled Church hierarchy and imperial authority of the Eastern Orthodox Church and the leaders of the Roman Catholic Church jointly

proclaimed a document of Union entitled *Laetentur coeli*, "Let the Heavens Rejoice." After the great Schism, dating from the mutual excommunications of the Pope and Patriarch of Constantinople in 1054, the Council of Florence had finally reunified the Eastern and Western branches of Christianity. The Union occurred at a moment of mortal strategic peril to European civilization, with the Ottoman Turk threatening to overrun the entire continent.

The Union was proclaimed jointly by the Greek Bessarion and the Italian Cesarini from the pulpit of the Florentine cathedral of Santa Maria del Fiore, under the great Cupola that had just been completed in 1436. As the two major branches of Christianity convened to rediscover their common roots in the period of the early Christians' struggle against the Roman Empire, they witnessed the literal, physical rebirth of a civilization before their very eyes, in a building that harkened back to antiquity's achievements but surpassed them.

At the Council, the Byzantines finally agreed to the doctrine that had long distinguished the Western, Augustinian form of the faith: the "Filioque" clause added in the West to the Nicene Creed, which clause was understood to define the necessity of technological progress as a central premise of the doctrine of the Trinity, by stating that the Holy Spirit proceeds both from the Father *and the Son* (in Latin, *Filioque*), who is both God and man.

31. In 1885, in *On Various Theorems of the Theory of Point Sets*, Cantor wrote:

The *hypotheses* forming the basis for most theoretical investigations of *natural phenomena* have never satisfied me very much. I believed that this had to be ascribed to the circumstance that *theoreticians* for the most part either allow a complete indeterminacy to govern the *ultimate* elements of *matter*; or that they take them to be so-called *atoms* of indeed *very small* but still *not absolutely infinitesimal volume*. I had no doubt that, in order to achieve a satisfactory *explanation of nature*, the ultimate or the truly *simple* elements of matter must be assumed to be of an *actual-infinite number* [in other words, a transfinite number], and as regards the *spatial* aspect must be regarded as *entirely without extension* and as *strictly points.* . . .

I join Leibniz in calling the *simple* elements of nature . . . *monads* or *unities.* . . (emphasis in the original).

From: Georg Cantor, *Gesammelte Abhandlungen* (Collected Treatises), ed. by Ernst Zermelo, Berlin, 1932.

32. Dino De Paoli, *op. cit.*, "The Transfinite," pp. 46-48.

33. See Lyndon H. LaRouche, Jr., *In Defense of Common Sense*, in *The Science of Christian Economy and Other Prison Writings* (Washington, D.C.: Schiller Institute, 1991), Chapters 3-6.

34. De Paoli, *op. cit.*

35. For the distinction between the Becoming and the Good in Plato, which is, essentially, the difference between the absolute infinite and the transfinite, see *The Science of Christian Economy*, Chapters 7 and 8 and specifically p. 471, note 6:

Ultimately, *being* is a quality which resides in the *Good*, not the becoming. The Good is *the changeless being of universal change*, the former One, the latter the generation of the *manifoldness* of the universe. *Being* is thus the residence of the highest which is higher than the transfinite

ordering of change: The constant good is this constant cause of change: *Matter* is thus generated (created) continuously by the *Good* (being).

The adoption of this distinction by the early Christian "Platonics," as St. Augustine calls them in his *Confessions,* is expressed, for example, by the passage of the Gospel of St. John from which Augustine quotes: "for the soul of man bears witness to the Light, but it is not the Light."

See also Georg Cantor as cited in De Paoli, *op. cit.,* pp. 49-50:

One can . . . question the actual infinite in three main relations: first, insofar as the actual infinite is realized in the highest perfection, in full independent existence beyond the world, in God, whence I call it the absolute infinite or simply, the absolute; second, insofar as the actual infinite is manifested in the dependent created world; third, insofar as mathematical magnitude, number or ordering type can be grasped by thought in the abstract. In the latter two relations, where the actual infinite clearly appears as limited, susceptible to further extension, and to that extent akin to the finite, I call it the transfinite and counterpose it most strictly to the absolute.

From: Georg Cantor, *Mitteilungen zur Lehre vom Transfiniten op. cit.,* p. 378.

36. See *In Defense of Common Sense, op. cit.,* Chapters 3-6 and *The Science of Christian Economy, op. cit.,* Chapter 7.

37. *The Science of Christian Economy, op. cit.,* Chapter 6.

38. *In Defense of Common Sense, op. cit.,* Chapter 8; and *The Science of Christian Economy, op. cit.,* Chapter 6.

39. *In Defense of Common Sense, op. cit.,* Chapter 3.

40. For example, an asymptote which is never reached by a function defines a mathematical discontinuity between that function and the asymptote. See also *In Defense of Common Sense, op. cit.,* Chapters 3-4.

41. *In Defense of Common Sense, op. cit.,* Chapter 4, "Continuous Transformation."

42. *Ibid.,* Chapter 6, "Entropy vs. Negentropy"

43. *The Science of Christian Economy, op. cit.,* Chapter 7, pp. 266-68.

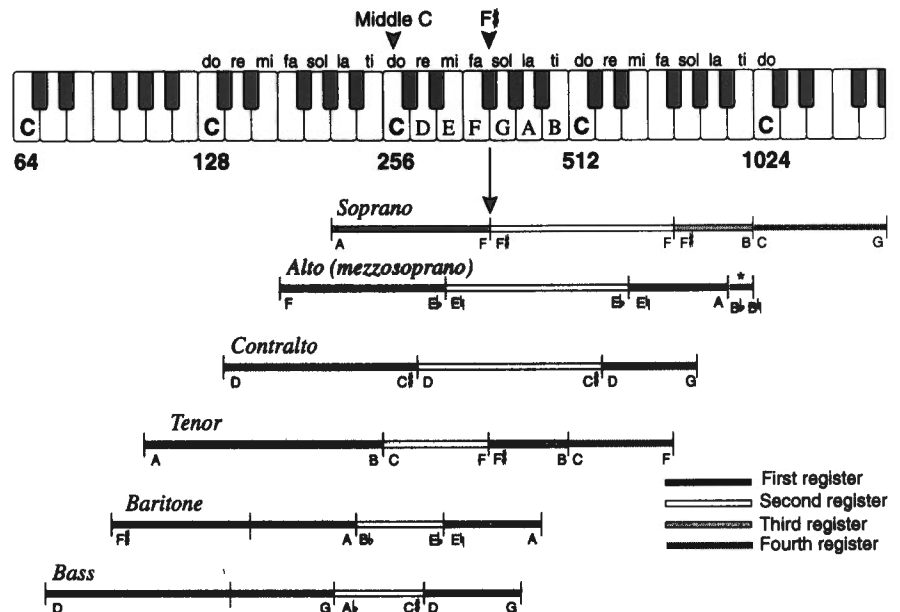**44.** *Ibid.,* Chapter 2.

45. *Ibid.,* Chapter 7, p. 266

46. *Ibid.,* Chapter 4.

47. *Ibid.,* Chapter 8, pp. 329-36.

48. *Ibid.,* Chapter 7, p. 296.

49. *Ibid.,* Appendix XII, "Anthropomorphic Science."

50. *A Manual on the Rudiments of Tuning and Registration* (Washington, D.C.: Schiller Institute, 1992), Foreword, p. viii.

The ranges (in registers) of the six major species of singing voice.

51. *A Manual*, loc. cit.

52. *Ibid.*, pp. 127ff.

53. *Ibid.*, p. 129.

54. *Ibid.*, Chapter 9.

55. *Ibid.*, Preface, p. ix; and Part II (unpublished manuscript), Chapter 2.

56. *Ibid.*, Chapter 1.

57. *A Manual*, loc. cit.

58. Al-Farabi, the influential Islamic musician and theorist of the Baghdad Caliphate, who established equal-tempering principles, lived in the ninth century A.D. Nearly two millennia earlier, in approximately 1000 B.C., an equal-tempered musical scale was already established and in use in China. This was proven by the unearthing, in late 1978 in China, of a large and complete set of tuned bells which have been dated to approximately 1000 B.C.

59. The Cathedral of Florence (the Church of Santa Maria del Fiore, by Brunelleschi), completed in 1436, is adorned by a Luca della Robbia sculpture, known as "The Cantoria," which unmistakably shows a chorus of children demonstrating that they have been trained in the principles of *bel canto* singing.

60. *A Manual*, op. cit., Preface, p. xxii.

61. *A Manual*, loc. cit.

62. *Ibid.*

63. This author, in his *In Defense of Common Sense*, p. 86, says the following about Kant: "In his last *Critique*, the *Critique of Judgment*, Kant restated his argument that creative processes are not comprehensible. In the same location, Kant argues, from the same premises, that there exists no rational yardstick of artistic beauty, and that, therefore, no yardstick exists excepting an irrationalist's pragmatic one."

64. A *Manual*, *op. cit.*, Preface, p. xii.

65. The first effort to institutionalize A = 440 was a 1939 conference organized by Nazi Propaganda Minister Josef Goebbels, who had standardized A = 440 as the official Nazi German pitch. Professor Robert Dussaut of the National Conservatory of Paris (where A had been set at 435 by law since 1859) told the French press: "By September 1938 (at the time of Munich), the Acoustic Committee of Radio Berlin requested the British Standard Association to organize in London a congress to adopt internationally the German Radio tuning of 440 periods. This congress did in fact occur in London, a very short time before the war, in May-June 1939. No French composer was invited. The decision to raise the pitch was thus taken without consulting French musicians, and *against their will*" (emphasis in the original).

66. A *Manual*, *op. cit.*, Foreword, p. ix.

67. *Ibid.*, Chapter 9, "Principles of Bel Canto," pp. 155-59.

68. A *Manual*, Preface, p. xiii.

69. When, in the heady days immediately after the Bolshevik Revolution in Russia, proletarian revolutions failed to sweep out of the Urals into Europe and, ultimately, North America, the Communist International (Comintern), seeing that attempts at workers' government in the West had lasted only months at best, began several operations to determine why this was so. One of these operations was run out of the Frankfurt Institute for Social Research (ISR), commonly known as the "Frankfurt School," by Georg Lukacs, a Hungarian aristocrat, son of one of the Hapsburg Empire's leading bankers; trained in Germany and already an important literary theorist.

Lukacs had become a communist during World War I, writing as he joined the party, "Who will save us from Western civilization?" He was well-suited to the Comintern task since he had been one of the Commissars of Culture during the short-lived Hungarian Soviet in Budapest in 1919, where he gave orders mandating sex education in the schools, easy access to contraception, and the loosening of divorce laws—all of which repulsed Hungary's Roman Catholic population.

Fleeing to the Soviet Union after the counter-revolution, Lukacs was secreted into Germany in 1922, where he chaired a meeting of the communist-oriented sociologists and intellectuals. This meeting founded the Institute for Social Research. Over the next decade, the ISR worked out what was to become the Comintern's most successful psychological warfare operation against the capitalist West.

Lukacs identified that any political movement capable of bringing Bolshevism to the West would have to be, in his words, "demonic"; it would have to "possess the religious power which is capable of filling the entire soul; a power that characterized primitive Christianity." However, Lukacs suggested, such a "messianic" political movement could only succeed when the individual believes that his or her actions are determined by "not a personal destiny,

but the destiny of the community" in a world "that has been abandoned by God."

What differentiated the West from Russia, Lukacs identified, was a Judeo-Christian cultural matrix which emphasized exactly the uniqueness and sacredness of the individual that he abjured. At its core, the dominant Western ideology maintained that the individual, through the exercise of his or her reason, could discern the Divine will in an unmediated relationship.

The task of the Frankfurt School, then, was first to undermine the Judeo-Christian legacy through an "abolition of culture"; and second, to determine new cultural forms which would increase the alienation of the population, thus creating a "new barbarism." To this task there gathered in and around the Frankfurt School an incredible assortment of not only communists, but also non-party socialists, radical phenomenologists, Zionists, renegade Freudians, and at least a few members of a self-identified "cult of Astarte." Besides Comintern support, over the next three decades the Frankfurt School received money from various German and American universities, the Rockefeller Foundation, Columbia Broadcasting System, the American Jewish Committee, several American intelligence services, the Office of the U.S. High Commisssioner for Germany, the International Labour Organization, and the Hacker Institute, a posh psychiatric clinic in Beverly Hills.

70. See *The Science of Christian Economy*, *op. cit.*, p. 313: "It is implicitly a straightforward matter, to show how all mathematical orders are derived from a synthetic constructive geometry. This includes, of course, the role of the 'non-algebraic' (transcendental) geometric constructions to represent a nonlinear 'curvature' of elementary physical space-time. These qualities of a generalized synthetic geometry are indispensable for full *transparency* (*intelligible representation*) of a coherent mathematical physics." See also Appendix XIV.

71. Heine in fact "denounced the evil Madame de Staël and Kant with surgical precision of insight." *In Defense of Common Sense*, p. 86.

72. The increasing mob violence of the Jacobins eventually wrecked the attempt of Benjamin Franklin's circles, French republican scientists, military figures, statesmen and authors, to create an "American" republic in France. That violence was given its impetus and steered from London, by the new "liberal" government of William Pitt the Younger and the Earl of Shaftsbury; actually taking the form of a conscious destabilization of French government and society, beginning with the mob disturbances demanding the rehiring of Swiss banker Jacques Necker as Finance Minister. The detailed history of this British destabilization of a French "American Revolution" potential, including the control of the actions of Danton and Marat from London, is given in two articles published in 1977 in *New Solidarity* newspaper: "How Pitt's Jacobins Wrecked the French Revolution," by Linda De Hoyos, *New Solidarity*, Vol. VIII, Nos. 28 and 29 (June 3 and June 7, 1977).

73. *In Defense of Common Sense*, *op. cit.*, pp. 86-88.

74. On the Venetian Party, see H. Graham Lowry, *How the Nation Was Won* (Washington, D.C.: Executive Intelligence Review, 1988), Vol. I, pp. 74-77.

75. See Friedrich Schiller, "The Legislation of Lycurgus and Solon," in *Friedrich Schiller, Poet of Freedom*, Vol. II (Washington, D.C.: Schiller Institute, 1988).

76. "The distinction between *oligarchism* and *republicanism* arose in literary history with the defense of the Greek city-state republics against the oligarchical enemies of Babylon and Canaan. The idea of *republicanism* grew up and evolved during many successive battles for freedom. Thus, when a truthful historian speaks of the history of republicanism, he offers two primary sets of distinctions. He refers to the succession of struggles, beginning with the constitutions of the ancient Ionian city-state republics, continuing through the work of Solon of Athens, Aeschylus' *Prometheus*, Socrates, and Plato. The historian concurs with St. Augustine's relevant letter, on the point that Christianity adopts *a Christian Socrates* as to scientific method in arts and science, but sees a crucial single flaw in a merely pagan Socrates."

Lyndon H. LaRouche, Jr., *Project A*, in *The Science of Christian Economy*, *op. cit.*

77. See "Poetry and Agapē: Reflections on Schiller and Goethe," by Helga Zepp-LaRouche, in *Friedrich Schiller: Poet of Freedom*, *op. cit.*, Vol. II, pp. xix-xliv; and, in the same volume, Schiller's *The Legislation of Lycurgus and Solon*, trans. by George Gregory, pp. 273-305.

78. Following the success of the Council of Florence, the enemies of Christianity redoubled their efforts to destroy the Church. No sooner did the Greek prelates and imperial rulers return to Byzantium in 1443, than the backlash against acceptance of the *Filioque* broke out throughout the remaining Byzantine territories, whipped up by reactionary monks of Mount Athos. In 1444, thanks to Venetian treachery, the Western forces commanded by Nicolaus of Cusa's friend and collaborator, Cardinal Giuliano Cesarini, were slaughtered in the battle of Varna in Bulgaria, and Cesarini "disappeared," no trace of him was ever found again. The Turks drew the noose tighter, and in 1453, with the help of renegade Western engineers serving the interests of the Venetian oligarchs, captured Constantinople. Then the Turks imposed upon the Greek Orthodox Church a new patriarch, Gennadios—who promptly renounced the *Filioque*.

79. *Executive Intelligence Review*, Special Issue, Jan. 1, 1991, Preface.

80. See note 30 above.

81. following comment was made by Lyndon LaRouche in a taped message to the annual conference of the International Caucus of Labor Committees on Aug. 31, 1991:

The problem on which we should focus, both in science—that is, the problem of lack of understanding of what the cold fusion experiments signify, the crisis in science, the epistemological crisis in science prompted by the cold fusion experiments' results, and the witch-hunt itself—both go back to something which happened essentially during the seventeenth century in England and France. On the British side, the problem was the establishment of what became known as British empiricism by a group of Rosicrucian cultists associated with Francis Bacon, Thomas Hobbes, Elias Ashmole (the founder of British Freemasonry), John Locke and, of course, including Isaac Newton.

These people introduced an anti-Renaissance, what was considered at that period an anti-science, Aristotelian method, which was infused in a very peculiar way with one element. This element was the introduction into science of what became known as empiricism, but was originally the central feature of the most notorious, sexually perverted reli-

gious cult in the history of medieval Europe—that is, the Cathar, Bogomil, or Bugger cult from the district of southern France associated with Albi and Toulouse.

The same thing happened in France itself. Buggery, in the form of the influence of this cult upon science, manifested itself in the work of René Descartes, particularly in Descartes' notion of *deus ex machina*. This established Cartesianism as a form of Buggery which had been traditional in French science and poisoning it or buggering it to the present day. This is quite literally the case: a Rosicrucian cult (which featured alchemy as one of its claims to fame), which was Aristotelian, cabbalistic, and Bugger (that is, it featured this split between spirit and flesh, as the new materialistic doctrine), which is characteristic of the Buggery cult of south France, of the Rhône district and Albi-Toulouse centuries earlier.

82.   See footnote 69, above.

II. Six of the Crucial Discoveries in Modern Science

We address the first of our three themes, the *principle of hypothesis*, by examining the way in which six successive revolutionary discoveries in mathematics illustrate the notion of a *transfinite* function which is otherwise also shown to be *non-linear* and *negentropic*. These six discoveries are the following:

1. Cusa's revolutionary insight into the reason no linear construction can square the (transcendental) circle.[1]
2. Leonardo da Vinci's insight into the physical and mathematical significance of harmonic orderings congruent with the circle's *Golden Section*.[2]
3. Kepler's adoption of Leonardo's insight into the Golden Section's harmonics as the cornerstone of an integrated, comprehensive mathematical physics.[3]
4. The discovery of the physical and mathematical significance of a new, more general class of circular action, the cycloids and non-algebraic functions generally, by Huygens, Leibniz, and the Bernoullis.[4]
5. The generation of nineteenth-century transcendental function-theory out of the successive and combined efforts of Monge, Legendre, Carnot, Gauss, Dirichlet, Riemann, Weierstrass, *et al.*[5]
6. The generalization of this development, from Cusa through the 1890s, by Georg Cantor's discoveries in the domain of transfinite functions.[6]

In each case of these six, the discovery had not been possible without the indicated preceding members of the series. In each case, the same principle of hypothesis was employed in application to geometrically defined physical demonstrations of a crucial nature.

Leonardo showed that all ordinarily observed processes whose morphology of growth and developed function is harmonically ordered in congruence with the circle's Golden Section, are living processes; those whose morphology does not satisfy this condition, are not living processes. This distinction, as also treated by Kepler,[7] is otherwise historically the

primitive distinction between what we term today *negentropic* (living, or living-like) and *entropic* (non-living, or dying) processes.

The construction, as elaborated by Leonardo and Kepler, already shows that all linear (e.g., *deductive*) processes are intrinsically *entropic*, or entropic descriptions of processes which, apart from that mathematical description, might be, in reality, either entropic or negentropic. The question remains, from Leonardo's work, is the (ostensibly) non-living universe entropic or negentropic on the astrophysical and microphysical scales? Kepler showed that the universe is *characteristically negentropic* on the *astrophysical scale*. The work of Bostick *et al.* shows that, relative to the Schrödinger ψ-function, the so-called elementary particles are defined characteristically by negentropic forms of action (on the microphysical scale).[8]

Here lies the direct connection to the issues of "Coulomb barrier" and "tunneling." Here is the way in which these epistemological issues focus upon crucial theoretical features of cold fusion experiments.

So, to the first transition. Cusa's work showed that circular perimetric action is not a Cauchyian "limit" of linear successive approximations, but, rather, in construction, what is termed later a transcendental *existence*—not a transcendental *number*, but a transcendental *existence*. The most useful initial approximation of the circle as such, a transcendental *existence*, is gained by defining the circle *constructively* by means of the isoperimetric theorem: the *minimal* perimetric *action* (displacement) required to generate the relatively maximal area. Such a construction is a reflection of *a universal principle of least action*.

Since it is impossible to generate linearly a construction of a transcendental circular existence, no definition of circular existence premised upon linear (e.g., deductive, *algebraic*) axiomatics is possible. We must, at this stage, define the circle in no other way than in ways modeled upon the "least action" tactic, the isoperimetric theorem's construction.[9]

This and related discoveries by Cusa clear the way for Leonardo and others to see the constructive, physical significance of Golden Section harmonics, circular action, and its harmonic derivatives, as expressions of action. The importance of Plato's devastating refutation of the Eleatic follies of Parmenides, Zeno, and Bertrand Russell,[10] stands out here. Then, with stunning force, comes Kepler.

Of the six selected crucial discoveries of modern science under immediate consideration, the initial mastery of the first four belongs to the secondary level of a competent educational program, and some essential features of the final two should be introduced on that secondary level. The first four are among the most indispensable of prerequisites for a competent introduction to the calculus. The representation for that purpose reaches into elements of the discoveries of Monge and Poncelet.[11] Therefore, an adequate representation of the axiomatic kernel of these discoveries must situate the relevant formal paradox and its solution on the secondary level so prescribed.

The corollary point is, that any properly educated person at completion of his or her secondary level, is already qualified to know that the referenced dogmas of the empiricists and Cartesian critics of Cusa, Leonardo, Kepler, and Leibniz, are absurd. It is on that level the scientific issue raised by such witch-hunters as the editors of *Nature* must be situated.

This is not the place to outline a secondary-level textbook. A few highlights are sufficient illustration for what is necessary here.

Begin the brief excursion with a return to the Archimedean series of successive, inner-outer approximations of the ratio of the length of a circle's perimeter as that length might be expressed in terms of the linear
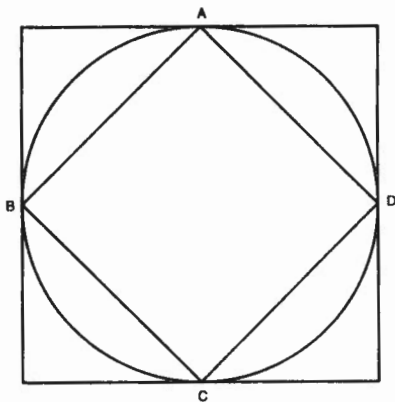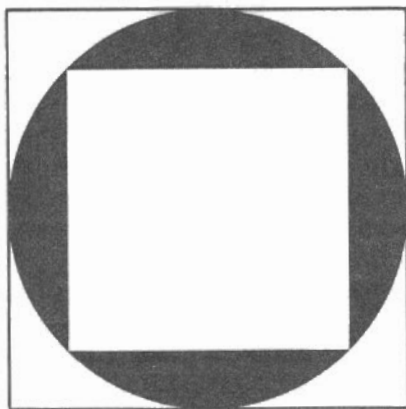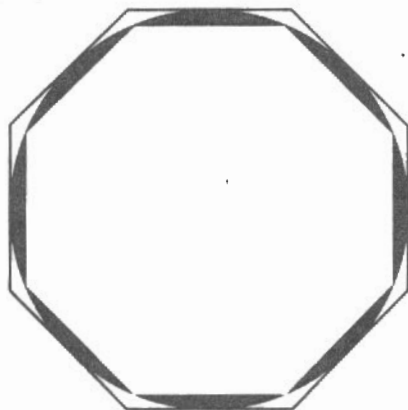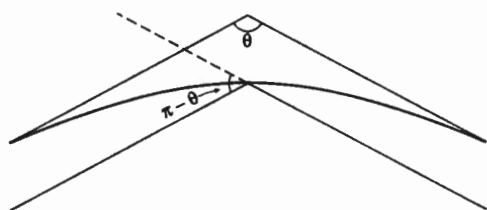
Figure 2A

Figure 2B

Figure 2C

Figure 2D

diameter of that circle. This is presented to those pupils as, apparently, the precondition for discovering a feasible approach to a construction which "squares the circle."[12] We must demonstrate to such students, in what is relatively a very shockingly sensuous experience for those secondary geometry students, that there is an axiomatic fallacy in this "Archimedean" approximation of the value of π.

So, for the purpose of this bit of Socratic dialogue, construct the square whose vertices exactly touch the interior of a circular perimeter at sequential points A, B, C, D. Construct a second square, the midpoints of whose sides, for example, touch the outer side of the same circle's perimeter at points A, B, C, D (see Figure 2A). The inscribed square can be rotated so that its vertices align with the circumscribing square (see Figure 2B). Construct, by halving and rehalving the sides of both the squares, the corresponding eight-sided and sixteen-sided regular polygons respectively circumscribing and inscribed within the circle (see Figure 2C). Continue this process of such constructions up to the point that a pair of regular polygons, each of exactly 2^n sides, respectively circumscribe and are inscribed within that same circle. Let 2^n become a significantly large number. Pause early in this process, at $2^n = 128$; then, in the imagination, continue the process to $n = 128$. If we could reach $n = 128$ by means of constructions possible in the classroom, we might assume that those students could have measured with prodigious degree of refinement a length, measured in *linear* diameters, approximating the desired number π.

Return to the more comfortable vicinity of the local series of regular polygons $2^n = 128;\ 256;\ 512$. This time, construct $n = 128$ such that one vertex of the circumscribing polygon lies upon the radial line defined by a vertex of the inscribed polygon. Focus upon the pair of variable angles, θ and $(\pi-\theta)$, defined, respectively, as the interior and exterior angles formed by each pair of adjacent polygonal sides. Now, magnify the image of one arc of the circle subtended by the external polygon's interior angle θ (see Figure 2D). Visualize that arc as "trapped" between this angle θ and the corresponding angle $(\pi-\theta)$ of the inscribed polygon.

Thus, attempt to view the constant values of positive and negative curvature of all circular perimeters as *quasi-angles:* compared with θ and $(\pi-\theta)$. From $2^n = 128$ onward, proceed toward $n = 128$ as far as the mind can continue the construction explicitly. Observe the changing values of θ and $(\pi-\theta)$; *see the ontological paradox.*

A linear approximation of a curvature is never a curvature. A linear construction *per se* cannot generate a curvature; *implicitly, therefore, no linear function could generate a curvature.* This proof is paradoxical, unless it is construed to demonstrate implicitly, that *physical space-time, as vision enables us to imagine it, is intrinsically curved,* and that *its curvature of extension is intrinsically non-linear.*

Nicolaus of Cusa's *De Docta Ignorantia* and his other relevant writings are to be read in this light, as the work of Leonardo da Vinci similarly reflects this included specific point of connection to Cusa.

In the next case, the second of the six selected, in a similar, paradoxical way, compare the construction of a *Fibonacci* series[13] with the circle's Golden Section. The Fibonacci series is linear; although it seems to seek, by approximation, an estimated scale of value for a certain characteristic of living processes, it is not a representation of a truly negentropic function in the specific sense achieved by the Golden Section.[14]

As this conception is more clearly underscored later, respecting non-algebraic functions, by Huygens,[15] Leibniz, and the Bernoullis,[16] the paradox of the Archimedean series cannot be resolved adequately until

first we have replaced the sterile notion of homogeneous distance in empty, inert space, by the relevant notion of *action*: specifically, *least action* as Leibniz defines this.[17] This consideration is crucial to understanding both Leonardo da Vinci's view of the Golden Section, and Kepler's adoption of this view as the cornerstone upon which a modern, comprehensive mathematical physics was founded.[18] Therefore, henceforth, as aid to clarity, let us adopt a term of distinction, *physical geometry*. This term should be understood to denote a special quality of reading of *constructive geometry*, the latter including *analysis situs*,[19] a reading consistent with that notion of a *curved, non-linearly extended,*[20] *physical space-time* which is implicit in Leibniz's principle of universal least-action.

The notion of such a physical geometry was already central to Cusa's fundamental contributions to the establishment of a modern physics. One example should be sufficient illustration. Cusa defines negentropically ordered evolution of species, and does this on the authority of the same methodological principle of hypothesis permeating all his leading contributions to mathematical physics.[21] The comparison which we wish to stress here, because it is literally so illuminating for the happier sort of secondary geometry classroom, is a specific link between Leonardo's work and that of Johann Bernoulli.

Pour clear red wine into a goblet's hemispherical cup. Observe the projected image, as upon a white tablecloth, as a beam of light is passed through the wine.[22] That image is the well-known figure of the spherical burning glass, the *caustic*. Leonardo da Vinci's *Codices* show the exacting craftsmanship employed to correct the curvature of a hemispherical mirror, to exactly the degree to produce as a reflection the neat, circular focal point, rather than a caustic.[23] The corrected curve is the catenary, a non-algebraic curve derived from the parabola, and also the evolute of the tractrix.[24] This work of Leonardo's has a hereditary relationship, in respect to both physical subject matter and *method of hypothesis*, to Johann Bernoulli's treatment of the *brachistochrone* problem.

Johann Bernoulli writes of his discovery:[25]

> We have a just admiration for Huygens, because he was the first to discover that a heavy point on an ordinary Cycloid falls in the same time [*tautochronous*], whatever the position from which the motion begins.[26] But the reader will be greatly amazed . . . when I say that exactly this Cycloid, or *Tautochronos* of Huygens, is our required *Brachistochrone*. I reach this understanding in two ways, one indirect and one direct. When I pursued the first, I discovered a wondrous agreement between the curved path of a light ray in a continuously varying medium and our brachistochrone.[27]

So, we are confronted at a distance of nearly two centuries,[28] with two cases, Leonardo's and Bernoulli's, in which the physics of reflection and refraction of light is employed to demonstrate the non-algebraic physical-geometric ordering inhering in a *universal principle of least action*. The Bernoulli solution referenced is explicitly a statement of the necessary interdependency of a relatively constant speed of light and that principle of least action. This pair of cases is exemplary, but not otherwise unusual in the history of modern science as a whole. It is relatively typical of crucial instances of the principle of *physical geometry*. Some further comment on that point is doubtless needed now.

Take the case of F. Brunelleschi, the early fifteenth-century scientist who solved the problem of constructing a cupola of that church usually referenced as "the Cathedral of Florence."[29] One of the central features

of Brunelleschi's investigations, leading to this process, was his pin-hole optics work. The crucial feature of his solution for the construction of the cupola, is the integral use of hanging chain, to provide the needed, guiding catenary.[30]

This may astonish, and may even also offend, some who imagine that they know already the important elements of the history of science, but the continuing importance of Leonardo da Vinci's work for crucial features of twentieth-century science is vastly underrated among relevant classrooms and professionals today. Briefly, one may say that the specific cast of Leonardo's mental power, which supplied Kepler with a cornerstone for founding a comprehensive mathematical physics, also produced, as a cohering feature of the same method, a general notion of the hydrodynamical form, on principle, of *all* propagation of physical action in our universe, light and sound included.[31]

Directly, sometimes by way of Dürer,[32] or by way of Kepler, or together with the influence of Kepler,[33] the hydrodynamical world-view of Leonardo shaped the work of many on light and sound, as well as fluid and gas dynamics, into the nineteenth century.[34] Today, we sometimes discover still that Leonardo's physics were right, where not only a seventeenth-century critic,[35] but a nineteenth-century Rayleigh,[36] or Rayleigh's twentieth-century successors, were wrong.[37]

We have considered thus, as in the compared cases of Leonardo and Bernoulli, how a crucial experimental consideration effected the adoption of a mathematical principle. We touch so upon the dispute, whether physics is not predominantly experimental (*objective*), and mathematics mental (*subjective*). What has been considered thus far points toward the historical proof that both of these extremist views are *false in construction*.

We have illustrated the case, in the form of constructive geometry, that circular action is a *transcendental* species not constructible by linear mathematical function. So much for the *subjective* side. We have considered Bernoulli's experimental basis for brachistochrone proof of the principle of least action, by physics and by constructive geometry, separately and together. The solution to the paradox ought to be on the tip of one's tongue.

What experiment proves is not a case by case accretion of isolated mathematical recipes, which one hopes might aggregate into a consistent body of knowledge. Each crucial experiment originates in the application of a general principle to expose a paradox in the form of knowledge. The experiment is intended to test the application of that general principle, and hence, that general principle itself.

For example, the seventeenth-century British empiricists foisted the hoax, that Galileo and Newton were the discoverers of universal gravitation.[38] Newtonian gravitation in its valid aspect was plagiarized wittingly from the work of Kepler, who had already claimed this discovery in writing. Newton's formula is obtained by the simple algebraic manipulation of applying the well-known inverse-square relationship to Kepler's Third Law.[39] However, in the course of this Newtonian plagiarism, the Rosicrucian cultists[40] of the London Royal Society overlooked a crucial point: Newton's copy was hopelessly flawed in the act of copying; that flaw is known as the three-body paradox.[41]

The three-body paradox inhering in Newton's formulation was already sufficient formal proof that the Newtonian opposition to Kepler was incompetent. Later, at the beginning of the nineteenth century, Carl Gauss discovered, in the crucial evidence of the harmonic values of the orbits of Pallas and Ceres, that Kepler's astrophysics was correct vis-à-vis the proven absurdity of all of Kepler's Aristotelian or neo-Aristotelian critics.[42]

Most of what a good mathematical physics discovers which is valid, is the result of applying established methods of hypothesis, either deductively, or Socratically, formally, to itself, as in Socratic forms of classroom exercises. The further refinement of this principle of hypothesis, rests upon discovering a barrier in concept which is delimiting the further self-improvement of heretofore successful principles of hypothesis.

The term *science* ought to be understood as signifying man's self-development of his own higher levels of creative powers, to the effect of guiding human behavior of entire societies to the effect of increasing mankind's per-capita power over the universe. This increase is reflected as an increase in mankind's potential population-density.[43]

So, the three-body paradox, and Gauss' insights into the crucial implications of the asteroid orbits, is not merely a conclusive disproof of Newton's specific opinion on the subject of universal gravitation. It is a crucial demonstration of the entire sweep of the Plato-Cusa-Leonardo-Kepler-Leibniz principled method of hypothesis, and proof of the relative worthlessness, and harmfulness, of Newton's deductive principle of anti-hypothesis.

What experiment proves, when no other rebuke suffices to effect the necessary change in belief, is that society's clinging to the neo-Aristotelian dogma must ultimately be destroyed by nature itself. Experiment contains the germ of the assurance that societies which adhere efficiently to the principle of hypothesis survive prosperously. Otherwise, as refinements of principles of discovery are clarified and affirmed by aid of crucial experiment, science is essentially subjective, in that it is impelled to its achievements by development and application of a sound subjective principle, the Platonic principle of hypothesis.

So, on to complete the relevant treatment of the six selected crucial discoveries.

Next, to Kepler.

Leonardo and Kepler

Of all Kepler's contributions to the founding of mathematical physics, the most crucial is, as we have noted, his adoption of Leonardo's conception of Golden Section harmonics as the cornerstone of his mathematics' basis in constructive geometry. Consider this, and that which follows immediately from it, from the vantage-point of our hypothesized secondary school classroom.

The examination of the ontological fallacy in the usual reading of that Archimedean series above, has already acquainted the pupils with a special kind of limit. The constant values of negative and positive curvature which are common to all circular action (in visible space),[44] are an unreachable boundary of the process of construction for both circumscribed and inscribed polygon series. As we proceed in that construction, from $2^n = 128$, in the direction of $n = 128$, the length of the arc subtended by the interior angle θ becomes very small, appearing under magnification as becoming approximately straight.[45] In this extreme case, only the construction of a tangent at the vertex of the inscribed polygon reassures us that there remains any curvature at all. At this point, the continued doubling suggests the Eleatic paradox's Achilles pursuing the tortoise.

We can never reach an angle θ equal to (*congruent* with) the corresponding quasi-angles of the arc. Disregard the foolish Zeno's Paradox.[46] The existence of the angle could never generate the constructive equivalent of the physical-geometric existence of the arc. As the arc becomes smaller, and very small, and the number of discontinuities (vertices) or intervals of observation becomes larger, the relative straightening of the arc makes the paradox more and more *singularly* clear.

So, we have the idea of polygons which are bounded by an external curvature. That is, if the circle were the limit generated by construction of regular polygons of 2^n size, that construction would be self-bounded by a circle. Since, in this case, the circle which bounds cannot be derived from a linear function, the process is not self-bounded; rather, the circle is an external bounding of linear process under examination.

In Euclid's *Elements*,[47] we meet the more interesting case of the way in which this sphere bounds internally the process of constructing regular polyhedra. If we had studied Plato's work, we would already be familiar with this fascinating, apparent anomaly.[48] In visible space, only five regular polyhedra can be constructed. Examination shows, that this limitation is associated with what one may describe loosely as "the properties of the sphere." We should contrast this with the related, but different kind of limitation on the largest size of interior angle θ of the Archimedean series, the latter limitation describable as a reflection of "the properties of the circle."

This limitation on construction of the regular polyhedra must be defined in respect to the single way in which the complete set of the five species of regular polyhedra is generated. To generate all five as a group, by means of a single function of construction for each and all, we are obliged to employ the circle's Golden Section as the uniquely characteristic metric of that process of construction of the group as a whole, as a unity. More simply, the dodecahedron, whose faces are regular pentagons, is generated first; the other four—tetrahedron, cube, octahedron, and icosahedron— are then simply derived from the dodecahedron.

So we can construct regular polyhedra only from three kinds of faces: regular pentagons (dodecahedron), regular triangles (tetrahedron, octahedron, icosahedron), and square (cube): 3, 4, or 5. We cannot, notably, construct a regular polyhedron whose faces are regular hexagons.[49]

In the case of the Archimedean series, the upper limit upon the polygon's interior angle θ was defined by the fixed value for the constant (positive, or negative) curvature of all circular action in either visible or, implicitly, similar space. In that case, that fixed curvature was identified as an external boundary, rather than a limit generated in its existing form by the polygonal process of construction itself. In this new case, that of the five species of *Platonic solids*, we appear to have a somewhat, but not precisely analogous situation: the curvature of the spherical surface has the form of a determining external boundary, bounding the process of constructing in any single mode each and all, as a unit, of the five Platonic solids.

Granted, we are reminded of the importance of the upper limit on size of the interior angle θ for the case of the Archimedean series. Only regular polygons of 3, 4, 5 sides can be used, and the angle θ for the pentagon acts as an upper limit of a *regular* polyhedron. [50] A different feature of this bounding dominates our study here. We're dealing with an added, apparently different quality of boundedness: Only five species of regular polyhedra are possible in our visible space. Moreover, but one of these five, the dodecahedron, is truly characteristic of the bounding of polyhedral function-space by the spherical surface; the remaining four are generated by characteristic features of the dodecahedron. This is a different effect than that seen in the Archimedean, two-dimensional series;[51] but, the bounding in this case is derived, as for the case of the polygonal interior angle, from the characteristic, constant values of the negative and positive curvature of all spaces which are densely *self-bounded* throughout by spherical surfaces.[52]

This case, the five Platonic solids, thus illuminates the pathway toward

a solution of the problem we cited earlier from Riemann's habilitation dissertation. We restate that problem: *How does a continuous manifold determine the metrical characteristic of each among its subsumed discrete manifolds?* (See page 4 in Chapter I for full quotation.)

The case of the two-dimensional Archimedes series implies, out of the corner of the mind's eye, the direction in which the answer might be sought: a curved discrete manifold. The case of the Platonic solids provides a crucial example, a case in which the connection is plainly manifested. It requires only, as Kepler illustrates this by his construction of the snowflake demonstration, that we see spherical curvature as *"densely self-bounding throughout."*

A warning is necessary. When the word "continuous" is employed in reference to such objects as circular parameters, or ultra-thin spherical surfaces of the imagination, the incautious mind usually carries over those notions of a linear homogeneity we otherwise locate among the most naive notions of a straight line. Even if we anticipate such a pathological naiveté among users of the term "continuity," "constant rate of curvature," and so forth, the student's mind tends to cling to the ontological notions naively projected upon the words "straight line."[53]

The following illustration introduces the conceptual problem which must be identified at this juncture.

In the matter of applying Cantor's most advanced work[54] towards solution of the cited Riemann problem, it appears that even a large ration among relevant mathematicians view Cantor—if not consciously so, at least in effect—as providing formalism with recursive recipes for baking the tiles wanted to complete a mosaic of idealized continuity. One senses that such a mosaic would have a perfectly smooth exterior, and be freed internally of the continued existence of all diverting singularities. Such "a night in which all cows are black"[55] corresponds to a complete misunderstanding of that "Dirichlet's Principle" which is incorporated, implicitly and otherwise, in the basis of the Riemann habilitation dissertation.

The circular perimeter of the two-dimensional Archimedean series, and the spherical surface of the imagination for the case of the Platonic solids, are not representations of a continuous substance, but *a continuous pathway of action.* It is not a continuum of continuous substance which we ought to seek, but a continuity of action. The Johann Bernoulli construction of the brachistochrone solution, like the earlier Leonardo derivation of the catenary as a solution to the problem of a caustic, is an illustration of the mental standpoint which the secondary pupil must be aided to reach, to understand such matters as Kepler's construction of the snowflake.

Consider the following argument from Bernoulli:

Fermat, in a letter to de la Chambre, has shown that a light ray passing from a thin to a more dense medium, is bent toward the perpendicular in such a way that, under the supposition that the ray moves continuously from the light to the illuminated point, it follows the path that requires the shortest time. . . . [H]e showed that the sine of the angle of incidence and the sine of the angle of refraction are in inverse proportion to the densities of the media, hence directly as the velocities with which the light may penetrate these media. . . . Consider a medium that is not homogeneously dense, but consists of purely parallel horizontally enclosed layers, of which each consists of diaphanous matter of a certain density decreasing or increasing according to a certain law. It is then manifest that a ray which we consider as a particle will not be propagated in a straight line, but

in a curved path. . . . We note that the sines of the angles of refraction at the separate points are to each other inversely as the densities of the media or directly as the velocities of the particles, so that the brachistochrone curve has the property that the sines of inclination with respect to the vertical are everywhere proportional to the velocities. . . . Whether the increase of the velocity depends on the constitution of a more or less resisting medium, *or whether we forget about the medium and suppose that the acceleration is generated by another cause according to the same law as that of gravity, in both cases the curve is traversed in the shortest time. Who prohibits us from replacing the one by the other?* (emphasis added).[56]

The same view must be applied to the planetary orbits, or to the apparent "force-free" conditions in Professor Bostick's filaments.[57] To move an object from its relatively force-free pathway requires work, but to keep it there does not. However, to keep to a pathway which is not such a "force-free" one, requires work. Otherwise, those are secondary matters; the primary concern, is how relatively force-free pathways of action are defined, without prior regard for whether any sorts of "forces" actually exist in our universe, or not. We must, first of all, discover what is the geometry of action in the universe in which we live.

That emphasis upon geometrical construction as the metric of such a notion of *action*, is a characteristic of the written work of Cusa, Leonardo, Kepler, Leibniz, and here, Johann Bernoulli, which causes the term "genius" to connote great beauty, as also exceptional pungency and force. So, Leonardo, Kepler, and Leibniz are prominently among the most beautifully pungent and powerful voices of recorded history. Bernoulli reflects this same quality, characteristic of scientific genius, in the passage just quoted here. It is a quality abhorred among the current generations of "politically correct" science graduates. That passage should be taken as implicitly a warning: It is a foolish student of science whose protracted and intense concentration of thought does not linger among Leonardo's and Kepler's intermeshed treatments of the Platonic solids' deepest epistemological implications.

When confronted by anomalous, verified experimental results, such as the electrochemists' cold fusion heat, a qualified candidate for an important career in scientific work would not permit himself to become so self-blinded by obsession with those obvious truisms toward which acquired habits impel one's attention, that he fails to seek out those vastly more significant facts which usually appear only fleetingly at first, only in a corner of one's mind's eye.

In the case of *"squaring the circle,"* a glance toward the corner of his mind's eye shows the pupil, not merely that the curvature limits the generalized polygon's interior angle θ; it also shows the alert pupil that he is staring into the eyes of a creature he has seen numerous times earlier, but never before imagined to exist. He is eye-to-eye, for the first time, with what he will come to name the "transcendental."

Ask that pupil to imagine the same theorem with a visible circle removed. Try to construct the series of polygons; it were as if the two-dimensional sheet of paper were super-dense with overlapping circles of all possible sizes. He sees that: "No, a circle is not generated by a point and a radial length of line; it is generated by a form of *action* we call *rotation.*" He sees that: "It cannot be constructed in any way but by *rotational action* in *space-time*; circles cannot exist in mere space, therefore." So he sees why the sheet of paper appears super-dense with circles of all imaginable sizes.

Let the pupil study the case of the Platonic solids from that comparative vantage-point. In other words, that the case of the Platonic solids demonstrated to Kepler, that our visible space-time behaves as if it were packed very super-densely with what our pupil might describe as "spherical bubbles."[58]

There are no grounds for adding the naive idea of "matter" to these "bubbles"; they represent an implicit, characteristic feature of the determination of *least-action pathways*, pathways to be viewed by the pupil more or less as the quoted passage from Bernoulli illustrates the relevant way of thinking in the language of *physical geometry*.[59]

How Kepler Thought

With that stress placed upon the situating of the *Leibnizian* notions of *action, pathway,* and *work,*[60] have the pupil examine afresh the continuity of Leonardo's and Kepler's notion of the Golden Section, and of the harmonic ordering in both music and in physics generally. Confront the pupils now with this following question:

Why did Johannes Kepler assume that the universe as a whole is constructed, top-down so to speak, according to harmonic orderings "hereditarily" congruent with the Golden Section? In other words, why did Kepler assign to the universe as a whole those same harmonical characteristics which both he, Kepler, and Leonardo earlier, emphatically set, and demonstrated were characteristic of living processes, as distinct from a different harmonic ordering characteristic of non-living processes?

Without recognizing those questions, and also at least a glimmer of the proper answers, no pupil will be able to understand Kepler's work, and no such pupil will get an inch further toward understanding the most crucial features of the development of modern science, from Kepler onward.

Important questions must often be restated, not merely repeated, but reformulated. For example: first, state the question from one vantage-point, then, a second question on the same topic, from a different vantage-point. Thus, prompt the mind of the pupil to "triangulate" the location of the unknown, the matter to be discovered, at the intersections, so to speak, of its line of sight from several standpoints which are either known, or readily knowable by the pupils. So, say to the pupils, next:

You must take into account the fact, in respect to all among those attacks upon Kepler's astrophysics from seventeenth- and eighteenth-century Baconian empiricists and Cartesians alike, that by the beginning of the nineteenth century new astronomical discoveries by Carl Gauss and others[61] had shown Kepler to have been brilliantly correct relative to the empirically proven absurdity of such leading critics of Kepler as Fludd and the Newtonians. You should also know, that the same empirical proofs developed by Gauss *et al.*, discredit, as relevantly illiterate on this issue, Kepler's critics among nineteenth- and twentieth-century physicists and related professionals.[62]

As a matter of Socratic pedagogy, a question which is of the specific implications of this one must be addressed by way of what some would describe as "successive approximation."

Begin, therefore, by calling the pupils' attention to that which, in this instance, corresponds to the labeling instructions on the container: *The founders of modern science—Cusa, Leonardo, Kepler, Leibniz, et al.—are Christian Platonists,* as St. Augustine, for one, identifies that distinction.[63] *They are each and all in practice opponents of the method and general doctrine of Aristotle.* The followers of Aristotle who are nominally within the ranks of the scientific professions, are the *gnostic* opponents of Cusa, Leibniz, Gauss, *et al.*, such as the Baconian empiricists, the Cartesians, and the Kantians.

The pupils must be cautioned, that one must hear any important statement made, in the language in which that statement is composed and uttered.[64] The pupil must apply that precaution to the language of science. The language in which each and all of these founders of modern science composed, is the (Augustinian Christian[65]) Platonic, anti-Aristotelian method. It would be a fraud upon science, and a breach of a teacher's moral obligation to his pupils, to represent the argument of any among these founders from an Aristotelian standpoint: In any case, the product of such a violation would be epistemologically gibberish.

Reference once again Leonardo of Pisa's *Liber Abaci,* the *Fibonacci* series.[66] This series of numbers is identified there as corresponding to a somewhat ideal picture of increase of a population of rabbits. To the careless pupil, this series might be a picture of organic growth. It is certainly not a valid picture of the growth of human populations. It does not represent true organic growth; there lies an essential quality of difference between the Fibonacci numerical series and generalized harmonic orderings congruent with the Golden Section.

The potential rate of continued reproduction of a species cannot be defined without regard to the changes in the totality of the preconditions for that continued reproduction. In the case of the human species, this bears directly upon both the per-capita and per-hectare (per square-kilometer) productivity of the society.[67] It bears, in turn, upon relevant potential-increasing improvements in nature. The result is that rabbit populations have a ceiling upon growth, a ceiling determined twofoldly by the fact that rabbits cannot willfully raise their society's per-capita and per-hectare productivity by aid of willfully effecting related kinds of improvements in nature generally.

By "Golden Section harmonics," we signify to the pupils, the inclusion of growth functions coherent with the most successful model. On this account, we cannot be accused competently of improving the knowledge of Leonardo da Vinci and Kepler retroactively. Our view here was already defined by their predecessor, Cusa.[69]

The picture of increase of human potential population-density just so given to the pupils, describes a special quality of recursive function. The pupils could assimilate a few highlights of this function, as follows.

On the first level of approximation, there is the potential for growth of population of a living species, like, for example, any sub-human form of placental or mammal variety. This is already an image of the kind of growth function referenced explicitly by Leonardo da Vinci *et al.* in their writings on the subject of harmonic orderings congruent with the Golden Section.[69]

On the second level of approximation, there are increases in the biological growth-potential of the human species effected by the *generation, communication,* and *efficient assimilation* of valid fundamental discoveries respecting the lawful ordering of the universe.[70]

On the third level of approximation, the pupils can identify *human willful action* upon the process defined constructively as the coupling of the preceding two processes of approximation. Now, ask the pupils next to make the variability of individual mental activity on the third level

itself an object of consciousness, as an object itself subject to change. By that last step, we have challenged the pupils to take as a willful object of conscious deliberation a conception which corresponds, from the time of Plato onwards, to *hypothesizing upon a higher principle of hypothesis.*

Another example of that is the referenced case of Cusa's notion of (negentropic) evolutionary ordering: a kind of "super" periodic-table process.[71] The teacher, bearing Cantor's work in mind, should aid the pupils in building up a map of our upward travels to this point, from the proximate starting point of Leonardo of Pisa's busy rabbits.

Let us turn now to the blackboard of our imagination. We are now going to construct and discuss a series of series. Each row, from left to right across the blackboard, shall represent a series. All of the rows, counted from the top row, toward the bottom, represent a series of series. For our purposes now, it would be convenient to break convention a bit: As we count the rows in downward sequence, imagine that we are actually moving upward, from lower to higher species of action.

Each species represented by a single row, is constructed according to the same kind of scheme employed in this author's *In Defense of Common Sense.* In time-sequence, the row-series is represented by the successive terms A, B, C, D, E, ... Each symbol represents a distinct species, such that A is a different species of whatever-it-is than any of B, C, D, E, . . . , and so on. Thus, if several succeeding states, in time-sequence, were of the same species, we would write A, A, A, A, A, ...

That is, a successive generation of rabbits, would form a series A, A, A, A, A, ...

By "species," we signify the same kinds of distinctions associated with the symbolic sequence A, B, C, D, E, . . . , in *In Defense of Common Sense:* A term "B" is distinct in "species" from a predecessor term "A," by virtue of the fact, that in formal terms, "B" is generated by an "hereditary principle" (integral set of axioms and postulates) which has no consistency, as an integral set, with a similar "hereditary principle" of "A."

The transition from A *to* B is effected by a "mathematical discontinuity" between the "hereditary principles" of A and B. This discontinuity corresponds to a singularity μ_{AB}. That singularity, μ_{AB}, is a non-linear, negentropic action by means of which hereditary principle A is transformed into hereditary principle B.

So we adopt an arbitrary symbology, A, (μ_{AB})B, $\mu_{AB}(B)$. If we mean A, A, A, we might write A,(μ_{AA})A. It were better to write simply A,(μ_0)A. So, for the hypothetical Fibonacci series, we have written on the blackboard

$$A_1,(\mu_0)\ A_2,(\mu_0)\ A_3,(\mu_0)\ A_4,\ \ldots\ .$$

Now, let us prepare to construct our second row, simple human biological reproduction (there is perhaps still a small minority of the U.S.A., British, and Muscovite older populations who recall how this used to be effected, a few decades past).

Now, leave the rabbits; we move on, to mankind.

If man were a mere beast, and we, in this classroom, were therefore members of an intelligent species of "Houyhnhnms" from a different solar system, the human species would be a "primitive hunting-and-gathering" race of "Yahoos," numbering in total not more than approximately 10 millions individuals with disgusting demographic characteristics and worse table manners, subsisting precariously under most unpleasant early Pleistocene conditions.[72] In that case, the second row on this blackboard should be virtually a copy of the rabbit series.

Man, on the contrary, is no mere beast. The human species can not only change its characteristic "economic" and related behavior, as no

beast can do so willfully. Man, in successful cultures, orders those successive changes to the effect of raising successively the level of the society's potential population-density. Not only is the number increased of persons who can be sustained, potentially; the demographic characteristics and the daily living standard are successively improved.[73] Cumulatively, these willful improvements, where and when they persist, have the net effect of being equivalent to successive stages of upward evolutionary development of varieties and species in the lower animal kingdom.

Thus, in such successful cases of cultural-evolutionary series,[74] we have a row of something like this:

$$A, (\mu_{AB})\ B, (\mu_{BC}),\ C, (\mu_{CD}D)\ D, (\mu_{DE}).\ \dots$$

Two features of this row are to be emphasized immediately. First, if we include a provision for space travel, there's no upper limit to the continuation of the series indefinitely. Relative to the land-area of Earth, the average per-hectare number of Earth's human population *in the universe* has no definable horizon at this time.[75] Second, on condition that the series $\mu_{AB}, \mu_{BC}, \mu_{CD}, \mu_{DE}, \dots$ is congruent with a single principle of hypothesis, the series is not only non-linear, as it is in any case; it is a *non-linear, negentropic, transfinite* function.[76] By *principle of hypothesis* we signify a *higher hypothesis*, a guiding principle governing the generation of those orders of *crucial* experimental hypotheses which are correlate with the generation of *a valid scientific revolution*. This impels us to reconsider two features of our construction of this row: our definition of the species-distinctions among A, B, C, D, . . . and the definition of any single value of μ.

It is feasible, implicitly, to define each of the "species" A, B, C, D, E, . . . of this second row such that there is a fully intelligible correspondence between the range of a *scientific revolution* and a range of potential population-density values. Leibniz said as much—with fair approximation—in describing the industrial revolution which he was designing, in terms of the potential of steam-powered machinery, to enable one man using such machinery to accomplish the work of one hundred without such means. The formalist would desire, quite reasonably, that this range lie between two crucial experiments, to such effect that the "hereditary principle," as represented by an integral set of fixed axioms and postulates, begins with the first crucial experiment, and ends with the second. For purposes of today's blackboard exposition, let us adopt that formal definition as a term of useful approximation.

The value of the successive transformation-singularities, μ_{AB} and μ_{BC}, is then defined thus. The first, μ_{AB}, corresponds to the crucial-experimental hypothesis which forces a determined change in "hereditary principle" A, to form new, successor "hereditary principle" B. The second, μ_{BC}, is the crucial-experimental hypothesis which overturns "hereditary principle" B.

So we have each of $\mu_{AB}, \mu_{BC}, \mu_{CD} \dots$ as a *crucial hypothesis* which defines a species-boundary. All of $\mu_{AB}, \mu_{BC}, \mu_{CD} \dots$, if this series qualifies as coherent, represents a *higher hypothesis*. Let us now construct a third row. Introduce ν_K symbolizing a higher hypothesis corresponding to the Kth coherent series of the type $\mu_{AB}, \mu_{BC}, \mu_{CD}, \dots$. Thus, the third row is of the form $\nu_1, \nu_2, \nu_3, \nu_4, \dots$. If this series is functionally coherent then this entire row, *taken as an integrated single object of willful consciousness*, represents *hypothesizing the higher hypothesis*.

In this case, we have to compare the range of values of *rate of rate of increase of potential population-density* with the variability of the rows and columns of elements now depicted on our blackboard. The focal point of our attention then becomes not the relatively simplistic question, "How do we increase man's power over nature?" but rather, "*How must we alter*

the way in which we change our **hypothesizing the higher hypothesis,** to increase the rate of rate of increase of potential population-density?" Now, introduce the issue of harmonic orderings, and the Golden Section of circular action, against the background just depicted on that blackboard. Look at the minds of Plato, Cusa, Leonardo, and Kepler in these terms of reference.

First, all that we have just said, excepting the correlation of hypothesis to *rate of rate of increase of potential population-density,* is all in Plato. The conception of *negentropic* evolution—in somewhat different terms, but to the same effect, is in Cusa's work—serving thus as a forerunner to the establishment and further qualitative development of the Mendeleyev periodic table, among other things.[77]

Look at the Golden Section so. Look at it from the standpoint of what Plato and Cusa knew before Leonardo and Kepler. Do not attempt to read it as if Leonardo and Kepler were such fools as not to have studied intently the work of Plato, Archimedes, and Cusa. See the suggestibly negentropic features of harmonic ordering according to the Golden Section in light of what is outlined on that blackboard. After Cusa's description of negentropic evolution had been learned by Leonardo, how would a Leonardo look at what is crudely depicted on this blackboard? Seeing that, what does he then see in Golden Section harmonic orderings?

Until we have grasped so the fact that true science is *subjective* in this way, that its validity is located essentially in that *anthropocentric subjectivity,* we do not have the means to read intelligibly the crucial argument of any among the founders of modern science. This is a fair depiction, by aid of our blackboard, of their own style of Platonic, anti-Aristotelian method, their adopted *principle of hypothesis.* All that we have added to their view of that method is summed up in two points. First, we've introduced the mooring-point of *potential population-density,* to a beneficial effect which should be readily obvious. Second, we have viewed Plato, Cusa, Leonardo, Kepler, and Leibniz as they represented themselves, but from the modern vantage point of a Georg Cantor looking retrospectively both at these founders and also the work of Riemann and Weierstrass.[78]

Unfortunately, fresh view or not, what we have espoused thus is the same *principle of hypothesis* which the Aristotelian gnostics[79] have banned successfully from the approved textbook, from accepted classroom practice, and from the compassionate consideration of today's professional-science publications referees. To that degree it is virtually prohibited today to refer to any of the work of Leonardo, Kepler, or Leibniz in the language of science in which they thought, or to acknowledge the most crucial among the conceptions which they adopted from such predecessors as Plato and Cusa. Thus, to that degree, and in that way, much of the teaching and practice of science today has been a fraud, even before the past two decades introduced such mind-crippling abominations as the "new (age) math."

Bring the classroom's attention back to the point at which we interrupted the review of Kepler's depiction of Leonardo's principle of the Golden Section. We have then underscored the meaning of "external boundary," as this described the relationship of *circular action (isoperimetric rotation)*[80] and the series of regular polygons whose interior angles are all less than a straight line. We had been in the process of making the corresponding point respecting the "external bounding" of the Platonic solids' *process of generation* by *spherical action.* Now, make the corollary point, that all constructible solids are externally bounded by *spherical action.*[81]

The crucial point thus placed into consideration is: *That which bounds,*

determines that which it bounds. Implicitly, *a continuous manifold is the external limit which bounds all subsumed discrete manifolds in our universe, and determines thus metrical characteristics of the latter.*

Thus, for Kepler, the *metrical characteristic* of spherical action which *bounds as if externally,* and *determines* the world of algebraic forms in visible space, is *the principle of harmonic ordering according to the Golden Section.* The primary source for the pupil's initial study of this connection, is Kepler's *Six-Cornered Snowflake.*[82] Of all among Kepler's published locations, this, because of its conciseness and rigor, is the best suited to the secondary geometry curriculum's treatment of the two theorems now immediately under consideration: *First,* Kepler's adoption of Leonardo's theorem respecting the crucial difference in harmonic ordering between living and non-living processes; *Second,* the theorem which we have just underscored, *that which bounds, determines.*

The selection of this little book of Kepler's offers us the minor advantage, that the pupil should be obliged to work through each step of Kepler's construction. There is a fundamental difference between purporting to interpret what one reads, and looking over the shoulder of one's own mind—so to speak—while that mind is working through each and all of the rigorously defined series of constructions. The latter vantage point coincides with the spirit of rigorous *hypothesizing: The most important classes of knowledge can be comprehended in this way, but in no different way.*

Assume, that that little book of Kepler's has now been mastered by the pupils in such a fashion. Our earlier citation from Riemann's habilitation dissertation,[83] comes back into view.

This difference between the harmonic orderings which are respectively characteristic of living and non-living processes, defines thus the elementary metrical characteristic of any discrete manifold which is subsumed by our universe's continuous space-time manifold. Since it is circular action's Golden Section which bounds externally all such discrete manifolds, *the lawful ordering of action is universally bounded by harmonic orderings congruent with the Golden Section.*

That which bounds the process, determines the metrical characteristics of that process. Thus, the laws of the universe, viewed from the standpoint of a discrete manifold, must appear to be coherent with *a system of harmonic orderings which are constructively congruent with the Golden Section of circular action.* Thus, as we see in *The Six-Cornered Snowflake,* living processes are coherent with the ruling principle (*negentropy*) of visible astrophysical space-time, whereas non-living processes (*entropy*) are, by construction, the lawful detritus of a universal creative process.[84]

This was not original to Kepler; in its bare essentials, it was already in Plato. Plato makes the point plainly, as Cantor did, explicitly referencing Plato, much later than Kepler. For the pupil's benefit, what is probably an indispensable summary of the point is interpolated at this juncture:

Recall, a bit earlier here, that we situated the Platonic principle *hypothesizing the higher hypothesis* so;[85]

Name	Corresponds To
Hypothesis:	Any value of μ.
Higher Hypothesis:	Any single value of ν, which corresponds to a specific series $A,(\mu_{AB})\ B,(\mu_{BC})\ C,(\mu_{CD})\ D,(\mu_{DE})\ \ldots\ .$
Hypothesizing the Higher Hypothesis:	The *unified conception* of a series of values of ν, ranked in order of rising correlated values of *mankind's potential population-density.*

In the latter case, we are assuming there to exist an ordering principle by means of which we might progress from relatively lower, to relatively higher values of ν. This *unit ordering principle,* taken as a unified object of thought, is the subject of *hypothesizing the higher hypothesis.*

Plato insists upon an absolute distinction between the *hypothesizing of the higher hypothesis* and a higher, supreme value, *the Good.*[86] In this contrast, *hypothesizing the higher hypothesis* is the highest rank of constructive imaging of the Platonic notion of *the Becoming.* Cantor references Plato on this point, and agrees.[87] To the higher-ordered determination of *the Becoming,* Cantor supplies the term *Transfinite;* to the *Good, Absolute Infinite.*[88]

Briefly, the *Absolute Infinite determines all change* of the order of *hypothesizing the higher hypothesis,* but *is not itself subject to such change.*[89] To comprehend the rigor of Kepler's adoption of Leonardo's theorem on Golden Section harmonics, we must look at Kepler's thought-processes—and those of Cusa and Leonardo earlier—from the vantage point of Plato's arguments on these matters. It was Plato who largely informed the views of such anti-Aristotelian followers of St. Augustine as Cusa, Leonardo, Kepler, Leibniz, *et al.*[90] Plato is understood more readily if we read him as Cantor read him on these matters of *transfinite* and *Absolute Infinite.*[91] Here we are pairing *hypothesis/transfinite* and *Good/Absolute Infinite* in respect to the matter of the way in which *external boundedness* defines the characteristics of the process which is thus bounded.

We have presented the pupils, thus far, with five classes of cases in which a process is externally bounded.

1. The elementary geometric constructions; *circular action* as *bounding externally* a process of regular polygons, and spherical action as defining the boundedness of construction of the Platonic (and other) solids.
2. Such elementary constructions as those are infinitely *bounded externally* by the processes associated with *simple hypothesis:* any specific value of μ.
3. An infinite series of coherently ordered *simple hypotheses* is *bounded externally* by a specific value of *higher hypothesis:* a value of ν.
4. An infinite series of coherently ordered *higher hypotheses* is *bounded externally* by a specific notion of *hypothesizing the higher hypothesis.*
5. The potentiality of self-development in hypothesizing the higher hypothesis is the highest attainable level of explicit conceptualization of the process of change. This potentiality is *bounded externally* by that efficient higher principle which causes change (*Becoming*), but the which is not changed itself: *the Good;* the *Absolute Infinite.*

Respecting the above three cases numbered 2-4, the pupils may require that we illustrate once more the nature of the differences among *hypothesis, higher hypothesis,* and *hypothesizing the higher hypothesis.* For such purposes of illustration, *hypothesis* is correlate with what we have identified as a specific kind of *crucial,* or *unique experiment. Higher hypothesis* pertains to such matters as the nature of the general curvature of physical space-time. *Hypothesizing the higher hypothesis* pertains to the definition of our universe in its aspect as a *Becoming,* from the standpoint of a notion of ordering, of development: *hypothesizing the higher hypothesis.*

Of the first, *hypothesis,* any valid crucial experimental hypothesis is an example. Of the second, *higher hypothesis,* Kepler's *Six-Cornered Snowflake,*

and Johann Bernoulli's treatment of the brachistochrone problem, are examples. Of *hypothesizing the higher hypothesis*, Cusa's *De Docta Ignorantia*, or Leibniz's *Monadology*, are examples. Cantor's treatment of *transfinite* orderings, and, notably, of the essential distinction between *transfinite* and *Absolute Infinite* are illustrations of matters lying between the *higher hypothesis* and *hypothesizing the higher hypothesis*.

So, Kepler proved that our universe is *negentropic* as a whole. It is bounded super-densely by spherical action, and thus imposes the harmonic orderings congruent with the Golden Section. Thus, although the universe as a whole is characteristically negentropic, it determines also the existence, as "detritus," of non-living, entropic form.

The later, seventeenth-century physics of the *non-algebraic functions* underscores both the accuracy and the efficiency of Kepler's founding of mathematical physics upon the "hereditary" implications of this proof of Leonardo's distinction between living and non-living harmonic orderings.

Non-Algebraic Functions

Probably the discovery of the cycloid belongs truly to Christiaan Huygens, for it was he apparently who was first to comprehend both its geometrical and physical significance.[92] Thereafter, by the close of the seventeenth century, the combined work of Kepler's successors—Huygens, Leibniz, the Bernoullis, *et al.*—centers around the cycloid and its "hereditary" derivatives, the non-algebraic functions.[93] Call these collaborators of Huygens "the Leibnizians"; their work in the domain of applications of non-algebraic functions became the leading formal issue of the virtual war between the Leibnizians, on the one side, and the followers of Descartes and of Bacon's Rosicrucian empiricism on the opposite.[94]

Implicitly, the pupils were already introduced to non-algebraic functions. First, in contrasting curvature to angles, in the Cusan view of the Archimedean series of polygons; second, in considering the two kinds of bounding which a super-density of Keplerian spherical bubbles imposes upon all linear functions within visible space-time. Nonetheless, this first encounter with relevant discoveries of Huygens, is a delicious moment not to be missed by the pupils or teacher.[95] Since mathematical science began, many millennia ago, with early successes in developing solar calendars and related methods of celestial navigation, there are several qualities of advantage in returning the pupils' attention to the way such task-oriented problems might be attacked by aid of the most rudimentary kinds of instruments. So, situate the practical significance of Huygens' modified pendulum clock. How do we measure latitude? How does an ocean sailing ship of the seventeenth century measure longitude? Situate thus, the practical problem of the tautochrone.

Then, turn again to Johann Bernoulli's crucial-experimental setting for the brachistochrone problem.

As we shall pick up on this later, briefly, the points to be identified at this imminent juncture, are as follows.

Later, we shall reconstruct the rudiments of a simple, geometric proof, developed, during the 1430s, by Nicolaus of Cusa, that a circular arc is a transcendental magnitude.[96] On the basis of Cusa's treatment of this,[97] we construct the non-algebraic functions from the following starting-point onward.

First, since no circular arc can be derived from a linear (algebraic) construction, a circle must be defined in its own right. (We may use ideas of point and straight line only negatively.) For this purpose, we employ the isoperimetric theorem of Jacob Steiner, *et al.*[98]

Second, we emphasize that a circle (or circular arc) is constructed by a space-time action called *rotation*. All measure is based upon circular rotations without help of any prior assumptions respecting so-called "natural numbers." This is aided by application of Leibniz's *analysis situs*.[99]

Third, we come to the *cycloid*. For the initial classroom exposure of the secondary pupils to the cycloid, we follow the model of Roberval[100] and Huygens.[101] Roll a circle along a straight line. Mark the point of the circle's tangency to the line at the start. Plot the continuous trajectory of that point as the circle rolls, up to the moment that point is next once again tangent to the same straight line. This trajectory is the simple cycloid. Construct next, after Roberval, the sine wave which Roberval names "the companion of the cycloid." The pupil should work through all of the Blackwell English edition of Huygens' *The Pendulum Clock*.

That exercise completed, the pupil should turn to Cusa's model from his *De Docta Ignorantia*.[102] Roll a smaller circle along the perimeter of a very much larger one. Let the larger circle be relatively so large, that its perimeter arc, in the vicinity of the rolling smaller circle, approximates a straight line.[103] This construction is then to be used as a definitional generalization of the principle of the cycloid.

Relative to any algebraic function, all functions which include a cycloid's generation, are transcendental functions axiomatically, "hereditarily." All functions of this included feature are, therefore, "non-algebraic functions."

Also, for reasons to be referenced below, all physical functions can be expressed in terms of non-algebraic functions, whereas some can be expressed *only* as non-algebraic. Therefore, a coherent physics is based elementarily on nothing less than such non-algebraic functions.[104]

Notes

1. Cardinal Nicolaus of Cusa, in one of his most influential theological and scientific works for the subsequent development of mathematical physics in Western civilization, the 1440 *De Docta Ignorantia* (On Learned Ignorance,
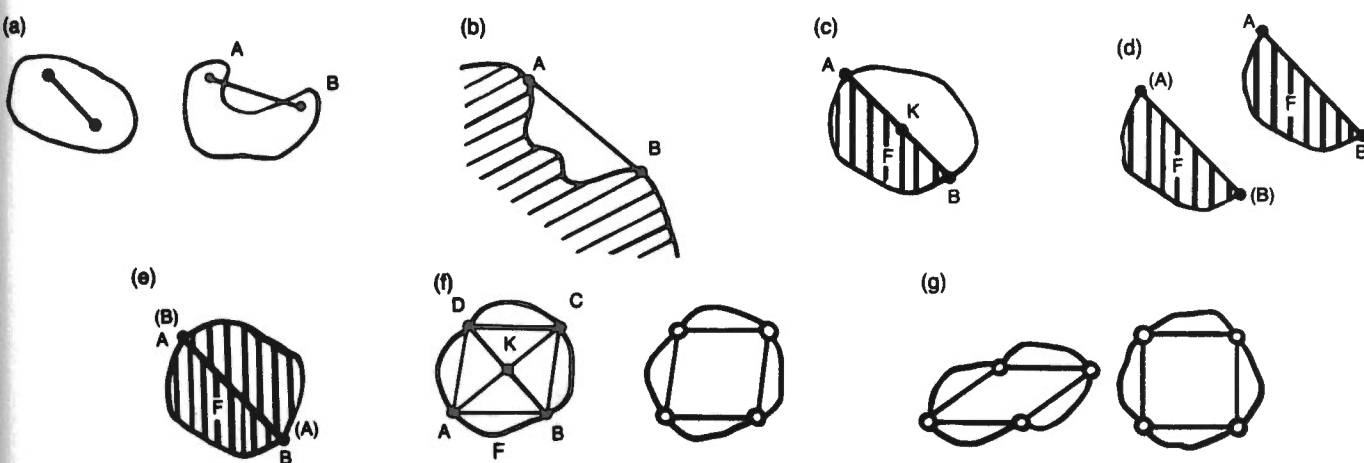

Elements of the proof of the isoperimetric principle of the circle, developed by nineteenth-century philologist and mathematician Jacob Steiner. The figure with the maximum area for a given perimeter must at least be convex; otherwise a line AB could always be drawn to increase its area (a). The corresponding first step with an arbitrary figure (b) is to wrap a string around it to make it convex. This increases the area and shortens the perimeter, which must then be stretched back to its original length. (c) shows the perimeter divided into two equal *lengths,* AB and BA, by folding, and then the figure is cut along the fold (d). One part will be larger; the other part is "thrown away" and the larger part rotated 180 degrees and rejoined to itself (e), making a figure which is now symmetrical and larger in *area* than before. The new figure is now folded in half twice (f) and the points A, B, C, and D thus created are joined with straight lines, forming either a square or a rhombus. If it is a square, a circle has been formed. If a rhombus (g), its *area* can be increased by straightening the rhombus into a square, without changing the perimeter. As the procedure (f) through (g) is repeated, the figure will get closer and closer to a circle.

or On the Ignorance Which is Learning) demonstrates that the classical Archimedean problem of the attempt to square the circle, actually has a deeper geometrical significance. Cusa shows that the circle is a "maximum-minimum" curve, enclosing the maximum area for a minimum circumference, and that it thus is not a "limit" for inscribed and circumscribed polygons of a greater and greater number of sides, but rather has a geometric existence which is transcendental to that of all of these polygons.

This "isoperimetric theorem" originating with Cusa was crucial for mathematics in the development of number systems of increasing power, still forming the explicit basis for Georg Cantor's achievements of transfinite number theory in the late nineteenth century—but more fundamentally provided a crucial experimental example that the curvature of space-time cannot be replaced by "linear curve-fitting" approximations.

2. This is demonstrated in the drawings by Leonardo, for the work of his teacher in mathematics, Luca Pacioli, *De Divina Proportione*, (On the Divine Proportion); this was Luca Pacioli's term for what is usually referred to as the Golden Section, or golden ratio of self-similar growth.

3. Johannes Kepler demonstrated the extraordinarily important discovery, that although the solar system, for example, and the physical universe as a whole, are not "living" systems, nonetheless the laws of action and construction of the physical universe "in the large"—of the macrocosm—are coherent with the same ratios and harmonics of the Golden Section, as are living processes. Thus, the structure of the universe, like that of life, is negen-
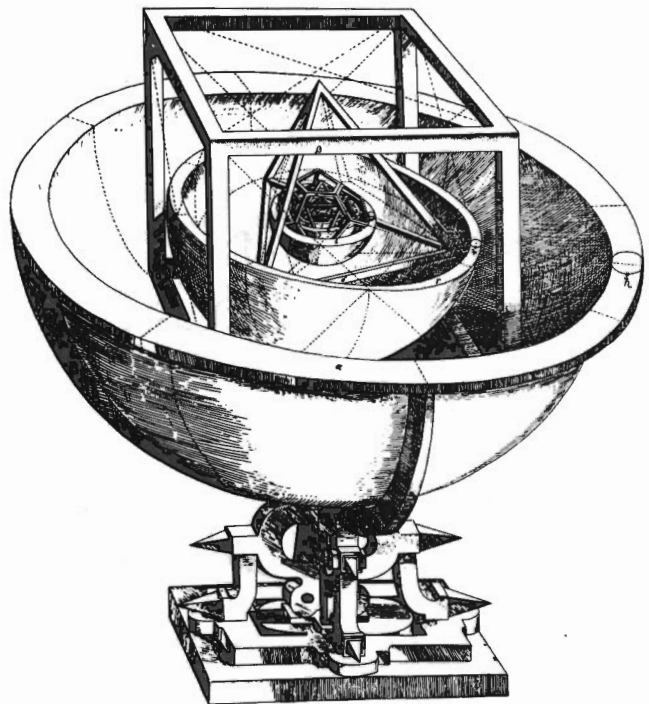
The drawing is by Kepler, from his *Mysterium Cosmographicum, op. cit.,* showing his initial model of the planetary orbits, made up of concentric spheres which inscribe and circumscribe the five "Platonic solids." The cube lies between Saturn and Jupiter; the tetrahedron between Jupiter and Mars; the dodecahedron (12 faces) between Mars and Earth; the icosahedron (20 faces) between Earth and Venus; and the octahedron between Venus and Mercury.

tropic—evolving toward greater ordering and beauty, and toward greater coherence with principles of Golden Section harmonics.

The germ of this Keplerian outlook on physics is contained in his early work, *Mysterium Cosmographicum* (The Secret of the Universe) (1596), trans. by A.M. Duncan (New York: Abaris Books, 1981). This develops Kepler's famous "polyhedral thesis" for the structure of the solar system for the first time. Kepler's conceptions of the negentropic laws of creation underlying the microcosm and macrocosm, are more fully developed in *Harmonices Mundi* (Harmonies of the Universe), of which an English translation has been published only of Chapter 5, by the *World Book* encyclopedia.

4. Christiaan Huygens (1629-95), the Dutch astronomer, mathematician, and experimental physicist, invented the pendulum clock in the winter of 1656-57. The device was constructed so as to guide the pendulum bob along the arc of a cycloid. Huygens had discovered that a weight released anywhere along the arc of this curve reaches the low point of the arc in equal time, thus imparting an equal period of oscillation to the pendulum regardless of the amplitude of the swing (*isochronicity*). His work *Horologium Oscillatorium* (The Pendulum Clock) was published in Paris in 1673. In it, he also defined the important relationship of *involute* and *evolute* of curves which was soon to play a crucial role in the development of the calculus. See Christiaan Huygens, *The Pendulum Clock, or Geometrical Demonstrations Concerning the Motion of Pendula as Applied to Clocks*, trans. by Richard J. Blackwell (Ames: Iowa State University Press, 1986).

Gottfried Wilhelm von Leibniz (1646-1716) first met Huygens in Paris in 1672, and was introduced by him to advanced geometry and physics. The collaboration led shortly to Leibniz's discovery of the calculus, a first-hand account of which can be found in Leibniz's 1714 essay "History and Origin of the Differential Calculus" in *The Early Mathematical Manuscripts of Leibniz*, trans. by J.M. Child (Chicago: The Open Court Publishing Co., 1920), pp. 22-58.

Their collaboration soon spread to include other leading mathematicians,

Christiaan Huygens
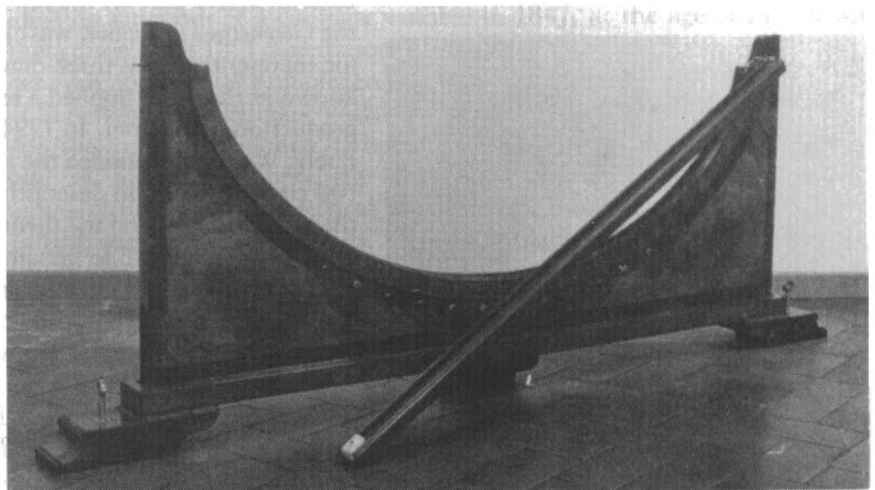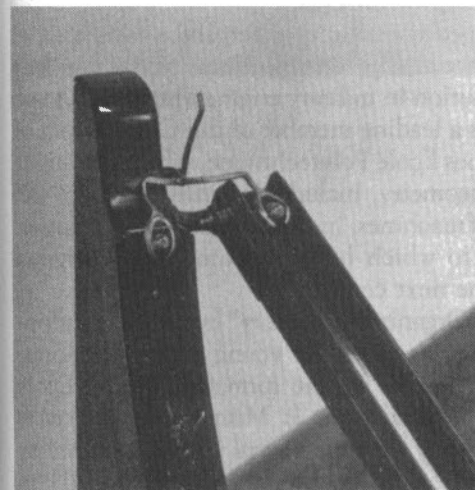
The photos are of a cycloid brachistochrone made of wood in 1775 by Francesco Spighi, at the Museum of the History of Science in Florence, Italy. The straight arm attached to the cycloid represents the "straight line," which can be compared to the cycloid curve by releasing marbles or small balls at the top of both. The cycloid curve is "faster" or "shorter" than the straight path to any point. Spighi attached a brass mechanism at the top to ensure the simultaneous release of both balls.

especially the two Swiss brothers Jakob (Jacques, James) Bernoulli (1654-1705) and Johann (Jean, John) Bernoulli (1667-1748). Jakob read Leibniz's works on the calculus published in the *Acta Eruditorum* of Leipzig (1684-86), and by 1690 was himself contributing papers on the subject. Leibniz and the Bernoullis were seeking a solution to the brachistochrone problem (the curve expressing the path of *least time* for a falling body). The younger brother Johann published a challenge to the learned world to discover the curve in the *Acta Eruditorum* 6 (June 1696). The solution was the cycloid, which was thus demonstrated to possess both the properties of *isochronicity* and *brachistochronicity*. See: D.J. Struik, ed. *A Source Book in Mathematics, 1200-1800* (Princeton, N.J.: Princeton University Press, 1986), pp. 391-99.

The study of the cycloids and other non-algebraic curves (catenary, tractrix, logarithmic spiral, etc.) was crucial to the further development of the calculus and the solution of a wide range of physical problems by this circle of collaborators.

5. The term *function theory* today refers to the method of representation of geometric relationships by analysis using the *complex* numbers (that is terms including the square root of negative numbers), rather than merely the real (rational and irrational) numbers. Although a few earlier investigators had found means to graphically represent the complex numbers, the science really begins in 1831 with the work of *Carl Friedrich Gauss* (1777-1855). Gauss completely generalized the concept of number and its relation to geometry in such a way as to subsume the real numbers within the complex or "Gaussian" plane. This made possible the treatment of problems not solvable in the earlier non-complex function theory. Subsequent developments in the nineteenth century established the uniqueness of another class of numbers, the *transcendentals*—of which π and the trigonometric functions (sine, cosine, etc.) are examples. *Transcendental* function theory refers especially to the work of Dirichlet, Riemann, Weierstrass and finally Georg Cantor in this regard.

Gauss' breakthrough rested on the foundations built by earlier French investigators.

Gaspard Monge (1746-1818) and Lazare Carnot (1753-1853) both studied at the Ecole Militaire at Mezières before the French Revolution and then took an active part on the republican side. Monge's chief work up to 1789, the *Géométrie Descriptive*, was classified as a military secret, since its technique for representing any three-dimensional object by plan and elevation, unknown at the time, implied a revolution in military engineering and in mass production of materiel. In 1794, as a leading member of the Commission of Public Works, he founded the famous Ecole Polytechnique, where he taught two courses. One, on descriptive geometry, included intensive study of the theory of surfaces, and the theory of machines; his lectures on the application of algebra (analysis) to geometry to which he contributed much original work, set a standard for most of the next century.

Lazare Carnot, acclaimed as the "Organizer of Victory" by the Revolutionary Convention in 1794, took courses from the young professor Monge at Mezières, and also took an active role in the formation of the Ecole Polytechnique. Carnot wrote his *Réflexions sur la Métaphysique du calcul infinitésimal (Reflections on the Theory of the Infinitesimal Calculus*, trans. by William Dickson (London: Richardson, Cornhill, and Cuthell, 1801) in 1797 while in exile for refusal to support a factional coup by allies of Bonaparte. His 1803 *Géométrie de Position* (Geometry of Position) sought to generalize many of the theorems of geometry, for example extending the Law of Cosines of plane trigonometry to the tetrahedron. In this work, Carnot

Lazare Carnot

proposed adopting intrinsic coordinates that do not "depend on any particular hypothesis or on any basis of comparison taken in absolute space," as opposed to the familiar Cartesian reference axes. He also defined a quantity, since known as *aberrancy*, related to the third derivative of a function.

In 1794, *Adrien Marie Legendre* (1752-1833) wrote his *Eléments de Géométrie*, the classic geometry text for almost a century, known in English as *Davies' Legendre*. But his most significant advances were in other areas: in differential equations, calculus, theory of functions, and number theory. Legendre did important work on the problem of elliptic integrals, and reduced the expression of elliptic integrals to three standard forms. Those of the first kind arise in the solution of the differential equation for motion of a simple pendulum. The second kind describes the arc length of an ellipse—the famous problem posed by Kepler after his discovery of the elliptic orbits of the planets. Two students of Gauss, Karl Gustav Jacobi (1804-51) (the first leading modern German mathematician of Jewish origin) and the Norwegian Niels Henrik Abel (1802-29), independently advanced the work on elliptic function theory about 1826-27, identifying the important double periodicity of the elliptic functions, among other feats. Only later did they discover some entries in Gauss' diary from 1800 concerning the related figure-8-shaped curve, the lemniscate, which indicated their teacher had already seen the essential principles.

Peter Gustav Lejeune Dirichlet (1805-59), born in the German Rhineland, was the first professor to lecture on the theory of numbers in a German university. He held professorships at Berlin most of his life and succeeded to Gauss' chair at Göttingen University upon his death in 1855. Much of his work on number theory was an elaboration of Gauss' monumental *Disquisitiones Arithmeticae*. A partial English translation by Edward Carl and John Chambless of Dirichlet's *Lectures on Number Theory* (R. Dedekind, ed., Braunschweig, 1871) exists in manuscript form. Dirichlet studied the properties of series, defining the important concept of *conditional convergence*—that is, series which can be made to approach any value by suitably reordering the terms—later taken up by Weierstrass and Cantor. He also addressed key questions in mathematical physics, including the boundary value problem associated with his name.

Georg Friedrich Bernhard Riemann (1826-66) first worked out his general ideas on functions of a complex variable in 1847, at the age of 21. He set them down in his 1851 dissertation "Grundlagen für eine Allgemeine Theorie der Funktionen einer Komplexen Grösse" (Foundations of a General Theory of Functions of a Complex Variable), *Werke*, pp. 3ff. Later in his "Theorie der Abeleschen Funktionen" (Theory of Abelian Functions), *Crelle's Journal*, No. 54, and other papers, the concepts grow. Riemann's method was a unique synthesis of geometrical and physical intuition and philosophical insight with pure mathematics, and his work is often misunderstood, or poorly appreciated, by modern specialists for this reason. His concept of a Riemann surface derives from the possibility in a complex mapping that different paths to the same endpoint in the complex plane can yield multiple coverings of the image plane. By such means the double periodicity of the elliptic integral, for example, which even Gauss had trouble representing analytically, was made evident. Riemann is thus led to consider the topological qualities of space, and the concepts of *connectivity*, *sheets* or *branches*, and *winding points* arise in his work. In other papers he applies these methods to physical situations, addressing such topics as electromagnetism, gravity, and the propagation of waves in a medium (from which he deduces the existence of transonic shock waves). A general idea of his unique approach can be found in his famous paper, submitted at Gauss' request for his habilitation at

P.G. Lejeune Dirichlet

Göttingen University, *On the Hypotheses which Lie at the Foundations of Geometry*, in D.E. Smith, ed., *A Source Book in Mathematics* (New York: Dover, 1959), pp. 411-25.

Karl Theodor Weierstrass (1815-97) was the first leading modern German mathematician to come from a Catholic background. He attended university in Münster where he studied under Gudermann, also a Catholic, whose name is still known in connection with one of the hyperbolic functions. Weierstrass, working largely in isolation from the mainstream of German mathematical thought, intensively studied the elliptic functions and their integrals. He thus arrived at unique relationships of these functions to power series and to various new types of transcendental functions, which he was the first to recognize and to name. In his function theory, he examined especially those "pathological" functions which became discontinuous in particularly unique ways. Some of these defied even the advanced ideas developed by Riemann, for the functions break through the sheets of the Riemann surface at certain branching points, in such a way as to leave uncertainty as to whether they continue again in one place, in many places, or become completely undefinable. In recognition of his achievements, at the age of 41 he was finally called to Berlin, one of two centers of mathematical thought in Germany at the time, but as a "state professor," still had to teach 12 hours a week in the Trade School, serving as Extraordinary Professor at the university. At the age of 49, he was appointed Ordinary Professor at Berlin, where he lectured until the age of 81, finally succumbing to a painful illness. Before his death, his function theory came under vicious personal assault from Kronecker, a zealot for the Aristotelian nominalist position that all of mathematics must be built up from the integers. Kronecker also attacked Cantor's conception of the transfinite from the same absurd and since discredited standpoint.

See:

Felix Klein, *Development of Mathematics in the 19th Century*, trans. by Robert Hermann (Brookline, Mass.: Math Sci Press, 1979);

Carl B. Boyer, *A History of Mathematics*, Second Edition (New York: Wiley & Sons, 1991);

Ralf Schauerhammer and Jonathan Tennenbaum, "The Scientific Method of Bernhard Riemann," in two parts, *21st Century Science & Technology*, Vol. 4, No. 4, Winter 1991, and Vol. 5, No. 1, Spring 1992.

6.   Georg Cantor: *Grundlagen* (Foundations of the Theory of Transfinite Numbers), English trans. by Uwe Henke von Parpart, published in *Campaigner*, Oct. 1978; *Beitrage zur Begrunding der Transfiniten Mengenlehre* (Contributions to the Theory of the Transfinite Numbers), English trans. by Dover, 1980; and *Mitteilungin zur Lehre vom Transfinitum* (Discourses on the Theory of the Transfinite), published in *Zeitschrift fur Philosophie und Philos. Kritik* (1887) (no English translation available).

7.   In Kepler's *The Six-Cornered Snowflake* of 1611, he sets out his task as follows: "There must be some definite cause why, whenever snow begins to fall, its initial formations invariably display the shape of a six-cornered starlet. For if it happens by chance, why do they not fall just as well with five corners or with seven? . . . We of course wondered what that agent was, and how it acted: could it be as immanent form, or as efficient cause from outside? did it stamp the six-cornered shape on the stuff as the stuff demanded, or out of its own nature—a nature, for instance, in which there is inborn either the idea of the beauty inherent in the hexagon or knowledge of the purpose which that form subserves?

"To arrive at a clear decision on these questions let us take familiar examples, but set them out in geometrical fashion."

Johannes Kepler, *On the Six-Cornered Snowflake* (De Nive Sexangula) (Oxford: Clarendon Press, 1966).

8. See Winston Bostick on the completion of his construction for the Shrödinger *psi* function, which is outlined in his 1985 *International Journal of Fusion Energy* paper and then completed during 1987 through 1988 and published in *21st Century Science & Technology* during 1990.

Winston Bostick, "The Morphology of the Electron," *International Journal of Fusion Energy*, Vol. 3, No. 1, Jan. 1985, p. 9; "The Plasmoid Construction of the Superstring," *21st Century Science & Technology*, Vol. 3, No. 4, Winter 1990; and "How Superstrings Form the Basis of Nuclear Matter," *21st Century Science & Technology*, Vol. 3, No. 1, Jan.-Feb. 1990, pp. 54-57.

9. Jacob Steiner, *Systematische Entwicklungen der Abhängigkeit geometrischer Gestalten von einander*, 1832.

10. Bertrand Russell's use of Zeno's paradoxes can be found in Russell's *Principles of Mathematics*, Chapter 43.

11. Adrien-Marie Legendre's *Elements of Geometry* (1794), and Joseph-Louis LaGrange's *Calculus of Variations* (1760). Gaspard Monge during the period of his training of the military engineers of France in descriptive and projective geometry in the 1780s and 1790, built on the original work of Leibniz in defining curves as a locus of their tangents—an envelope.

12. See Chapter I, footnote 23.

13. See Dirk J. Struik, ed., *A Sourcebook in Mathematics 1200-1800* (Princeton, N.J.: Princeton University Press, 1986), pp. 1-4.

14. Here, it should be obvious, lies the crucial distinction between "Golden Section" and "Golden Mean"; the two terms do not have the same meaning.

15. Huygens, *op. cit.*

16. Gottfried Wilhelm Leibniz, *Système Nouveau de la Nature* (1695); Johann Bernoulli on the brachistochrone curve in the *Acta Eruditorum 6* (June 1696), see, D.J. Struik, *op. cit.*, pp. 391-99.

17. *Leibniz, ibid.*

18. See Johannes Kepler, on The Six-Cornered Snowflake, as in footnote 7 above.

19. Otherwise known, since the nineteenth-century work of Jacob Steiner and Bernhard Riemann, as *synthetic geometry*. This includes *topology* and differential geometry developed from the standpoint of Leibniz's *analysis situs*.

20. Leibniz's conception of universal least-action is described, with a crucial example, in Lyndon H. LaRouche, Jr., *In Defense of Common Sense*, in *The Science of Christian Economy* (Washington, D.C.: Schiller Institute, 1991), Chapter 3, pp. 63-65.
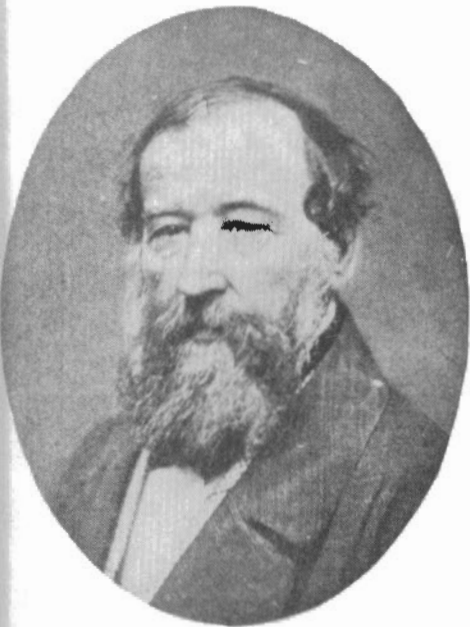
Jacob Steiner
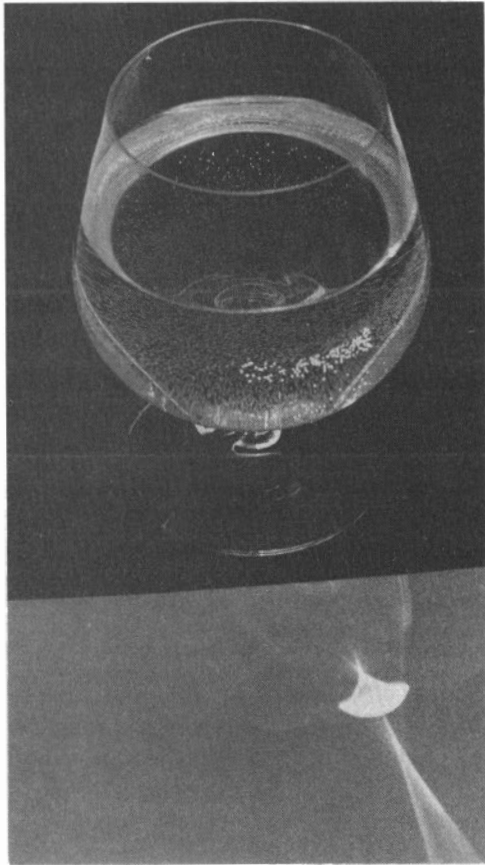
21. See footnote 24 of Chapter 1.

22. The illustration is that used in his lectures by Dino De Paoli, from whom this writer has borrowed it. It was reproduced in *Executive Intelligence Review*, May 26, 1989.

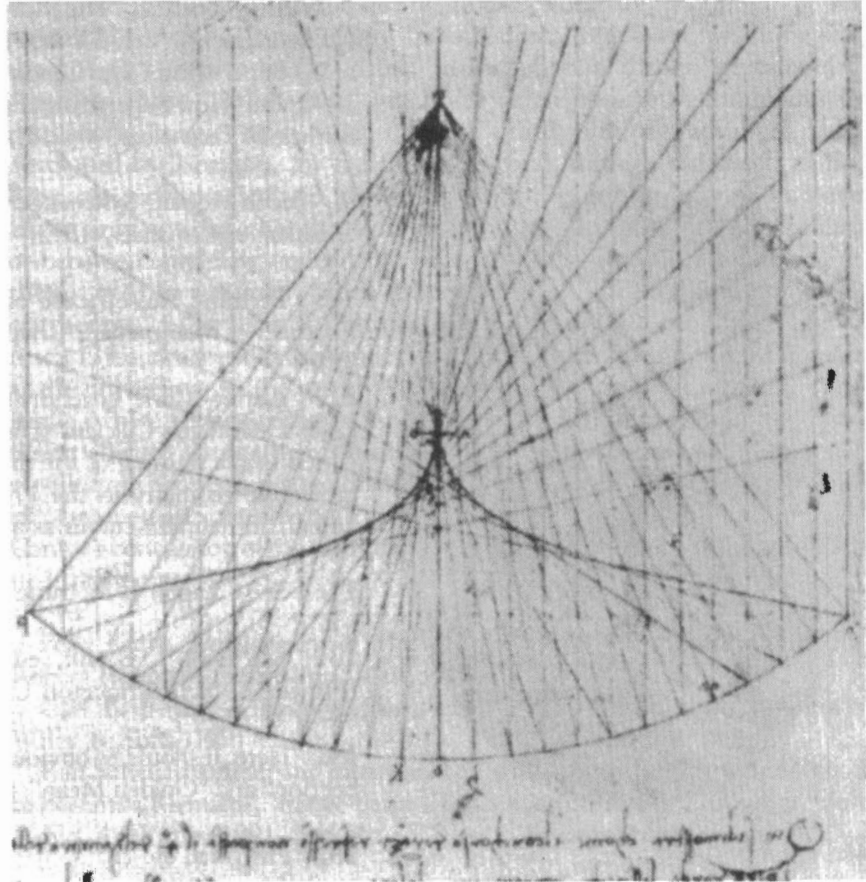The photos show a wine glass and the caustic curve produced by shining light through it. Note that the caustic is an envelope of rays emanating from a point, which are refracted or reflected by a curved surface.

The drawing is Leonardo da Vinci's presentation of a caustic.

23. The caustic, and the correction of the caustic by parabolic mirror surfaces, are shown in illustrations by Leonardo which can be found in *Leonardo e la tecnica*, 1978, Istituto Geografico de Agostini, chapter on "L'Ottica di Leonardo," p. 55.

24. For fuller examples and illustrations see Carol White, "Hyperbolic Functions, the Catenary, and the Human Mind," *21st Century Science & Technology*, Spring, 1991, pp. 47ff.

25. Prior to January 1697.

26. Huygens, *op. cit.*, pp. 69-70.

27. D.J. Struik, *op. cit.*, pp. 392-93.

28. The Leonardo Codice dates from ca. 1500; the Bernoulli discovery from the mid-1690s.

catenary

The catenay curve is the form assumed by a hanging chain or rope.

29. This achievement of Filippo Brunelleschi (1379-1476) is discussed in detail in *21st Century Science & Technology*, July-August 1989, "Brunelleschi's Dome: The Apollo Project of the Golden Renaissance," by Nora Hamerman and Claudio Rossi.

30. Prof. Lando Bartoli, *Filippo Brunelleschi*, ed. by Nardini, Florence, 1977; and *Requiem Per Una Cupola* (Requiem for a Cathedral Tower), unpublished, Florence, 1988. After the construction of the famous eight "ribs" of the dome, and their securing by concentric rings at the top and bottom of the tower, Brunelleschi had his workmen hang chains between adjacent ribs, forming catenary curves (hanging chain curves) in the spac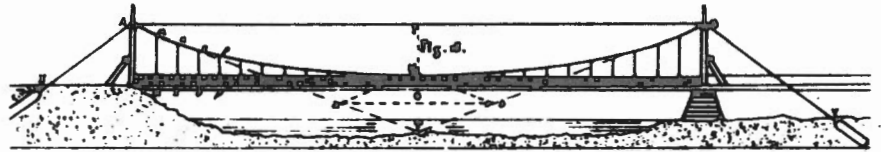e between the ribs. This gave Brunelleschi the guides for adding reinforcing beams between the ribs (at and from the ribs to the middle points of the chain curves), and for the masonry of the faces of the dome.

The schematic drawing of the dome shows how the catenary chains were placed during construction. The catenary curve is the basis of the suspension bridge, resulting in the roadbed placing an equal weight or stress on each equal length of suspension cable.

The photo of a soap bubble formed from lowering a two-ring structure into soapy water, shows that the boundary curve between the two rings is the catenary. The surface of the soap bubble is the surface which is made by rotating a catenary curve around 360 degrees.

31. See Dino De Paoli, "Leonardo da Vinci and the True Method of Magnetohydrodynamics," *Fusion*, magazine of the Fusion Energy Foundation, Jan.-Feb. 1986.

32. Albrecht Dürer (1471-1528) influenced, and was strongly influenced by, Leonardo's work, as in Dürer's 1525 *Unterweysung der Messung mit dem Zirckel und Richtscheyt* (A Course in the Art of Measurement with Compass and Ruler). Distribution of Leonardo's manuscripts by Dürer was one of the primary means by which these manuscripts became known throughout Europe.

33. Huygens' and Leibniz's writings often directly reference Cusa, Leonardo, as well as Kepler.

34. Dino De Paoli (see footnote 31, above) provides a full discussion of the continuing power of Leonardo's manuscripts on hydrodynamics, such as *Sul Volo* (On Flight), into the nineteenth and twentieth centuries, centering on the work of the pioneers of supersonic flight, Adolf Busemann and Ludwig Prandtl.

35. De Paoli's article (notes 32 and 34, above) describes the hostile and uncomprehending attitude to Leonardo's hydrodynamics work, both by the London Royal Society of Newton ("according to Newton, there is nothing interesting happening in the wake of a moving object"), and by seventeenth-century French circles dominated by René Descartes.

36. Uwe Henke von Parpart's companion article to De Paoli's on da

Vinci ("The Question of Scientific Method: How the Riemannian Approach Allowed the Development of Supersonic Flight"), *Fusion*, Jan.-Feb. 1986, pp. 39ff) is based on a talk given by Parpart in May, 1985 at a memorial conference for space rocket pioneer Dr. Krafft Ehricke. Parpart describes the opposition to Riemann's proven existence of shock waves, from late nineteenth-early twentieth-century figures led by Lord Rayleigh, Helmholtz, and Theodore von Karman, whose own linear mathematical method convinced them that flight of heavy objects could not be supported by the disturbance and transformation of state of the air medium. Their denials were focused upon Riemann's 1859 paper, "On the Propagation of Plane Air Waves of Finite Magnitude." Rayleigh said that shock waves could not exist, and that although there do exist singularities in the mathematical formulation of the wave equations, we cannot assign to these singularities any physical existence. Von Karman in 1901 "proved to his own satisfaction that flight heavier than air was impossible."

German hydrodynamicist and mathematician Ludwig Prandtl, working in Riemann's tradition, showed the existence of effectively separate "boundary layers" around wings and showed the way out of the limitations of the existing "gas-dynamic" wave equations championed by Rayleigh and Helmholtz. Prandtl's work led to that of Adolf Busemann and others actually responsible for the advent of supersonic flight.
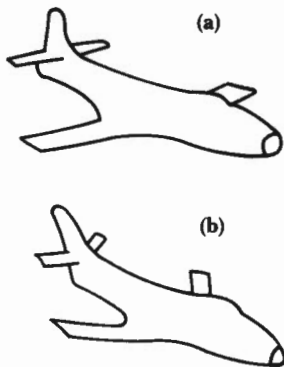
37. Parpart's article (note 36) includes the story of the Douglas D-558, the first attempt at a transonic plane in the U.S., under the influence of von Karman's dominance in U.S. aerospace research after World War I. The plane was a failure until von Karman, in an interview with Adolf Busemann in 1945, discovered that the wings of the plane had to be swept back.

The drawings show the D-558 design in 1945: (a) with a conventional straight wing, and (b) after von Karman and others visited Germany and interviewed Adolf Busemann.

38. *The Science of Christian Economy, op. cit.*, pp. 267ff, and more detail on pp. 471-72 in footnotes to the same work.

39. *Ibid.*

40. See notes 14 and 15, Chapter 1, on Bacon's and Locke's adherence to Rosicrucianism; particularly striking in Bacon's *New Atlantis*, Fludd's *The History of the Microcosm and the Macrocosm*, the latter described as a synthesis of "Renaissance Magic and Cabala with the addition of alchemy."

41. *The Science of Christian Economy, op. cit.*, p. 473.

42. *Ibid.*, pp. 268 and 473.

43. *Ibid.*, Chapter 6, "The Reproduction of Man," specifically pp. 241-46.

44. It is important to call attention to negative curvature at this level of secondary education.

45. Cardinal Nicolaus of Cusa's best-known and most detailed work on this subject is *De Docta Ignorantia* (On Learned Ignorance). Early in that work Cusa develops carefully and in constructive detail the way in which the circular circumference, if thought of as an actual infinite, has the potential existence of an infinite line (straight line), and that "in such a line straightness and curve are not mutually exclusive, but are one and the same

Tetrahedron

Cube

Octahedron

Icosahedron

Dodecahedron

The five Platonic solids.
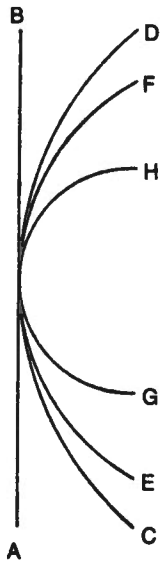
thing." This begins his discussion throughout the first book of the work, of the uniqueness of circular curvature (circular action), and that no elaboration of inscribed and circumscribed polygons can reach it. Nicolaus Cusanus, *De Docta Ignorantia,* trans. by Father Germain Heron (New Haven: Yale University Press, 1954), Chapter 8, "Modifications of the Absolute Infinite Line," and following pp. 28ff.

The drawing is from *De Docta Ignorantia,* in which Cusa says: "Now if the curvature of the curved line decreases as the circle whose circumference it is increases, then the circumference of the greatest possible circle is the least curved, thus completely straight. The smallest thus coincides also with the largest. . . ."

46. *The Science of Christian Economy, op. cit.,* p. 259.

47. Euclid's *Elements,* Book 9.

48. In Plato's dialogue *Timaeus.*
For depiction of the five Platonic solids, the reader is referred to Luca Pacioli's *De Divina Proportione,* in which the solids are believed to be by Leonardo da Vinci.
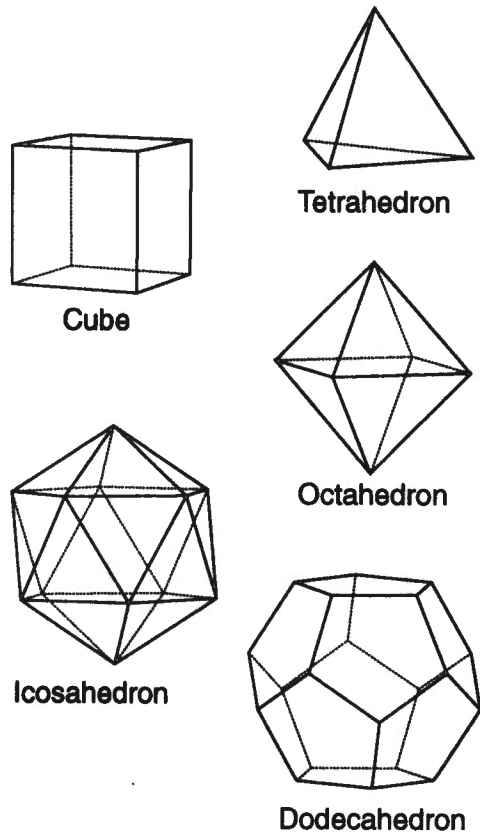
49. See Kepler, *The Six-Cornered Snowflake, op. cit.,* pp. 15-21, in which Kepler discusses how space can and cannot be geometrically divided, and the importance of the "divine proportion" (Golden Section) in determining this: "It is in the likeness of this self-developing series that the faculty of propagation is, in my opinion, formed"; he concludes, "and so in a flower the authentic flag of this faculty is flown, the pentagon." On page 41, he speaks of "the difference between a faculty that builds sterile shapes, triangles, and hexagons, and that second faculty that builds fruitful shapes, pentagons."

50. At this point, the classroom is considering only the regular polyhedra.

51. The use of "two-dimensional" in "two-dimensional Archimedean series" here, is a mandatory qualification, since the series of Archimedean solids is a key feature of Kepler's treatment of the curvature of physical space-time: as in Kepler's *Mysterium Cosmographicum, op. cit.,* particularly Chapters 2 and 3. Also, these Archimedean solids have found new physical significance in Professor Moon's fresh approach to defining the periodic table as a process, a relevant point of this proposal. (See Laurence Hecht, "Mysterium Microcosmicum: The Geometric Basis for the Periodicity of the Elements," *21st Century Science & Technology,* Vol. 1, No. 2, May-June 1988).

52. This language, "densely *self-bounded* throughout" by spherical surfaces, is strictly required. For example, that view of boundedness, as permeating densely physical space-time, is crucial for following Kepler's proof of the necessary six-sidedness of the snowflake. See Kepler, *The Six-Cornered Snowflake, op. cit.,* pp. 39-45, the conclusion.

53. Again here, the quotation from Riemann's habilitation paper of 1853, concerning measurement in geometry, is helpful: "The question of the validity of the postulates of geometry in the indefinitely small, is involved in the question concerning the ultimate relations of size in space. . . . While in a discrete manifold, the principle of metric relations is implicit in the notion of this manifold, it must come from somewhere else in the case of a continuous manifold." Both Riemann and Cantor demonstrate that in a continuous

manifold, the fundamental metric of space-time may vary with the extension and development of the manifold.

54. See "Contributions to the Founding of the Theory of Transfinite Numbers," Georg Cantor, English trans. by P.E.B. Jourdain (New York: Dover); see also Chapter V below, sections titled "Riemann's Challenge" and "Information Theory" for a complete discussion of LaRouche's application of Cantor's work to solving the cited problem of Riemann.

55. The impulse to borrow G. Hegel's famous summation of the work of his contemporary, Joseph Schelling, is almost irresistible, and appropriate here.

56. Johann Bernoulli, *op. cit.*, p. 393.

57. Winston Bostick, "The Pinch Effect Revisited," *International Journal of Fusion Energy*, Vol. I, No. 1, March 1977; and *EIR*, Feb. 8, 15, and 22, 1991, Vol. 18, Nos. 6, 7, and 8.

58. In Kepler's *The Six-Cornered Snowflake, op. cit.* paper, pp. 13-17 in the Clarendon Press edition cited above, he discusses the close packing of loculi of pomegranates within the fruit, of peas in the pod, of spheres generally, in raising the question of how God's purpose for growth of living forms is expressed in the characteristics of space. The same conception is developed at greater length in his earlier work on the ordering of the solar system, *Mysterium Cosmographicum, op. cit.*, especially Chapters 11 to 14.
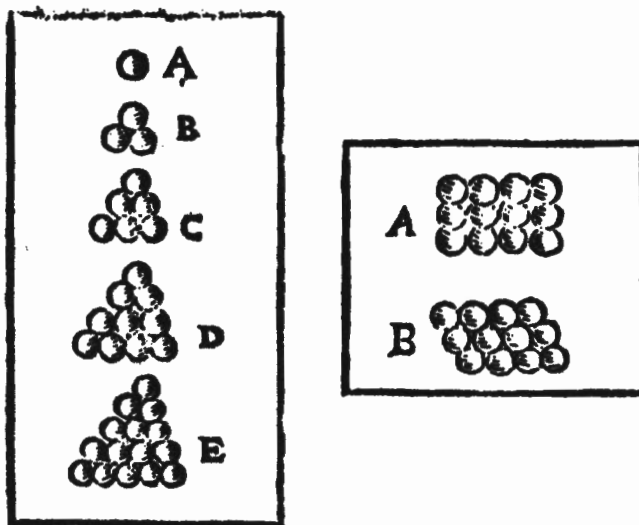
The drawings are Kepler's, contained in *The Six-Cornered Snowflake.*

59. As noted earlier this term, *physical geometry*, is employed to signify the subordination of a *constructive* ("non-deductive"), or *synthetic* geometry to the notion that all rotation is *action*, and that which is generated by action in *space-time* is *work.* "Physical" connotes thus "action" and "work." This view of a *physical* synthetic geometry incorporates Leibniz's *analysis situs* within *synthetic geometry.* See Riemann on *Analysis Situs*, in *Riemann's Mathematische Werke*, ed. by Heinrich Weber, and also footnote 99.

60. See Leibniz's "Specimen Dynamicum" (1695), English trans. in *Leibniz Selections*, ed. by Philip P. Wiener (New York: C.S. Sons, 1951).

61. Carl Gauss' 1871 discovery of the large asteroids Pallas and Ceres, showing "planetary fragments" or the equivalent in precisely the solar system orbital location in which Kepler had forecast that a planet might have existed but would necessarily have broken up, is described in detail in footnote 7 of Chapter 3.

62. The lack of reading of Kepler's published works in U.S. universities and secondary schools, is discussed by LaRouche in *Campaigner* magazine for August 1981, in a subsection "Concerning Science" in a larger discussion of the early nineteenth-century curriculum reform of the Humboldt brothers as opposed to the destructiveness of modern liberal education "reforms."
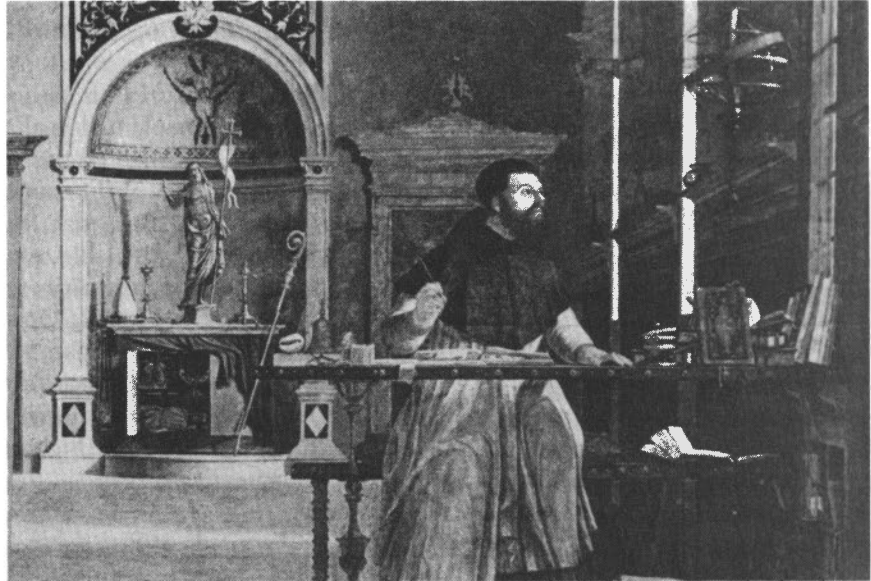
St. Augustine. Vittore Carpaccio's portrayal of the saint with the features of Cardinal John Bessarion.

63. St. Augustine, whose life and work in the fourth century A.D. shaped the evangelical work of Christianity to the Italian Renaissance and afterward, discusses the coherence of Christianity with Platonic philosophy in his *Confessions*, in the context of discussing the decisive role of his reading of the "Platonics" in his final conversion to Christianity; in *The City of God*, from Chapter 10; and in *De Musica*.

64. For example, there is a powerful musical argument, not to present the singing of an Italian or German opera in English translation. The original was composed with respect to the musical principles of *vocalization*. Conversely, it is clear upon studying Franz Schubert's song "Who Is Sylvia?" that Schubert composed this song in Shakespeare's English, not the awkward, musically unsatisfactory German translation of the text often used in performance.

65. The mention of the Gospel of St. John and the New Testament Epistles of St. Paul, should suffice to register acknowledgment of the fact of a Christian Platonic method of science existing long before the birth of Augustinus. The difficulty is typified by the fact that there have been gnostic neo-Aristotelian cults which have professed to be both "Christian" and "neo-Platonist." Since all among the founders of modern science were strictly "Augustinian Christian" Platonics in their scientific method, our usage of "Augustinian Christian" is not only appropriate but avoids irrelevant sorts of unwanted nominalist issues.

66. In early fifteenth-century Italy, the mathematician Leonardo of Pisa wrote the work *Liber Abaci* (The Book of the Abacus), in which he describes the significance for processes of growth, of the Fibonacci series, named for the eleventh-century author Fibonacci. In this series, each successive member (number) is formed by the addition of the previous two members: 1,1,2,3,5,8,13, etc. The ratio of each member of the series to the one preceding it, approximates, but is not equivalent to, the Golden Section ratio which is characteristic of the action of growth in living systems. Leonardo of Pisa uses the series to measure the growth of a population of rabbits through a number of generations.

67. These relationships are described in *The Science of Christian Economy, op. cit.*, Chapter 6, "The Reproduction of Man," pp. 242-51.

68. Cusa's view in his early work *De Docta Ignorantia, op. cit.*, (1439), is that "God has implanted in all things a natural desire to exist with the fullest measure of existence that is compatible with their particular nature. . . . There is in them a discernment that is natural and in keeping with the purpose of their knowledge, which ensures their natural inclination serving its purpose and being able to reach its fulfillment. . . . If at times this does not happen, it is necessarily the result of an accident."

Later, in *The Vision of God* (1464), Cusa develops the conception that each species, with its natural faculties as they develop, "yearns" for the existence of a higher species as man does for the knowledge of the Absolute, of God. Cusa articulates negentropic evolution as a lower species participating in the emergence of the higher; as a phenomenon of ordering of negentropic development.

69. Leonardo of Pisa, *Liber Abaci*; Luca Pacioli, *De Divina Proportione*, for which Leonardo da Vinci did the drawings.

70. *The Science of Christian Economy, op. cit.*, pp. 257-66.

71. See footnote 68 above.

72. The best estimate made by anthropologists for the population-density of civilizations based on hunting, gathering, fishing, etc., is that on the order of 10-15 square kilometers is required for the support of each human individual's life; thus for the areas of the planet thought to be inhabited by such civilizations, a total human population on the order of 10-15 million. Today, by contrast, the area of highest population-density (Europe) is characterized by one square kilometer supporting the life of 100 or more individuals. This is an increase in potential population-density, of more than three orders of magnitude (more than three powers of ten, or 1,000 times). See *There Are No Limits to Growth* (Washington, D.C.: Schiller Institute, 1985), Chapter 1.

73. See *The Science of Christian Economy, op. cit.*, Chapter 6.

74. *In Defense of Common Sense, op. cit.*, pp. 3-19.

75. In other words, the surface of the Earth can be the launching point for human work on the surface of the Moon, which in turn is a launching point for human work on the surface and in the orbits of Mars, etc., as described Lyndon LaRouche's "Moon-Mars" proposal first made in May 1985 at the Memorial Conference on the contributions of Dr. Krafft Ehricke, and pub-

lished as *Colonize the Solar System!* (Washington, D.C.: Schiller Institute, 1985).

76. Dino De Paoli, "Georg Cantor's Contribution to the Study of the Human Mind," *21st Century Science & Technology,* Summer 1991, Vol. 4, No. 2.

77. In Cusa's *Vision of God,* this idea of negentropic species-evolution as the characteristic of Creation, is expressed by the poetic conception *terminus specie.* The universe consists of negentropic growth of higher orderings, whose microcosm is human reason. The species recognizes this divine order of creation, in its own way, and becomes a singularity in the transition from one ordering to the next. Thus the species has a *terminus specie,* the actualization of infinity in one point, which enables further development. "This power, which I have from Thee, and in which I possess a living image of the power of Thy almightiness, is the free will through which I am capable of either increasing or reducing the capacity to receive Thy beneficence."

78. Karl Weierstrass (1815-97), a major creative figure in the nineteenth century in the development of physics, whose most celebrated contribution to that century was probably his famously ruthless intellectual rigor. He was the crucial figure of influence upon Cantor.

79. We drop the further use here of "neo-Aristotelian" in our references to Bacon, Descartes, Kant, and their immediate followers. These figures were "Aristotelians" in the strictest sense; earlier here, we employed "neo" only in respect to the time and "counter-Renaissance" circumstances of this re-emergence of Aristotelianism. As for "gnostic," you'll be shown later here that all Aristotelians are intrinsically *gnostics;* it was the sixteenth-century Catholic Church's refusal to see this intrinsic connection of Aristotle and gnosticism, which allowed the empiricists, Cartesians, Kantians, and modern positivists that degree of sleepy-eyed toleration by means of which they rose to the position of occupying political powers in the science and related institutions which they command today.

80. That "external boundary" was not a line—not a line in the sense of "fence line." It is the fact that a circular pathway cannot be generated by any function but a certain quality of rotation, and *isoperimetric* rotation. That is, the rotation which generates the maximum area, relative to circumference. (The isoperimetric theorem should be presented to the pupils at this point in secondary instruction in "advanced geometry," as if it had not been presented already at an earlier point.) It is this principal aspect of "constructibility" which represents the efficient boundary.

81. What is shown specifically for the Platonic solids, epitomizes a principle which also governs, in the same way, all other kinds of inscribable and circumscribable solids.

82. See footnote 7 above for the English translation of Kepler's *Six-Cornered Snowflake* paper.

83. The quotation from Riemann is found on page 4 of Chapter 1.

84. Kepler's *Six-Cornered Snowflake,* specifically the section cited in footnote 49 above.

85. See discussion on pp. 38-39 above.

86. In Plato's dialogues *Philebus* and *Parmenides*.

87. In *Contributions to the Foundation of the Theory of Transfinite Numbers*, as described in detail in De Paoli, in *21st Century Science & Technology*, Summer 1991, pp. 48ff, "Cantor and Religion."

88. J.W. Dauben, *Georg Cantor: His Mathematics and Philosophy of the Infinite* (Cambridge, Mass.: Harvard University Press, 1979) p. 170; and "Georg Cantor and Pope Leo XIII: Mathematics, Theology and the Infinite," *Journal of the History of Ideas*, 1977, No. 38, pp. 85-108. Dauben, while noting accurately several instances of Cantor directly quoting Plato, writes as if Cantor were merely making a mathematical application of Plato's ideas of *limit, unlimitedness,* and *mixton,* embracing the first two from Plato's *Philebus,* rather than seeing the clear philosophical adoption of Plato's philosophical view against that of Aristotle, fundamentally defining Cantor's mathematics. Dauben's work is an example of the errors of interpretation which result when the commentator relies too much on the commentary of others, without coming to grips with the actual subject matter of Cantor's work in this connection.

89. Lyndon H. LaRouche, Jr., *Project A,* in *The Science of Christian Economy, op. cit.* pp. 150-55.

90. Plato's arguments connecting the idea of the Good (of the Absolute Infinite as expressed by later Christian Platonists) both to the evolution of the physical universe, and to the process of Becoming proper to human reason, are developed with increasingly arduous rigor in a number of famous dialogues: *Theaetetus, Parmenides, Sophist, Politics, Philebus, Timaeus, Critias.*

91. In Cantor's *Grundlagen* (Foundations of the Theory of the Transfinite), he states point blank that the disease in mathematics against which he is arguing, the idea that *"infinitum actu non datur* [the actual infinite is not given, or does not exist] presents itself as an incontestible proposition taken over from Aristotle." And then later, "Plato's conception of the infinite is an entirely different one than that of Aristotle."

Cantor's fullest discussion of the entire question of the Platonic conceptions of Becoming, Good, and Infinite, is in his *Mitteilungen zum Lehre vom Transfinitum* (Discourses on the Theory of the Transfinite), and this is discussed with extensive quotations from this work, in the section of De Paoli's article on Cantor cited in footnote 87.

92. Christiaan Huygens, *op cit.*
The drawing shows schematically how Huygens designed the pendulum clock. The pendulum bob swings back and forth, wrapping itself against two guides, each of which is a cycloid. Since the bob is describing the evolute of these curves, and the evolute of a cycloid is another cycloid, the lower curve, described by the bob itself, is a cycloid. That means that the time of motion of the bob will be the same for any amplitude of swing, since the cycloid is always the least-action path through a medium, and always an equal path.
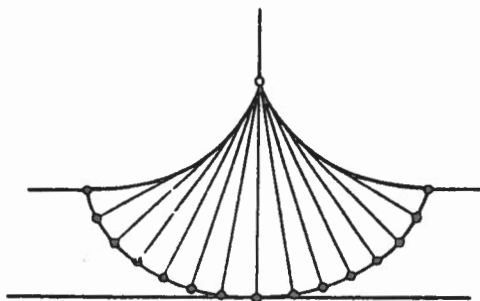
93. Robert C. Yates, *Curves and their Properties* (Reston, Va.: National Council of Teachers of Mathematics, 1972).

94. For Leibniz's general standpoint see: *Discourse on Metaphysics*, trans. by P.G. Lucas and L. Grint (Manchester: 1953); *The Leibniz-Arnauld Correspondence*, trans. by H.T. Mason (Manchester: 1967); *The Leibniz-Clarke Correspondence*, Clarke's translation, ed. by H.G. Alexander (Manchester: 1956). The following specific citations can be found in *Leibniz, Selections*, ed. by Philip P. Wiener (Charles Scribner's Sons: New York, 1951): "On Aristotle's and Descartes' Theories of Matter: Fragment (c. 1677)" p. 90; "Specimen Dynamicum" (1695), pp. 119-136; "On Substance as Active Force (*Vis Viva*) vs. Mere Extension (Letters to De Volder, 1699-1703)," pp. 156-80.

The standpoint opposed to Leibniz is found in: Descartes, *Reply to Second Objections, Discourse on Method, Oeuvres*, ed. by Adam and Tannery, (Paris: 1896-1910); *Philosophical Works*, trans. by E.S. Haldane and G.R.T. Ross (Cambridge: 1934), Vol. II, pp. 48-49; Thomas Hobbes, *Of Universal Synthesis and Analysis*; John Locke, *Essay Concerning Human Understanding*.

95. Huygens, *op. cit., passim*. This is another text which the secondary pupil should work through in full.

96. Nicolaus of Cusa, *De Seculii Quadratura* (On the Quadrature of the Circle), trans. into German by Jay Hoffman, (Mainz: Felix Meiner Verlag).

97. Nicolaus of Cusa, *De Docta Ignorantia*, see footnote 45.

98. See footnote 9 of this chapter.

99. Gottfried Wilhelm Leibniz, *On Analysis Situs*, in *Gottfried Wilhelm Leibniz's Philosophical Papers and Letters*, trans. and ed. by LeRoy E. Loemker (Chicago: University of Chicago Press, 1956), Vol. 1, pp. 390-96; and Bernhard Riemann, *Analysis Situs, op. cit.*

100. Gilles de Roberval, "The Cycloid," from *Treatise on Indivisibles*, trans. by Evelyn Walker, (New York: Teachers College, 1932); also quoted in Dirk J. Struik, ed., *op. cit.*

101. Huygens, *op. cit.*

102. Nicolaus of Cusa, *De Docta Ignorantia, op. cit.*, Book II, pp. 107-10.

103. *Ibid.*

104. "Nothing less than" anticipates Georg Cantor's higher, "aleph" cardinalities.

III. The Three-Body Paradox

To choose a fresh starting-point for this next topic, consider three problems of the geometry classroom. We cannot construct, either by ruler-and-compass or kindred, linear methods: squaring the circle, trisecting the angle, or, our subject here, a solution for the three-body paradox.

The commonplace confusion, which appears endemic among today's initiates in the classroom textbook, is the reckless presumption, that Nicolaus of Cusa's discovery of the "inverse-square rule"[1] of fifteenth-century *camera oscura* optical experiments,[2] is equivalent to axiomatic adoption of the so-called "Newtonian" dogma of "action at a distance."

Three leading historical features of Kepler's work bear directly upon that reckless presumption of Newton's credulous admirers:

1. Kepler's construction of harmonically ordered array of planetary orbits shows us, from a modern vantage-point, that Kepler has thus defined what are now termed "relatively force-free," "least action" pathways.[3]
2. Newton's own general formulation for gravitation is nothing more than a mathematical formula derived simply by inversion, from Kepler's *Third Law*.[4] The application of optics' "inverse-square rule" to that Third Law, yields the Newton formula[5] for the principle of universal gravitation which Kepler had earlier announced as discovered.[6]
3. After Carl Gauss, at the turn of the nineteenth century, had proven the case for the then-newly discovered Asteroids Pallas and Ceres,[7] there could be no reasonable doubt that Newton's opposition to Kepler's use of the Platonic principle of hypothesis was Newton's folly—and that of Newton's credulous admirers.

The crucial significance of the discovery of those larger Asteroids, is that Kepler's method of constructing the planetary orbits had demanded the *former existence* of an additional planet in an orbit located between those of Mars and Jupiter.[8] Kepler had specified the necessary self-disintegration of a planet in that orbit; and Kepler had specified the harmonic values for this lost planet. Gauss recognized that although the Asteroids had widely eccentric pathways, the harmonic values of those wild orbits were the values which Kepler had specified approximately two hundred

years earlier, when no empirical observation indicated the existence of a planet or fragments there.[9]

This discovery by Gauss points directly to the deeper implications of the Newtonian three-body paradox: (a) Mathematically, Newton's formula is derived with perfect deductive-hereditary consistency algebraically from Kepler's Third Law; so why should Kepler's results be essentially accurate,[10] whereas Newton's yields the absurdity of the three-body paradox? Kepler's construction (b) requires the former existence of a disintegrated planet in a range of between musical "F" and "F-♯," itself lying between the orbits of Mars and Jupiter; why does Newton's system fail on this account? What, therefore (c), is that difference between Kepler's Third Law and Newton's action-at-a-distance, the which shows the necessity for the relative success of Kepler,[11] and the catastrophic failure of Newton's work? Since the Newton formulation is nothing less than a formally consistent algebraic derivative of Kepler's Third Law, how did Newton incur, in the process of algebraic derivation, a three-body paradox which did not exist in Kepler's original?

This flaw in Newton's algebraic derivation lies formally in the implied axiomatic *space-time features* imbedded within *the inductive method* itself.

The empiricists' inductive method putatively bans all principle of hypothesis. That claim by the empiricists is a fraudulent one; Newton's ban, *hypotheses non fingo,*[12] asserts its own single, unchanging principle of the hypothesis to be exclusive and universal. In other words, Newton's inductive method of arithmetic series allows but one Cantorian *Type*[13] in all formal mathematical physics, the *linear* Type.

Consider Newton's *hypotheses non fingo* to be a *postulate* of his formal system as a whole. It is thus a member of that integral set of axioms and postulates which determine, as a set, all possible consistent theorems of the system. Contrast this with the geometry of physical space-time as represented in Kepler's *Six-Cornered Snowflake.* Thus, in brief, all of Newton's applications of his notion of gravitation belong to the set of theorems hereditarily consistent with an integral set of axioms and postulates including *hypotheses non fingo* as a postulate.

Newton's ban is thus an attempt to limit the general practice of mathematical physics to those forms of mathematics whose primitive basis is of a *Type* which includes the *2ⁿ-regular polygon series* of the preceding chapter's discussions at the blackboard. Newton's own pseudo-calculus, his "fluxions,"[14] was no better than a generalization of a previously established practice of linear "infinite" series, as Leibniz has emphasized this fact in the *Leibniz-Clark-Newton Correspondence.*[15]

This formal disability in Newton's mathematics has two prominent expressions during the seventeenth and eighteenth centuries of the internal history of modern science. The British empiricists' and the Cartesians' refusal to accept the reality and devastatingly crucial experimental implications of what was termed then "non-algebraic functions," i.e., a *Type* of functions whose representation by construction is rooted in the cycloidal constructions of Huygens *et al.*[16] For the same reason, Newton's *Principia* is permeated by the devastating error, a primitive form of that fiction later reintroduced, ca. 1850, by Rupert Clausius and Lord Kelvin, as the so-called "Second Law of Thermodynamics."[17] These latter features of Newton's own work, which we take up next, are efficiently examined by reference to our now familiar, Kepler's *Six-Cornered Snowflake.* These two historical features of Newton's follies serve as benchmarks, by aid of which we may "triangulate" the origin of Newton's three-body paradox.

The so-called "Second Law of Thermodynamics" has had two incarnations as a professed dogma of British empiricism. The first appearance

was made in Newton's own commentary upon a notable feature of his *Principia*.[18] This admission became a celebrated eighteenth-century issue when Leibniz took up Newton's admissions publicly, in the *Leibniz-Clark-Newton Correspondence*.[19] The issue of Newton's work is usually referenced as the "clock-winder" problem.

Newton's argument is, summarily, this. He confesses that his published mathematical physics gives the impression, that the universe, left to its own devices, is running down in the sense we associate "running down" with a mechanical timepiece. This creates the spectacle, Newton confesses, of a universe which the Creator must "rewind" periodically. Newton admits it to be his own opinion, that this is all nonsense, but laments that his choice of mathematics is entirely to be blamed for this appearance. On the last point, Newton is directly to the point.

Turn now to Kepler's *Six-Cornered Snowflake*. Here, *negentropy* is defined as the form of action associated with the characteristic morphology of function and growth of living processes. This, as Leonardo da Vinci *et al.* had shown, is a form of harmonic ordering congruent with the circle's Golden Section. Thus, the space-time packed super-densely with spherical "bubbles," is *overall negentropic*, but, in detail, either *negentropic*, or, like the snowflake, *entropic*.

If we confront these considerations with what Leibniz *et al.* later defined as a *universal principle of least action*, we see why there is no three-body paradox in Kepler's work. The available pathways of least action are defined independently of the simply local terms of any isolated event within that region of physical space-time. The *tautochrone/brachistochrone* argument of Bernoulli, is a superb illustration of this point.[20]

It should have been obvious to some among the empiricist mathematicians of that period—as it has been among some scientists who joined, opportunistically, the lynch-mob against cold fusion—that the issue of Kepler's *Six-Cornered Snowflake*, and that of the Huygens-Leibniz-Bernoulli *principle of least action*, were essentially one and the same. It should be clear, that the super-density of spherical bubbles in the space-time of Kepler's *Six-Cornered Snowflake*, is no more than a way of representing universality of the *bounding, determining principle of circular rotation*, as this is to be seen in the instances of the squaring of the circle, and the implications of the Golden Section respecting such crucial characteristics of all mathematical physics as the uniqueness of the Platonic solids.[21] Thus, the fact of the existence of living processes were sufficient, crucial demonstration that what Kepler's "spherical bubbles" represent, is true for the universe generally.

Thus, the universe is bounded by the elaboration of this limiting principle of universal, "transcendental" rotation. This is to such effect, that the universe as a whole is a whole process *of Becoming*, and is characterized by harmonic orderings congruent with the Golden Section morphologies—and topologies[22]—of living processes. The *Six-Cornered Snowflake* shows, by means of a rudimentary construction, why, in such a universe, the "detritus" of non-living, *entropic* processes is existent as it is subsumed by a *negentropic* form of universal lawfulness.

In that setting, the non-algebraic functions have an obvious significance.

What is primary, bounding, limiting, and determining, is circular (isoperimetric) rotation, that which is "transcendental" relative to all linear processes, including linear processes such as Newton's choice of mathematics for his *Principia*. What is hidden behind the ordinary reference to "ruler and compass," is the fact that the action applied to this

compass is *rotation*. A circle is *not* generated by a point and line (radius); it is generated by *rotation*.

What, then, is a *circle*, from the standpoint of rotation?

1. Among all possible rotations, it is *isoperimetric*: the *least perimetric action* generating the *relatively* largest area per *cycle* of rotation.
2. Rotation is measured in *cycles*: this is the root of all *metrical* relationships subsumed by rotation-based continuous processes.
3. All cycles are to be compared with circular cycles.
4. *Rotation* eliminates consideration of "instantaneous" space-*per se*, and defines space-time.
5. Rotation in space-time is termed here *action*.
6. That which is generated (constructed) in space-time by means of such *action*, is termed here *work* (e.g., area, volume, etc.)
7. From circular action, we derive *circular action upon circular action*. From this, we derive *straight lines* and *points* from circular action (but, never the reverse);[23] straight lines and points, so constructed, are degenerate forms of *cycloids*.

Cycloids are the characteristic root of intelligible representation, by construction, of so-called "non-algebraic functions."

The pupils may require a description of simple cycloids.

1. There is the simple cycloid of Roberval *et al.*: the path of a point on the perimeter of a circle, as that circle "rolls" one complete revolution along a straight line.[24]

This should be made more general, by substituting for the "straight line," the perimeter of an enormously large circle.[25] That makes the Roberval (and simplest Huygens) model consistent with the *Type* of function generated by circular action upon circular action. Let us name constructions of this type, *functions of the simple cycloid*. (Replacing "circular" by "spherical," we have in the most generalized case, the Keplerian space-time's super-dense packing with "spherical bubbles.")

2. *Simple Metrical Functions.* In the case of the simplest sort of cycloids, we may "roll" a circle of relatively smaller radius along either the interior or the exterior of the relatively larger circle. Or, we may "roll" a pair of such circles (of a relatively smaller radius), of different radii, one externally, and the other internally.[26]

Some crucial, "axiom-like" conceptions are reflected in cases which supercilious opinion may wrongly derogate as "ridiculously trivial," or as, simply, "obvious." In such matters, it is often that the obvious opinion is the wrong one. As the referenced history of the tautochrone/brachistochrone implies, the simple cycloids are already rich in useful intellectual treats awaiting the more attentive observer. Consider just a few illustrations.

(*a*) Given, a *circle of radius r*, the which is rolling on the exterior of a larger circle of *radius R*. At the start of this rolling, the two circles are mutually tangent at a common *point P* on the larger circle, *R*, and a coincident *point p* on *circle r*.

Query 1: Where does *p* lie, at the instant the smaller circle next touches *P*? Here lies the beginning of measurement.

Query 2: If, at that instant, *p* coincides with *P*, how many times has *p* touched the perimeter of the larger circle before touching *P*? The notions of *regular polygons*, of *diophantine functions*, of *prime numbers*, of simple *analysis situs*, and so on, are implied.

(*b*) The rolling movement of *circle r* around *circle R* generates an *orbital*

R = Nr
N = 2
R = 2r
$r = \frac{1}{2}R$

$r = \frac{N-X}{N} \times R$

N = 5
X = 3
$r = \frac{5-3}{5} \times R = \frac{2}{5}R$
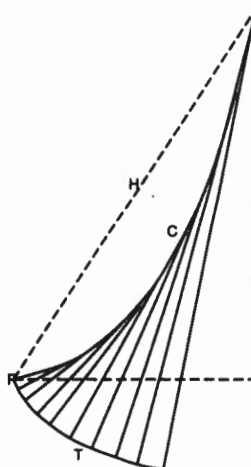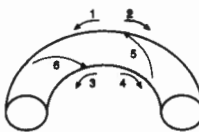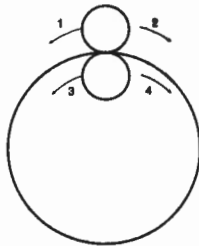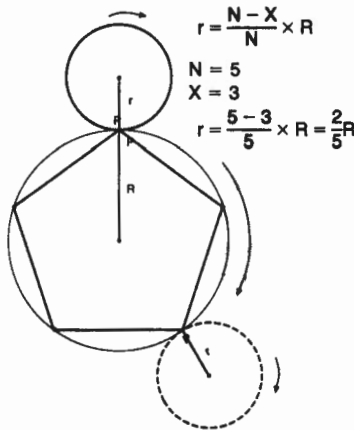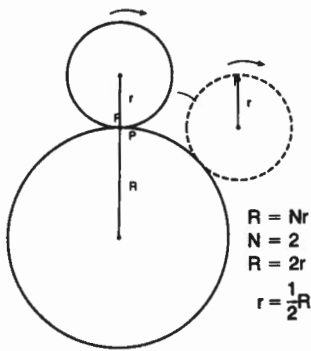
pathway, like a circular approximation of one of Kepler's planetary orbital pathways.[27] This is the flat-plane projection of a circular torus, whose inner radius is R, and whose outer rim has a radius (R+r); the circular tube of the torus has a cross-sectional radius r (measured along the radius of the torus' outer rim).

This torus is that of the important extended development of Leibniz' *analysis situs*[28] by the Ecole Polytechnique's Louis Poinsot.[29]

(c) We may repeat these steps, for the case of *circle r* rolling along the exterior of *circumference R*, by rolling *circle r* along the interior of that circumference.

The exterior of that circumference represents *positive curvature*, the interior, *negative curvature*. The pupils should test this for values of R/r equal to 1,2,3,4,5,6,7,8,9. For each case, as in (a) here, trace the pathway of *point p* as the *circle r* rolls along the perimeter of *circle R*, both externally and internally, as if simultaneously.

So, in simple *analysis situs*, the plain torus permits four choices of rolling motion: *clockwise, counterclockwise*, and also either (*in*) negative or (*out*) positive curvature.

Let R/r = 5. Now, roll clockwise a circle whose radius is ⅖R, and then, successively circles whose radii are ⅗R and ⅘R. Let the task assigned be to touch all points on the *circle R* touched by p of r = ⅕R with the p of r = ⅖R, the p of r = ⅗R, and the p of r = ⅘R. Now do the same counterclockwise. What simple, primary observations are to be made on the variable features in these operations? Compare this with the work of Poinsot.

In the case of the three-dimensional torus, we have all the possibilities of the plain torus, plus some additional ones. Essentially the *surface of the tube* has an *external positive curvature, and an internal negative one*. It has also *cylindric-elliptic curvature* (negative and positive) in addition to circular.

(d) In all these cases with integer solutions—plain, solid, negative, positive—the movement of the *point p* co-generates what Roberval termed "the companion of the cycloid,"[30] the sine wave as a standing wave on the surface of the perimeter, in the manner Kepler defines musical intervals.[31]

(e) The evolute-involute relationship, as presented classically by Christiaan Huygens.[32] There is a very special point to be made in this connection.

Classroom practice notes the commonplace student's mystification at the sight of a curve being generated by an unwinding taut thread. Look at this matter for a moment; the illustration of an extremely important point is met in this little thing. Take as a specific choice of illustration, *the generation of a tractrix from a catenary.*

Take a catenary or "hanging chain curve," shown here as C. Take a thread running up the right arm of the catenary, from the center of that catenary (the center is shown as P). Now, begin to pull that thread slowly from the catenary, beginning at that center, always holding the thread taut. Describe the curve generated by the tip of the thread which was initially at the center of the catenary. The result, of course, will be the right arm of a tractrix, marked here as T.

What is happening from moment to moment as the thread is very slowly pulled away?

Each moment, a small length of thread is detached from the catenary, and added to the length of that taut-free thread.[33] At the same time, the angle of the taut thread is changed to correspond to the new point of tangency along the catenary's right arm. The increment of length is, in

each instant, *a product of a transcendental function*, and the rate of change of the position and the angle of the tangent is also the *product of a transcendental function.*

Thus, the generation of a tractrix's right arm is not the result of a straight line, but of *the changes in length, position, and angle of a line generated by a transcendental function.*

Let us spell this out a bit for some of the pupils.

The curve of the arm of the catenary moves from left to right, and from lower to higher. Construct the relevant right triangle, with the hypotenuse (H) connecting successive, upward points A and B along the arm of the catenary. Obviously, as Huygens proves, the length of the catenary (C) is greater than that hypotenuse (H). So, we see by inspection, why the generated curve (at the tip of a thread) must constantly fall lower and lower, below the lowest point of the catenary. Since the tangent to the catenary's arm is the normal to the generated curve, we have the result.

Let us make these statements.

Linear functions are a (Cantorian) *Type* of actions which could never determine a non-linear function. The discussion of the Archimedean polygons and circular action, earlier, is specifically referenced. Relative to circular (*transcendental*) action, all linear (algebraic) functions belong to a *Type*. Transcendental functions represent a *Type*. We have, then, the higher *aleph*-series of *Types* of Georg Cantor's transfinite orderings.[34] Specifically, here, we are addressing non-algebraic functions. They belong, *geometrically*, to the *Type* of functions representing generation by circular or other *rotation*. They are of a *type* which could not be constructed by linear constructions (remember, the use of a compass to generate a curve, is a *rotation*, not a linear construction). So, the *type* of action represented by the evolute is transmitted "genetically" ("hereditarily") to the generated involute.

This brings us to the relevant, pathological case of Bertrand Russell and the matter of "the theory of types."[35]

The 'Theory of Types'

This matter of Cantorian *Types* is a central issue in shaping the aborted science career of "Bugger" Bertrand Russell. Through the politically influential following of Russell's and Robert Hutchins' "Unification of the Sciences" project,[36] Russell's attitudes are not only leading features of today's proliferating pseudo-scientific "ecology" cults,[37] but the most savage feature of the political witch-hunt against the cold fusion scientists.

Russell's career in mathematical science began in what is fairly described as his role as a political thug. On the instruction of superiors in the Cambridge University (England) Apostles Society,[38] student Russell was assigned to assist the continuation of a British campaign of fraud and calumny against certain leading figures of what the British labeled hatefully "continental science."[39]

The particular campaign, to which Russell was so assigned, had first surfaced in 1850, featuring the British science assets Clausius[40] and Kelvin.[41] Other notable British agents in this continuing fraud had been Maxwell,[42] Helmholtz,[43] and Rayleigh.[44] The usual British targets in France were included on the list of targets for definition, such Monge collaborators as Ampère,[45] and Legendre,[46] notably. German targets were the British "character assassins' "[47] priority. These latter targets included, foremost, Carl Gauss, and Gauss' leading collaborator in establishing the science of electromagnetism, Weber.[48] This included most prominently, also, Bernhard Riemann,[49] Karl Weierstrass, and, later, Georg Cantor. Initially, Russell was assigned to circulate calumnies against Gauss, We-

ber, and Riemann. Early in this century, the emphasis of this Aristotelian sophist's thuggery had shifted, to his newly principal target, Cantor.[50]

The feature of Cantor's work which seems to have panicked Russell the most, was what Russell identified as Cantor's "theory of Types."[51] Professor Kurt Gödel's direct attack on Russell's scientific reputation, on this specific issue, was the end of Russell's career in science—beyond that of a pseudo-scientific commentator.

What Bertrand Russell suffered thus at the hands of Kurt Gödel was, at that time, one of the most devastating public humiliations before peers in the history of twentieth-century science. A comparable case is the humiliation of anthropologist Teilhard de Chardin when his part in the "Piltdown Man" hoax was publicly exposed.[52] Russell deserved worse. All of Russell's differences with Cantor's work were products of Russell's crude epistemological fallacies, and these vulgarities were not even original, but mere copies of the errors of the ancient Eleatics and of Aristotle.[53]

Retrospectively, from the standpoint of Russell versus Cantor, and Gödel versus Russell, we should recognize that the quarrel between Huygens, Leibniz, and the Bernoullis, on the non-algebraic function side, and the empiricists and Cartesians, on the other side, was already a matter of what Russell described as "the theory of Types." The non-algebraic functions are "genetically" of a *Cantorian Type* which is given an intelligible representation through constructions based upon, derived from the cycloids.

(f) This brings us to the last of the sub-species of this short list, the *conics*. Construction shows us that the family of conics can be accessed "genetically" from the starting-point of the simple cycloids, by aid of the evolute-involute chain.

Similarly, the same starting-point gives us access to the family of negative curvatures,[54] a venture to which we may be encouraged by Leonardo da Vinci's construction of the catenary as a correction done to a spherical mirror to eliminate a caustic *reflection*.[55] Or, we may be prompted to apply constructive skills to the understanding of the least-action forms which are produced by soap-bubble constructions.[56]

It is as if one were traveling, alternately, in two worlds. In one world, there is action-at-a-distance along straight-line pathways, a linear, empiricist or Cartesian world. In the adjoining world, a circular action is produced by *rotation*, not by action-at-a-distance along straight-line pathways. The straight-line world, we see, is inferior, never capable of being that toward which it might yearn asymptotically. On the other side, the rotation-world delimits, bounds, and determines the inferior, straight-line world. These two worlds are two Types, of which the rotation-world Type is the superior, the bounding, the limiting, the determining, the higher one.

Also, of the two Types, the inferior world, the one referenced by Descartes and Newton, is characteristically *entropic*. The rotation-world, the other *Type*, is characteristically *negentropic*. However, as Kepler shows so simply in his *Six-Cornered Snowflake*, the superior Type, although negentropic itself, subsumes the generation of both negentropic and entropic forms, both human beings and snowflakes, both living bees and their honeycomb.

Thus, the paradox of Newton's *Principia*. Newton rightly insists that the unwinding-clock characteristic of his mathematical physics, is not the work of nature itself, but is rather a distorted image caused by a defect in the "mirror" he has employed, the "mirror" of his choice of mathematics. That "mirror," that mathematics, is of the linear-algebraic type which Kepler had already shown to be implicitly "entropic." What

we are seeing in Newton's *Principia,* is not reality, but merely his defective choice of mathematics.

The three-body paradox arises because the London Royal Society, in extracting Newton's formula for gravitation from Kepler's Third Law, has moved the relationship described from the negentropic real-world mathematics of Kepler's *Six-Cornered Snowflake* to the entropic universe of linear algebra.

Does the gravitation referenced by Newton exist, then? Ask, instead, is the correlation of effects associated with "Newtonian gravitation" real? Of course, it is real. To offer that reality as objection to our analysis of Newton, would be sophistry; the issue is, *ostensible correlation is not necessarily causation.*

In how many ways, geometrically, might the apparent correlation be effected? Which of those numerous ways is merely correlation, and which one is causation? What is the crucial experiment which supports our selection of that one? The usual answer to the latter query is, "The most paradox-free construction might be assumed to be the best choice." *Thus, the three-body paradox tends to be, even by itself, a crucial proof that we must derive the correlatives of gravitational phenomena in a Keplerian, rather than a Newtonian way.*

There are other, cohering considerations. For example, the *tautochrone/ brachistochrone* case, already referenced, is crucial, and devastatingly so. The most devastatingly crucial part of all is the existence of the disputants' themselves: living processes, especially thinking, living processes. This turns our attention, once more, to Kepler's *Six-Cornered Snowflake.*

Biology, Chemistry and Physics

Conventionally, there are two ways to separate the domains of biology and physical chemistry. In this transition from "living" to "decomposed," the remains presumably pass, in intellectual title, from the domain of the biologist, to that of the chemist, and, then, to that of the physicist. Or, we have a similar apportionment as we decrease the scale of inquiry of a living process, down to the molecular, the atomic, the nuclear, and the sub-nuclear. Is that biology instructor prating there, himself a subject of biology, chemistry, or physics? Kepler already showed such compartmentalization to be absurd.

An aspect of this old business has been featured in the proceedings of the cold fusion search. Is cold fusion physical chemistry, or is it physics? This is not a new dispute respecting nuclear fusion; Harkins referenced such an issue in 1922.[57] We may look back further than Kepler, to Nicolaus of Cusa on negentropic evolution, a century and a half earlier.[58]

The prevailing professional and common-sense views alike, are aggravated by the recent popularization of a pseudo-science called "information theory."[59] The prevailing such view is that matter in its tiniest aspect is made up of inorganic raw material, whose investigation is the intellectual property of physics. Then, the prevailing view continues, as the modern physicist's primordial super-galactic ooze produces *entropically* the composites called atoms, *chemistry* springs spontaneously (perhaps, *entropically*) into existence, to administer the combining of atoms into molecules. Then, further down the same pathway, we encounter the emergence of *organic chemistry,* and then, *biology.*

Kepler says, "But, that is absurd!" His *Six-Cornered Snowflake* says implicitly, "That is absurd, as I had already shown back in 1620."

At what level of scale[60] does a, *might a,* living organism become merely chemistry or physics, rather than biology? Kepler's physics says, that the

universe as a whole is characteristically *negentropic,* but that a *negentropic* process generates *entropic* processes, such as snowflakes, in addition to *negentropic* (e.g., living) ones.

This paradox is disturbing enough on the level of the virus or bacterium. The leap on this to come, from the simplest plant-life to the highest mammal, less than man, is a mere child's step, when compared with the titanic leap from that highest mammal to *thinking man.* Here, our difficulties are compounded by the consideration that, in this connection, we must consider physical science (including biology) *subjectively,* in the manner we have noted this earlier.

Whatever the level of this or that person's thinking, at this or that moment, in this or that circumstance, the quality of thinking which is characteristic of the successfully self-produced existence or self-reproduced existence of the human species is *hypothesizing the higher hypothesis.* Or, if one wishes to be terribly finicky about this matter, let us say that Plato first made human beings conscious of the process which is identified by *consciousness of* hypothesizing the higher hypothesis.

The immediately relevant points are these: (1) that hypothesizing the higher hypothesis is a *physically efficient* form of *mental* ("spiritual") action; (2) that such modes of thinking are characteristically *negentropic* in both the form of their own self-action, and in terms of the processes definable as their characteristic physical effect; (3) that, these thus-coupled negentropic processes, mental ("spiritual") and physical, are of a *Cantorian Type;* (4) that *this Cantorian Type* corresponds to Plato's *Becoming* at its highest level; and (5) that the physical efficiency of both living processes and hypothesizing the higher hypothesis shows that this *Cantorian Type,* congruent with Plato's *Becoming,* corresponds to a constructible form of intelligible representation of the lawful ordering of the *Becoming* of the universe as a whole process. This includes (6) the implicit acknowledgment, that, for us, as for Plato,[61] as for Cantor,[62] the *Becoming* (e.g., hypothesizing the higher hypothesis) is not the *Good.*

Shift focus briefly, back to the cited issue of the ostensible division of intellectual property-rights over living processes among the biologists, chemists, and physicists. Where does the *Cantorian Type,* which is the mathematical image of *life* itself, emerge in that sort of hierarchical domain of matter? Is it, as vulgar reductionists such as today's "information theory" faddists propose, an organization of "dead matter" according to the sophistical design of that famous Duino Castle suicide, Ludwig Boltzmann.[63] *"Prithee, Professor Information Theorist, on what level does this living form of statistical organization occur? Is it molecular, atomic, nuclear, or sub-nuclear?" The question itself is paradoxical.*

Is it not the case, as Professor Winston Bostick argued under the rubric of the *"l'chaim* particle," that—in respect to most elementary particles ("wavicles") which might be even imagined from the standpoint of the crucial-experimental evidence of ultra-high energy-density plasma physics—"matter" has the kind of dual effect portrayed in the *Six-Cornered Snowflake?*[64] Is not our universe, from the largest expanse, to the smallest *monad,*[65] predominantly *negentropic*—as Cusa,[66] Leonardo, Kepler, and Leibniz agree?

This *negentropy,* insofar as we define it as a mathematical image of the characteristic of living processes, is a *Cantorian Type.* It is a *Type* of efficient action which transforms ostensibly non-living, to living processes, by means of biological reproduction and metabolism. It is also the *Type* of action characteristic of successfully hypothesizing the higher hypothesis or, to use a simpler term for that, *creative reason.*

Thus, *creative reason* is of the same Cantorian Type as *life.* However, creative reason also acts upon *the Type of ordering* which is life; thus,

creative reason (hypothesizing the higher hypothesis) is of a higher Cantorian Type than merely living processes.

If, then, these Types of action are efficient causation in the universe, how must we conceive the "laws" of the universe? Add to this, that this Type is also the form of *Becoming* which bounds the universe, according to Cusa, Leonardo, Kepler, and Leibniz.[67] Thus, is it not appropriate, to seek the form of the "laws" of the universe, within the *subjective* process of *hypothesizing the higher hypothesis—creative reasoning?*

Why is it that Plato is relatively a more powerful scientific thinker than any scientist of the nineteenth and twentieth centuries? Why are Cusa and Leonardo similar cases? Or Kepler? Or Leibniz? The characteristic feature of their most relevant writings, is conscious reflection upon *hypothesizing the higher hypothesis.* Leibniz's two published Platonic dialogues[68] illustrate this point. We see this quality in his polemical warnings against the deadly, infectious errors of Cartesianism,[69] as in the succinct *Monadology.* From a familiarity with this explicit feature of the work of Plato,[70] Augustinus,[71] Cusa, and Leibniz on this point, one is tuned to recognize the same distinctive Cantorian Type of *creative reasoning* in the work of all among the leading figures of the Plato-Augustinus-Cusa-Leonardo-Leibniz tradition. This is the method presented ever more explicitly by Cantor in his papers and key letters from the 1883 *Grundlagen* on.

The most common, and relevant, observed weakness or "blocks" in the creative work of accomplished and other gifted scientific workers,[72] is a show of fear, sometimes approaching terror, that they might not be considered "sufficiently objective" by their professional peers. Under suitable circumstances,[73] it is often demonstrated that the best work of these scientists has been the fruit of a "classical" scientific emphasis on the "subjective side," i.e., *hypothesizing the higher hypothesis.* It could not be otherwise; no profound discovery could be produced but "subjectively."

Look back the greater part of this century, to the spectacle of putatively respectable academics behaving like a pack of hyenas, attacking a scientist of such eminent distinction as Professor Max Planck, over Planck's differences with the doubtful Ernst Mach. Planck's written work shows the scars of that and earlier experiences with a pack of positivist hooligans who have seized most of the parapets of official science over the course of the recent hundred-odd years.[74] See how Planck defers, reluctantly, to the positivist radicals' fanatical insistence upon "objective science."

Planck's defense of the "Second Law of Thermodynamics"[75] is a case in point. What he says of the kind of experimental material to which he refers, is not untrue, to say the least.[76] The problem lies in what he omits to say. Kepler's *Six-Cornered Snowflake* insists that snowflakes are six-cornered—i.e., "entropic." Planck really proves nothing, respecting the Clausius-Kelvin "Second Law," by repeating the fact, that certain (Cantorian) Types of processes are *entropic.*[77] What of the different, negentropic Types which are not? Such are the effects of the positivist Buggers roving the premises of our universities, laboratories, and professional journals.

That point deserves, but shall not enjoy, further treatment here. The point is sufficiently well made for our purposes: *How do those two, negentropic (Cantorian) Types, life and creative reason, bear upon solution for the three-body problem?*

The Geometry of Creative Reason

If those successive, successful scientific revolutions (both greater and lesser), which are effected by (in effect) hypothesizing the higher hypothesis, do correlate with increases in the rate of growth of potential popula-

tion-density, then the successive changes within scientific thinking which are so effected, are a kind of reflection of the laws of the universe as a whole.

It must be emphasized, that we are not referencing "absolute laws" of the universe, but only the *lawfulness* which is characteristic of the universe experienced by the human intellect as "a process of Becoming." Cantor's distinction between the *transfinite* "actual infinite" and the "absolute infinite," is in force on this point.

These changes in scientific thinking occur as directly communicable ideas within the framework of three overlapping qualities of language: (1) what we ordinarily signify by "language," the language of speech and writing; (2) the language of vision and of mathematics, a constructive geometry based upon the principle of rotation, and incorporating thus Leibniz's definition of *analysis situs;*[78] and (3) the language of music, of well-tempered, polyphonic harmonics.[79]

One must resist any temptation to regard these three aspects of communicable language as constituting the "medium of thought." Also it would be an exaggeration even to suggest that these are the scope of communicable thought; I need but wink while speaking, to discredit such an exaggeration. Only after making such qualifications, we can agree, that most of what speech might convey by aid of winking, smiling, shouting, growling, or gesticulating in other ways, can be incorporated into a written communication. This writing will first accomplish its ends more richly if both communicating parties were literate in the devices of classical poetry, since a classical poem is also a musical score according to classical principles governing vocalization.[80]

Let us assume now all that might be done to communicate conceptions using the overlay of these three primary aspects of language. By aid of this setting, examine the scientific lawfulness of our physical universe from the subjective side of human knowledge.

The human mind in its self-degraded state resembles a Hollywood "soap opera." In its nobler state, it is a Platonic dialogue. The Platonic dialogue, and its dialectical method, are better introduced by comparing it to classical dramatic tragedy. By classical tragedy, we mean to include Aeschylos' *Prometheus*, and *The House of Atreus*; Christopher Marlowe's plaintive *Jew of Malta* and his *Dr. Faustus*; the best of the Shakespeare tragedies; some Lessing; and the greatest dramatic tragedies ever composed, those of Friedrich Schiller.[81] We should also include the *Don Quixote* of Miguel Cervantes, which is both a great tragedy, a Platonic dialogue, as well as one of the greatest dramas written. *The secret of scientific discovery is to be learned from these dramas.*

A great tragedy includes certain key plot-elements which bear more or less correctly on the issue of scientific discovery:

(1) A nation is headed toward the brink of a catastrophe. The cause of this danger is the composition of that nation's established institutions, and, more emphatically, the generally accepted way which virtually all the people of that nation customarily behave and think (like the United States under President George Bush).

This danger arises not so much from any past or imminent events. The cause of this danger, in this scenario, is the decision which the nation is almost certain to make, in response to some impending event. The essential threat comes not from the impending event itself, but from the consequences of the decision which *custom* will almost assuredly cause a people to choose.

(2) The decisions of the nation are treated by the tragedy as analogous to the theorems of a formal geometry. As long as the nations accept the

generally accepted opinion (the axioms and postulates of that "geometry"), they will respond to any event with a decision ("theorem") which is consistent with that set of customary, underlying opinion.

(3) The hero of the tragedy is the figure situated such that he (or she) might save the nation, by preventing the nation from adopting that customary quality of decision. This hero will fail to do that; the fatal consequence will result.

(4) The task of the artist who composes this tragic drama, is to bring the audience to see that scenario in these terms of reference.

The successful composer of such dramas, presents to his audience all of the *recognizable* elements of a solution: a possible decision by the hero, which will avert the otherwise certain chain-reaction of disaster. These must be made *recognizable* to the audience. The failure of the hero to follow that course, engages the attention of the audience. The tracing of the inner workings of the hero's mind becomes a principal focus of the audience's attention. The fact that the hero is following custom toward looming disaster becomes, thus, a focus.

The audience thus becomes a conscious agency, conscious of the ongoing consciousness of the character portrayed on stage. The more sensible parts of the audience see the connection between customary opinion and the theorem of the ill-fated, tragic decision.

Without the tragic ending, the drama would be a moral failure. It is the keen awareness of the tragic consequences of custom, under conditions of looming crisis, which impels the audience to examine the custom within its own, the audience's, assumptions. Thus, the artistic purpose of great tragedy, is to send the audiences out from the end-scene, post-performance theater, as better people than they entered it, a few hours earlier. On this account, Schiller succeeded like no one before him.

A Platonic dialogue is such a drama. Really great actors could render a credible and moving performance of any among the later (post-*Republic*) dialogues.[82] Good actors, perhaps good amateurs, should be employed in such dramatic presentations of some selected dialogues of Plato, if only to provide audiences a sensuous experience of the reality and power of these works as drama of a very high artistic quality.

The essential feature of Plato's Socratic dialogue as a scientific method, is the conscious seeing of one's own conscious processes, through seeing others' consciousness of one's own conscious processes. Out of this arises *hypothesis, higher hypothesis, and hypothesizing the higher hypothesis.* Also, it should be recognized at this point, that the hierarchy of Cantorian Types is a hierarchy corresponding to that of the Platonic dialogues' escalating configuration of a *recursive* process of consciousness of consciousness. Better said, it were "a recursive process of *willful* consciousness of *willful* consciousness."

To this organization of the dialogue, a problem must be supplied, a task-orientation. Let science be the task-orientation. Let rendering existence intelligible through constructive geometry, be the task-orientation. Then, you have the kernel of science in Plato, Cusa, Leonardo, Kepler, Leibniz, and . . . Cantor.

The task is to increase the rate of growth of mankind's potential population-density through willfully conscious scientific progress. The willfully conscious, willfully recursive consciousness of the process which the structured Platonic dialogue undergoes in the course of effecting successive such successful changes, is the *subjective* essence of true science. It is the only honest science, because it is the only form of science which is fully conscious of its own subjectivity.

"Why did we fail?" "What did we overlook?" "What false assumptions

misled us?" "What steps did we skip over?" "Did we commit the sophomoric idiocy, of equating asymptotic convergence with equivalence?" And, so on, and so on.

As we showed in our discussion at the blackboard, in the preceding chapter, scientific progress moves forward in two directions: forward, through successive, non-linear transformations in the principle of hypothesis; and upward, through advances in hypothesizing the higher hypothesis. The single principle which, in each instance, defines that ordered succession is a distinct negentropic *Type*, a *Cantorian Type*.[83]

For example, the subjects of Platonic dialogue are, typically, spoken language, constructive geometry, and well-tempered[84] musical harmonics. This is exemplary of *Platonic dialectical self-consciousness: willful consciousness of one's own willful self-consciousness*. There is nothing accidental in this, or its result.

The human being is the living individual, whose characteristic morphology of growth and organ movement, is harmonic orderings which are congruent with the Golden Section. This form is characteristic of living processes, and also of the universe as a whole. This form is represented by a rigorous constructive geometry, a geometry based "axiomatically" upon the "non-algebraic," "transcendental" principle of rotation, and is imbued so with the quality of Leibniz's elementary *analysis situs*. This form imparts to *least-action* form of vocalization by the healthy human speaking/ singing apparatus, a well-tempered, polyphonic[85] harmonic ordering, which is the normal musical characteristic of a poetically composed and uttered form of speech. The spoken language itself is a mathematical physics, a physical space-time language. These features of language are natural terms of representation of the conceptions of physical science: geometry, musical harmony, space-time.

This brings us back to the second aspect of the matter of human Type, the Type of efficient creative reason, efficient hypothesizing the higher hypothesis.

This type of action in the mind is efficient cause in the physical relationship of mankind with the universe. It is efficient cause within the universe. Furthermore, it is in the image of the negentropic bounding of the universe as a whole.

That is what the empiricist Buggers, the Enlightenment materialists, reject. That is what Newton rejects with his *"hypotheses non fingo."* That is what the Cartesians reject with their gnostic Bugger's *deus ex machina*.

To separate spirit (mind) from matter, as the usury-practicing Buggers prescribe, they reject the determination by the Golden Section, and the derived harmonic ordering of the relatively "force-free" orbits. That is explicitly the reason Newton incurs the three-body paradox.

The Alternative to Newton

Although Newton stole[86] his formula for gravitation, as a derivation of Cusa's inverse-square law, and Kepler's Third Law, certain useful artifacts have been attached to the empiricist's plagiaristic perversions in this and other instances. For reason of those useful attachments, so the explanation runs, professionals defend the perversion itself.

We lost much more—to such sink-holes as the three-body paradox— when we tolerated the discarding of Kepler's work in general, and the "diophantine" principle of harmonic ordering in particular. Perhaps more significant, we failed to address adequately the deeper implications of the tautochrone/brachistochrone phenomenon.

Do particles act directly "at a distance" upon one another? Would we lose the mathematical phenomena we use to suggest they do, if they did not? As we enter the domain of 10^{-8} to 10^{-12} meters and smaller, there is much to suggest we should throw away the mystique of "action at a distance."

The obvious alternative to "action at a distance" is twofold, as follows.

First, there is no three-body paradox in the original, Kepler theory of gravitation, because Keplerian space-time is harmonically ordered. This much is virtually settled.

In this case, the "relatively force-free" or "least-action" pathways define relations between two objects in the same such pathway, or in different pathways of the same harmonically ordered series. The functions will correlate in a way which should not be interpreted as action at a distance. This leads us to consider a second possibility, case two:

Second, if the particular, the singularity (the microcosm), is in efficient interaction with the macrocosm, then through the medium of this connection, singularity "A" will affect other singularities of that same macrocosm, as efficiently as might be supposed to be the case, were it solely in direct interaction with B, or C, or D, or. . . . Thus, may we not go beyond the certainty of the first case, to inspect also this second?

That is not to end this matter, but rather, to set the stage for beginning our summary treatment of this issue.

Reconsider these just-described first and second cases, from the standpoint referenced earlier, the standpoint of *creative reason,* or *hypothesizing the higher hypothesis.* Consider *such creative reason* as a Cantorian Type of *causation.* That is to say: Instead of limiting causation to the notion of "exerting force" against objects, conceive of *change per se* as a form of causation.

To render more clearly intelligible this notion of "change per se," let us borrow briefly from the appropriate medium, the medium of Plato's Socratic dialogue. Consider the transmission of a valid, crucial scientific discovery, generated within one sovereign creative mind, to be assimilated efficiently for successively improved (changed) practice by other minds. How does this causal process of spiritual change function to such material effect? What medium is employed to communicate a spiritual change to such efficient material effect?

The medium used is language: spoken and written language, geometry, and music. Is there any *Cantorian Type* of change located in the particles of language as such? Does the combination of such particles embody this Cantorian Type of change? Neither! Then, how is the change communicated via language, if it is rather simply shown, that language cannot contain explicitly such an embodiment of change? Similarly it is shown, as the case of the 2^n polygon series illustrates, that no combination of these particles could represent such change. The change is of a different Type than can be achieved by construction of the mere particles of language.

Turn to classical poetry for a clue. The essence of classical poetry and of all good prose composition, is *irony,* irony as exemplified by *metaphor.* Irony is like a crucial experiment. In a manner of speaking, by means of a successful crucial or *unique* experiment,[87] we tease out of nature a response which she, nature, has hitherto been reluctant to reveal explicitly to us. What do we use to this effect? What but an apparatus assembled of components of which none is unknown to us, as in the case of an experimental apparatus. Where lies the crucial experiment, then? It lies in the relationship between our creative reason and the *reason in nature.* Our mind believes that nature has a reason embodied within it, command-

ing it, which, if addressed in a certain manner, will prompt the voice of nature's reason to speak and act in a certain manner, to a certain effect.

In Socratic dialogue, language becomes a medium for transmitting what the medium of language itself cannot contain or replicate. Such was the folly of Professor Norbert Wiener, and all the fools who credulously follow him, not to recognize, that no measurement of language can measure the intelligence transmitted from one mind to another by means of the employment of that language-medium. The essential communication of creative reason is by resort to *irony*, essentially by resort to *metaphor*.

The thus formal demonstration of this point is the work of the great pedagogue. The more the educational system mistakes the "transmission of information" for education, the more we'll accelerate the past twenty years' tendency in our public school system and universities, to graduate successfully useless, utterly uncreative babblers of "political correctness." The great teacher guides the pupils to relive selected, crucial mental experiences of the greatest intellects from the past.

Types again! "Information," as Norbert Wiener, as a dictionary nominalist, and so on, define it, is *linear*, intrinsically so. No true *intelligence* could ever be embedded in mere "information." Look at the child reliving the experience of Pythagoras, Plato, Archimedes, in discovering afresh the solution to a geometry problem those great ancient minds solved similarly about two-and-a-half thousand years ago. There is the transmission of *true intelligence*. There is the process of *negation*, sometimes named ironically irony, or metaphor, by means of which the creative reason in the mind provokes a resonant response in another mind.

That suffices, not to define adequately the Cantorian Type of creative reason. It suffices merely to indicate the rules of the ball park in which we are playing. It is that ironical method of bypassing the limitations of a mere medium, that creative reason in one sovereign intellect might provoke resonance in another, which is the feature of the causal Type which we have intended to illustrate so. My creative reason knows the nature (Type) of another creative reason. The concept cannot be transmitted across the intervening medium which separates those intellects. A non-linear image cannot be transmitted by means of a channel of only linear band-paths, but the linear channel may be used to *signal* the message *ironically*.

Given, a space-time which may be reasonably "cartooned" as Kepler's *Six-Cornered Snowflake* does. That space-time is super-densely packed with *negentropy*—e.g., the type of living processes' morphology of function, with Professor Bostick's "*l'chaim* particle." How do these existences interact? Linearly? Not possible! Yet, each acts upon the space-time with which all singularities in that space-time interact. In other words, the interaction which may be misinterpreted as "action at a distance," is producing the latter, misleading, linear appearance as the mere "snowflakes" of Keplerian space-time, as the "detritus" of the actual, primary relationship.

"Then, correlation or causation: If the figures jive, what difference does it make?" cavils our positivist. As we enter the extremes of astrophysics, microphysics, or any other phase of negentropic harmonic ordering, the linear model fails. To the extent we attempt to project linearity there, we fail.

Finally, in this connection, the following. The cult of *"hypotheses non fingo"* has often taken the formation of the reductionist's snarling objection to "excessive reliance upon geometrical reasoning." Hence, the "New Math" fad, and the calculated lunacies of that Club of Rome founder Dr.

Alexander King's 1963 OECD education program, had pushed geometry, and competence, from our secondary schools and universities.[88]

Notes

1. Sir Edmund Whittaker reports the following in his book *A History of the Theories of Aether & Electricity, Vol. I: The Classical Theories,* (New York: Harper & Brothers, 1960), p. 56: "A suggestion of the inverse-square law of attraction between magnetic poles had been made by the Cardinal Nicolaus of Cusa (1401-64) in 1450; cf. *Nicolai de Cusa Opera Omnia,* ed. L. Bauer (Lipsiae, 1937), Vol. V, p. 127."

2. The reference here is to the *camera oscura* (or "pinhole") optics work of Filippo Brunelleschi, the builder of the Cathedral Dome of Florence, as it is described by his contemporaries, including Antonio di Tuccio Manetti in his 1480s *Life of Brunelleschi.* In one example, Brunelleschi made a painting of a Florentine church and piazza before it, and defined the perspective point of the painting by making a hole in it, which was tiny on the painted side, but led into a cone through the painting's thickness and thus was coin-sized on the back side, so as to be an eye-hole. This eye-hole was to be used to view the painting from behind it, using a mirror held in the viewer's hand a certain distance from the painted side. This arrangement provided such perfect perspective that Manetti reports he could not distinguish looking at the painting in this way, from looking at the scene itself.

In order to create this extraordinarily lifelike representation as to both perspective and size (as well, of course, as in respect to skill in painting), Brunelleschi had to use an optical inverse-square law to determine how far from the painting the viewer was to hold the mirror, relative to the size of the painting, the size of the church-and-piazza area painted, and the viewing distance from which Brunelleschi painted the scene in the first place.

3. Winston Bostick, "The Pinch Effect Revisited," in *Executive Intelligence Review,* Feb. 8, 15, and 22, 1991, Vol. 18, Nos. 6, 7, and 8. (Reprinted from *International Journal of Fusion Energy,* Vol. 1, No. 1, March 1977.)

4. The derivation of Newton's inverse-square law of gravitation from Kepler's Third Law is as follows: Kepler's Third Law states, that the cube of the mean radius (a) for any planet, divided by the period (T) of the planet squared equals a constant (k).

(1) Kepler's Third Law:

$$a^3/T^2=k$$

(2) The speed or velocity of a planet in terms of the radius of the circular orbit (assume circular rather than the almost circular elliptical orbit of the planets) and the period is:

$$v=2\pi r/T$$

where v = speed of planet;

r = the radius of a circular orbit;

T = period time for one revolution.

(3) Christiaan Huygens (1629-1695) had shown centrifugal acceleration to be:

$$A=v^2/r$$

where A=acceleration.

(4) Since $F=mA$, $F=mv^2$.

where F=force;

m=mass;
A=acceleration.

From equation (2):

$$v=2\pi r/T \text{ thus } v^2=4\pi^2 r^2/T^2.$$

From equation (1):

$$a^3/T^2=k \text{ or } T^2=a^3/k.$$

Since the orbits of the planets are nearly circular, assume a=r, so

$$T^2=r^3/k.$$

By substituting this value for T^2 into the value for v^2—i.e.,

$$v^2=4\pi^2 r^2/T^2$$

the result is

$$v^2=4k\pi^2/r.$$

Now take this value for v^2 and substitute it in the value for $F=mv^2/r$. The result of this final substitution gives you the inverse square relationship in Newton's law of gravitation. So

$$F=4\pi^2 km/r^2.$$

The preceding derivation shows how the inverse-square laws and Newton's Law for Universal Gravitation can be derived from Kepler's Third Law, assuming the orbits of the planets are circular, rather than the nearly circular ellipses that they are. It is generally accepted that Kepler's Second Law of constant real velocity had indicated to Newton, that whatever forces were acting on the planets were directed toward the Sun instead of tangentially to their paths.

Furthermore, Kepler had proposed this proportionality of masses and a force relationship in his 1609 *Astronomia Nova*. Kepler writes, "If two stones were removed to any part of the world, near each other but outside the field of force of a third related body, then the two stones, like two magnetic bodies, would come together at some intermediate place, each approaching the other through a distance proportional to the mass [moles] of the other." E. Hoppe claims the concept of mass, not for Newton, but for Kepler, who designates it by the word *moles*.

5. *Ibid.*

6. In Kepler's *Mysterium Cosmographicum* of 1596, in which he first described the structure of solar system orbits in terms of the geometry of the Platonic solids, he also stated that this required a new understanding of the principle which caused the *action*, or motion, of this system, and hypothesized that it was a force emanating from the Sun, by which the planetary bodies were propelled in their orbits around the Sun, and which expressed by the degree of force, the position of each orbit. This "gravitation" was later further defined by Kepler's discovery of his first two laws of motion in 1609, and his publication of his three laws of motion in *Harmonices Mundi* (Harmonies of the Universe) (1619).

7. In the summer of 1801 the great mathematician Carl Gauss became acquainted with the astronomical discovery of the small planet Ceres. After Ceres, coming too close to the Sun, became invisible, Gauss developed new methods for calculating the orbit of Ceres. Gauss applied his new methods to the discoveries of other small planets, Pallas in 1802, and Vesta in 1807. Gauss, recognizing that there are no two-body problems in the solar system, but n-body problems where other planets attract a given planet, and perturb the elliptical orbit, applied his mathematical genius to the problem. In 1818, Gauss published a paper on the theory of perturbations. Gauss determined the distribution of mass on the circumference of the ellipse by assuming a distribution of the mass according to Kepler's Second Law, the law of constant

real velocity: Equal amounts of mass will be distributed on that length of the ellipse that requires equal times.

Pair-wise interactions and point masses—Newton's method—did not and could not predict the existence of Ceres and Pallas, as Kepler's method did. For Newton, mass is primary and the size of the two masses determines the orbit of the planet. For Kepler, the mass is determined by the orbit and the orbit is determined by the curvature of physical space-time. For Kepler, musical harmonies and the uniqueness of the five Platonic solids were the keys to determining why certain orbits were permissible, and others not. From these conceptions, Kepler developed his three planetary laws. God's universe flows from a principle of sufficient reason, which has manifested itself in the universe through the musical harmonies and the Platonic solids. From this standpoint, Kepler developed his three laws by exploring least action/least time/isoperimetrical qualities that the Creator has built into His creation. Kepler's solutions work for the multi-body problem presented by our planetary system.

Newton's point-mass/pair-wise interaction approach falls apart as soon as the three-body problem appears. It also falls apart if we think of the simple problems presented by modern spectroscopy. Electrons revolving around a nucleus of an element in the gaseous state emit and absorb light at definite frequencies, which are characteristic of the element making up the gas. This is how spectroscopy can identify the gaseous elements of which planets are composed. There are many possible orbits around a nucleus. In some orbits electrons circle faster than in others. Why do electrons only circle in those orbits which have the assigned frequencies, and why do orbits only have an assigned frequency? Furthermore, the collisions of atoms in a gas are occurring at 10^{12} times per second, which creates a large amount of heat energy. The impacts are powerful and should change the orbits of the electron completely, in respect to size, shape, and frequency, were Newton's force prescriptions to apply. This does not occur, because the orbits are determined by a more fundamental process, the curvature of physical space-time, and not some simplistic notion of pair-wise interactions of point masses.

8. Johannes Kepler, *Harmonices Mundi* (1619).

9. Kepler's explication of these values is in *Harmonices Mundi*, where he replaces his earlier circular planetary orbits—derived from the spheres circumscribing and inscribing the five Platonic solids—with ellipses, conic sections which give harmonic intervals because the points of the orbits which are nearest and farthest from the Sun are in an harmonic ratio. This ratio can be determined for the orbit of each planet, and Kepler's values for the angular velocities of the planets at these points are extremely close to those arrived at with modern astronomical methods of measurement. Gauss' further development was expressed in his early paper, *Theory of the Motion of the Heavenly Bodies Revolving Around the Sun in Conic Sections*. This was written in 1809, after Gauss' success in calculating the orbits of Pallas, Ceres, and other asteroids discovered in the first decade of the nineteenth century.

The table on page 80 shows for each planetary orbit the angular velocity of the planet at the most distant point of the ellipse (aphelion), and at the closest point to the Sun (perihelion); and then in the third column the ratio derived from them, with the musical intervals to which the ratios correspond. For Mercury through Saturn, the source is Kepler's *Harmonices Mundi*; for Ceres and the planets discovered since Kepler's death, the source is modern astronomical data.

10. The terms "essentially accurate" are used here to indicate the lack of

Kepler's Harmonies of the Planets

Planet		Apparent angular velocity	Interval (period/aphelion)
Mercury	perihelion	384'00"	12:5=octave
	aphelion	164'00"	+ minor third
Venus	perihelion	97'37"	25:24= diesis
	aphelion	94'50"	
Earth	perihelion	61'18"	16:15=semitone
	aphelion	57'03"	
Mars	perihelion	38'01"	3:2=fifth
	aphelion	26'14"	
Ceres	perihelion	15'06"	1:0.7111=
(asteroid)	aphelion	11'00"	"devil's interval"
Jupiter	perihelion	5'30"	6:5=minor third
	aphelion	4'30"	
Saturn	perihelion	2'15"	5:4=major third
	aphelion	1'46"	
Uranus	perihelion	0'46"	6:5=minor third
	aphelion	0'39"	
Neptune	perihelion	0'22"	25:24=diesis
	aphelion	0'21"	
Pluto	perihelion	0'24"	octave +
	aphelion	0'08.7"	"devil's interval"

Kepler's diesis = 0.96 = half-step from E to E-flat
Semitone = 0.9375 = half-step from B to C
Kepler's "devil's interval" = 1:0.7111
Modern Ceres Data = 1:0.7278 Modern Pluto data = 1:0.7250 + octave

Sources: For Mercury through Saturn; Johannes Kepler, *Harmonici Mundi*. For Ceres through Pluto; modern astronomical data.

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precise correspondence between the orbits and Kepler's calculations and to distinguish such mathematical precision from the fact that conceptually Kepler's determination, although a first approximation, was correct as a first approximation, whereas the contrary views of all his critics were in error.

11. Kepler's successes were not mathematically perfect, but relative to all his critics, they were a first approximation of the correct answer, whereas all of his critics were absolutely flatly wrong.

12. Sir Isaac Newton, in his *Principia Mathematica* (The Mathematical Principles of Natural Philosophy) (New York: The New York Philosophical Society, 1964), stated that "*hypotheses non fingo*" ("I don't make hypotheses"), and explained his reasons for this on grounds of *induction* versus hypothesis.
 Newton wrote:

In the preceding books I have laid down the principles of philosophy; principles not philosophical, but mathematical. . . . It remains that, from the same principles, I now demonstrate the frame of the System of the World. . . . For since the qualities of bodies are only known to us by experiments, we are to hold for universal all such as are not liable to diminution, can never be quite taken away. We are certainly not to

relinquish the evidence of experiments for the sake of dreams and vain fictions of our own devising; nor are we to recede from the analogy of Nature, which uses to be simple, and always consonant to itself. We no other way know the extension of bodies than by our senses, nor do these reach it in all bodies; but because we perceive extension in all that are sensible, therefore we ascribe it universally to all others also. That abundance of bodies are hard, we learn by experience; and because the hardness of the whole arises from the hardness of the parts, we therefore justly infer the hardness of the undivided particles not only of the bodies we feel but of all others. That all bodies are impenetrable, we gather not from reason, but from sensation.

13. In his *Contributions to the Founding of the Theory of Transfinite Numbers*, Georg Cantor wrote:

"The concept of 'ordinal Type' developed here, when it is transferred in like manner to 'multiply ordered aggregates,' embraces, in conjunction with the concept of 'cardinal number' or 'power' . . . everything capable of being numbered that is thinkable, and in this sense *cannot* be further generalized. It contains nothing arbitrary, but is the natural extension of the concept of number" (emphasis added). Georg Cantor, *Contributions to the Founding of the Theory of Transfinite Numbers* (Beiträge zur Begründung der transfiniten Mengenlehre), trans. by Philip Jourdain (New York: Dover Publications, 1955), p. 117.

Further discussion of Cantor's work can be found in Dino De Paoli, "Georg Cantor's Contribution to the Study of Human Mind," *21st Century Science & Technology*, Summer 1991, pp. 37-54.

14. Newton called *fluxions* and *inverse fluxions* his method of correlating the coordinates of a moving point in Cartesian space, with the motion and direction of the point. He said later that he devised this method in 1666, but no publication of it appeared until his *Principia Mathematica* in 1687, twenty years later. Newton also said that he wrote a manuscript on *fluxions* in 1669, *De Analysi per Aequationes Numero Terminorum Infinitas*, but this manuscript was not published until 1711, more than 40 years later.

15. For Leibniz's discussion of Newton's pseudo-calculus, see "The Controversy between Leibniz and Clarke," pp. 1095-169, in Leroy E. Loemker, *Gottfried Wilhelm Leibniz Philosophical Papers and Letters*, Vol. II (Chicago: University of Chicago Press, 1956).

16. Huygens, in exploring the isochronic property of the cycloid, and the fact that the evolute of a cycloid is another cycloid, discovered that he could design a pendulum clock that wrapped around sheaths in the shape of a cycloid, which would be perfectly isochronic and therefore keep accurate time.

The proof that the path of quickest descent is the cycloid, was a *tour de force* for the Leibniz-Huygens-Bernoulli faction against the Newtonians and Cartesians.

Christiaan Huygens, *The Pendulum Clock, or Geometrical Demonstrations Concerning the Motion of Pendula as Applied to Clocks*, published in Paris as *Horologium Oscillatorium* in 1673, trans. by Richard J. Blackwell (Ames: The Iowa State University Press, 1986); and Gilles de Roberval, "The Cycloid," from *Treatise on Indivisibles*, trans. by Evelyn Walker (New York: Teachers College, 1932), and quoted in Dirk J. Struik, ed. *A Sourcebook in Mathematics 1200-1800* (Princeton, N.J.: Princeton University Press, 1986).
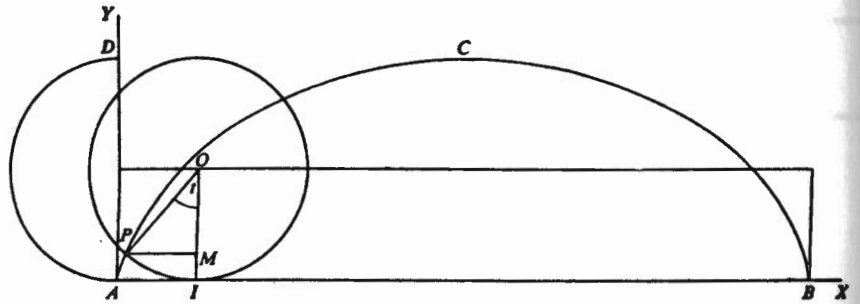
The diagram shows the generation of a cycloid, when a circle O rolls on a line AB from A to B. The point P on the circle, having started at A, is seen to move, as the circle rolls, to P and along the solid line to C and down to B. This path of point P is the cycloid, which here is shown as a path of ascent. If the circle rolled underneath the line, the cycloid would be a path of descent. The cycloid is also the fastest path of curvature of a light beam which enters a medium of steadily changing density; thus the light beam will follow that path.

17. The actual development of the so-called "universal" Second Law of Thermodynamics is the following.

In 1850, Rudolf Clausius wrote his first article in *Annalen der Physik*, No. 79, discussing the theory of heat. Clausius' book was without experimental proof, and was also without any reference to a "universal law."

Then in 1852, William Thomson (later Lord Kelvin), who had previously translated the work of the great French engineer and scientist Sadi Carnot into English, wrote an article for the *Edinburgh Philosophical Magazine*, titled "On a Universal Tendency in Nature to the Dissipation of Mechanical Energy." (Vol. IV, No. 4, p. 304). Thomson's article consisted of ideological speculations on the experimental work on heat-powered machines of Sadi Carnot, in which Thomson had not participated. In that article, Thomson postulated that the universe, since it was nothing but a machine, would one day run down, and that man could not do anything about it.

In 1854, Thomson's friend Helmholtz used the same thesis in his *On the Transformation of Natural Forces*.

Finally, Clausius, in the second (1865) edition of his book, *after a meeting with Thomson,* concluded the book with the now-famous two axioms: 1) the energy of the universe is constant; 2) the entropy of the universe tends toward a maximum.

18. In Newton's 1704 *Opticks*, "Query 31," he acknowledges that the universe as defined by his mathematics requires an unknown force to create motion or action in it: "The *vis inertiae* is a passive Principle by which Bodies persist in their Motion or Rest, receive Motion in proportion to the Force impressing it, and resist as much as they are resisted. By this Principle alone there could never have been any Motion in the World. Some other Principle was necessary for putting Bodies into Motion." And later in that "Query" he identifies "the Wisdom and Skill of a powerful, ever-living Agent, who being in all Places, is more able by his Will to move the Bodies within his boundless uniform Sensorium, and thereby to form and reform the Parts of the Universe. . . ." Sir Isaac Newton, *Opticks* (New York: Dover Publications, 1952).

19. Leibniz's commentary on this view of Newton is in his first letter to Clarke, from 1715: "Sir Isaac Newton and his followers have also a very odd opinion concerning the work of God. According to their doctrine, God

Almighty wants to wind up his watch from time to time; otherwise it would cease to move." In Clarke's reply, he acknowledges that God "not only composes or puts things together but is himself the author and continual preserver of their original forces or moving powers." Leibniz, *Philosophical Papers and Letters*, Vol. II, *op. cit.*

20. See Chapter II, the quote from Johann Bernoulli on page 30, and footnote 4 of that chapter.

21. The reference here to the uniqueness of the Platonic solids is not intended to ignore the relevant star figures or the Archimedean series. However, the principle which determines the five Platonic solids' characteristics as given is the same principle which determines the characteristics of the star figures and the Archimedean solids.

22. For a further elaboration of this, see Gottfried Leibniz, *On Analysis Situs*, in *Gottfried Wilhelm Leibniz Philosophical Papers and Letters*, Vol. I, *op. cit.* See also Louis Poinsot, *Memoirs on Polygons and Polyhedra*, (*Mémoires sur les Polygons and les Polyhedras*) (1809), trans. by Laurence Hecht, *21st Century Science & Technology* manuscript, not published; and Bernhard Riemann, *Analysis Situs*, in *Riemann's Mathematische Werke*, ed. by Heinrich Weber.

23. By folding the circle against itself, we generate a straight line. By folding such lines we generate points. These definitions of lines and points generated by folding (rotation) are what are signified here.

24. Roberval, "The Cycloid," see note 16 above.

25. See Chapter II, note 45 for the section of Cusa's *De Docta Ignorantia* in which this is done.

26. A good encyclopedia of curves for reference of pupils and teachers is Robert C. Yates, *Curves and Their Properties* (Reston, Va.: National Council of Teachers of Mathematics, 1974).

27. This is clear in Kepler's own drawings for Chapter 1 of *Mysterium Cosmographicum*. The planetary orbits are calculated as "belts" or "tubes" defined by the construction of circular action around an idealized circular orbit. The development of this idea through the correction from circular to elliptical orbits, leads to Carl Gauss' *Theory of the Motion of the Heavenly Bodies Revolving around the Sun in Conic Sections* (1809).

28. What is commonly known as *mathematical analysis* is analysis of *magnitude*, not of *situation*, and as such it pertains directly and immediately to arithmetic but is applicable to geometry only in an indirect sense. The result is that many things easily become clear through a consideration of situation, which the algebraic calculus shows only with greater difficulty. To reduce geometric problems to algebra, i.e., to reduce problems determined by figures to equations, is often a rather prolonged affair, and further complications and difficulties are necessary to return from the equation to the construction, from algebra back to geometry. Often, too, the constructions produced in this way are not entirely appropriate, unless we are lucky enough to stumble upon unforeseen postulates and assumptions. This Descartes himself tacitly admitted in solving a certain problem of Pappus in Book III of his *Geometry*. In fact algebra, whether using numbers or symbols, adds, subtracts, multiplies, divides, extracts roots, all of which are arithmetical. For *logistics* itself, or the

science of magnitude and proportion in general, deals only with general or indeterminate number and with the species of operations performed on it, since *magnitude* is in fact measured by the number of determinate parts, yet this number may vary for the same fixed thing, depending upon which measure or unit is assumed. It is not surprising, therefore, that the science of magnitude in general is a kind of arithmetic, since it deals with indeterminate numbers. From Leibniz, *On Analysis Situs, op. cit.*, p. 254.

29. Louis Poinsot, *op. cit.*

30. Roberval, see footnote 16 above.

31. In Kepler's *Harmonices Mundi*, Chapter 3.

32. Huygens, *op. cit.*, pp. 73-104. See footnote 16.

33. *Ibid.*

34. See footnote 13 above.

35. Bertrand Russell's "Theory of Types" in his *Principles of Mathematics* (Boston: W.W. Norton & Co., 1903), p. 104 and Appendix B.

36. This project for "Unification of the Sciences" was launched by Russell and Hutchins (later President of the University of Chicago, prime enforcer of Aristotle's views in "great books" and "great ideas" programs in American schools, and a major figure in the "sociological" monitoring of the testing of the effects of psychedelic drugs) with a 1938 meeting at the University of Pennsylvania. In that year after the success of their joint efforts in launching Britain's Peace-Pledge Union, Crowleyite satanist Aldous Huxley and Bertrand Russell launched another foray into their favorite victim, the United States. Huxley went where satanists and kindred folk prefer to seek pleasure, the Hollywood film community. Russell teamed with Chicago University's Robert Hutchins, to launch a syncretic movement of satanists, Tavistock "fruit-cakes," "Frankfurt School" degenerates, and others, the Unification of the Sciences project. After World War II, the same mixture turned up in the CIA-backed zombie-manufacturing program, called "MK-Ultra."

37. Rogelio Maduro, *et al.*, *The 'Greenhouse Effect' Hoax: A World Federalist Plot, EIR Special Report*, (Washington, D.C.: 1989).

38. In his *Autobiography*, Russell wrote, "The greatest happiness of my time at Cambridge was connected with a body whom its members knew as 'The Society,' but which outsiders, if they knew of it, called 'The Apostles.' . . . It was a principle in discussion that there were to be no taboos, no limitations, nothing considered shocking, no barriers to absolute freedom of speculation." See Bertrand Russell, *The Autobiography of Bertrand Russell 1872-1914* (New York: Bantam Books, 1967), pp. 83-84. The Cambridge Apostles later acquired the unpleasant reputation of harboring as many Moscow spies and fellow travelers as a Soviet KGB latrine.

39. In his *Autobiography*, Russell explains that The Apostles (see note 38 above) had adopted language "by way of making fun of German metaphysics. The Society was supposed to be The World of Reality; everything else was Appearance. People who were not members of The Society were called 'phenomena.' Since the metaphysicians maintained that Space and Time are

unreal, it was assumed that those who were in The Society were exempted from bondage to Space and Time." Russell spent most of his adult life in much the same activity—attempting to prove the "unreality" of the life's work of Gauss, Cantor, and Riemann. *The Autobiography of Bertrand Russell 1872-1914, op. cit.*, pp. 84, 165-66.

40. German physicist Rudolf Clausius (1822-88) studied at Berlin and was appointed to the chair of natural philosophy at Bonn in 1869. He was elected a foreign member of the British Royal Society in 1868, and was given its highest honor, the Copley Medal, in 1879. He is credited with discovery of the Second Law of Thermodynamics (that "heat cannot of itself pass from a colder to a warmer body") and introduced the term *entropy* (see footnote 17).

In electrodynamics, Clausius is known for the introduction of absolute velocities into electrodynamics, opposing the more advanced conception of relative velocity between electric charges held by Wilhelm Weber and Bernhard Riemann. See Alfred O'Rahilly, *Electromagnetic Theory, A Critical Examination of Fundamentals*, Vols. I and II (New York: Dover Publications, 1965), republished from the original 1938 title, *Electromagnetics*.

After Riemann's death, Clausius devoted himself to finding "mathematical errors" in Riemann's work—and also that of his associate Enrico Betti—most of which "errors" represented Clausius' failure to conceptually comprehend the work.

Clausius is also responsible for imposing a mistaken reformulation of Ampère's law of the force between moving charges, which was first propounded by the mathematician H. Grassman in 1845. See Peter Graneau, *Ampère-Neumann Electrodynamics of Metals* (Nonantum, Mass.: Hadronic Press, 1985).

41. British physicist William Thomson, the 1st Lord Kelvin (1824-1907), was professor of natural philosophy at the University of Glasgow for 53 years, beginning 1846. Discovery of the Laws of Thermodynamics is generally credited to Thomson, Clausius, and William Rankine, in the official British hagiography (cf. footnote 17). The absolute temperature scale, based on the Second Law, is named for Lord Kelvin. Thomson was knighted in 1866, largely in recognition of his electrical engineering work on the first Atlantic Cable. He was a leading member of the Royal Society and its president 1890-95. His best-known work is the *Treatise on Natural Philosophy* (Part 1, 1867; new ed. 1879), written with Professor Peter Guthrie Tait.

42. Scottish physicist James Clerk Maxwell (1831-79) studied heat, the kinetic theory of gases, color and color blindness, but is best known for his *Treatise on Electricity and Magnetism* (1873). The work is an undisguised attack on the electrodynamic theory of the leading German mathematical physicists, Gauss, Weber, and Riemann, and their Italian collaborators, in particular Enrico Betti. In the preface to the first edition of the *Treatise* Maxwell admits to his partisan stance:

"I have therefore taken the part of an advocate rather than that of a judge, and have rather exemplified one method than attempted to give an impartial description of both. I have no doubt that the method which I have called the German one will also find its supporters. . . ."

Maxwell oversimplifies and misrepresents the "German theory" as action-at-a-distance (a falsification that continues to this day) and then contrasts this misrepresentation to the Faraday-Maxwell field theory. Ironically, he attributes to the Germans the simplistic cosmology of Newton ("massy particles" and empty space) already refuted two centuries earlier by Gottfried Wilhelm Leibniz in his correspondence with Newton's representative,

Lord Kelvin

James Clerk Maxwell

Clarke. Maxwell's refusal to accept the more advanced physical geometry of the German theorists, in particular their recognition that the electromagnetic action implies a multiply-connected topology, can be seen in Sections 18, 113 and 481 of the *Treatise*, where he employs the now-archaic terms *periphraxy* and *cyclosis* in referring to the topological qualities of space. By noting that a multiply-connected space can always be reduced to a simply-connected one by a determinate number of *cuts*, Maxwell imagines that he has "cured" the problem.

Upon the death of Riemann in 1866, Riemann's topological approach to electromagnetic theory was picked up and advanced by his leading Italian collaborators, Enrico Betti (whom Maxwell singles out for attacks in the closing pages of the *Treatise*, Sections 864-66), and Eugenio Beltrami. Beltrami's devastating refutation of the entire theory of elasticity upon which the Maxwell electromagnetic theory is based can be found in his paper "Sulle equazioni generali dell' elasticità" (On the General Equations of Elasticity), *Annali di Mathematica pura ed applicata*, serie II, tomo X (1880-82), pp. 188-211. English translation by Richard Sanders is a *21st Century Science & Technology* magazine manuscript.

See also:

Giuseppe Filipponi, "Basic Electrodynamics: Riemann and His Italian School versus Maxwell," *International Journal of Fusion Energy*, Vol. 3, No. 1, January 1985, pp. 87-88. Accompanying the article is an English translation of Enrico Betti's 1868 essay, "On Electrodynamics" (pp. 89-90) and Bernhard Riemann's "A Contribution to Electrodynamics" (pp. 91-93).

James Clerk Maxwell, *A Treatise on Electricity and Magnetism*, reprint of the unabridged Third Edition, 2 vols. (New York: Dover Publications, first printing 1954).

O'Rahilly, *op cit*.

Ralf Schauerhammer and Jonathan Tennenbaum, "The Scientific Method of Bernhard Riemann, Part 2: Riemann the Physicist," *21st Century Science & Technology*, Vol. 5, No. 1, Spring 1992.

43. Hermann Ludwig Ferdinand von Helmholtz (born Potsdam, August 31, 1821; died Charlottenburg, September 8, 1894) was appointed professor of physiology at Königsberg in 1849, and Heidelberg in 1858. In 1871 he went to Berlin University as professor of physics. His paper "On the Conservation of Force," read to the Physical Society of Berlin on July 23, 1847, was not accepted for the *Annalen der Physik* and had to be published as a separate treatise. Here Helmholtz asserted that the conservation of energy is a universal principle of nature, basing himself on studies of the voltaic cell among other phenomena. The conclusion was consistent with those of Joule and later British investigators (including William Thomson), and Helmholtz thus gained fame among these circles.

In his 1863 *Die Lehre von den Tonenempfindungen*, translated into English by Ellis as *Sensations of Tone as a Physiological Basis for the Theory of Music*, (1875), Helmholtz presents a mechanistic theory of music, which leads to the conclusion that Beethoven was an inferior composer because of his frequent modulations of key.

Bernhard Riemann's short essay, "The Mechanism of the Ear," published just after his death in 1866, challenged Helmholtz's mechanistic approach. Helmholtz attempted to refute it in his 1869 essay, "The Mechanism of the Ossicles of the Ear" (English translation, New York: William Ward & Co., 1873).

For the Helmholtz-Riemann controversy, see the following articles in *Fusion*, Vol. 6, No. 3, September-October 1984, pp. 16-38:

Robert Gallagher, "Riemann and the Göttingen School of Physiology";

Hermann L.F. von Helmholtz

John W.S. Rayleigh

Bernhard Riemann, "The Mechanism of the Ear" (first English translation);

Jonathan Tennenbaum, "Riemann and the Science of Life."

44. John William Strutt Rayleigh (1842-1919) was educated at Cambridge and served as professor of experimental physics there from 1879 to 1884. A devotee of the occult, he was a founding member of the Society for Psychical Research in 1882, along with J.J. Thomson, Sir Oliver Lodge, and William Crookes, all leading men of British science at the time. The organization was devoted to communicating with the "spirit world," held frequent seances with world-renowned mediums, and experimented with the psychotropic effects of chemicals.

From 1887 to 1905, Lord Rayleigh (who succeeded to the title of 3rd Baron in 1873) was professor of natural philosophy in the Royal Institution. He also served as secretary to the Royal Society (1887-96), and director of the Cavendish Laboratories at Cambridge.

Rayleigh is most notable for his errors in the theory of sound. In his two-volume work *Theory of Sound* (1896) Rayleigh claimed to have discovered an error in Riemann's treatment of the development of shock waves (pp. 40ff, 1945 edition). Bernhard Riemann's famous 1859 paper "On the Propagation of Plane Air Waves of Finite Magnitude" (English translation in *International Journal of Fusion Energy*, Vol. 2, No. 3 1980, pp. 1-23) had foreseen the formation of a shock front at the "sound barrier," and thus the conditions that would have to be overcome to exceed the velocity of sound. However, Rayleigh believed that such a thing was impossible. As a result of Rayleigh's influence, research on supersonic flight was greatly retarded in England and America. (See Uwe Parpart, "Riemann Declassified: His Method and Program for the Natural Sciences," *Fusion*, Vol. 2, No. 6, March-April 1979, pp. 24-37.)

Rayleigh was awarded the Nobel Prize in 1904 for his association with Prof. William Ramsay in the latter's 1894 discovery of the inert atmospheric gas, argon. He became lord chancellor of Cambridge University in 1908. In 1919, the year of his death, Rayleigh assumed the presidency of the Society for Psychical Research which he had helped to found. "To my mind," Rayleigh said in his presidential address, "telepathy with the dead would present comparatively little difficulty when it is admitted as regards the living. If the apparatus of the senses is not used in one case, why should it be needed in the other?" See Carol White, *The New Dark Ages Conspiracy* (New York: New Benjamin Franklin House, 1980), Chapter 6, "The British Cult of Science."

45. André-Marie Ampère (1776-1836) was professor of physics at the central school at Bourg, France, taught at the Ecole Polytechnique in Paris, and was elected a member of the Academy of Sciences in 1814. Before conducting his groundbreaking researches in electrodynamics, he had done important work in theoretical chemistry. He attempted to develop the implications of Avogadro's 1811 hypothesis, and conceived a scheme of molecular interaction based on the Platonic and derived solids of hexagonal symmetries.

Ampère's electrical research began in 1820. This led quickly to his invention of the galvanometer and to his hypothesis that magnetism is caused by tiny electric currents moving in circles. He referred to this as the *magnetic molecule* or *current element*, and used it as the basis for his deduction of the laws of electrodynamic interaction from a series of experiments he conducted in 1820 on the interaction of current-carrying wires in various configurations.

His deductions, fundamental to this day, were immediately and repeatedly attacked. In 1821 an anonymous pamphlet recounting the history of electro-
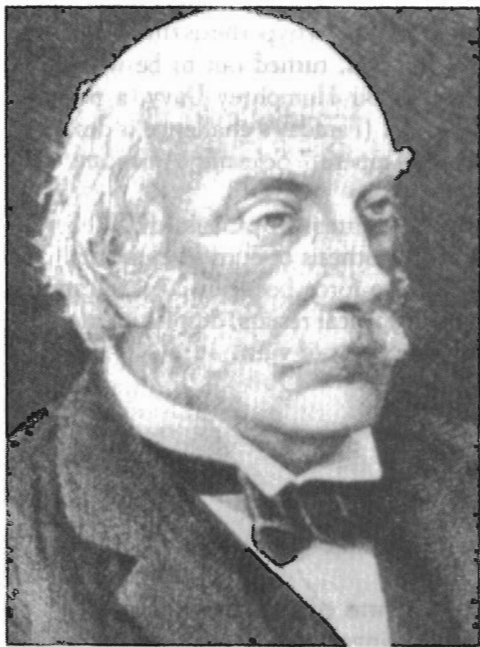
André-Marie Ampère

magnetism appeared in England and was translated immediately into French. The work, which erroneously challenged Ampèe's hypothesis that permanent magnetism is the result of electrical currents, turned out to be written by Michael Faraday, then in the employ of Sir Humphrey Davy, a powerful figure in the British science establishment. (Faraday's challenge is described in L. Pearce Williams, "André-Marie Ampère," *Scientific American*, Vol. 260, No. 1, January 1989, pp. 90-97.)

Though Ampère's work was adopted in Germany by Gauss and Weber, in 1845 H.G. Grassmann questioned his hypothesis of current elements. The result was a "simplified" expression for the force between current-carrying conductors, which could describe most empirical results, despite its theoretical weakness. Clausius adopted a similar point of view.

See O'Rahilly, *op. cit.*, for example.

Also see Graneau, *op. cit.*

46. See footnote 5 of Chapter II on Legendre.

47. The term "assassins" is not less than appropriate here.

48. Wilhelm Eduard Weber (1804-91) was educated at Halle, Germany and became professor of physics at Göttingen in 1831 where he worked closely with Carl Friedrich Gauss, and later with Bernhard Riemann in experimentation in electricity and magnetism. In 1834 Gauss and Weber built the first electromagnetic telegraph which ran from the observatory to the physics office at the university. In 1837, Weber was one of the "Göttingen Seven," professors forced to leave the university for refusing to renounce their earlier oaths to support the republican constitution of 1828, as demanded by the new King of Hanover. Weber relocated to the University of Leipzig from 1842-49 and then resumed his chair at Göttingen.

Weber's research and formulation of the laws of electrical potential were revolutionary. In his 1846-48 *Elektrodynamische Massbestimmungen* (Electrodynamic Measurements), the first of ten memoirs he published under this title during his long life, he formulated a relativistic theory of electrical interaction. In the Sixth Memoir (1871), he postulated the existence of the electron and a positively charged particle of different mass, deduced the possibility of an atomic orbit, suggested that the velocity of light must be a limit on the velocity of electrical particles, and described the distance below which the repulsive force (Coulomb barrier) would turn into an attractive force as $4e^2/mc^2$.

Weber's Sixth Memoir appears in English translation in *The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science*, Vol. XLIII (Fourth Series), January 1872, pp. 1-20 and 119-49. A partial English translation of the First Memoir along with a paper on diamagnetism appears in *Scientific Memoirs*, ed. by Richard Taylor (London: 1852), Vol. V, pp. 489-529 and 477-88.

49. See footnote 40 above.

50. Bertrand Russell was given Georg Cantor's *Männichfaltigkeitslehre* (Theory of Manifolds) in 1895, by his Cambridge tutor James Ward, for purposes of developing mathematical arguments against it. It is clear that Alfred North Whitehead was also aware of this assignment, but was not impressed at all with Russell's attempts to carry it out. Whitehead wrote: "I have been studying you on Types. As far as I understand, I approve highly—But the points are so subtle that I have grave doubts as to whether all the difficulties that you are dodging are really present to my mind. . . ." Whitehead judged

Wilhelm Eduard Weber
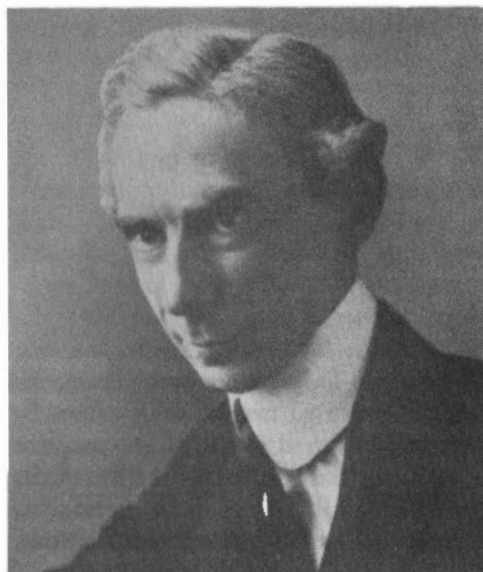
Bertrand Russell

Russell's 1895 Fellowship dissertation to be next to worthless as mathematics; however, Ward "praised it to the skies" for its "philosophical" (i.e., not its mathematical) virtue.

Another sign of this mediocrity is that a year later Russell became a lecturer, but not in mathematics at all; rather he was the first lecturer at the London School of Economics, which had been formed only that year by W.A.S. Hewins. Russell says that he "spent the time reading Georg Cantor. . . . At the time I falsely supposed all his arguments to be fallacious, but I nevertheless went through them all in the minutest detail."

See *The Life of Bertrand Russell* (New York: Alfred A. Knopf, 1976), p. 114 for the quote from Alfred North Whitehead; and *The Autobiography of Bertrand Russell, op. cit.*

51. See footnote 35 of this chapter.

52. In 1912, Pierre Teilhard de Chardin, the originator of "anthropogenesis," was given the opportunity to "confirm" Charles Darwin's theory of evolution. In Sussex, England, the fossil remains of the "Piltdown Man" were discovered by an amateur naturalist, Charles Dawson. This remarkably brutish-appearing missing-link ancestor was widely publicized, although doubters questioned the distance of bones from one another in the find, and some curious features of the jaw. In 1913, Teilhard, who was a physical anthropologist, as well as a priest, was called in. It was he who made the clinching discovery of a canine tooth.

This transitional brute captivated the public mind and dominated the theory of human evolution until 1953—when it was conclusively proved to be a fraud. In the interim forty years, when the Piltdown Man had been kept under lock and key in the British Museum basement, experts were only allowed to see a plaster cast of the fossil.

While the "find" had given the British another "first," the earliest known man-ape, their purposes were broader. The cult symbol of the baboon was to loom large to convince man that he was made not in the image of Christ, but of the ape.

The above is taken from Carol White, *op. cit.*, pp. 279-85.

53. Russell uses Eleatic paradoxes, Achilles and the tortoise, for example.

54. For background, see D. Hilbert and S. Cohn-Vossen, *Geometry and the Imagination*, trans. by P. Nemenyi (New York: Chelsea Publishing, 1952).

55. The caustic and its correction by parabolic mirror surfaces, are shown in illustrations by Leonardo which can be found in *Leonardo e la technica*, 1978 Instituto Geographico de Agostini, chapter on "L'Ottica di Leonardo," p. 55. For the English reader, this is illustrated in *Executive Intelligence Review*, May 26, 1989.

56. On soap-bubble construction and least-action phenomena, see C.V. Boys, *Soap Bubbles: Their Colors and Forces Which Mold Them* (New York: Dover Books, 1983).

57. See the quote from William Draper Harkins at the opening of the Preface.

58. Nicolaus of Cusa's *De Visione Dei* (On the Vision of God) (1464). See also footnote 70 of Chapter II.
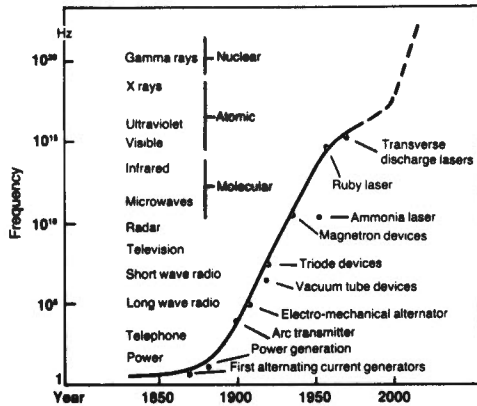
59. Launched by the so-called Wiener-Shannon information theory, as treated in Professor Norbert Wiener's *The Human Use of Human Beings: Cybernetics and Society* (Garden City, N.J.: Houghton Mifflin, 1950). The author's professional specialty was adopted in direct reaction against Wiener's formulation of "information theory." This prompted the author to devote most of the years 1948-52 to refuting Wiener's dogma from the standpoint of the causal relationship between scientific discovery and technological increase of the (physical) productive powers of labor.

60. For rather obvious reasons it is convenient to measure microphysical scales in frequencies of light, rather than meters.

The chart shows the scale of frequencies and wavelengths as against typical physical forms of action: molecular, atomic, nuclear and so forth. The points on the graph show the date of the first development of devices for generating coherent radiation in the range of frequency corresponding to the vertical axis.

61. See footnote 90 of Chapter II.

62. See footnote 91 of Chapter II.

63. See Dr. Morris Levit, "Linearity and Entropy: Ludwig Boltzmann and The Second Law of Thermodynamics," in *Fusion Energy Foundation Newsletter*, New York, September 1976, for Boltzmann's suicide at the Torre e Tasso family's Duino Castle.

64. Winston Bostick, "The pinch effect revisited," in *Executive Intelligence Review*, Feb. 8, 15, and 22, 1991, Vol. 18, Nos. 6, 7, and 8. (Reprinted from *International Journal of Fusion Energy*, Vol. 1, No. 1, March 1977.)

65. G.W. Leibniz, *Monadology*, trans. by George Montgomery (Peru, Ill.: Open Court Publishing Company, 1989), pp. 251-72.

66. In *De Visione Dei*, see footnote 96 of Chapter 2.

67. G.W. Leibniz, *Monadology*, *ibid.*, pp. 251-72.

68. Of Leibniz's two published Platonic dialogues, one, titled "Dialogue, August 1677," can be found in *Gottfried Wilhelm Leibniz's Philosophical Papers and Letters, op. cit.*, (see footnote 99 of Chapter II).

69. For Leibniz's attacks on Descartes and Spinoza, see "On the Ethics of Benedict de Spinoza, 1678," "Meditations on Knowledge, Truth, and Ideas, 1684," and "A Brief Demonstration of a Notable Error of Descartes and Others Concerning a Natural Law, 1686," in *Gottfried Wilhelm Leibniz's Philosophical Papers and Letters, op. cit.*, pp. 196-206, 291-95, and 296-302 respectively.

70. What Plato describes the Socrates of the *Philebus* dialogue as naming "my dialectical method," the method of his later dialogues most emphatically, is the standpoint of "hypothesizing the higher hypothesis."

71. The fact that Thomas Aquinas, a follower of Augustinus, replied to the gnostics of his time in *those gnostics' own Aristotelian terms*, has been misinterpreted, since the sixteenth century, to suggest that Aquinas was an Aristotelian, and that, therefore, St. Augustine either was, or should have

St. Thomas Aquinas

been. Aristotle was introduced to Western Europe only through gnostic channels, such as gnostic Paduan routes, Moses Maimonides, and the Averroists.

72. The author's observations to this effect reference both written works of the nineteenth and twentieth centuries and also direct work with professionals and student specialists.

73. "Suitable circumstances" includes private working discussions and closed-door seminars.

74. On Max Planck's views of this, the references are in German in *Von Wesen der Willensfreiheit,* (Frankfurt-am-Main: Fisher, 1990): *"Der persönliche Errinerungen aus alten Zeiten,"* pp. 19-34; *"Der Geschichte der Auffindung des Physikalischen Wirkungsquantum,"* pp. 35-44; *"Kausalgesetz und Willinsfreiheit,"* pp. 81-117; *"Ansprache in der Preussischen Akademie der Wissenschaften,"* pp. 141-51; and *"Scheinprobleme der Wissenschaft,"* pp. 213-27.

75. *Ibid.,* pp. 35-45.

76. *Ibid.,* pp. 35-44.

77. *Ibid.,* pp. 19-34.

78. See footnote 28 above.

79. On the language of music and the well-tempered system, see Dr. Jonathan Tennenbaum, "The Foundations of Scientific Musical Tuning," in *Fidelio,* published by Schiller Institute, Washington, D.C., Vol. 1, No. 1, Winter 1992.

80. Schiller Institute, *A Manual on the Rudiments of Tuning and Registration* (Washington, D.C.: Schiller Institute, 1992), Chapter 2, "The Six Species of Singing Voice."

81. Friedrich Schiller's plays *Don Carlos, Infante of Spain; Wilhelm Tell* and *The Parasite;* and *The Virgin of Orleans* and *The Homage to the Arts* can be found in Vols. I, II, and III respectively of *Friedrich Schiller Poet of Freedom,* ed. by William F. Wertz, Jr. (Washington, D.C.: Schiller Institute, 1985, 1988, and 1990).

82. These dialogues are: *Phaedo, Phaedrus, Theaetetus, Parmenides, Sophist, Politics, Philebus, Timaeus,* and *Critias.* On this subject, see Don Dario Composta, *History of Ancient Philosophy,* Pontifical Urban University, Vatican (Bangalore), 1990.

83. The connection of this determination of *Type* by the mode of Platonic dialogue is key to understanding adequately why an argument in the form of Professor Gödel's "Richardian Paradox" could have been so fatal for Bertrand Russell's pretenses at science.

84. Golden Section-ordered harmonics are well-tempered.

85. Soprano, mezzosoprano, tenor, baritone, bass, as voice-species, define human music to be polyphonically contrapuntal in essence.

86. Probably from Hooke, from whom, according to Hooke, liberal writers such as Boyle stole liberally.

87. The distinction *unique* (or in German, *einzigartig,* as opposed to crucial or *entscheidende,*) experiment references most directly Riemann's habilitation dissertation published in 1854, which in English is "On the Hypotheses Which Underlie Geometry."

88. See *Executive Intelligence Review,* Vol. 8, No. 25, June 23, 1981, "Club of Rome Founder Alexander King Discusses His Goals and Operations." On May 26, 1981, in an interview with *EIR,* Dr. Alexander King, Commander of the British Empire and of the Order of St. Michael and St. George, who in 1968 was the director general for the Scientific Affairs Section of the OECD, an apparatus considered a subordinate feature of NATO but which is actually its policy controller, described the role of his office in helping to create the New Math, and shift students' focus away from problem-solving and into a more "practical" approach.

"We invented the whole question of curriculum reform, trying to teach mathematics and chemistry, etc., in new ways," said Dr. King. "We were very much criticized for this. The ministries of education were all culturally based. Education was something that passed down the riches of posterity to new generations, in their view. To tie education to the economic wagon seemed terrible."

IV. The Cathar Root of Cartesianism

According to popular legend, Simon de Montfort's Albigensian Crusade purged France's medieval Languedoc of that notorious gnostic cult called, interchangeably, the *Bogomils, Cathars, Bougres,* or, simply and crudely, *"The Buggers."*[1] Yet, more than half a millennium later, that dogmatic sexual perversion appeared in modern seventeenth-century Europe, as the characteristic doctrinal feature of Bacon's Rosicrucian empiricism,[2] and also as the *deus ex machina* of René Descartes and his followers.[3]

This same "Cathar paradigm" is axiomatically characteristic of a majority among Anglo-American science-education authorities today. That paradigm is key to the specific kind of epistemological crisis which was provoked by the successes of the cold fusion experiment. The fact that this paradigm is the heirloom of one of the most depraved and fanatical gnostic cults which Byzantium deployed in the efforts to destroy Charlemagne's Europe, is relevant to the peculiar viciousness and bestial irrationalism of the 1989-91 political witch-hunt against the cold fusion scientists.[4]

So, an historical anomaly presents itself. To employ the emotionally appropriate, blunt language: How did a putatively extinct, medieval cult of sexual perverts appear, a half-millennium later, as the seventeenth-century Rosicrucian sect which established British empiricism and also Cartesianism in France? By means of what extraordinarily powerful agency, was such a pathological dogma imposed upon the generally accepted axiomatic features of today's classroom teaching of science? The obvious place at which to pick up the trail of clues is among the circles of Francis Bacon.

Rosicrucianism in Britain

The final foolish years of Queen Elizabeth I had been a time of bloody, treacherous intrigues, a time marked by such illustrious cadavers as that of young Essex, and of that great playwright, Kit Marlowe, whose best work had not been mere fiction. Out of this pathetic turmoil came a bleak morning for England, for Christendom, and for science, that day in 1603 when Bacon's favorite, James I, ascended the throne. The cabal of Bacon's Rosicrucian cronies, who occupied more than the Crown's treasury, repre-

sented the corruption of that most depraved cult in the history of France; they were the "Buggers."

Bacon's political backers were a continuation of the same Lombard party of international usury—typified by the Houses of Bardi and Peruzzi—which had loosed the "New Dark Ages" holocaust of usury, famines, epidemics, local wars, and mass lunacies upon fourteenth-century Europe. During Bacon's time, and later, into the eighteenth century, this party of international usury was known as "the Venetian Party."[5]

During the sixteenth century, England knew the "Venetian Party" as associated with banking names such as Pallavicini and Montefiore. In seventeenth-century England, the "Venetian Party's" hand was behind such personalities and projects of Bacon's cabbalistic Rosicrucian cult as Thomas Hobbes, Elias Ashmole, John Locke, Isaac Newton, and the London Royal Society. The same international party of usury was represented by the Levant Company, and by related interests behind the William of Orange of 1688-89.

The eighteenth century is fairly characterized as the unfolding of the "Venetian Party's" scheme to establish Imperial Britain's London as the "Venice of the North," a "Third Rome's" capital, exploiting strategic geographical advantages useful to a global financial and maritime power. The characteristic external activity of this Venetian Party's Imperial London throughout this century, is the mustering of resources for the twin purposes of, first, destroying France, and, second, crushing the insolent assertions of freedom from "free trade," by the North America colonists.

The principal Venetian Party institution of this English eighteenth century is the British East India Company.

The notables who served the Venetian Party interests came to be controlled chiefly through such channels of the British East India Company and Barings Bank as that British Beelzebub of the eighteenth century, the Second Earl of Shelburne. Shelburne owned such political trifles as scribbler Adam Smith by the basketful;[6] his bigger fish included Prime Minister William Pitt the Younger, and, virtually, King George III himself. It is Shelburne's right arm—the Jeremy Bentham who played "Artful Dodger" to Shelburne's "Fagin"—who displays the Bugger in the "Brit" most shamelessly at center stage.

Bentham, whose list of admirers over the centuries have included, typically, Bolshevik Leon Trotsky,[7] produced a collection of published titles, such as his *Principles of Morals and Legislation, In Defense of Pederasty,* and *In Defense of Usury,*[8] which leave no doubt that he was truly a usurious Bugger in the tradition of Bacon's Court of King James I.

Exemplary of Bentham's handiwork on behalf of the British Foreign Services, was his leading role in the London side of the safe-housing, training, and direction of the celebrated Jacobin mass-murderers Danton and Marat. The targets for destruction of the British and their French Jacobin accomplices around Philippe Egalité, Jacques Necker, and Robespierre, were chiefly three:

First, the pro-American faction, including King Louis XVI, against whom the British and Philippe Egalité sought the ultimate bloody revenge—exterminate them all, root and branch.

Second, the bloody extermination of the Catholic Church in France, in revenge for earlier judgments upon Jacques de Molay and the "Buggers" (*Les Bougres*).

Third, the virtual destruction of French science and technology, then the most advanced in the world.[9] Such was Bentham's relationship to Danton and Marat, and such was the French Jacobins' satanic treason

against France. Such was the French and British *Enlightenment*, of which Bentham is an epitome.

The Enlightenment

As we have stressed in an earlier chapter: The history of modern Europe begins with the A.D. 1439 Council of Florence, in coincidence with the publication of Nicolaus of Cusa's *De Docta Ignorantia*, and the placing of Filippo Brunelleschi's cupola upon the Cathedral.[10] This was the political high-water mark of the "Golden Renaissance," the rebirth of civilized Europe from that holocaust of famines, epidemics, local wars, and mass lunacies, "the New Dark Ages," into which the international party of usury had plunged all of fourteenth-century Christendom.

As we also indicated: Immediately, beginning the time of that Council, the international party of usury reacted. The most obvious issue for these financiers, was the certainty that a reunified Catholic Church would issue an enforceable condemnation against the criminal practice of usury.[11] There were, as we shall soon consider this, other issues, too.

First, the party of usury used such corrupt accomplices as the Prince of Muscovy and Mount Athos' future Ottoman Patriarch, Gennadios, to betray the Greeks into prolonged Ottoman subjugation.[12] This virtually nullified the reunion of Western and Eastern branches of the Catholic Church, which had occurred on the basis of the "*Filioque*," effected at the 1439 Council.[13]

Second, the party of usury's backers poured vast sums into supporting the "Reformation" splits from the Catholic Church as the documented cases of usury-party approaches to Martin Luther[14] and England's King Henry VIII[15] attest. By this means, and by lucrative, usurious financing of Catholic-Protestant wars of the sixteenth and seventeenth centuries, the usury party effectively nullified the Catholic Church's (and Luther's) vigorous denunciation of the evil of usury.[16]

Third, the same usury party used its old ally Aristotle once again, and rallied an assortment of cabbalistic and other heathen/gnostic bric-a-brac,[17] including France's Cathar and Templar heirlooms, to conduct escalating cultural warfare against the ideas and institutions of the Golden Renaissance. It is upon this third feature of the usurers' campaigns, that our attention is focused primarily here. This third feature came to be termed, generically, "the Enlightenment," of Bacon, Descartes, and Immanuel Kant.

Like the fresh outbreak of symptoms of active herpes in a physician's patient, usury is not only an evil in itself. It is usually an indicator of some other, more deadly moral sickness in the patient, and possible also fellow members of his family and lodge. Wherever usury has been tolerated in a general way, the usurer is customarily afflicted with the contagious moral cancer of *oligarchism*. It is *oligarchism*, rather than usury, which is fundamental to the historical anomaly under examination here.

Historian Friedrich Schiller[18] argued that all of the principal conflict in European history (in particular) is a reflection and continuation of an essential opposition between two ancient models: the one typified by the law of Solon of Athens, and the opposite by the law of Sparta's Lycurgus.[19] Insofar as the Christian Platonic humanism of the Golden Renaissance subsumes the work of Solon and Plato, Schiller's thesis is more than borne out in a general, descriptive way; it may be applied with exacting precision.

Let us define our terminology for this examination. Instead of "model

of Lycurgus," read *oligarchical*. Instead of "model of Solon," read *republican*, signifying by the latter the "constitutional republic" of reformed Athens under Solon, rather than the Jacobin or empiricist use of the term "republican."

First, now, we define *oligarchical* in terms of the history of the Mediterranean littoral. We begin with the characteristics of oligarchical pagan religious cults.

Ancient Roots of Oligarchism

The dominant original form of oligarchical pagan religious cult, in the Mediterranean littoral, is the Shakti-Shiva model from "pre-Aryan" India.[20] This is the Earth-Mother/fertility/lunar goddess, with her phallus-serpent consort (frequently with the relevant sexual attribute severed). This becomes, in the area of the Dravidian ("black-headed people") colony known as Sumer, the Semitic Ishtar, the Athtar of Sheba/Ethiopia, and the Astarte of Canaan.[21] This is also the Indo-European (Phrygia) Cybele-Dionysos cult.[22] There is the Hellenic Isis-Osiris-Horus cult clearly derived from the penetration of Egypt by the Athtar cult.[23] There is the putatively original, pre-Apollo, cult of the Delphi site, the Gaia-Python cult.[24]

The odd man out among this ancient Mediterranean collection of oligarchical cults, is the putatively Indo-European Olympos myth. All other notable cases appear to conform to the Shakti-Shiva model of a Moon-worshipping whore-witch playing feminist tricks upon her serpent-phallus pet. The particular importance of this exception, is that it is the form congruent with the organization and functioning of the modern European oligarchy (despite the current attempt of some members of the British Royal Family to introduce the Shakti-like Gaia model). We shall state a few facts respecting this myth, indicate the nature of the myth's oligarchical character, and situate the similar Cathar-cult-myth accordingly.

According to the Berber account of ancient Roman chronicler Diodorus Siculus, Olympia, the mother of Zeus, was the real-life concubine of a thalassiarch of the ancient Atlas region—the fertile region of northern modern Morocco.[25] The successful parricide, Zeus, and his siblings, presumably established a dynasty of sea-power, before taking up residence upon the modest Greek mountain-top named for their mother.

The story dovetails with several others, including the Atlantis references in Plato's *Timaeus* and *Critias*.

During the second millennium B.C. (and possibly earlier) Greeks in their "Viking-like" longboats were "Peoples of the Sea," in instances entering the Mediterranean from settlements at the northern coasts of Europe. The existence of an Indo-European thalassiarch's settlement in Berber-land, not far from the Straits of Gibraltar, is not a proposition which begs a suspension of disbelief. Whether, as a reading of the *Odyssey* might suggest, for example, the Olympic Pantheon is a syncretic composite of several cults, is not an issue for us here, one way or the other. The classical Greeks had ways of life echoing accumulated ancestral experiences over many generations; the important thing is, therefore, that the Olympic Pantheon, however composed, accords with a standard of oligarchical behavior which has been transmitted to northern Europe from the Greek and other ancient Indo-European cultures of the European Mediterranean littoral.

The oligarchical character of the Olympic Pantheon is underscored by

Aeschylos, notably in the surviving portion of his *Prometheus*.[26] See political prisoner Prometheus chained to the rock by "George Bush" Zeus' current administration, and the relevant thought begins to take shape.

Think of the mythical "Gods of Olympos," not as simple individuals, but as a collection of powerful families, perhaps with such names as Lowell, Cabot, Astor, Mellon, and Rockefeller. Imagine each of those quasi-immortal families to be constituted and regulated according to the pagan Roman law of the family. Think so of those Olympians whom Aeschylos' Prometheus is challenging. Think of such Olympians as the noble families of Lycurgus' Sparta, and Prometheus as defending the human rights of the helots.

What is Prometheus' warning to such a Zeus? "You Establishment families delude yourselves, that you are as if immortal gods, who can play whatever mean tricks your mere whims may prefer upon mere mortal persons, or even entire nations, as that overaged Caligula, petulant George Bush, did against Panama and Iraq. Do you imagine that there exists no real God, whom your hubris might greatly offend?

"You think that you make the laws at your whim, and may give the name of 'justice' to each of your wicked caprices? There is a higher law, which you would ignore, but which will not ignore your misdeeds."

The Modern Issue

Cusa provides the best implicit definition of the *republican* alternative to *oligarchism*. Two features of Cusa's work define this in the sharpest way. First, Cusa's emphasis upon man as in the *living image of God (imago viva Dei)*. Second, man's *participation* in God. These two qualities define man's potential and required role in the universe, and thus, explicitly, the form of society which is required for mankind.[27]

Man is in the living image of God, because every person is given a divine spark of the potential developed powers of *creative* (non-linear, negentropic) *reasoning*, as we have defined "creative" earlier here.[28] The act of creative discovery (such as re-learning, by reconstruction, of a new conception), is a process which must be completed within the individual mind, and is thus a sovereign individual act.[29] Thus:

- God is the (Absolute) Good, in Plato's sense of the distinction between the *Becoming* (or *hypothesizing the higher hypothesis*) and the Good.[30]
- God is essentially the *Creator*, the source of creative (negentropic) change, but which is not changed.[31]
- The individual person is in the living image of God's activity as Creator, a likeness imperfectly expressed[32] in actions congruent with hypothesizing the higher hypothesis (negentropic Becoming) in the universe—man is thus *bounded externally* by God, beneath God, but also obliged to be participating in God in this mode and manner.

The proper function of society is implicit in this relationship of the individual person, as microcosm, to God, and to the universe in its entirety. Society is obliged to foster the development of that quality—*creative reason*—in the person, the which is the living image of God. Society must foster those activities which are coherent with this development of such powers of creative reason.

Through such creative reason, man is capable of rendering intelligible

to himself, and efficiently so, the relationship through creativity between himself as microcosm and God as macrocosm.[33] Man is thus capable of rendering intelligible, and efficiently so, the principled nature of the lawful internal ordering of the universe. Man is capable, similarly, of knowing God's law, which is thus for all nations and persons the only true, *natural law*.

The Golden Renaissance posed as never before the right and obligation of the individual person to participate in the government of his entire nation. If that person is in the living image of God (*imago viva Dei*),[34] his divine spark of developable potential for creative reasoning, is the medium through which God's *natural law*, the only true law, is made known to nations. Shall such a faculty be silenced? Shall the individual's rights and obligations have standing only in matters which affect this individual and his family affairs in the simplest, most explicit way?

The mere posing of such a question is a grave threat to the continued existence of such oligarchical tyrannies as that one which has terrified the world under President George Bush and his "British proconsul" in the wings, Henry A. Kissinger.[35] It is also a condemnation of such brutishly irrational tyrannies of "political correctness" as the corrupt, populist Democratic Party of Athens which effected the judicial murder of Socrates.[36] Consider the highlights of that latter case as an object-lesson in this matter.

At that late time in his life, Socrates had been occupied, once again, with his increasingly critical, leading part in defending the republican, anti-usury heritage of Solon's reformed Athens, against the satanic menace of the world's capital of international usury, oligarchical Babylon's Persian Empire.[37] In this historical strategic setting, while Socrates' friend Xenophon was off to the East, marching through the heart of that Persian Empire with the Greek Ten Thousand,[38] a mere leading political hack of the Democratic Party of Athens, the populist demagogue Meletys,[39] brought the aged Socrates to trial and to death on two charges:[40] exerting a personal *cult-like influence* over younger people, and practicing *political extremism* against the honor of assorted pagan gods.[41]

Although Meletys was later condemned to death, largely because of the stink he bore for his leading part in the judicial murder of Socrates, Athens applied justice in this matter much too late for its own sake; as a calculable consequence of Athens' toleration of the crimes of the Democratic Party, Athens fell under the rule of the Macedonians, and after the murder of Alexander the Great, the Holy Alliance of those murderers, and later the conquering Roman legions.[42]

With Socrates' proper successor, Plato's Academy of Athens, the true history of European civilization begins. It is from the vantage-point of this crucial historical fact, that the continuing mortal conflict between republican and oligarchical forces may be rendered intelligible, and the oligarchist's resort to Buggery thus understood.

Plato appeared too late for the redemption of dishonored Athens. The city's usurious hubris in the Delian League, and its shameful toleration of the corrupt Democratic Party, had made the appropriate degree of punishing humiliation of Athens a necessary object-lesson on behalf of the majesty of the *natural law*. The Biblical cases of Sodom and Gomorrah might be compared, respecting the varying degrees of punishment justly suffered by Thebes and Athens on these accounts, for example.

Yet, for that very reason, the just humiliation of Athens is no fault of Plato's. Although Plato mustered his best possible effort to save Athens from the twin evils of the Delphi Cult and Persian Empire, saving Athens

proved not to have been the true, essential mission of Plato's life. There was a far higher mission, as history attests.

What Plato and the Academy did was to save the honor of Athens from the erring Athenians themselves. The best of the tradition of Solon, Aeschylos, Socrates, *et al.*, and of Athens' Ionian-republican heritage, was concentrated in the work of Plato and the Academy; that shall live, as if immortal, whereas the heritage of the Democratic Party and the Apollo cult should vanish from memory that its echoes might be extirpated from modern imitations in practice. What Plato and the Academy, in processes concurring with the principles of natural law, did, was to ensure that the best of Greek culture was provided for use and further development by future humanity. Were the last Greek to vanish, the ideas of Plato make it urgent for future generations that the classical Greek of Plato continue in use for reference to Plato's writings.

Real history begins with Plato and the Academy; Plato and the Academy create the beginning of the history of ideas, the history of the efficient generation of efficient ideas. That *history of ideas* is *the process of reshaping the efficient principle of hypothesis from the conscious vantage-point of hypothesizing the higher hypothesis.* Before Plato there is no present record of the existence of this conception.

After Plato the development of the history of the Mediterranean region, to this present day, is bounded, either positively or negatively, by response to the challenge of Plato's discovery of this principle of efficient ideas— the hypothesizing of the higher hypothesis. The assimilation of Plato's discovery of the principle of *consubstantiality*, from Plato's *Timaeus* dialogue, and related actions in the manner of the Apostles St. John and St. Paul, define Augustinian Christian Platonism, which found its most powerful fresh expression in the Golden Renaissance.

Even as the European oligarchs sought through their Aristotelian, Baconian, Cartesian, and Kantian Buggery, to eradicate this Golden Renaissance, Europe was imbued with the scientific increase of *productive powers of labor* which that Renaissance had set into motion. Thus, Christian Platonism had transformed European culture into the most powerful culture of this planet, more powerful by a magnitude of a "hundredfold,"[43] than any other in human history to present date.

It could be said fairly, that the violently adverse reaction to the A.D. 1439 Council of Florence, by the international party of usury, was an echo of the Emperor Tiberius' crucifixion of Christ, and of the Persian oligarchy's use of the Democratic Party to destroy Socrates.[44] Although we know relatively little of Socrates' life and work, beyond what we have from Plato and Xenophon, we know enough to pinpoint with certainty the feature of Socrates' influence which would have sufficed to provoke the oligarchy's orders for extermination of not only the man, but his influence.

Usury is the most sensitive point of adopted self-interest by the oligarchy. Nonetheless, it is a shallow-minded blundering which blames usurious greed for the oligarchy's reaction in cases such as those just cited. Usury is a common characteristic of oligarchism, but not the essential one. It was not Christ's throwing the money-changers out of the temple, which prompted Rome's local Jewish "quislings" to howl on cue for the crucifixion. The motive was not human; it was truly *satanic.*

To bring the true, satanic face of oligarchism out from behind its Orphic mask of usury, consider the proposition, that there could not have been a true *science,* until Plato made *the subject of consciousness,* the *conscious standpoint* of hypothesizing the higher hypothesis. What we

know of Socrates, his anti-oligarchic standpoint in patriotism, and that he used at minimum the rudiments of a Platonic dialectic method, is sufficient evidence to show with certainty why the oligarchy sought to destroy him.

The dialectic method is the partner of classical tragedy, whether of Aeschylos, Kit Marlowe's *Faustus* or *Jew of Malta*,[45] Shakespeare's tragedies, or Friedrich Schiller's. We see this connection already in the *House of Atreus* and *Prometheus Bound*. Through the drama, we observe with our conscious deliberation upon the problem, the conscious attempt at innovative discovery at work in the mind of the character which the great tragedian has put afoot on stage.

This is no "soap opera"; there is no kinship between drama and "soap opera," or Hollywood "horse opera." The actor's character on the stage of great tragedy is engaged in mastering the highest available levels of task-oriented problem-solving discovery. The principal character of the tragedy is seeking consciously an *hypothesis*, at the minimum. Hamlet, in his soliloquy, "To be, or not to be," is seeking to define an *higher hypothesis*. We, watching that latter performance, considering the bloody consummation of Hamlet's psycho-sexual impotence, his "blocked" refusing to dare to think through what he must, ought to be *hypothesizing the higher hypothesis*.

This aspect of efficient human intellectual potential is also illustrated— and demonstrated—by the construction of Georg Cantor's higher transfinite cardinalities. The ability to think, and therefore act efficiently through consciousness of a *task-oriented* (potential population-density) *variability* as the conscious subject of *self-consciously hypothesizing the higher hypothesis*, is the highest rational power of which we are explicitly capable.[46] This is a conscious *reflection (imperfect expression)* of that which defines each person as in the living image of God the Creator.

If man is *imago viva Dei* in that intelligible way, who can tolerate the degradation of any person to the Spartan status of *helotry*? Who could tolerate the assumption that there are biologically determined "racial" distinctions in *quality of humanity* among persons? Who, then, would tolerate the perverted ways of thinking of a profound drug-trafficking amoralist like the Adam Smith of "flea market" fame, or a rabidly Cartesian oligarch such as the famous Physiocrat, Dr. Quesnay? These considerations bring our attention now to the nub of this matter of oligarchism. How does the human species generate and develop itself? What such boundary-conditions, external limits, determine the lawful characteristics of the human species?

'Society and Economy'[47]

In first approximation, if man were an animal, our species' *potential population-density* would never have exceeded approximately the ten square kilometers of average Cenozoic wilderness per person. Such is the population-potential of man's subsisting, approximately as a slower-moving baboon, as a "simple hunting and gathering" creature. Today, the human species has a population-density approximately three decimal orders of magnitude above that possible for "simple hunting and gathering society."

We have not only increased man's potential population-density more than a thousandfold. A "simple hunting and gathering society's" demographic characteristics would be a life-expectancy of less than twenty years of age for a post-infancy individual, and a "Yahoo" level of moral existence precariously compared to the social life of baboons.

This increase in the proliferation and quality of individual human life has been won chiefly by the generation, communication, and efficient assimilation of scientific and technological progress, or of that which is

a clear analogue of scientific and technological progress. The maintenance of that progress requires improvements in land area's suitability for human use, improvements conveniently classed as basic economic infrastructure.[48]

However, this development incurs an additional factor of cost. The natural resources marginally depleted at one level of technology, must be offset by technological progress' use of successfully poorer relative qualities of ore, for example, but at a lower average social cost to society as a whole per-capita than the use of richer ore earlier. Thus there is no possible static equilibrium in technological progress or general economic growth in terms of potential population-density. To maintain even a constant level of potential population-density, requires some significant level of investment per-capita and per-hectare, for continuing scientific and technological progress.

Thus without a continuing technological and related increase of potential population-density, the human species' level of existence must collapse. In the extreme case, a virtual extinction of mankind, or his civilization at best. In the middle range, an accelerating devolution associated with famines, pandemics, pestilences, various homicidal practices, collapses of population-levels, and collapses of mental and moral quality of the typical individual.

What, then, is *wealth?* What, then, is the source of wealth? Is the source "natural" nature? Then, tax the insects, or the flora, for they have the greatest use of this planet. *Wealth is that which, through its consumption, fosters the maintenance and improvement of those average productive powers of labor whose characteristic employment causes the increase of the human species' potential population-density.*

These productive powers are *typified* by the generation, transmission, and efficient assimilation of scientific and technological progress. By *typified,* we signify a *transfinite* quality, classed as a *Type* by the standard of *equivalence.*[49] Thus, by science, as a *Type,* we signify also classical art, as we indicated the case of the classical music of Bach, Mozart, Beethoven, Brahms, and also classical plastic arts.[50] We mean to include under this Type, the classical Indo-European philology of Wilhelm von Humboldt, August Boeck, *et al.* We include classical philosophy (especially as *epistemology*).

The point on which we are directly focused is twofold. To produce wealth, society must foster, as education and culture, the classical Renaissance-humanist program of science, art, philology, and philosophy. This requires what Wilhelm von Humboldt's educational reforms identify as *classical humanist secondary education,*[51] and that as both a right and a *moral obligation* for every adolescent. This also requires the ordering of the opportunities in society for a quality of condition of technologically progressive labor and a family household life consistent with that standard of secondary and higher education.

No helots here! Please!

For example, the "flea-market" economists of the United States think it prudent to close down more and more of the industrial, produce, milk, and meat production inside the United States, to produce these (for consumption by employed U.S. natives, presumably) in countries such as Mexico, where wages are a fraction of those in the U.S.A.[52] How will the unemployed U.S. population pay for these commodities, even at presumably reduced prices? The idea proposed is insane; but that fact, the fact that a policy is murderous lunacy doomed to fail, has never seemed to deter a truly fanatical follower of Milton Friedman or the "Laffer Curve."

If we do not meet the costs to a family household and larger residential community, of reproducing educated labor of a certain quality, the result must be, in the final analysis, the same achieved by the Nazi slave-labor program at Auschwitz. The North American Free Trade Agreement (NAFTA) program for Mexico implicitly transforms all of Mexico, but especially the northern border states, into a kind of Auschwitz slave-labor zone. The death-rate is, so far, significantly lower than that of wartime Auschwitz, but the principle of slave-labor is the same.[53]

The result is not only quasi-slave-labor conditions in the *maquiladora* zones of Mexico. This means increased rates of "runaway-shop"-correlated unemployment in the United States. It means that the less-than-60¢-an-hour slave-labor standard in Mexico's *maquiladora* Auschwitzes determine a proportional collapse of the "flea market" price of labor inside the United States. This argument was already proved, on the Southern slaveholding oligarchy's use of chattel slavery, respecting the impact of slavery upon the wage levels and family household conditions of U.S. labor generally.[54] The science-illiterate fanatics of the Milton Friedman or Harvard-Sachs-maniac schools have the consoling advantage of their ignorance, not to know the economics of U.S. chattel-slavery or Auschwitz slave-labor programs.

Although classical art, etc., are of the same Type as science, we emphasize science because of its more obviously direct bearing upon productivity.

Why Britain's Aristotelians Hate Science

If states such as fifteenth-century Florence realize the scientific and technological progress which Leonardo da Vinci's work made available to that city, then the increase of productive powers so, per-capita, renders that state rapidly more powerful per-capita in every way than its slower-to-progress competitors.[55] In that case, the competitors are obliged to match that state by emulating its policy, or in the alternative, to go to war to crush that state while they are still capable of doing so.

Such was the case in Britain, during the early nineteenth century. Under the Shelburne-Pitt-Bentham-Castlereagh policies of Britain's Crown, Britain of the 1820s had become a scientific backwater, to such a degree that but a handful of men in Britain could even follow intelligibly the level of science practiced in St. Petersburg or Philadelphia, to say nothing of the vastly more advanced science of France and Germany. In response to this challenge, circles at Britain's Edinburgh and Cambridge universities kicked a stubbornly anti-scientific Oxford and London Royal Society with a movement which later became the British Association for the Advancement of Science (BAAS).[56] This BAAS-centered movement followed a twofold course: Copy everything being done on the continent and in the United States, while also working to sabotage continental European and American scientific and technological progress as much as possible.

Following the 1880s, it was the scientific and technological superiority of the German economy, and no other reason, which prompted Britain to prepare and set off World War I. So, centuries earlier, the oligarchy ruined fifteenth-century Florence by bringing it for a time under the dictatorship of a local sort of "Ayatollah Khomeini," Savonarola, just as the U.S. and British governments overthrew the Shah of Iran and Bakhti-ar's government, for reasons earlier set forth by British agent of influence Henry A. Kissinger's 1974 NSSM-200.[57] For the same reason, the Anglo-

Americans destroyed the Third World nation Iraq in 1990-91.[58] These evil deeds were done by Kissinger, George Bush, *et al.*, because Kissinger, Bush *et al.* are agents of the oligarchical international party of drug trafficking and usury.

Example: Britain versus France and Germany

Compare the two dominant features of European internal conflicts during the recent 400 years: Britain's successful selection of, first, France, and then Germany, each in turn, as the principal targeted adversary of the "Levant" or "Venetian" Party of international usury. We summarize the most relevant episodes from history.

The leadership, successively, of Cardinals Richelieu and Mazarin, brought the peace treaties, of 1648 and 1653, ending the Thirty Years' War in Europe. In these circumstances, under the masterful leadership of Mazarin's protégé, Minister Jean-Baptiste Colbert, France quickly asserted its overwhelming superiority of leadership in science and economy. In the attempt to ruin this, the oligarchical international party of usury—known then as the "Venetian Party"—deployed its assets inside France and Britain, together with those of the House of Orange in the Netherlands, to drain and ruin France's economy by engaging it in protracted wars.

It was the refusal of the Stuart government in Britain to develop and maintain a "Cromwellian" scale of military establishment for war against France, which prompted the "Venetian Party" to overthrow King James II, and bring William of Orange to the English throne.[59]

Finally, by 1763 France was, for the moment, exhausted by war upon war. The internal enemies of France's interests, typified by the oligarchical Physiocrats and corrupt circles around King Louis XV, had supplied the erosion within, to aid the cause of those Venetian Party assets operating from without.[60] France's later program of rebuilding its military power, under Louis XVI, intersected Benjamin Franklin's post-1766 mobilization of the former networks of Gottfried Wilhelm Leibniz throughout Europe for the coming American struggle for independence.[61]

After 1783, Britain regained much of the ground it had lost to France, benefitting to this effect through the national stupidity of Cartesian France in accepting both the British "free trade" agreement, and the evil ministership of Jacobin-sponsored Lausanne banker Jacques Necker. (Necker was to Louis XVI what American Jacobin minister Albert Gallatin was to the ruined U.S. economy under duped U.S. Presidents Jefferson and Madison.)[62] The partly London-directed[63] Jacobin Terror, threatened to decapitate France's patriotic leading stratum. With the depletion of France by the oligarchical adventurer Napoleon Bonaparte, the British imperial interest was served by the 1815 Treaty of Vienna.[64]

The deliberate transfer of world leadership in science, from the France of Gaspard Monge's 1794-1814 Ecole Polytechnique,[65] to the Leibnizian Germany of Göttingen's Carl Gauss and Berlin's Alexander von Humboldt, over the period 1815-50, corresponds to Germany's subsequent rise to pre-World War I world leadership in agricultural and industrial technology. After 1815, France predominantly stagnated in relative economic development, until the effort to reverse this by President Charles de Gaulle.

The two most crucial bad things which the poor Restoration Bourbons did, to ruin France's scientific position, were, first, to exile Ecole Polytechnique sponsor Lazare Carnot,[66] the "author of victory" who had saved

France from dismemberment, and the replacement of Gaspard Monge at the Ecole Polytechnique by the Cartesian "Buggers" LaPlace and Augustin Cauchy.[67] With those measures, France's position in science fell rapidly, from world leader to second-rate.

From inside Germany the identity of the resistance to this beneficial transfer illuminates the French case. At Gauss' Göttingen, in Hanover, the British Queen Victoria's royal family[68] set back the development of Ampère's science of electromagnetism[69] by a decade or so. At Berlin, the effort to sabotage science came through two very politically influential leading professors at that university, Metternich agent G.W.F. Hegel[70] and Hegel's crony, Karl Friedrich Savigny, the ideological forerunner of the Nazi oligarchical legal code.[71]

The transfer of French leadership in science to Prussia and Göttingen was deliberate by relevant scientists on both sides. For approximately ten years, until 1827, Alexander von Humboldt occupied approximately half of each year in Paris, working with the precious group of Monge's Ecole Polytechnique scientists who were being subjected to varying degrees of an anti-Leibnizian, anti-Monge, political witch-hunt by the party of Cartesian Buggers which was led by LaPlace and Cauchy.[72] Lejeune Dirichlet, then studying in Paris, later a professor in, successively, Berlin and Göttingen, was among Humboldt's leading young collaborators in this enterprise of transfer. A journal in imitation of Leibniz's (Leipzig) *Acta Eruditorum,*[73] *Crelle's Journal,*[74] was founded as the vehicle for blending the efforts of the French (Carnot-Monge) and German branches of Leibnizian science.

Nonetheless, although Humboldt's group stands out in the history of science as among the greatest authorities from the nineteenth century, even the politically powerful Humboldt was required to resort to subterfuges, to place such geniuses in professorships at that University of Berlin which came to be known as *Humboldt University*. The opposition to the appointment of these nominated professors came from G.W.F. Hegel, while he lived, and Karl Friedrich Savigny. Humboldt used chiefly two subterfuges against the intrigues of these two scoundrels. At Berlin University, his brother Wilhelm von Humboldt's circles controlled the Department of Philology, where some of Germany's greatest mathematical scientists were therefore habilitated! The second avenue was the Prussian military school, which also subsidized *Crelle's Journal.* Once the nominees were habilitated as professors of sciences at the military school, they had legally automatic status also at the Berlin University.

On both sides—Berlin and Paris—we have clear examples of the same quality of political "Buggery" of science witnessed in the actions of Bacon's Rosicrucian empiricists, and the current political witch-hunt against the cold fusion scientists.

Politically, the Bourbon appointees, LaPlace and Cauchy, were pure to the traditional type of Cartesian "Buggers." The issues of methodological differences with Monge *et al.* were brutishly demonstrated by LaPlace's ripping out that geometry curriculum at the Ecole which had produced battalions of such great scientific minds of European history as Legendre, Fourier, Ampère, Poncelet, Sadi Carnot, and so on. The authority for LaPlace's radical change in scientific method was purely political buggery. Otherwise, but for such means as his notorious plagiarism of Abel's paper, Augustin Cauchy's scientific achievements were third-rate.[75]

Hegel and Savigny were "French Jacobins of 1789," in about the same degree they spoke German. As accurately as Hegel perceives Immanuel Kant to be essentially no more than a copier of Aristotle, Hegel's *Phenomenology*[76] and later writings show him to be an Aristotelian, whose system

of ideas, like Kant's before him, centers around acceptance of the essential Cartesian Buggery, the dogma of *deus ex machina.* Savigny is the leading nineteenth-century authority for the positivist dogma of "Romantic" law, and he is the forerunner of Carl Schmitt[77] and the Nazi legal code of Judge Roland Freisler.[78] Savigny was also the rabid Kantian who was so influential in establishing an hermetic separation in Germany of *Geisteswissenschaft* from *Naturwissenschaft,* that modern German-language form of identification of that spirit-matter dogma which is the center of the Buggers' sexual perversion.

Denis Papin's working steam engine[79] shows that Leibniz's plan for immediate launching of the "industrial revolution," based upon heat-powered machinery, was technologically ripe to be begun by the late seventeenth century, or at the latest, the very early eighteenth. The British arranged the disappearance of Papin and his working steam engine—and later claimed to have created it themselves.[80] France's technological development was stalled by the "Venetian Party's"[81] wars. Germany was still recovering from the Thirty Years' War, and from continuous destabilizations by, chiefly, the international party of usury. The Americans had started to develop industry during the seventeenth century,[82] but the succession of suppression measures by the London-assigned Andros governments, and, later, the London eighteenth-century Liberals, had recessed such a vigorous effort until America's growth was supplied French technology, in the onset of the U.S. struggle for independence from imperial London.

The French Jacobins attempted to eradicate science and technological progress. But Lazare Carnot, Thermidor, and the Monge Ecole Polytechnique had made France once again the world's leader in scientific and technological progress. With the defeat of Napoleonic France, as we noted, Castlereagh's obedient Bourbons ripped science—Gaspard Monge's program—out of France, almost root-and-branch. Nonetheless, despite this damage, Europe did not descend into that "post-industrial" quasi-pastoral estate of serf-like imbecility, which oligarchs view with yearning as a kind of Paradise. In Louis Pasteur's France, despite Cauchy, science struggled for continued life. In Germany, despite Hegel and Savigny, science was flourishing. The seeds of French and German— non-Cartesian—"continental science" were spreading to, and growing in Italy,[83] Russia's St. Petersburg,[84] and such post-1815 North American clones of Monge's Ecole Polytechnique as the new science program of the U.S. West Point Military Academy.[85]

The British saw, during the course of the 1820s and 1830s, that they had failed to halt scientific and technological progress on the European continent; so, to compete, Britain must once more tolerate scientific and technological progress in its home, while working to delay and wreck it abroad. Thus the British Association for the Advancement of Science was established.

President Abraham Lincoln's defeat of London's puppet-government, the Confederacy, was a major defeat for British imperialism. Had London failed in its assassination of the U.S. President, Lincoln's stated policies would have been carried through. The "former pro-slavery states"[86] would have enjoyed a continuation of the spectacular, wartime agro-industrial growth of the Union. Lincoln's successor, President Johnson, was more of a help than a hindrance to British agent August Belmont's leading position, both in the Democratic Party and the New York-centered financial community.[87] Under Johnson, the prospect for vigorous economic growth was temporarily ruined. Later, a corrupted U.S. Congress' passage of the treasonous U.S. Specie Resumption Act[88] permitted Lon-

don to despoil the United States at such bargain prices, to such effect, that despite the vigorous post-1877 expansion of the United States, the nation was wracked with repeated, prolonged, and severe financial crises, and a deepening social crisis, up to the eve of the outbreak of European general warfare in August 1914.

London's greatest fear of the mid-1860s, was that a United States which had just defeated Britain—and whose President Lincoln knew that Judah Benjamin's Confederacy had been only a British puppet-government—would link a growing U.S. economic and military power to one or more of the major powers of continental Europe, most probably either Russia or Germany, or perhaps both.[89]

During 1862-63, Russia's Czar Alexander II had sent Russia's naval forces on demonstrative friendship visits to New York and San Francisco harbors, and warned London and Napoleon III's Paris, that Moscow was prepared "to make war in Europe" should Palmerston, Russell, and Napoleon III proceed with their military plans against the United States.[90] After chewing the rug for a while, London's Palmerston and Russell decided to call off the Anglo-French military action in aid of London's Confederacy puppet. The Royal Consort, Prince Albert, transmitted peace gestures to Lincoln on the monarchy's behalf.

Czar Alexander II—until Britain's Russian accomplices removed him—was more than an admirer of the United States; he intended to introduce American methods into Russia, as by his freeing Russia's serfs. There appeared a capable minister, Count Sergei Witte (and, later, Stolypin), who was a proponent of the Hamilton-Carey-List "American System of Political-Economy,"[91] and who sought both German and French cooperation in making List's work[92] the basis for vast projects of cooperative economic development of the Eurasian continent.

Witte's ploy was the issue which enraged Britain to commit itself to support a revolution in Russia and war against Germany.

Before the twentieth century, there used to be a special kinship between the United States and Germany, a kinship at its strongest during and following the United States war against Britain's Confederate puppet-government. From the founding of our republic, until the ascendancy of rabidly irrational Anglophiles, such as Harvard's President Charles Eliot and President Theodore Roosevelt, it was to the superiority of German science that American professors such as Agassiz, Bache, and Harkins turned for training and partnership.[93] London's and Paris' Nazi-like atrocities in 1860s Mexico, and those empires' accompanying threats to our republic directly, reminded us of the valued friendship of Germans.

During the time of Professor Louis Agassiz,[94] for example, Harvard University was a leading U.S. center of education and researches in the achievements and rigorous methods of what the British term "continental science"; the regular connections to German scientific centers were notable. When Eliot became president of that university, there was an abrupt change in direction, at Harvard and also other U.S. universities.[95] The orientation to Germany and other "continental" centers was reversed; Eliot's Harvard, by profession, became merely a humble, colonial, intellectual backwater of England's Oxford and Cambridge.

This paralleled the changes introduced, on a broader scale, by President and also ex-President Theodore Roosevelt.[96] All this, Eliot's and Roosevelt's anti-German policies included, was part of the British preparation—especially from 1898-1904 onwards[97]—for dragging the United States into Britain's planned war against Germany.[98]

Similarly, during the past quarter-century, today's Anglo-American international party of usury, drug-trafficking, and oligarchism, has sought

to establish a "post-industrial" form of "new world order," creating, with much help from Aleister Crowley's Satanist cults,[99] the 1963-91 "rock-drug-sex" and "neo-malthusian," *New Age* counter-culture.[100]

Example: Britain Opposes Scientific Progress

The zero-technological-progress code of the Roman Emperor Diocletian[100] is an illustration of the same point. The kind of utopia which the oligarchy seeks is a single world empire, or a federated condominium of empires, in which technological progress is virtually outlawed, in which a division of society among aristocrats or nobles, citizens, and *helots*, is securely fixed and regulated by law and custom, as this was so under Sparta's Lycurgan code.

Societies which foster scientific and technological progress are feared and hated, as if by an oligarchical equivalent of "pit-bull instinct." There are two interrelated reasons for this fear.

1. The society practicing generalized scientific and technological progress, is increasingly superior in power, per-capita, to one which is not. Thus, to compete with societies sustaining such progress, an oligarchical society must emulate such a competitor's policy.
2. Sustained scientific and technological progress requires an educational development and culture consistent with efficient generation, transmission, and practical assimilation of such new ideas. This requires a society ruled by a "meritocracy" based in general political equality and high cultural level of existence of the population as a whole—or at least virtually so.

Such a latter form of society and oligarchism cannot be for long one and the same nation. For oligarchies to sustain such progress is to invite a popular overthrow of the oligarchy.

Consider, for example, a comparison of the population of the United States and Britain at approximately the time of the first U.S. Census, 1790.

Condition of Population	Functional Literacy	Productivity of Labor	Household consumption
Britain	±40%	100	100
USA	Greater than 90%	±200	±200
Note	"Latin farmer"	Index	Index

As former Secretary of State Henry A. Kissinger's plainly racialist 1974 NSSM-200 illustrates, the British oligarchs behind the founding of the Club of Rome,[102] the "Donatist" Greenpeace, and the other gnostic "ecology" cult organizations, are not such fools as to believe themselves the anti-scientific, demagogic hoaxes put forth by "the environmentalist movement."[103] Kissinger is plain-spoken on the real issue. If developing nations such as Brazil and India[104] continue to increase their populations, then they must resort to large-scale scientific and technological progress to meet "the populist demands" of those populations. It is that scientific and technological progress which British agent Kissinger[105] will not toler-

ate.[106] Kissinger's policy is identical with the oligarchical Nazi policy for savage depopulation of Eastern European populations.[107]

Communist International official Georg Lukacs[108] founded the so-called "Frankfurt School" of Theodor Adorno, Walter Benjamin, Hannah Arendt, one-time Nazi and Arendt lover Martin Heidegger, et al. in 1923 on the basis of the dogma, that the reason Bolshevism failed in Western Europe is that Western (Christian) culture has an effective "immunological" factor, enabling it to resist the Bolshevik virus.[109] The purpose, and continuing later practice, of Horkheimer's, Marcuse's, Adorno's, and Arendt's "Frankfurt School," like its fellow-traveler and former Nazi Martin Heidegger,[110] has been to destroy Western European (Christian) culture. In British intelligence circles, the Anglo-German "Frankfurt School" obscenity, has been complemented by Brigadier John Rawlings Rees', Eric Trist's, and R.D. Laing's London Tavistock Clinic and London Tavistock Institute.[111] Tavistock types, seeking the same purpose as the cacophonous Adorno and witch Arendt, refer to a "cultural paradigm-shift" in Western values—i.e., toward "New Age values," away from traditional Western ones.[112]

It is important to underline a crucial feature of a combined "cultural paradigm-shift" activity of Adorno's networks and the Tavistock crowds of MK-Ultra circles. The key added element was provided by the avowed Satan cults of pro-Freemasonic "Golden Dawn" Satanist Aleister Crowley, the Satanist who inducted Hollywood's and Tavistock's Aldous Huxley of LSD-25 fame.[113]

In one respect, the 1963 mass-brainwashing of the "New Age" by the Anglo-American Establishment, is an echo of the seventeenth-century operation of the Bogomil-rooted Rosicrucian cult.

Then, on those former historical occasions, as now, the purpose for which the (oligarchical) party of international usury has launched and relaunched the kind of Buggery typified by Bacon's Rosicrucian empiricism, is to produce an effect which relevant Tavistock types term "a cultural paradigm-shift."[114] This was the purpose of those Byzantine and Venice interests which sponsored the proselytizing by the Bogomils in southern France. This was the purpose of spreading the gnostic influence of Aristotle via Padua and "Averroist" Spain into France and England, during the thirteenth and fourteenth centuries. This was the purpose of introducing A = 440 Hz at the Congress of Vienna, in the setting of the Versailles Treaty operations, and, again, on the eve of World War II.[115] This was the purpose of the satanic "New Age" of Aleister Crowley, H.G. Wells, Bertrand Russell, Georg Lukacs, Aldous and Julian Huxley, Theodor Adorno, Margaret Mead, and so on. Call it "cultural warfare," if you wish. Call it "paganist religions revived as warfare in the effort to exterminate Christianity," for that, in large degree, is also what it has been, and is today.[116]

Deus Ex Machina

We have indicated here, above, the nature of the proof—supplied in other locations—that successfully[117] continued human existence requires at least some minimal, and significant[118] rate of "average" scientific and technological progress. Let us now focus upon those few highlights of that argument which bear most directly upon Descartes' deus ex machina.

1. We have shown that science is essentially subjective, and could not be science were it otherwise.

It is the reflection upon hypothesizing the higher hypothesis which is the "substance," which is the very existence, of science as scientific activity: Qualitative improvements effected in an hitherto established principle of

hypothesis, is the core of practical scientific progress. Without a renewal of science, through its continued progress in that way, a science based only upon a fixed, stagnating principle of hypothesis, would be a science on the road to becoming inert, virtually dead. That constant change, corresponding to successfully hypothesizing the higher hypothesis, as the direct object of thought, is *the minimal condition of fundamental scientific activity.*

A *significant* amount of scientific progress is: sufficient fundamental scientific progress (valid change in principle of hypothesis) to define this experienced change, for a living generation experiencing it, as an experiencing of science in its essential character as *hypothesizing the higher hypothesis (Becoming).*

This must be science conscious of its essential interdependency with *increases in the rates of increase of potential population-density.* It must, thus, be a physical science which is self-consciously coherent with *the Leibnizian science of physical economy.* The case of the mid-1960s scientific and rational optimism, which the Kennedy aerospace "crash program" fostered in the population, is a handy illustration of *significant* change. The demonstration of an accelerating scientific illiteracy and popular irrationalism fostered by the "zero-growth" indoctrination and political practice of the 1960s and 1980s, shows how a population's scientific literacy can be politically destroyed over as short a time as a generation by combined miseducation and aggressively willful technological stagnation.

It is, as we have stressed, the "correlation" between crucial advances in principle of hypothesis (higher hypothesis) and rates of increase in potential population-density, which defines hypothesizing the higher hypothesis as the practice of successful human existence. Without that conscious practice, society's grip upon science is an uncertain one at best. So, *science is essentially "subjective":* Generate a proven hypothesis, respecting those "directions" of non-linear, negentropic change and the principle of hypothesis, the which will assuredly increase the rate of increase of mankind's political population-density.

2. Thus, spirit causes material change.

The cause of scientific progress is that which causes a negentropic direction in continued hypothesizing the higher hypothesis. Thus, the cause of increase of potential population-density is purely mental (spiritual) activity of this included *cardinality,* to use Cantor's Types. Thus, man's power to change the *material* universe is the effect of a *spiritual* cause.

In other words, the material *mediates* the spiritual existence's action upon itself.

There is a student's difficulty to be overcome, to understand this adequately. As we warned earlier, the student begins by imagining in a naive way, that a uniform quality of anything—matter, for example—must be linearly homogeneous. That naive state of mind cannot comprehend a non-linear, continuous-manifold space super-dense with spherical "bubbles," or the continuum cohering with Cantor's hierarchies of transfinite orderings. One example, summarized from the author's *The Science of Christian Economy,* serves our purpose here.

Virtually everyone in Western industrialized nations, perhaps, has, at worst, a fairly clear image of the experience of creative problem-solving, probably most clearly from secondary school experiences. At one moment, the problem refuses solution; at the next, the solution has been conceptualized in an initial way. The new idea still needs some working-

through, but the raw material of the new idea is there—as it was not "there" a moment earlier.

Now, the new idea can be a subject of (social) communication. However, the moment of transition, from "not seeing" to "seeing" the new conception (in raw form) remains something located within each individual mind in which that conception is generated. This singularly individual aspect of generating the conception—in each and every case the experience is repeated—is a *sovereign* feature of the individual person's mental processes. It is this distinction, a sovereign feature of individual *creative* thinking, which shows the individual personality to be essentially a sovereign existence, because it is essentially, as a creative potentiality and process, a creative (negentropic) process. [119]

This sovereignty of the individual person is not derived from the mere fact that he or she has a biological individuality. All arguments respecting the "sovereignty of my body," such as the well-known feminist litany, boil down to a definition of the animal rights of a house cat or milk cow. The sovereignty of the individual person is *not a bestial, but a human quality*, a quality determined ("bounded") by that divine spark of potential for developable creative reasoning in each individual.

Conversely, if we deny creative reason's primacy—the primacy of that *divine spark*—we deny that which defines man as in *the living image of the Creator*.

Christian theologians have too often erred, in using a relatively popular, but bad idea to assist a worse argument: The use of the word *scientism* typifies this. It is science, defined in respect to hypothesizing the higher hypothesis, which, if it is infused with *agapē*, [120] represents man's intelligible representation of man in the living image of God. It is not an optional human behavior; it is the aspect of human behavior on which the perpetuated existence of mankind depends absolutely. It is the expressed form of *agapic* [121] activity, by which one may demonstrate the essential, absolute superiority of mankind over the beasts.

How could the theologians have been misled so into worrying themselves about "scientism," when they refer to what we have represented as science here? There is a formal source of these theologians' error.

The formal error is this. No literate theologian could deny that the method of Augustinian Christianity is *Platonic*, in opposition to Aristotelianism. In Aristotle's method, both Creation and the existence of the Christian God are impossible, and *consubstantiality* is denounced implicitly by Aristotelians as a guise for *pantheism*. However, many have erred in the respect, that while insisting rightly that Christian theology is Platonic in that restricted meaning of the term, they also argue that "Aristotle, however" is the method of science. From the adoption of this latter error, the warning against "scientism" follows.

That is an honest and understandable error, but also a serious error, and mistaken policy in misapprehending the meaning of science; failing to grasp science as did Augustine or, most emphatically, Nicolaus of Cusa, as scientific principle. They err in conceding the field of science (*Naturwissenschaft*) [122] to Aristotle.

The opportunism is twofold. Simply, they have, as indicated, accepted the claims to science *by the Buggers, by the oligarchical party of international usury*, by the people with the largest chunks of money. They have also accepted the positivist dogma of Kant and Savigny, the hermetic separation of *Naturwissenschaft* from *Geisteswissenschaft*. They have fallen into the trap fostered by such positivists as the pseudo-scientific ethnologists-anthropologists, the sociologists, the modernist (positivist) psychologists, the "political scientists," and so on. They forget, that the separation of

Geisteswissenschaft (and *Rechtswissenschaft*) from *Naturwissenschaft*, is that denial of *natural law*, by Kant and by Savigny, the which leads by a direct route into Bolshevism and the Nazism of Martin Heidegger and Judge Roland Freisler.[123]

Once we break the link of *scientific intelligibility* between the Creator's law and a notion of *natural law* in statecraft and private morality, we render the word "natural law" a term for a seemingly arbitrary dogma, as of a sect, relative to society at large. By destroying (by avoiding, or even denying) *scientific* intelligibility, we degrade the very term "natural law" to the "objective" definitions supplied traditionally by Hobbes, Locke, Aristotle, Hume, and Kant: the arbitrary authority of traditional *custom* (Kant) contending with the *radical* impulse of a Bentham.[124]

From the vantage point of examining some salient effects of such erring concessions to Aristotle and Kant by some Christian theologians, we have intended here to render less difficult the needed sensuous quality of insight into the gnostic, Descartes-Kant dogma of *deus ex machina*.

Thus, if we separate the practical, material, fleshly, sensual aspects of human activity from the creative (spiritual), the productive labor of man is not essentially distinguishable from the hunting-and-gathering of any dumb beast. Then, a "surplus" from the work of productive labor must be attributed, not to labor, but to the *bounty of nature*, as the oligarchical Physiocrats did.[125] Thus, the aristocratic Physiocrat of a serfdom's estate is justified *in practice* in managing the serfs as they had been his mere cattle, and the yield, being the "bounty of nature" belonging to the feudal lord by virtue of ownership of that land which secretes such a bounty.

Whereas, if one recognizes historical fact, the true net gain is the fruit of the effect of scientific and technological progress, in increasing "the productive powers of labor."[126] This distinction of man, apart from and above the beasts, underlines *in practice* the sovereignty of that in each person which defines the person as in the living image of the Creator. In the former view, that of the Physiocrats, we have the essence of all apology for oligarchism and usury; in the latter, the proof that oligarchism and usury are evils whose gains must be forfeit under natural law.

'The Stones Would Cry Out'

The standpoint from which this proposal is written is the *ecumenical* one. That is to say, we must not offer as policy something which is based only upon the authority of the taught doctrine of some religious body. Rather, everything proposed must be presented from the standpoint of an independently existing, verifiable, intelligible representation. This is the proper standpoint for any treatment of matters of statecraft; it is required with double force, when we are attacking the high priests of commonly accepted classroom mathematics as acting in the arbitrary, doctrinaire interests of a pagan/gnostic, Rosicrucian cult.

Thus Luke tells us that Jesus reproved his disciples, Let it be as if "the stones would cry out[127]." Let nature sing the truth for us. Never fear; it will sing God's truth.

The fact that all persons (in each society) are thus in the living image of the Creator, defines implicitly the required standards (of approximation) for such matters as universal compulsory education, real incomes of nuclear-family households, forms and conditions of gainful employment and other work presented as opportunities for members of the standard labor force, and so on.

For example, Friedrich Schiller's principles of education are implicitly

up-to-date as statements of educational policy today.[128] So are the models for universal compulsory secondary education by Wilhelm von Humboldt. What is required, is that such qualities of compulsory education be practiced as universal education—not limited to an elite relatively few.

For example, as Leibniz's *Society and Economy* argues to the same general effect,[129] the wage rate must be congruent in effect with a certain universal minimum standard for *nuclear-family households* (not individuals). The cost of labor is its social, real cost of reproduction by households. The quality of labor we shall require during the coming two generations is the standard of quality which must determine the "process sheet" and "bill of materials" of the household reproducing such future labor.

Let the stones cry out. We employ the ecumenical standpoint. Put aside for the moment all relevant doctrines of churches, excepting those of science's Rosicrucian and kindred adversaries. Examine the Enlightenment's *materialism* cult of Francis Bacon, Descartes, Newton, Kant, and Savigny from the ecumenical vantage-point. On the elementary issues of *deus ex machina,* use, as a bench-mark, Kepler's *Six-Cornered Snowflake,* as we have situated that earlier in this location.

We pose two interrelated background issues.

First, we have pointed out the modern *positivist,* or *reductionist, method* as an alien intrusion into science by the politically powerful representatives of a seventeenth-century, gnostic, Rosicrucian cult. We've identified that cult's relevant, characteristic feature in its Cartesian form as the dogma of *deus ex machina.* We have attributed that characteristic to a derivation from the notorious, southern France cult of medieval sexual perverts, known variously as the Bogomils, Cathars, or "Buggers."

Second, we have identified the backers of the Rosicrucian cult's intrusion into science as that oligarchical international party of usury, the international financial cartel known to seventeenth-century Britain (in particular) as "the Venetian Party." We identified the relevant motive of the usury party—then, and today—to be the oligarchical class' fear of the social effects of fostering popular admiration of the benefits of practicing scientific rationality.[130]

The two issues are interlinked under a common, single principle: the oligarchy's innate fear and hatred of the way in which true human creativity affirms as social practice the existence in each sovereign individual person of that "divine spark" of creative reason which defines all persons as created equally in the living image of the Creator.[131] Thus did the evil Roman pagan Emperor Diocletian and his successors enact all of his so-called "social decrees" of population control and zero technological growth,[132] to seek to perpetuate oligarchical society against the persisting threat represented by Christianity.

Simplify the pupil's task, of recognizing the quality of fearful desperation permeating the usury party's killing rage against the successive achievements of the Golden Renaissance. First, therefore, focus upon that narrower aspect of this process, the narrower aspect which modern educated populations might grasp with relatively less difficulty, the *material* aspect.

The preparations for what became Christopher Columbus' discovery of America, as early as A.D. 1439, by Paolo Toscanelli *et al.,* is one example of this material success.[133] The scientific achievement incorporated in the completion of construction of Brunelleschi's design for the cupola of Florence's Santa Maria del Fiore is the insignia of the great Council of Florence.[134] The *rate of increase* of mankind's sustainable growth of potential population-density since the beginning of Europe's fifteenth century, to date, exceeds by far the accomplishments of any other part or period of this planet throughout history.

The pupils should be reminded of the relevant distinctions between a mere collection of isolable, useful inventions, and a functional series of coherent, successively more advanced, valid discoveries generated by a *constant principle of hypothesis*. It was not a few impressive inventions which made Leonardo da Vinci so dangerous to the usury party; he was the embodiment of a communicable, teachable principle of (higher) hypothesis-making. The study of the ordered sequence which includes prominently the fundamental scientific discoverers Cusa, Leonardo, Kepler, Leibniz, Cantor, *et al.*, shows this more forcefully. The Golden Renaissance's revolution in "natural philosophy" was an ongoing, trans-generational, self-developing process, a living embodiment of an efficiently progressive hypothesizing of the higher hypothesis.

The usury party saw with horror that the Golden Renaissance was not the possessor of a miraculous Golden Egg, but of a breed of upward-evolving geese which produced ever-improved qualities of Golden Eggs. The usury party's response: "Kill that goose!"

The usury party saw that its own cause could not survive, unless the *source* of this kind of scientific progress were either destroyed, or nearly so. These usurers and their agents defamed, and sought to destroy also by other means, the persons and institutions identified as chiefly responsible for this continuing Golden Renaissance. So, Venetian usurers, Musco-vites, and Mount Athos' Patriarch Gennadios connived to assist the Ottoman conquest of Constantinople and Greece, in A.D. 1453, to eliminate the Paleologue partner of the Golden Renaissance's Council of Florence. So, it sought to derogate science's vital principle, the principle of hypothesis, and so it sought to supplant the principle of hypothesis by the inferior, anti-scientific, inductive methods of empiricism, and the linear methods of the gnostic ideologues such as Descartes and Kant.

Just as the sexually perverted Cathar's heathen belief[135] forbids him from allowing his semen to impregnate a woman,[136] so the Rosicrucian Buggers in the trains of Francis Bacon, Descartes, and Kant must forbid the introduction of the potent principle of hypothesis into matters of scientific inquiry. So, Bugger Savigny decreed, that Leibniz's method of *Naturwissenschaft* (natural law),[137] must be excluded from the internal affairs of *Geisteswissenschaft* (social, mental, artistic matters) in general, and from *Rechtswissenschaft* (law) in particular.[138]

For Example: the Physiocrats and Karl Marx

To place both oligarchism and usury in their relevant focus here, consider the eighteenth-century feudalist faction known as Dr. Quesnay's *Physiocrats*,[139] and, for comparison, the related case of communist Karl Marx.[140] Both the Physiocrats and Marx are considered here as typifying the *oligarchical* philosophical standpoint.

In the science of physical economy,[141] *wealth* is a *non-linear, negentropic* magnitude. It cannot be measured in pounds, man-hours, or dollars, or any other scalar units. *Essentially, wealth* is the composite, but indivisible entirety of all of those objects and other kinds of physical and cultural improvements which, as a totality, is functionally necessary to maintain positive values for the rate of increase of the potential population-density of society as a whole.

However, we may use that term, *wealth,* to attribute *wealth* as a functional quality of some necessarily included lesser portion of *wealth* as a whole.

To situate the crucial arguments to be made respecting the Physiocrats

and Marx here, draw the following sort of linear input-output table on the classroom's blackboard. List every principal part of the economic activity of a national economy twice: once in a row of its own; once in a column of its own. Let rows signify outputs, and columns, inputs. That is, the output of each row appears once in total and also as distributed as output by columns.

Divide the categories roughly as follows:[142]

1a. *Basic physical economic infrastructure (physical)*
Water management, sanitation, and land improvement in general; production and distribution of power; general transportation (ports, inland waterways of transport, railways and analogous transport, highways, warehousing of goods in transit); communications.

1b. *Basic social infrastructure:* health-care delivery systems; educational systems, social welfare systems.

2. *Agriculture and mining.*

3. *Middle industry:* Machine-tool, state-of-the-art technical services of supply, installation and repair—producers, households, construction trades.

4. *Manufacturing and analogous.*

5. *Physical distribution of product.*[143]

6. *Scientific and related technical services* (to the above).

7. *Other.*[144]

Group the elements in our classroom blackboard diagram as follows: Make a list of all elements, assigning each element to not more than one of the seven categorical groups of elements just listed. Thus, we have a series of rows, one under the other in downward sequence. Leave a place for a group of rows (and corresponding columns) assigned to designate labor (total plus several sub-classifications). Next, construct an array of columns: For each row, there will be a column carrying the same unique label as that row.[145]

Consider briefly the manner in which labor is to be represented in this blackboard diagram. This requires us to stand back from the blackboard and remind ourselves of our relevant purpose.

The way in which we must represent labor, as both an input and an output, in that blackboard schema, is determined by the already-referenced, reciprocal relationship between science in general and the science of physical economy.[146] *Science* is the process of discovery of that which is characteristic of successfully hypothesizing the higher hypothesis. The empirical proof of that process of discovery is the ordering of higher rates of growth of potential population-density. That reciprocal relationship between science, so defined, and the physical economy, is science properly defined as *subjective*. That definition of science is, reciprocally, the proper definition of a science of physical economy.

Thus, the function of *labor* in a physical economy is defined by labor as human, as *imago viva Dei*, by *labor as scientific practice*.

In a modern, pre-1966 industrial economy,[147] labor is expressed in its purest form as *physical scientific discovery*. From science is derived labor in the productive process, labor in the form of either *machine-tool research and development*, or analogous activity in agriculture. The productive form of a valid, perfected crucial experiment is the model for a corresponding machine-tool-design principle. That machine-tool-design principle (or analogous process-design principle) is the form of introduction of fundamental (and lesser) scientific discovery to the productive process in gen-

eral. Next, beyond the machine-tool research and development operative, we have the manufacturer of productive capital goods incorporating that design principle. Next, we have the operative employing that machinery in production. And so on. The functioning of this process as a whole depends upon the induced capacity of producers, users, repairers, and so forth, at all levels to cope efficiently with this transmission of new, higher technologies from laboratory to sales showroom floor.

Two points of relevance to this blackboard scheme follow. First, labor must be defined in respect to this process of successful transmission of successive waves of more advanced technologies, and not in any contrary way. Second, since the process is defined in terms of a social reproduction process, for society as a whole,[148] we must define *labor* itself as a product of appropriate demographic characteristics of a growing society, of rising potential population-density, based upon the principled *sovereignty* of the so-called "nuclear" family.

Thus, the essential process of production is the conversion of scientific and technological progress into increases of potential population-density of society as a whole. This relationship is expressed in terms of increased physical product per-capita and per-hectare (or per square kilometer)—predominantly in terms of the seven categories of output identified just above. So, we have the following categorical division of labor:

1. *Labor as a whole:* the whole labor force of society, defined for a level of technological development, and as a demographic characteristic of the ensemble of nuclear-family-centered households.[149]
2. Labor employed *directly* in the productive-cycle process of *infrastructure, agriculture, mining, middle-industry high-technology functions, manufacturing, physical distribution of physical product,* and *other.*
3. Labor employed *indirectly* in the *technological development of* the productive-cycle process: science and related services to the development of the productive process.
4. Other employment.
5. Unemployed portions of the labor force.

There are some critical ratios of employment of labor to be considered in constructing the blackboard scheme. These include the ratio of agricultural labor to urban-industrial, the ratio of labor employed in production of producers' goods to that employed in production of households' goods, and, most significant, the percentile of the labor force employed as, respectively, scientists, and machine-tool specialists. The latter two express the relationship between production and technological progress.

On this and kindred accounts, the blackboard diagram is transformed from an input-output chart, into a kinescopic series of charts. The spectacle which this succession presents is more than merely analogous to our deductive scheme of successive stages of a non-linear process of fundamental scientific progress.[150] That is to emphasize, that the relative weights of rows and columns are changing; some rows and columns are vanishing over time; new rows and columns are being added. In correlation with this, the ratios of the productive labor process are changing. A fascinating study in *analysis situs (topology).*

The changes in composition of these successive input-output charts, indicate increases in the required absolute physical content of the typical households' and producers' market basket. With technological progress, the composition of needs changes per-capita and per-hectare; with tech-

nological progress, the level of need is increased. Those who speak of a "subsistence" income, are babbling as fools do; a *required income* is a changeable value, varying with the levels of technology and productivity prevailing and in terms of improvements required.

Thus, we must deal with unit "market baskets," defined as units in respect to per-capita values of nuclear-family household needs, to per-capita production requirements of producers' goods, to per-hectare requirements for residents, basic economic infrastructure, and production. The contents of these unit market baskets changes significantly in qualities and quantities; the change is principally a function of levels of technology and potential population-density. The content varies so, but the "sovereign" quality of the nuclear family's per-capita market basket *does not change* in its character as a sovereign unity. It is not an accumulation of objects; it subsumes sovereignly its required content.

Thus, in its happier moments, our blackboard scheme shows an attributable *profit*. This is not the same kind of "profit" ordinarily presented by an accounting report. Rather, our blackboard shows, in its better times, at least, that the amount of physical product as output exceeds the amount of physical product required to generate that level of total social output. For purposes of clarity, let us term this a *physical profit*, as distinct from an imputable *money profit*.

The practical significance of this *physical profit*, is that it may be used to expand the economy, or to make the economy *more capital-intensive* at a *higher level of technology*. Where the advancement of technology is successively employed for this use of margins of *physical profit*, the result is a greater gain in productivity than the physical costs associated with the investment causing this increase. In other words, a result which defies the so-called "Second Law of Thermodynamics." This defines the productive process as in *a negentropic phase*, a phase induced by that mental activity called *science*, generated by hypothesizing the higher hypothesis.

Counterpose what we have just summarized to the Buggers' argument of Dr. François Quesnay's Physiocrats. Quesnay has conveniently supplied us his own "blackboard scheme," the *Tableau Economique*[151] so much admired by Karl Marx. Quesnay, attacking Colbert and Leibniz, most emphatically, is aware of the notion of a *physical profit*. He attributes the existence of all of this *physical profit* gained by a society to "the bounty of nature." By tracing all of the production by a society, to the role of an original supply of raw materials by agriculture and mining, as he does in his *Tableau Economique*, Dr. Quesnay argues that all of the resources of downstream enterprises (and their employees) are nothing but a parasitical sharing-out of "the bounty of nature" supplied originally through the fruits of agriculture and mining.

Quesnay does not argue that it is the production by agricultural and mining *labor*, which generates this alleged "bounty." Rather, the Physiocrats claim, it is nature itself which generates the "bounty," for whose release the agricultural laborer or miner serves merely as a kind of midwife. Some readers may be familiar with this Physiocrat's heathen dogma in its guise as the "Single Tax" doctrine of former nineteenth-century New York City mayoral candidate Henry George.

Dr. Quesnay's argument ought to be recognized readily as a copy of the medieval French Buggers' sexually perverted dogma respecting the separation of *spirit* (mind) from *flesh* (the sensuous, material world). It is consistent with the seventeenth-century forms of French Buggery, notably the Renaissance *deus ex machina* dogmas of the Cartesians.[152] It is coincident with Francis Bacon's and Isaac Newton's insistence upon the

Buggers' *empiricist* "inductive" *materialist method*, to the exclusion of the *principle of hypothesis* (mind, spirit).

This is also a defense of *usury*. To such French feudal oligarchs as the Colbert-hating Physiocrats, the *bounty of nature* belongs to him who held property-title to the land. The serf or miner had no natural right to the product of his own labor, beyond the same degree of bare subsistence the farmer might prudently set aside for the non-human livestock.[153]

Karl Marx, an admiring student of Quesnay's writing, alleged that Adam Smith reflected a significant degree of the Physiocrats' influence in his own dogma.[154] On this point, Marx was essentially correct. A brief comment on that is most relevant to the issues of scientific method in today's classroom.

The key to Adam Smith is that he was nothing but Glasgow's second-rate edition of the famous, perverted British diplomat and spy, Edinburgh's David Hume.[155] Hume had risen from obscurity by showing such extravagant signs of post-adolescent mental disorder, that his family shipped him off to France to avoid further embarrassing comment from the neighbors. It was in France, that Hume's initial British-intelligence career was established. It was Hume's Voltairean network in France and Geneva, Switzerland which was used by the British East India Company, beginning 1763, to train Smith in economics and certain other matters.[156] It was the French Physiocrats and Voltaire's Franco-Swiss supporters of the cult of Rousseau, who provided Smith the training reflected in Smith's 1776 *The Wealth of Nations.*[157]

The Bugger in Smith showed already in 1759, in his *Theory of the Moral Sentiments,* published four years before the East India Company's evil Shelburne tapped the obscure Smith for Smith's training assignment among Hume's and Voltaire's—and Philippe Egalité's—circles in France and Geneva. The relevant dogmatic assertion in the 1759 book is conclusive proof that Smith was already a Bugger of the Rosicrucian stripe by 1759.

Comparing this key passage from the 1759 *Theory* with the stated dogma of "the Invisible Hand" in the 1776 *The Wealth of Nations,*[158] shows indelibly that the doctrine of "free trade" is nothing more than a carbon copy of the dogmatic sexual perversion of the original French Buggers.

The seventeenth and eighteenth centuries' international oligarchical party of usury—the so-called "Venetian Party" of that period—was the same party, operating under instruction of the same, single philosophical standpoint in religion, mathematics, physics, economy, social philosophy, music, painting, architecture and so on. In all of these facets of that party's brutishly aggressive undertakings, the original Buggers' dogma of sexual perversion is the central axiom of the party's opinion, policy, and practice.

In the wars which the British, Philippe Egalité's, and Mazzini's Rosicrucian freemasons fought in the attempt to eradicate Christianity from this planet,[159] in the literal wars fought between opposing freemasonic factions during the eighteenth century,[160] and in the savage warfare which the faithful followers of Francis Bacon, René Descartes, and Isaac Newton wage against science down to the present day, the philosophical standpoint of these agents of the international party of usury has always featured as central the dogmatic sexual perversion upon which the entirety of the legendary Enlightenment based its opinion and practice in every dimension of human endeavor.

The kernel of that Buggers' dogma in, for example, physical science, physical economy, and music, is a medieval Buggers' insistence upon an hermetic isolation of the *spirit* (mind) from the *flesh* (the *materialism* of

sensuous experience). In this, as the Buggery called "Romanticism" in the nineteenth-century music of Liszt, Wagner, Berlioz, etc. illustrates, the modern Buggers have never opposed an *emotional* intervention into the domain of the flesh, even *en masse;* it is the creative powers of *life* within semen, or *of intellect* which were the objects of the prohibition.

In physics, the modern classroom's affectionate name for medieval Buggery is Clausius'[161] and Kelvin's[162] version of a "Second Law of Thermodynamics."[163] That is the dogma which every yuppie graduate of "Politically Correct Science Appreciation 101" knows as "Jeremy Rifkin's Law of Universal Entropy."[164] To see the tradition of sexual perversion in Kelvin's dogma, look at the formal issues of mathematical physics from the vantage-point of Kepler's *Six-Cornered Snowflake.*

How does Kepler, in that location, show the geometrical necessity for the dual determination of both an exclusively *negentropic* (Golden Section harmonics) and also an exclusively *entropic* ordering such as that of the snowflake? Remember, that "negative entropy" (or *negentropy*) is only a positivist's perverse way of not saying plainly "living *or equivalent* forms of ordering."[165] There was nothing essentially original in the nineteenth-century concoction of a "Second Law"; Newton acknowledged such a paradoxical dogma to be implicit in his *arbitrary* choice of a mathematics (a linear form of series). We have also encountered that same paradox as the difference between a true circular function and an n-polygonal effort to approximate a true circular function.

From the standpoint of biochemistry, the same "Second Law" shows itself to be most absurd. "Is human life a scientific possibility?" a student asks positivist Professor Nerd. Professor Nerd points to the "Second Law" and shakes his head slowly, with deep regret. Carry the inquiry deeper, into the molecular atomic-nuclear domain. Of what are living processes assembled? Are these processes entropic or negentropic at the nuclear level? Now, we are in immediate proximity to the issues of cold fusion.

Go to Professor Bostick's *l'chaim* particle.[166] This is a very "Keplerian" particle, which can be the germ of life, or of a snowflake, negentropic *life,* or entropic *detritus.* On this account, we must repeat today, even in the language of ultra-high-temperature plasma physics, nothing is found contrary to Kepler's essential argument of 1620. Not only do "the stones cry out"; the smallest possible things in the universe ridicule Clausius and Kelvin, as they also jeer at Bacon, Descartes, Newton, and Kant.[167]

This is not to suggest that little progress has been made since 1620. It is to illustrate, that the problem lies with nothing but the persistence of Buggery. It is the introduction and persistence of the same axiomatic assumptions borrowed from the medieval Buggers of southern France, which is the continuing source of the principal disorders in official science today. *The special problem is that most victims do not know they are polluted in this way, since their judgment in all matters is premised axiomatically upon the polluting assumptions which modern opinion prefers to term "materialism," rather than "Buggery."*

Notes

1. On the origins of the Bogomil or Cathar cults in Manicheanism, and the Albigensian Crusade against them, see LaRouche, *The Science of Christian Economy and Other Prison Writings* (Washington, D.C.: Schiller Institute, 1991), pp. 485-86.

2. For the characteristic materialism and dualism of the universe as de-

scribed by the most famous of Bacon's scientific progeny—Sir Isaac Newton—see Chapter III, footnotes 12, 14, and 15.

3. See René Descartes, *Meditations on the First Philosophy in Which the Existence of God and the Distinction Between Mind and Body are Demonstrated* (1635), in Ralph Eaton, ed., *Descartes, Selections* (New York: Charles Scribner's Sons, 1955).

4. According to Gibbon's researches, and others, the *Paulicians*, a Manichean sect earlier used by the Caliphate against Christendom, were forcibly transplanted into Thrace (modern Bulgaria) by the Byzantine Constantine Copronymus. Edward Gibbon, *The Decline and Fall of the Roman Empire*, Chapter 54, pp. 328-34. Thus, the Bulgarian origins and *Bogomil* name of this sect of Cathars; thus, the various plays upon the name of *Bulgarian*, culminating in the English "Bugger."

5. See H. Graham Lowry's *How The Nation Was Won: America's Untold Story, 1630-1754* (Washington, D.C.: Executive Intelligence Review, 1988), pp. 74-77.

6. See Anton Chaitkin, *Treason in America*, Second Edition (New York: New Benjamin Franklin House, 1985), Chapter 1, on Shelburne.

7. Leon Trotsky's praise of Bentham is in Trotsky's autobiography, *My Life* (New York: Charles Scribner's Sons, 1930).

8. *The Works of Jeremy Bentham*, John Bowring, ed. (11 Vols.), London, 1843.

9. So the Jacobin judges sentenced the French chemist Antoine Laurent Lavoisier, friend of Benjamin Franklin, to be decapitated: "The Revolution has no need of men of science," declared Jean-Paul Marat in the meeting of the National Assembly in 1791 at which Lavoisier was denounced and sent toward his execution. Earlier, Marat had written a pamphlet, "Modern Quackery," vowing to destroy the entire French Academy of Sciences and singling out Lavoisier, who was not, however, the Jacobins' only prominent scientist-victim. The story in French is in Joseph Fayet, *La Revolution Française et la Science (1789-1795)*, 1960, French National Scientific Research Center; and in English, in Dr. Morris Levit, "Jean-Paul Marat: The Terrorist Model for Today's Antiscience Environmentalists," in *Fusion* magazine for June 1978, Vol. 1, No. 8.

10. Filippo Brunelleschi (1379-1446) won the public contest for design of the Dome of the Cathedral of Santa Maria del Fiore in 1418; work began in 1420, and the cupola was completed in 1439, in time for the Council of Florence declaration to be made beneath it. See Nora Hamerman, "Brunelleschi's Dome," *21st Century Science & Technology*, July-August 1989, Vol. 2, No. 4., pp. 28ff.

11. The Roman Catholic Church had forbidden usury by actions of the Lateran Council of 1139; by the Papal Bull *De la usura* of Urban III in 1186; by the Papal Council convened by Gregory IX in Rome in 1240; and by the Council of Vienna in 1311-12, which said that any Catholic who did not recognize usury as a grave or mortal sin, was committing heresy. The Council of Florence reaffirmed the condemnation. In 1586, one hundred fifty years

Jean-Paul Marat

later, Pope Sixtus V held a synod in Rome and issued a Papal Bull declaring usury *Detestabilis.*

12. The operations by Venice and Muscovy against the Council of Florence, and against the Paleologue emperors of the Byzantine Empire for ecumenical agreement with Rome at the 1439 Council, are described in Nora Hamerman, "The Council of Florence," in *Ibykus* magazine, Wiesbaden, Germany, Schiller Institute, Fall 1991.

13. In a Dec. 16, 1988 conference of Catholic theologians at the Evangelicum College of the Dominican Order in Rome, Helga Zepp-LaRouche identified from documentation how Cusa won the Eastern Church to the *Filioque* by showing from the Greek documents, that the Greek Councils had already agreed to this principle. See *Executive Intelligence Review,* Jan. 6, 1989, pp. 36ff.

Erasmus of Rotterdam
by Albrecht Dürer

14. The split of the Catholic Church over the writings of the obscure monk Martin Luther was masterminded by Albrecht von Brandenberg, the Electoral Archbishop of Mainz, himself the financial agent in Germany of the Venetian bank Casa di San Giorgio and the Casa's partially owned Nuremberg bank, the House of Fugger. Albrecht took out an enormous Fugger loan to buy his Electoral position from Rome, because the Electorate brought with it the subcontract for collecting indulgences in Germany. Beginning in 1504, Albrecht's ally, Hapsburg Emperor Maximilian, also impoverished Germany by borrowing heavily from the Fuggers to repay his Venetian debts, at high interest. The Fuggers' agent followed Albrecht's collection officials to every town, taking the Venetian loan repayments directly from the indulgence box.

The party of Nicolaus of Cusa in France and Germany, during this period led by the Pauline scholar Erasmus of Rotterdam, conceived a plan based on Cusa's 'Concordantia Catholica' to establish a Catholic state from the fragmented princedoms of Germany, free of usurers such as Albrecht and Maximilian. This unified Germany was to be modeled on the France of Erasmus' ally, the "Spider King" Louis XI, and directed by Erasmus' students among the German princes, notably the Elector of the Rhineland-Palatinate, whose Heidelberg University had become a great center of Christian and classical scholarship in Greek and Arabic sciences.

In 1502, the Venetian diplomat Contarini reported from the Diet of Augsburg that the German princes were ready to overthrow Maximilian, because his huge debt to Venice and the Fuggers caused "excessive burdens of the common man such as compulsory services, feudal dues, ecclesiastical fees, taxes" which the princes sought to relieve since the population "would not tolerate them forever."

Beginning in 1510, the Venetians began a campaign to destroy the Cusan party in Germany. The Venetian Archbishop Albrecht first demanded the burning of all Hebrew and other classical books in Germany. In 1514, Albrecht hired Ulrich von Hutten and Franz von Sickengen, two dispossessed knights, to write pamphlets denouncing "that Florentine, Erasmus." Luther turned his pen against the concept of *imago viva Dei,* or the divine spark in man, then championed by Erasmus' writings, and then against the Catholic Church itself.

See Johannes Janssen, *History of the German People at the Close of the Middle Ages,* Vol. I; Richard Ehrenberg, *Capital and Finance in the Age of the Renaissance;* and Frederick Hertz, *The Development of the German Public Mind,* Vol. I.

15. Venetian and Genoese bankers' control over England in the reign of Henry VIII came from the financing (by loans to the prospective buyers), of Henry VIII's sale of confiscated estates for hereditary titles, and particularly of Catholic Church estates and properties, which Henry's government seized to provide itself financial means. See Christina Huth, "The Life and Death of Sir Thomas More," in *New Federalist* newspaper, Vol. III, Nos. 13 and 14, 1989.

16. See footnote 11 above.

17. Rosicrucianism, putatively an alchemy cult, combined elements of Aristotle, cabbalism, and Manicheanism with bits and pieces of old and specially fabricated mythologies. See Frances E. Yates, *The Occult Philosophy in the Elizabethan Age* (London: Routledge and Kegan Paul, 1972).

18. During the last years of his life, 1789-99, Schiller was University of Jena Professor of Universal History. It was during this period that he issued his commentary on the laws of Solon and Lycurgus.

19. Friedrich Schiller, *The Legislation of Lycurgus and Solon*, trans. by George Gregory, in *Friedrich Schiller Poet of Freedom*, Vol. II, ed. by William F. Wertz, Jr. (Washington, D.C.: Schiller Institute, 1988).

20. This references what has been named "Harrapan" culture, a powerful inland and maritime culture which corresponds in all essential features to the "the black-headed people" of pre-Semitic Sumer in Mesopotamia. When the Aryans migrated in from Central Asia by way of Hindu Kush settled in the region of "Harrapan" culture, is not at issue here.

21. Compare Herodotus, *The Histories*, trans. by Aubrey de Selincourt (Baltimore: Penguin Books, 1955), pp. 68-71, and 93-95.

22. Compare Herodotus, *ibid.*, pp. 123-25. This is the basis for the Cybellene cult of Rome. Dionysos is an Indo-European name for "Day/Night"; Dionysos is the model for Manicheanism.

23. The Semitic variants of Shakti are Ishtar (Mesopotamia), Athtar (Sheba/Yemen; Ethiopia), and Astarte (Canaan). Isis is the Hellenic name for Athtar, brought into Egypt by conquest via Ethiopia.

24. Briefly, the legend of Delphi is this. The place was putatively originally sacred to Gaia, the Earth-Mother analogue of Shakti/Ishtar, and her Shiva-analogous phallus-serpent consort, Python. Apollo, who wanders in through and from various original swamps of pagan mythology, turned up at Delphi in a nasty mood, slew Python, cut him into pieces, and buried the pieces in what became known as the grave of Python/Dionysos, the site of the Oracle of Delphi. Apollo then put on a great show of remorse, and made peace with Gaia thus, and adopted Delphi as his cult headquarters. So, into Roman times, the cult of Delphi featured the priestess Pythia, seated at the grave of Python/Dionysos, picking marbles from an urn, or emitting Delphic utterances. The priests of Apollo, whose ranks included the famous Plutarch, sat in the benches facing the proceedings, and supplied the official "spin" on the Delphic utterances, following the performances.

25. Diodorus Siculus, in *Histories of the Greek Peoples*, describes early settlements of "peoples of the sea" on the Northwest coast of Africa, in which
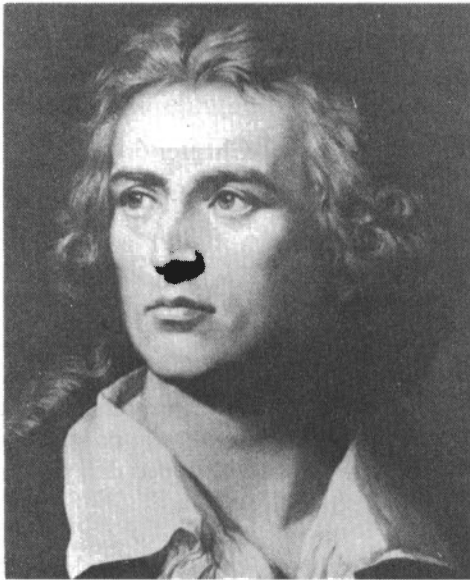
Friedrich Schiller
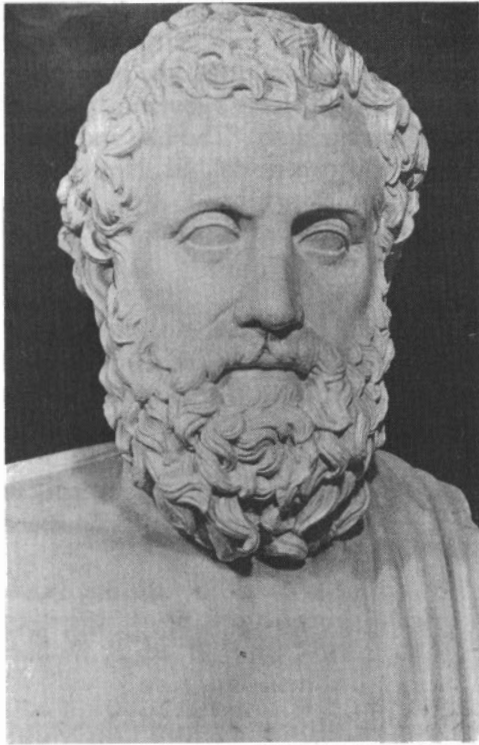
Aeschylos

the children of rulers of this civilization and their concubines, began to call themselves gods by virtue of their lineage from Olympia. The area is described as part of the launching or central region of the ancient Atlantis civilization.

26.   Aeschylos, *Prometheus Bound*, in *Aeschylus*, Vol. I, trans. by H. Weir Smith, Loeb Classical Library (Cambridge, Mass.: Harvard University Press, 1973), pp. 212ff.
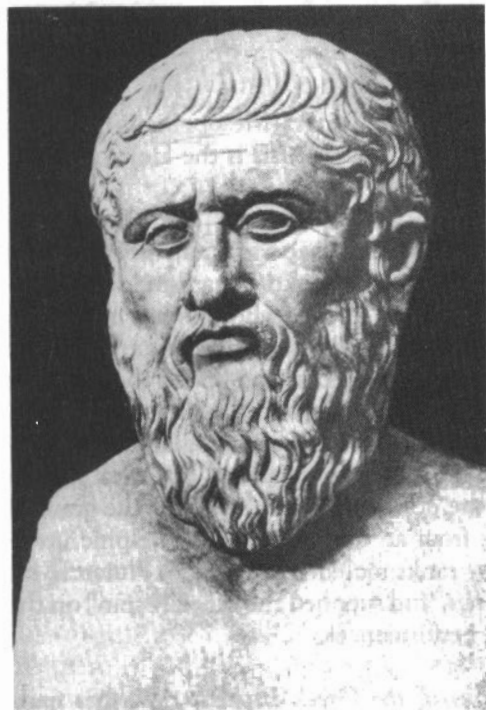
27.   See Nicolaus of Cusa, *De Docta Ignorantia*, trans. by Father Germain Heron (New Haven: Yale University Press, 1954); and *De Pace Fidei*, trans. by William F. Wertz, Jr., in *Executive Intelligence Review*, Jan. 4, 1991, Vol. 18, No. 1; and see Helga Zepp-LaRouche's speech to the faculty of Evangelicum University in Rome, in *Executive Intelligence Review*, Jan. 6, 1989, Vol. 16, No. 1. Also Uwe Henke von Parpart, "Nicolaus of Cusa: Hypothesizing the Higher Hypothesis," *New Solidarity*, Sept. 7, 1984, Vol. XV, No. 51.

28.   See the concluding section of Chapter II.

29.   See *The Science of Christian Economy*, *op. cit.*, Chapter 6.

30.   See footnotes 90, 92 and 93 of Chapter II.

31.   See LaRouche, *Project A*, in *The Science of Christian Economy and Other Prison Writings*, *op. cit.*, Chapters 10 and 11.

32.   On the use of the term *perfect* here: It is to be emphasized, as a paradigmatic reference, that a circular action is a *perfect* expression of a circular arc; whereas, an Archimedean 2_n power series of regular polygons is an *imperfect* expression of that arc. That which is relatively *perfect* determines that imperfect expression which it bounds externally.

33.   See Nicolaus of Cusa, *De Docta Ignorantia*, *op. cit.*, Chapters 1 and 2 of Book I.

34.   We choose Cusa's *living* image of God (*imago viva Dei*) here for efficient historical reasons. It is to Cusa's reaffirmation of Augustinian Platonism that the enraged, oligarchical party of international usury has been reacting since the A.D. 1439 Council of Florence.

35.   See Kissinger's public address to a London Chatham House (Royal Institute of International Affairs/Wilton Park organization) audience on May 10, 1982. In this address, Kissinger brags of his role as an agent-of-influence of the British secret intelligence service during the 1968-1977 period. He served with U.S. Presidents Nixon and Ford in the National Security Council and Department of State. Kissinger's British controller, Chatham House, is a powerful element of the cabal brought together for controlling the policies of the U.S. Bush administration.

36.   In the literature of that time, the "Persian model" was simply interchangeable with "oligarchical model." Like its companion feature, usury, the oligarchical models of the ancient Mediterranean region were either derived from the copies of the Shakti-Shiva cult, or the influence of such "matriarchical phallus" cults upon the Greek Olympos-cult model.

37.   Formally, during this period, the leading center of international usury

Plato
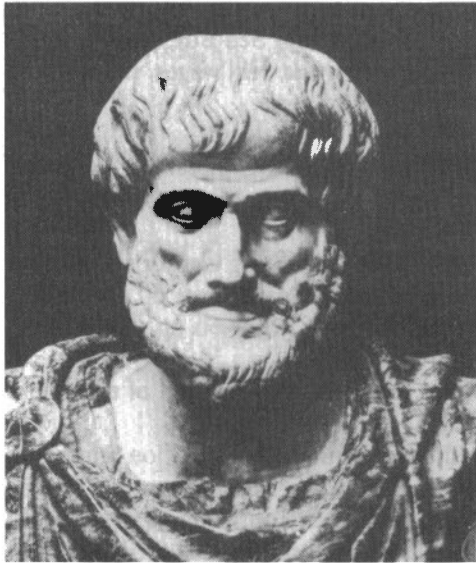
Aristotle
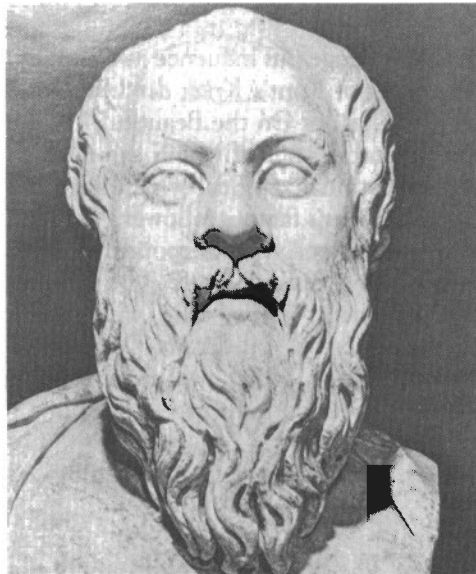
Socrates

Alexander the Great

was the Levant, of which the most evil center was the Persian Empire's Canaanite city of Tyre. Nonetheless, usury was the most characteristic feature of the ancient cultures of Mesopotamia, and the continuing leading cause of collapse of empires and dynasties through and beyond the crucial role of usury in causing the fall of the great Caliphate of the Abbasids. It was from the worshippers of such Shakti-Shiva copies as the cults of Ishtar, Athtar, Astarte, Isis, and Gaia, that the practice of usury was spread throughout the Mediterranean region. It was from the tradition of brainwashed Hebrew captives of the Babylonian captivity, that modern neo-Judaism received the anti-Mosaic, pro-usury Babylonian Talmud.

38.   Described in Xenophon's own account, the *Anabasis*.

39.   The ancient Athenian form of demagoguery is derived from the art of Delphic Sophistry taught to Aristotle and others at the Athens School of Rhetoric, where Aristotle was trained under Plato's pro-oligarchical adversary, Isocrates.

40.   Described in Plato's dialogues *Apology*, *Crito*, and *Phaedo*.

41.   There is a special category of modern Mazzinian Jacobin, typified by the satanic figures of Georg Lukacs, Theodor Adorno, Hannah Arendt, and the late I.F. Stone, all fairly described as "bankers' socialists," who echo in modern language the same depraved hatred of reason, which Comitas, Meletys, *et al.* of the Democratic Party of Athens showed in the trial of Socrates.

42.   Alexander the Great was a collaborator of the Academy of Athens of Plato, then recently deceased. The murder of Alexander by the generals allied to Aristotle's oligarchical faction doomed the hope for a true restoration of Athens' former position. Finally, the colonies, through the Roman legions, completed the subjugation and extensive enslavement of Greece.

43.   The references to "hundredfold" and "productive powers of labor," are specifically referent to Gottfried Wilhelm Leibniz's *science of physical economy*. Leibniz employed the discoveries being made by himself, Huygens, and others, to design what became known as the "Industrial Revolution," in which, Leibniz emphasized, heat-powered machinery would enable one man (using such machinery) to do the work of a hundred others (lacking heat-powered machinery). It was thus the Golden Renaissance of, typically, Leonardo's and Leibniz's work, which gave European culture a relatively sudden, gigantic margin of advantage throughout the world.

44.   It is said by scholars of Roman history that the Roman Emperor Tiberius paced in a certain part of his palace on the Isle of Capri (then sacred to the cult of Mithra) waiting for the ship-borne messenger bearing news of the execution of Jesus Christ. In the case of Socrates' trial, it was the Persian Magi plotters whom Socrates' continued existence threatened, plotters whose bribes controlled the leading Democrats of Athens, in time-honored practice.

45.   Marlowe's *Jew of Malta* is much more directly to the point than even Shakespeare's *Merchant of Venice*, in attacking anti-Semitism at its core. Poor Barabbas discovers, in the end, that he has been guilty of the folly of pride, in refusing to see that he was merely a tool of some other agency's interest.

46.   One might have said "recursively capable."

Wilhelm von Humboldt

Henry Carey

47. This (in English translation) was the title of Gottfried Wilhelm Leibniz's first short work of 1671, on physical economy. See *EIR*, Jan. 4, 1991, Vol. 18, No. 1, pp. 12-13. The theme of that work, real wages, is a featured element of the argument immediately following here.

48. See *The Science of Christian Economy, op. cit.*, Chapter 6, "Land and People."

49. On *Equivalence, Types*, see Dino De Paoli, "Georg Cantor's Contribution to the Study of the Human Mind," *21st Century Science & Technology*, Summer 1991, particularly the quotations from Cantor on pp. 45ff.

50. See above, the example of music, pp. 6-10 in Chapter I of this book.

51. For a full discussion of Wilhelm von Humboldt's education reforms in Germany from 1815, see a special issue of *Campaigner* magazine on the subject, August 1981, published by Campaigner Publications, New York. Friedrich Schiller's *Aesthetical Letters* was an important guide for Humboldt: see "Aesthetical Lectures" (1792-1793) and Humboldt's "On Schiller and the Course of His Spiritual Development," both in *Friedrich Schiller: Poet of Freedom*, Vol. II, *op. cit.*
   Friedrich Schiller recognized both Kant's dangerous influence in Germany, and the dangerous falsehood at the center of Kant's *Kritik der Urteilskraft* (Critique of Judgment). See Schiller's "Kallias, or On the Beautiful," in the above volume. Schiller wrote lengthy rebuttals, out of which came, as an included feature, Schiller's proposed educational reforms, which were the basis for the later educational reforms of Schiller's famous follower, Wilhelm von Humboldt. Humboldt carried on an extensive correspondence with Schiller, and later published it as a book with his own essay, "On Schiller and the Course of His Spiritual Development." Humboldt, whose best-known published work is *Linguistic Variability and Intellectual Development* (Philadelphia: University of Pennsylvania Press, 1971), was for a time in charge of all educational policy in Prussia. See footnote 74 below.

52. See "Auschwitz Below the Border," *EIR Special Report*, Washington, D.C., August 1991.

53. See Costas Axios, "Final Solution: The Schachtian Economy of the Third Reich," in *Campaigner* magazine, March 1975, Vol. 8, No. 5.

54. Henry Carey, *The Past, the Present, and the Future* (1848) and *The Principles of Social Science* (1858), both reprinted by A.M. Kelley Publishers, New York, 1970. Henry Carey was the economist most relied upon by Abraham Lincoln and the founding Republican Party "whig" political movement of which Lincoln had been a leader.

55. Niccolò Machiavelli, the *Commentary on the Ten Books of Livy*, referring to the use of technology of Florence as the basis for developing military capability.

56. *The Principle of Pure Deism in Opposition to the Dotage of the University* was written by Charles Babbage and John Herschel (1811) while students at Cambridge. It was the inaugural publication of the discussions of the pro-Leibniz group on campus, the Analytic Society, which underlined the success of Leibniz's calculus and authority, and the contrasting futility of Newton's "Fluxions." Herschel went on to become a famous astronomer, a translator

of Schiller, and a key figure in the battle to establish Middle C musical pitch at 256 cycles per second. The Analytic Society eventually evolved into the British Association for the Advancement of Science. See Carol White, "The British Royal Society," in *Fusion*, December 1977, Fusion Energy Foundation, New York.

57. The U.S. National Security Council document referenced here, National Security Strategy Memorandum 200 (NSSM-200), titled "The Implications of Worldwide Population Growth for U.S. Security and Overseas Interests," was produced under direction of National Security Adviser Kissinger and his deputy Brent Scowcroft in December, 1974. It defined the population growth occurring in thirteen major Third World nations, as a national security threat to the United States. See full report in *Executive Intelligence Review*, May 3, 1991.

58. See "The Facts about Bush's Gulf War Policy," published by *New Federalist*, January 1991.

59. Compare H. Graham Lowry on the first Duke of Marlborough, in *How the Nation Was Won, op. cit.* Marlborough and his British Liberal accomplices sum up in practice the true "Venetian Party" motive for the overthrow of King James II.

60. The anti-Colbertiste movement, typified by the usurious Physiocratic oligarchs of France, the deliberate bankrupting of France by aid of British agent John Law, in the "Mississippi bubble," and the influence of the international party of usury of the Paris bankers, are notable examples. Note that the "South Sea Island" bubble in Britain had interesting political targets inside Britain itself.

61. Franklin made a tour of Europe in 1766. Seeing that Shelburne's Britain was irrevocably committed to ruining America, Franklin pulled together the nucleus of an international force to aid the Americans in preparing to fight their cause. It was networks linked to Leibniz by tradition who provided the core of Franklin's network.

62. The leading French freemason, enemy of Benjamin Franklin, and Orléans cousin of King Louis XVI, Philippe Egalité, armed and directed the mob which stormed the Bastille. After temporarily freeing the few idiots actually kept there at that time, the mob marched off, bearing the severed heads of the guards on their pikes, the freed gibbering lunatics on their shoulders, and the admired bust of Lausanne banker Jacques Necker before them. Philippe Egalité had staged the bloody, dionysiac Grand Guignol all to the purpose of supporting the candidacy, to become prime minister of ruined France, of the same Jacques Necker who, as French finance minister, had just bankrupted the nation. One wonders, to what purpose does France today still celebrate *Bastille Day?*

63. See Anton Chaitkin, *Treason in America, op. cit.* The legendary richness in and adjoining the valley of France's Rhône River has attracted many evil visitors, including the Buggers and many members of satanic Voltaire's mailing list. Jacques Necker was a Swiss banker from Lausanne, politically in the Voltaire circle of David Hume, Adam Smith, and the Rousseauvians. In this light, it is notable, that before she became the notorious Madame de Staël, Necker's daughter was seriously considered as prospective bride for

Jacques Necker

London's "scribbling" Mr. Edward Gibbon, of *Decline and Fall of the Roman Empire* fame.

64. The relevant joke, attributed to the Principessa Pallavicini of the Napoleonic period, is that she, when asked which part of Corsica her family currently controlled, quipped the reply, "Il Buona-parte." Napoleon was the Jacobin and oligarchical Bugger, temporarily selected by some continental European oligarchical factions, as candidate to establish a new, Rome-based French Caesarian dynasty of a *Third Rome*. This is distinct from the Russian design for a *Third Rome*, that of Philotheus of Pskov of 1510, or the "Venetian Party" plan to make London the "Venice of the North," the capital of a worldwide "Third Rome" empire.

65. The Ecole Polytechnique was founded as a secular successor to the Jacobin-destroyed French Oratorian teaching order, which had trained Monge and Lazare Carnot, and which Monge had served so brilliantly for so long.

66. Lazare Carnot, as "author of victory," had a co-sponsoring as well as collaborating relationship with the Ecole Polytechnique. Carnot himself contributed crucial work on the principles of machinery.

67. The Marquis Pierre-Simon de Laplace (1749-1827), while apparently adopting an extreme diversity of political persuasions—depending upon who was in power in France—throughout his long career as both a French government official and a mathematician in the French Academy of Sciences, nevertheless remained true to the principles of Cartesian philosophy.

Laplace is known as the "Newton of France," for championing Newton's work on the continent versus that of Kepler, Huygens and Leibniz, as seen in his *Mécanique Celeste*. He is also credited with founding modern probability theory. Together with fellow Academician Joseph-Louis Lagrange, Laplace suppressed the work of Jean-Baptiste Joseph Fourier on the "wave" theory of heat from 1807 to 1824. This Fourier work represented a direct attack on the algebraic approach of the Newton-Descartes faction. And it not only threatened to revive the transcendental—"mechanical curves"—approach of Leibniz and Cusa, but was also directly congruent to the efforts to revive the transverse wave theory of light of Leonardo da Vinci and Huygens. Only when Fourier became the head of the Paris Academy in 1824 was his work published in the Academy's *Memoirs*.

When the work of Young and Fresnel demonstrated that Huygens was right and Newton wrong about the wave nature of light, Laplace recognized the necessity of reformulating the Newtonian-Cartesian framework. In particular he realized that the results of electrodynamic research, as initiated by Benjamin Franklin and his collaborators, could no longer be contained. Laplace promoted his friend Jean-Baptiste Biot, whose "simply-connected" Biot-Savart law for the interaction between electric current elements, was the counter to the "multiply-connected" law of the fundamental electrical experimentalist A.M. Ampère. The Leibnizian approach of Ampère was adopted by Riemann and Gauss in their electrodynamics, while that of Laplace was imposed later through the Maxwell fraud.

See Felix Klein, *Development of Mathematics in the 19th Century* (English translation, Math Sci, 1979); E.T. Bell, *Men of Mathematics* (Simon and Schuster, 1937); Jesper Luetzen, *Joseph Liouville 1809-1882: Master of Pure and Applied Mathematics* (Springer-Verlag, 1988); Michael Monastyrsky, *Riemann, Topology, and Physics* (Birkhauser, 1987); "Newton, the Man," by John Maynard Keynes, read at the Newton Tercentenary Celebrations at

Trinity College, Cambridge, U.K., on July 17, 1946; Sir David Brewster, *Life of Sir Isaac Newton.*

68. From 1817 Carl Friedrich Gauss functioned as the chief scientific adviser to the only science agency of the U.S. government, the Coast and Geodetic Survey, directed by Ferdinand R. Hassler and later by Alexander Dallas Bache, the great grandson of Benjamin Franklin (see footnote 95, below). In 1833 Gauss had successfully completed a project initiated by Bache to demonstrate a working electric telegraph. This was done at Göttingen in close collaboration with Wilhelm Weber. When Ernest Augustus, the Duke of Cumberland, the third son of King George III, succeeded to the throne of Hanover in 1837, his first act was to shut down Gauss' electrical research program by exiling Weber and Gauss' son-in-law, Ewald. In fact most of Gauss' immediate family took refuge in the United States with the help of Bache at this time. See *The Damnable Duke of Cumberland* by Anthony Bind for the royal families' version of Ernst Augustus' life of "murder, rape, sodomy and incest." See Guy Waldo Dunnington, *Carl Friedrich Gauss: Titan of Science, A Study of His Life and Work* (New York: Exposition Press, 1955). Also see "Joseph Henry and the Magnetic Telegraph," An Address Delivered at Princeton College, June 16, 1885 by Edward Nicoll Dickerson, LL.D. (New York: Charles Scribner's Sons, 1885).

69. See footnote 45 of Chapter III.

70. Georg Wilhelm Friedrich Hegel (1770-1831) was the German philosopher who provided the framework for both the Marxian dialectical materialism of modern communism and the "Philosophy of Right" of the National Socialist Workers Party of Adolf Hitler. He was also an agent for the Austrian Chancellor Metternich and close associate of Friedrich Karl von Savigny (1779-1861). He was a professor at Jena, Heidelberg, and Berlin. Among his best known works are *Phenomenology of Mind* (1807); *Science of Logic* (1812-16); *Encyclopedia of Philosophical Sciences* (1817); *Philosophy of Right,* 1821. Hegel's direct interventions into the physical sciences ended in 1800. In 1781 Sir William Herschel had discovered Uranus, the then-seventh planet. Astronomers were searching for an eighth planet. Hegel published a sarcastic attack on this research in 1800 in which he asserted that philosophy proved there could only be seven planets. The sighting of Ceres by Giuseppe Piazzi in 1800 and the demonstration, shortly thereafter, by Carl Friedrich Gauss that this was part of the "exploded" planet lying between the orbits and Mars and Jupiter—what today we call the asteroid belt—which had been predicted by Johannes Kepler, completely refuted Hegel.

71. Friedrich Karl von Savigny (1779-1861) is the German jurist and legal scholar who created the theoretical framework later adopted as the basis for Nazi jurisprudence—centered on the idea that the popular desires and preferences of the "people" governed both law and cultural taste. He studied at Göttingen and Marburg. From 1808 to 1810 he was Professor of Roman Law at the University of Landshut in Bavaria. From 1810 on he joined Hegel on the faculty of the University of Berlin. In 1817 he became a member of the Prussian Privy Council. In 1819 he was appointed to the Berlin Court of Appeal and Cassation for the Rhine Provinces. In 1842 he became the Minister for the Department for Revision of Statutes. The revolution of 1848 ended his government career.

With the elevation of the violently anti-Leibniz, anti-Schiller Hegel to the status of official Prussian state philosopher, Savigny became Hegel's leading accomplice; after Hegel's death, Savigny acquired, de facto, Hegel's

official authority in matters of culture. It was Savigny who popularized, in Germany and elsewhere, the doctrine of an hermetic, anti-science separation of *Naturwissenschaft* (natural science) from *Geisteswissenschaft* (art, theology, sociology, history, etc.). Savigny's dogma was accepted not only among the radical irrationalists of that period (the Romantics as such), but wherever Kant's doctrine was already adopted. So, there developed the cult of "art for art's sake," according to which the bearing of science on art was denied, as John Ruskin and his circle preached this sort of irrationalism in Britain, otherwise known as "British nineteenth-century philosophical radicalism."

72. For background on Laplace's revisions at the Ecole Polytechnique, see Felix Klein, *op. cit.*; E.T. Bell, *op. cit.*; and Jesper Luetzen, *op. cit.*

73. See footnote 10 of Chapter I, on Gottfried Wilhelm Leibniz. In 1682 Leibniz founded the scientific journal *Acta Eruditorum*. (The journal's name was changed to *Ad Nova Acta Eruditorum* in 1731.)

74. "Crelle's Journal," *Journal für reine und angewandte Mathematik* (Journal of Pure and Applied Mathematics), which commenced publication in 1826, is characterized by E.T. Bell and other modern commentators as "the first periodical in the world devoted exclusively to mathematical *research*." But the facts, as detailed by Felix Klein in his *Development of Mathematics in the nineteenth Century*, show that "Crelle's Journal" was part of the "initiative of Alexander von Humboldt" to revive "the exact sciences" in the tradition of Leibniz by "founding a comprehensive polytechnic institute . . . on the model of the Ecole Polytechnique" in collaboration with General von Mueffling, Chief of the Prussian General Staff. They tried to obtain Gauss as the director of this new institute. . . . All state scientific institutes were to be subordinate to him, and he would have a definite influence on the general development of education in Prussia (*Bruhns Brief Zwischen A. von Humboldt und Gauss*, 1877)." But Metternich's secret police intervened. (Niels Heinrik Abel was latter offered this post, but he died before being able to accept.)

August Leopold Crelle (1780-1855) was a consultant to Humboldt's Prussian Ministry of Culture. He was also chosen for membership in the Berlin Academy. When the founding of "a comprehensive polytechnique institute" was sabotaged, Crelle helped Humboldt establish some elements of the project in existing German universities, particularly through selecting key personnel. As Building Commissioner (*Oberbaurat*) Crelle generated the plans for the first Prussian railways, including the 1838-40 Berlin-Potsdam line, and "most of the Prussian highways."

75. Augustin Louis Cauchy (1789-1857) served as a mathematics tutor for the restored, post-1815 Bourbons and as their agent in the French Academy of Sciences. Cauchy is responsible for the two most famous scandals in the history of mathematics when he suppressed the work of Niels Heinrik Abel (1802-29) and Evariste Galois (1811-32).

As detailed by Felix Klein and by E.T. Bell in their historical works cited in immediately preceding notes, Cauchy, acting as the responsible authority for the French Academy, was given possession of the original papers of Abel in 1826 for review. Cauchy reported that he had lost the papers. When Jacobi, who had been apprised of the content of these papers, learned from Legendre what Cauchy had done, he wrote in a letter of protest dated March 14, 1829: "What a discovery is this of Mr. Abel's! . . . Did anyone ever see the like? But how comes it that this discovery, perhaps the most important mathematical discovery that has been made in our Century, having been

Augustin-Louis Cauchy

communicated to your Academy two years ago, has escaped the attention of your colleagues?"

The Norwegian government was informed and intervened, but the Abel manuscripts were not found among Cauchy's papers until the Bourbons were overthrown in 1830 and Cauchy banished for a time from France.

Similarly, Galois had duly submitted his work to Cauchy in 1829, and again Cauchy "lost" the papers. (Galois was a leading republican organizer, who had been imprisoned by the Bourbons and then later murdered, according to Alexandre Dumas in *Mes Memoirs*.)

Abel's work was not published until 1841 with the strong insistence of the Norwegian government. Galois' work did not appear until 1846 through the efforts of Ampère's protégé, Liouville. During the intervening years Cauchy made free use of the results of these "lost papers" in his voluminous published work.

But Cauchy's service to the oligarchy was not limited to science. In helping to establish the post-1848, post-Holy Alliance order, Cauchy became the leading continental propagandist for Britain's Crimean War. According to Bell, Cauchy attacked both "Muscovite ambition and Mohammedan fanaticism. . . . The Jesuit Council, grateful for Cauchy's expert help, gave him full credit" in preparing "the regeneration of peoples brutalized by the Koran. . . ." According to Bell: "The net result of the Work was the particularly revolting massacre of May, 1860. Cauchy did not live to see his labors crowned."

76. G.W.F. Hegel, *The Phenomenology of Mind*, see footnote 70 above.

77. Carl Schmitt was one of the foremost legal theorists in Germany before Hitler—and continued so after the Nazi accession to power in January 1933. Among the theories he evolved, which were most congenial to Nazi legal theory—and often quoted by such Nazi judges as Roland Freisler, see below—was that of *Freund-Feind*, or "friend-enemy image," defining the state as, in effect, derived from the racial basis of the *Volk*, or people. In that outlook, whatever served the "race," served the state—was a "friend"—and was therefore the crowning law. Whatever did not serve the state, was the "enemy." Like his predecessors in the nineteenth century, Schmitt was a radical legal positivist, whose fundamental assertion was that all law emanates from the state. Thus, the state can initiate any law, regardless of its content, as long as it has the power to do so. No considerations of natural moral law restrain it.

Theories like these were Schmitt's contribution to the Nazi concept of law as power and race, and to the Nazi rule of terror.

H.W. Koch, *In The Name of the Volk: Political Justice in Hitler's Germany*, (New York: St. Martin's Press, 1989).

78. Roland Freisler was the Chief Judge of the Nazi *Volksgerichthof* (VGH), or "People's Court," from its inception in Berlin in 1934, the year after Hitler came to power. The purview of the VGH, as it was known, covered all crimes of treason against the Nazi state; in practice, that meant that it was used as a weapon of terrible vengeance against any and all domestic opposition. In the VGH, the judges, guided by Freisler, were judge, prosecutor, and jury—and the sentence was almost always death.

Freisler became notorious to history by reason of the way in which he presided over the 1944 treason trials of the members of the Officers' Plot against Hitler—the men who tried to assassinate Hitler on July 20, 1944. Films of those trials still exist, showing Freisler screaming and cursing at the defendants, for whom no defense was possible in his court. Although the

VGH and Freisler became notorious for those trials in particular, Freisler's reach was far greater, and extended, as war and conquest occurred, to the Germans in Czechoslovakia, Poles, and non-German "terrorists" in the occupied countries of the West.

Freisler began his career as a communist, and became a Nazi in the 1920s. Evoking his communist past, Hitler referred to Freisler as "my Vishinsky"—the state prosecutor in the Stalin purge trials of the 1930s. Freisler died on the bench, when an Allied bomber attack wiped out the VGH building in 1945. See Koch, *op. cit.*

79. Philip Valenti, "Leibniz, Papin and the Steam Engine: A Case Study in British Sabotage," in *Fusion* magazine, Vol. 3, No. 3, Nov. 1978. Denis Papin invented and successfully operated the world's first direct action steam engine.
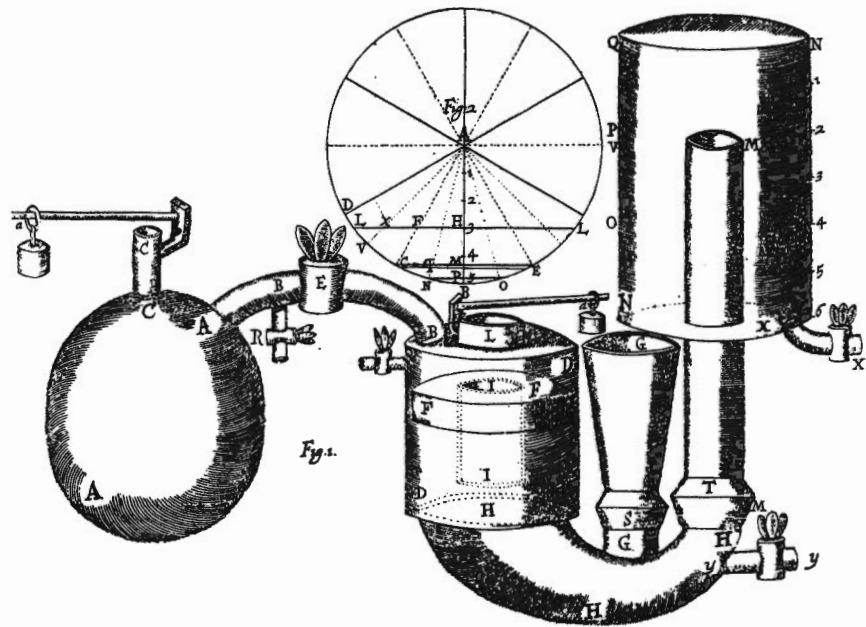
Papin published the results of his experiments in 1707, including this diagram.

80. *Ibid.*

81. Lowry, *op. cit.*, pp. 70-91.

82. *Ibid.*, Chapter 1, on the development of currency and industry in Massachusetts. The earliest public writings on the "how to" of this development are by Cotton Mather and Benjamin Franklin, for example, Franklin's 1729 paper on how to create a public currency, which is contained in published versions of Franklin's works in both hardcover and paperback.

83. By the 1850s, scientific work had recovered in northern Italy to the point that the Betti, Ponchielli and others in Eugenio Beltrami's circle visited Göttingen, establishing their continuing collaboration with Bernhard Riemann. The British special term of enmity toward the tradition of Leibniz is "continental science." The use of such a term by a non-British writer is therefore most revealing information respecting that author.

84. St. Petersburg was the site of the Russian National Science Academy which Czar Peter "the Great" established according to the recommendation

of Gottfried Wilhelm Leibniz. This was famously Leonhard Euler's relatively long-term posting, and the principal center of influence for Russian scientific excellence from then until the Bolshevik Revolution.

85. French military veterans formerly associated with the work of the Monge Ecole Polytechnique were attached after 1814 to development of the West Point Military Academy.

86. On the use of the term, "former pro-slavery states," this is "a term of convenience," useful as long as it is not read too literally. The Confederacy was established by methods of a coup d'état, prepared and executed by a cabal of *oligarchist* fanatics operating within the Scottish Rite of freemasonry's U.S. Southern ("New Age") Jurisdiction, using styles such as "The Knights of the Golden Circle," predecessor organization of Judah Benjamin's later, 1867 creation, the "Ku Klux Klan." Most of the "white population" of the principal slave-cotton states had a political status little higher than Sparta's helots, or than the Negro slaves. The ruling power of these states under Britain's spy, and Confederate Secretary of State Judah Benjamin, was a pro-slavery oligarchy; in that latter sense, under the British Confederacy, the states were pro-slavery states.

87. August Belmont's personal correspondence is one of the key sources of best evidence that the Confederacy was a British plot to carve the United States into several warring "baronies." I.e., Belmont himself, head of the Democratic Party, was a British spy, eligible to be hung as a wartime traitor of the 1861-65 war.

88. The ruinous and immediate effects of the Specie Resumption Act, which was enacted in 1876 under combined British "advice" and direct British financial blackmail against the U.S. government's debt, and which went into effect over 1877-78, is described in Allen Salisbury, *The Civil War and the American System* (New York: New Benjamin Franklin House, 1979). The act required the United States to directly pay out its gold reserves on demand to holders of its debt; a gold-exchange, rather than a gold-reserve, system of currency. The change was dramatically deflationary, as the British wished, plunging the rapidly growing U.S. economy into the infamous Panic of 1877. This was the deepest plunge of the U.S. economy prior to the 1930s Great Depression, and led to widespread social upheavals and the spread of socialist currents.

89. On Judah Benjamin, Britain, and the Confederacy, see Chaitkin, *op. cit.*

90. *Ibid.*, and Salisbury, *op. cit.*

91. See special issue of *Executive Intelligence Review* for Jan. 3, 1992, Vol. 19, No. 1, for source documents and history of "American System" political economy.

92. On Witte and the key work of German "American System" economist Friedrich List, see "The Railroad Plan of Scientist Mendeleyev and Statesman Witte to Civilize Russia," by Barbara Frazier, in *New Federalist*, June 10, 1991, Vol. V, No. 21.

93. From the early 1830s the most productive American scientific and engineering leaders were in regular and fruitful contact with the circles of

Alexander von Humboldt

Alexander and Wilhelm von Humboldt, the organizers of German scientific/educational reform. This organized American grouping called itself "The Lazzaroni," (in Italian, "the beggars," indicating their debt to the German scientists), and constituted a "junto" consciously modeled on the scientific societies started by Benjamin Franklin sixty and seventy years earlier. The founder of the "Lazzaroni" was Alexander D. Bache, protégé of U.S. National Bank head Nicholas Biddle, and a great-grandson of Benjamin Franklin. Bache studied in Göttingen University in Germany with Carl Friedrich Gauss and Wilhelm Weber; then returned to found the American Magnetic Union, the U.S. Coastal Service (geology and oceanography), America's leading astronomical observatory; and headed Girard College. Others included William Chauvanet, who founded the U.S. Naval Academy; William Harkins; and the famous Harvard teacher Louis Agassiz, who was perhaps the leading scientific protégé of Alexander von Humboldt.

Louis P. Agassiz

94. During the 25 years before the Civil War, Harvard University under the leading influence of Professor Agassiz was a center of activity and influence of the "Lazzaroni" (see above). Its faculty included a number of the leading "Lazzaroni," and the institutions they created from this base included (in addition to those mentioned above in footnote 93) the National Academy of Sciences, and the famous Franklin Institute in Philadelphia.

95. After 1890 the presidency of Harvard fell to Charles Eliot, who, along with his successor James Lowell, transformed Harvard into a "carbon copy" of the British elite universities Oxford and Cambridge. Eliot broke Harvard up into schools or "houses," whose headmasters and internal social relations mirrored those of the British elite schools exactly, but which had no educational function. He also brought to Harvard large numbers of anthropologists and sociologists, training the students to oppose the rapid scientific progress for which Agassiz and the "Lazzaroni" had striven, and to support the "conservation" doctrines imposed as national policy by Theodore Roosevelt's presidency.

96. While President, Theodore Roosevelt played a dirty role in the Russo-Japanese War, and in Anglo-French operations in Morocco. Domestically, he used his Attorney General Charles Bonaparte (nephew of dictator Napoleon III), to create a European-style national political police force, later called the Federal Bureau of Investigation (FBI). He was, while President, a raving leftist defender of the usurious international financier interests, against U.S. native agricultural and industrial interests.

After his presidency, Roosevelt founded a left-wing political movement, initially called the "New Age" movement. He ran in 1912 as an independent "spoiler" to ensure the election of a Democrat, Woodrow Wilson, thus ensuring the passage of the Federal Reserve Act, the Federal Income Tax, and U.S. commitment to go all the way with London in an imminent war against Germany.

97. In 1898, French minister Théophile Delcassé was the favorite "political catamite" of Britain's Lord Grey. French troops were ordered to submit, by Delcassé, to the British Expeditionary Forces at Fashoda. From this point on, step-by-step, French commitment to ally with London for war against Germany, was assured. The agreement to this effect, called the *Entente Cordiale*, was concluded by 1904. During the 1890s, the British oligarchy had already intended to launch a war to destroy Germany; without France's complicity, achieved by 1904, the war could not be prudently launched. See

Jacques Cheminade, "Will We Repeat the Blunders That Led to World War I?" in *Executive Intelligence Review*, Dec. 13, 1991, Vol. 18, No. 48.

98.   The British warhawks of the period were centered in Lord Alfred Milner's "Kindergarten" and "Round Table," both predominantly Fabian Socialist organizations in composition. For added insight into the Fabian-Wilson connections, see the (Oliver Wendell) Holmes-Laski correspondence. The Fabian Socialist warmongers, such as H.G. Wells, were the "neoconservative" butchers and bunglers of that period.

99.   See Editors of Executive Intelligence Review, *Dope, Inc.*, Third Edition (Washington, D.C.: Executive Intelligence Review, 1992).

100.   The same Crowleyite links to the Huxley-(Allen) Dulles *MK-Ultra* drug-and-brainwashing program which launched the 1963-onward drug warfare against U.S. college-age youth, and later youth generally, was behind the "New Age" project as a whole. See Carol White, *New Dark Ages Conspiracy* (New York: New Benjamin Franklin House, 1981).

101.   Diocletian (245-313); Roman Emperor from 284 to 305, established a capital in Bassinia (present day Macedonia) in 285; his edicts or "reforms" in 299 and 300, attempted to "freeze" the economic crumbling of the Roman Empire from Malthusianism and collapsing population, by fixing prices, wages, etc. This led, later in the fourth century, to the strictly Malthusian "reforms" of Theodosius, which established effective legal enforcement of the trade or occupation which each Roman citizen must follow for his entire life. Romans were then required to learn and do, only what their fathers had learned and done, in a vain attempt to "keep filled" trades which had collapsed.

These Malthusian "reforms" were effectively the earliest attempt to impose socialist decrees by totalitarian government. See "Global Showdown: The Russian Imperial War Plan for 1988," *EIR Special Report*, Washington, D.C., July 1985, on the edicts of Diocletian and his successors, and their relationship to the Soviet problem.

102.   Founders were, chiefly, Britain's Dr. Alexander King, a NATO consultant on population and environment, and Lord Solly Zuckerman, also a NATO consultant, British millionaire, and one-time professed anthropologist who had conducted experiments on primates which involved breaking their skulls. The Club of Rome was founded in a 1971 meeting, and its first internationally known project was the funding of the book *Limits to Growth*, by MIT Professors Dennis Meadows and Jay Forrester. According to King, the Club of Rome, together with the (Vienna, Austria) International Institute for Applied Systems Analysis (IIASA), was created for the actual purpose of effecting a forced collapse of the populations of peoples of darker complexion; King included explicitly "Mediterranean" peoples such as Arabs, Turks, Greeks, etc. King's statements to this effect are quoted in *Executive Intelligence Review*, June 23, 1981, Vol. 8, No. 25.

103.   On two typical, anti-scientific frauds perpetrated by the so-called "environmentalist movement," see Rogelio Maduro and Ralf Schauerhammer, *The Hole in the Ozone Hoax* (Washington, D.C.: 21st Century Associates, 1992).
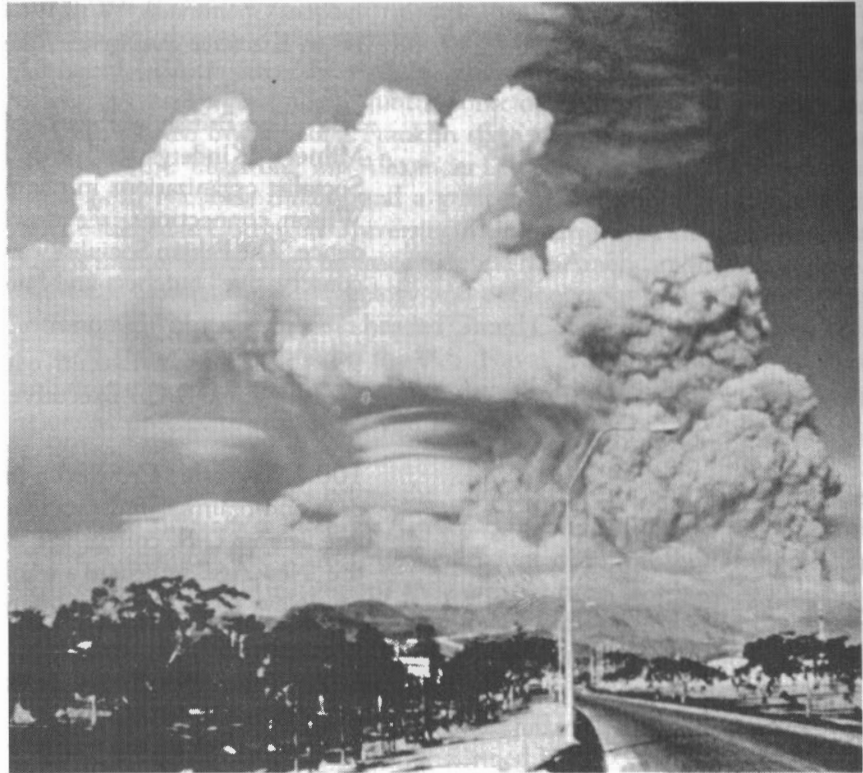
1991 eruption of Mt. Pinatubo, the Philippines

For example, the huge 1991 eruption of Mt. Pinatubo in the Philippines, shown in the photo, is (as of mid-1992) being reluctantly admitted to be the major source of current climate perturbations, including global cooling and temporary depletions of stratospheric ozone levels. Maduro and Schauerhammer had demonstrated this obvious fact in their book and in many interviews and discussions with competent scientists, but for a year the truth was completely suppressed in media accounts.

104. Brazil and India are only two of the nations targeted for hostile U.S. action by Kissinger in NSSM-200. The full list of those named is Brazil, India, Bangladesh, Pakistan, Indonesia, Thailand, the Philippines, Turkey, Egypt, Nigeria, Mexico, Ethiopia, and Colombia. See footnote 57 above.

105. Kissinger has bragged publicly of his role as an agent of British influence within the U.S. Nixon and Ford administrations. Speaking at London's Chatham House, May 10, 1982, Kissinger generalized his conduct in office as National Security Adviser and Secretary of State in the Nixon and Ford administrations, by saying that he had always kept the British embassy in Washington better briefed and consulted, than the U.S. State Department or the President himself. See footnote 35 above.

106. "We will make a horrible example of you, Mr. Bhutto." This warning from Kissinger to Pakistani Prime Minister Zulfikar Ali Bhutto, concerning the Pakistani nuclear program, was reported directly to journalists of *Executive Intelligence Review* by Pakistanis to whom Bhutto had related it privately. See "The Pakistan Papers," *EIR Special Report*, New York, 1977.

107. There is no difference in principle between the Nazi slave-labor

program for depopulating Eastern Europe, and what was called from the middle 1970s the "Paddock Plan" for forcing population reduction in Mexico by strategic measures of the United States, or the current "North American Free Trade Agreement" policy toward Mexico. Just as Hitler was guilty of "genocide," then all "neo-Malthusian" population-control programs including the outgoing Carter administration's *Global 2000* and *Global Futures* are also "genocide." LaRouche's analysis of the "Paddock Plan," made in an October 1976 national television broadcast on NBC-TV, were featured in Mexican dailies such as *El Heraldo* as late as August 11, 1980. The point is proven in documented detail, including candid interviews with the U.S. government officials in charge of reducing Mexico's, El Salvador's, etc. population under the Carter administration's *Global 2000* plan, in *Executive Intelligence Review* for March 17, 1981.

108. Georg Lukacs in the 1920s founded the Frankfurt School, which became the most important and influential source in the twentieth century, of both right-wing and left-wing "culture" (better called by its modern name "counterculture" to indicate the purpose of destroying classical Western Judeo-Christian culture). Lukacs was a Hungarian aristocrat and son of one of the leading bankers of the Hapsburg empire. He became a Communist during World War I, and briefly served as Commissar of Culture in the short-lived Hungarian Soviet regime of 1919, being one of its most bloodthirsty officials. Lukacs' founding of the Frankfurt School was explicitly a Comintern project, with Comintern funding; it has since become vastly influential in creating the very "media culture" of the West which various mafias are now "re-exporting" to the nations of the former Soviet empire.

109. For a complete discussion of the explicit purposes and activities of the Frankfurt School as referenced here, see Michael Minnicino, "The New Dark Age: The Frankfurt School and 'Political Correctness'," in *Fidelio*, Vol. 1, No. 1, Winter 1992, published by the Schiller Institute, Washington, D.C.

110. *Ibid.*

111. On Rees' and Trist's Tavistock, see "The Tavistock Grin," in *Campaigner* magazine, National Caucus of Labor Committees, New York, April 1974.

112. Minnicino, *op. cit.*

113. Editors of Executive Intelligence Review, *Dope, Inc.*, Second Edition (New York: New Benjamin Franklin House, 1986), pp. 509ff.

114. One of the most concise demands for a "paradigm shift" away from the reliance on science and technology by civil society in the postwar period, came in the form of a report by the Tavistock Institute of London, which was prepared in 1966 for the express purpose of being heavily circulated in the Lyndon Johnson administration. Known as the "Rapoport Report," it was prepared by Anatol Rapoport, the editor of Tavistock's magazine, *Human Relations*. The report attacked the Eisenhower-Kennedy space program, then at the height of the Apollo Project, for creating a rapidly expanding proportion of "redundant scientists and engineers," and for saturating American society with knowledge and interest in space science and technology, down to the junior high school level. From this report came the propaganda underpinning of what came to be know as Johnson's "Great Society" turn

toward welfarism: the nonsense-claim that the space program was "wasting resources which should be spent on Earth." This report recommended, successfully, obviously, that the U.S. aerospace program be cut back, in order to arrest what Tavistock viewed as an undesirable increase in scientific interest and rationality in the U.S. population.

This Tavistock report is exemplary of several which, combined, induced the Johnson administration to begin collapsing the then-increasingly successful and remunerative Kennedy aerospace program. The motive: The aerospace program was too successful in fostering a shift in popular opinion in favor of scientific kinds of rationality.

Full-time-equivalent scientist and engineers employed in R and D, by sector: selected years
thousands
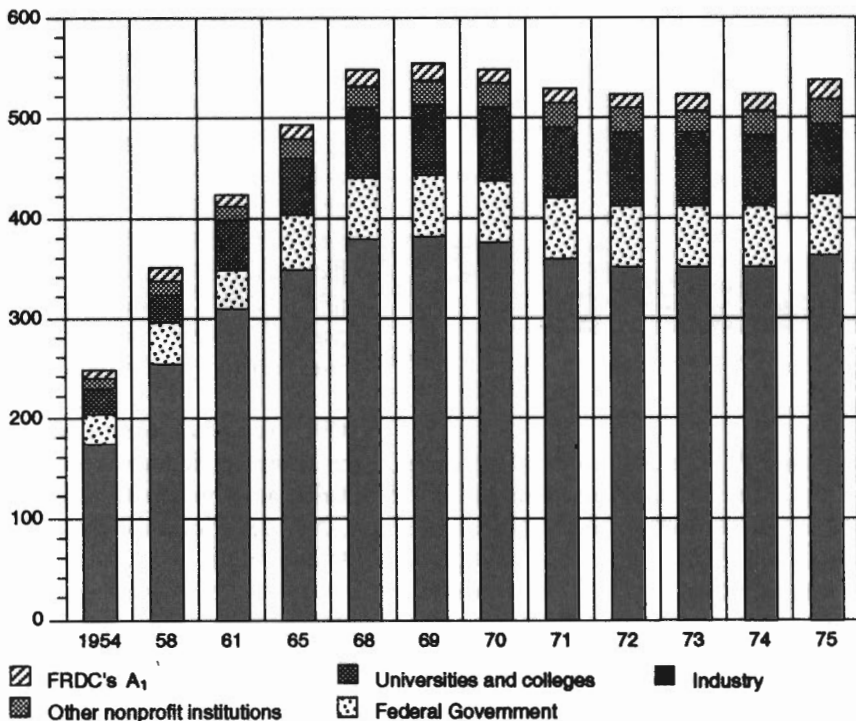
A₁ University-associated Federally Funded Research and Developement Centers
Source: National Science Foundation

The chart shows the direct effects of the scale-down of NASA on scientific employment within the U.S. labor force, as it shows the dramatic effect the Apollo Project had had on such employment during the 1960s.

115. Beethoven's close associate, Anton Schindler, identified the Congress of Vienna as the occasion for the assault upon the standard pitch of classical music (*Niederrheinische Musik-Zeitung*, 1855). He related that the Czar of Russia went out of his way to arrange for instrument-maker Stephen Koch to create a new set of band instruments, at an intentionally higher pitch, to be introduced at the time of the Congress of Vienna. Counterpoint and voicing gave way to a competition among Austrian regimental bands for higher pitches and greater surface brilliance. Once the inroad was established among the woodwind and brass instruments in the regimental bands, this fad intruded into the opera houses in the 1820s. Schindler's willingness in 1855, forty years after the fact, to identify the source of the pitch inflation with the political decisions of the Congress of Vienna, allowed for the first direct attacks on this problem in conferences in France and England in 1858 and 1859.

While the "Romantic" school of Wagner and Liszt championed the higher pitch, classical musicians resisted, and the French conferences actually led to an 1859 law by which France established a pitch standard coherent with the scientific pitch of C = 256 cycles per second. Giuseppe Verdi led similar efforts in Italy, but the international standardization of the scientific tuning was blocked.

Among the enemies of the scientific tuning, it was the Nazis who attempted to force the higher pitch to become internationally standard. Josef Goebbels made A = 440 cycles per second the requirement for all orchestras in Germany, and in June 1939 a British-German conference in Berlin claimed to have made this the international standard—no French musicians were invited. After the war, so-called international standardizing conventions in London again tried to rule A = 440 to be the "world pitch." However, no such standard has come into force, only the increasingly widespread practice of forcing tuning upwards.

19. WHAT ARE THE QUALITIES OF MUSIC?

What is standard pitch? Strike the note middle C on any average, well tuned piano and it gives 256 vibrations per second. Likewise the middle C tuning forks that are used in all physical laboratories are all tuned to 256 vibrations per second. This gives the note A 427 vibrations per second. (See Fig. 19-1.) The other notes of the scale vibrate according to a fixed ratio, like that shown in the diagram. In *concert* pitch, which is now little used, midd'...

EXPLANATION OF SOME TERMS

"We often disagree merely because we fail to understand each other's terms alike."

Standard of Pitch. In this book where other authors are quoted, the standard of musical pitch used by them is often retained. On the other hand, where a comparison of two authors is necessary the pitches cited by one are sometimes converted, so that the two may be made to talk in exactly the same terms. Thus D. C. Miller prefers the tempered scale or so-called "International Pitch" where A = 435 and Middle C = 258.65; but Sir Richard Paget, and other scientific investigators cited in this work, generally use the "Physical" or "Scientific" pitch where A = 430 and Middle C = 256. Where the two are compared, the figures of the one are reduced to the...

FIG. 19-1. Th...

Sopranos f...
his contem...
the pitch...

How do...
that shown...
one row of...
forced thr...

These pages from textbooks on musical tuning from the World War II period, show that into the 1940s, these textbooks assumed C = 256 Hz when they spoke of scientific tuning of instruments.

116. The Rosicrucian cult's present-day offshoots have planted among some Protestant denominations the doctrine that the Pope is the "Anti-Christ" of St. John's Apocalypse. Some circles close to the Protestant sects known as the "British Israelites" are committed to destroying the Vatican before the end of this century.

117. Reference to Chapters 2 and 3 of LaRouche, *In Defense of Common Sense*, in *The Science of Christian Economy, op. cit.*

118. See again the discussion of the major scientific revolutions in Western civilization since the Renaissance, in Chapter II of this paper, for the definition of "significant" in this context.

119. *Science of Christian Economy, op. cit.,* Chapter 4.

120. *Ibid.,* Chapter 5, and also St. Paul's First Letter to the Corinthians, verse 13.

121. *Ibid.* Note, the emphasis upon *agapic activity.*

122. The German *Naturwissenschaft* or *natural science* is referenced to emphasize the neo-Kantian theses of Professor Savigny, as is done above.

123. For the cases of Carl Schmitt and Freisler in respect to the positivist Savigny's links to Nazi legal practice, see footnotes 77 and 78 of this chapter.

124. Cf. Immanuel Kant, *Prolegomena to Any Future Metaphysics,* on "custom," as contrasted with Jeremy Bentham, *On the Principles of Morals and Legislation.*

125. The Physiocrats were a school of eighteenth-century, primarily French, economists, working for and representing the French feudal oligarchy in their battle against the "dirigist" tradition of Louis XI and Colbert which had built French industrial power to rival and in some ways exceed that of England. The most influential were Quesnay, Mirabeau, Say, and the Finance Minister Turgot.

The Physiocrats insisted that the "bounty of nature" was the sole source of wealth, for example Quesnay:

> As soon as the labour of the husbandman produces more than his wants, he can with this superfluity that nature accords him as a pure gift over and above the wages of his toil, buy the labour of the other members of the society. The latter, in selling it to him gain only their livelihood; but the husbandman gathers, beyond his subsistence, a wealth which is independent and disposable, which he has not bought and which he sells. He is, therefore, the sole source of the riches which, by their circulation, animate all the labours of the society, because he is the only one whose labour produces over and above the wages of labour.

Reflections on the Formation and the Distribution of Riches, 1766.

Physiocratic economics, which based the support of the state entirely on tax farming primarily in the raising and trading of tobacco and other of what the International Monetary Fund would today call "cash crops," bankrupted France by the end of the eighteenth century and helped tip the balance away from an industrial and military buildup and alliance with America, to pro-Swiss, pro-British Jacobin chaos.

126. First systematically discussed in Leibniz's *Society and Economy,* published in German in 1671. An English translation was published in *Executive Intelligence Review,* Jan. 4, 1991, Vol. 18, No. 1.

127. The Holy Bible, Luke 19:40: "I tell you that, if these should hold their peace, the stones would immediately cry out." King James Authorized Version.

128. See footnote 51 of this chapter.

129. Leibniz, *Society and Economy, op. cit.*

130. See footnote 114 of this chapter.

131. See *The Science of Christian Economy, op. cit.*, Chapters 4-6.

132. See footnote 101 of this chapter on "Diocletian reforms" and socialism.

133. Paolo dal Pozzo Toscanelli (1397-1482), the Florentine collaborator of Nicolaus of Cusa whose maps made Columbus' later voyages effective, began preparations for this seventy years earlier, when Toscanelli came into contact with the visiting prince of Portugal, Dom Pedro, whose brother was the famous Prince Henry the Navigator. Dom Pedro's visit to Florence in 1428 resulted in an ongoing collaboration of Toscanelli with the Portuguese explorations of the fifteenth century, which both discovered and mapped the entire coast of Africa down to and around the Cape of Good Hope, and also probed westward in case the Indies were to be found in that direction. This is discussed in the essay of Florentine historian Gustavo Uzielli, "Paolo Toscanelli, Amerigo Vespucci and the Discovery of America."

In the 1470s, Columbus learned of correspondence between Toscanelli and the high cleric of Lisbon, Fernão Martins, on the subject of exploration westward across the Atlantic Ocean for the Indies. Columbus wrote to Toscanelli and became fully informed, in the last years of Toscanelli's life, of the collaboration which had been ongoing for decades before, and which had begun with the immediate Florentine circle of Nicolaus of Cusa during the years before the Council of Florence of 1439.

See Paolo Emilio Taviani, *Christopher Columbus: The Grand Design* (London: Orbis Press); and Ricardo Olvera, "The Discovery of the Americas and the Renaissance Scientific Project," *Executive Intelligence Review*, Oct. 19, 1990, Vol. 17, No. 40.
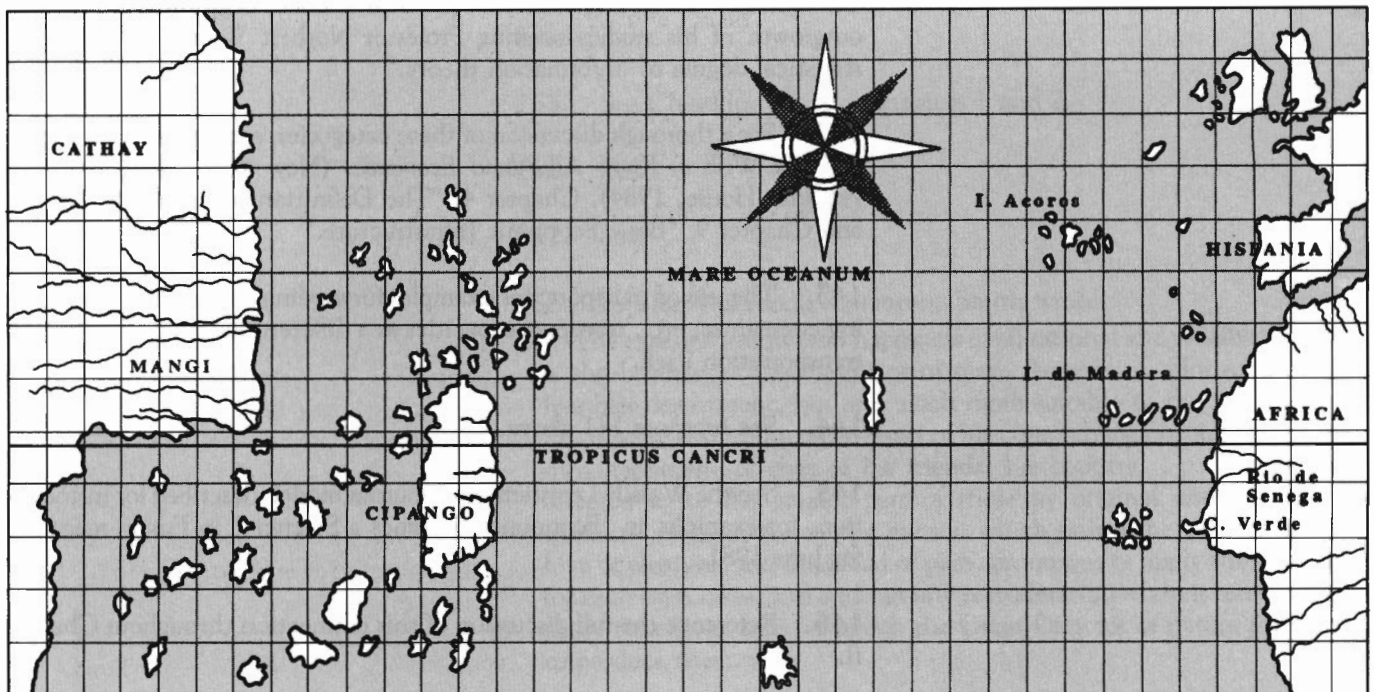
This is the map prepared by Toscanelli, of which Toscanelli reports he sent a copy to Columbus after receiving a letter from Columbus inquiring about his researches concerning the "ocean sea."

134. On Brunelleschi and the dome of the Florentine Cathedral of Santa Maria del Fiore, see footnote 32 of Chapter II, and footnote 10 of this chapter.

135. Manicheanism did not begin in Bulgaria, but rather began in Persia as Manicheanism and is actually a form of the old cult of Dionysos which appeared in many forms as the light-darkness cult.

136. The Manichean belief that flesh, and all the material universe, is an evil creation of the devil allowed by God, is basic to the Bogomil, later Cathar, cults. See Walter Birks and R.A. Gilbert, *The Treasure of Montsegur: A Study of the Cathar Heresy and the Nature of the Cathar Secret* (London: Aquarian Press, 1987).

137. Leibniz's conception of natural law, in *Essays on Human Reason* (1704), and *Monadology* (1714).

138. See footnote 71 of this chapter.

139. See footnote 125 of this chapter.

140. Marx's Vol. IV of *Capital* (also titled *Theories of Surplus Value*), calls the Physiocrats the most scientific of the "bourgeois" economists, and specifically agrees with them that interest (therefore usury) necessarily creates increased monetary "value" which cannot be matched by increases in human productivity.

141. The science of physical economy was established by Leibniz, as in his *Society and Economy* (see above). It was taught in the eighteenth and early nineteenth centuries as part of the university curriculum in Cameralism. This author revived this branch of physical science, beginning 1952, as an outgrowth of his studies refuting Professor Norbert Wiener's Boltzmann-statistical dogma of "information theory."

142. For a thorough discussion of these categories, see Lyndon LaRouche, *So, You Wish to Know All About Economics* (New York: New Benjamin Franklin House, 1984), Chapter 4, "The Definition of Economic Value," and Chapter 9, "Basic Economic Infrastructure."

143. The use of transport, for example: forwarding companies, warehousing companies, etc., transport capacities as a different function than human transportation itself.

144. See footnote 141 above.

145. See the Wassily Leontieff input-output model, described for introduction, for example, in "Economics Becomes a Science," in *Fusion* magazine for June 1981.

146. Reference the full discussion of this connection throughout Chapter II.

147. Chapter V below gives the reason for this formulation as to time.

148. See Chapter V below.

149. The primary census is of households. Secondary census is of persons within households. This bears significantly on the definition of wage, as to whether a wage is defined as the wage paid to a person or a wage paid to a person as an income-producer for a household.

150. See text above, the opening pages of Chapter II.

151. François Quesnay, *Analyse du Tableau Economique* (Analysis of Economic Tables, 1761) said that there were three classes of people in society: "the productive class (agricultural laborers), the class of landowners, and the sterile class (all the citizens occupied with other services and with other labours than those of agriculture." This is quoted by Karl Marx in Vol. IV of *Capital*, titled *Theories of Surplus Value*, p. 54.

Physiocrat Mirabeau claimed that the three great inventions of society were writing, money, and Quesnay's Tables, but they consisted simply of a number of columns of agricultural products and producers, with diagonal lines connecting them in what were claimed to be permanently fixed lines of circulation of wealth. "The movement of commerce from one class to another, and the conditions which give rise to it, are not hypotheses. They are faithfully copied from nature."

152. In Descartes' *Meditations*, see footnote 3 of this chapter.

153. Again Quesnay: "The mere workman who has only his arms and his industry, has nothing unless he succeeds in selling his labour to others. In every kind of work it cannot fail to happen, and as a matter of fact it does happen, that the wages of the workman are limited to what is necessary to procure him his subsistence."

154. Karl Marx, *Theories of Surplus Value*, quotes the doctrines of Quesnay and the Physiocrats as proof of the iron and inherent laws of capitalist development.

155. See Chaitkin, *op. cit.*, Chapters 1 and 2.

156. *Ibid.*

157. *Ibid.*

158. In *Theory of Moral Sentiments*, Smith wrote:

The care of the universal happiness of all rational and sensible beings, is the business of God and not of man. To man is allotted a much humbler department, but one much more suitable to the weakness of his powers, and to the narrowness of his comprehension: the care of his own happiness, of that of his friends, his country. . . . Nature has directed us to the greater part of these by original and immediate instincts. Hunger, thirst, the passion which unites the two sexes, the love of pleasure, and the dread of pain, prompt us to apply those means for their own sakes, and without any consideration of their tendency to those beneficent ends for which the Great Director of nature intended to produce them.

159. See Michael Baigent and Richard Leigh, *The Temple and the Lodge* (New York: Arcade Publishing, 1989); also Rt. Rev. Bernard O'Reilly, *Life of Leo XIII* (London: Sampson, Low, Marston & Co., Rivington & Co.);

and Cardinal Caro y Rodriguez, *The Mystery of Freemasonry* (Hawthorne, California, 1957), Second Edition.

160. On the eighteenth-century freemasonic wars involving Mozart and his circles in Vienna, see David Shavin, "The Battle Mozart Won in America's War With Britain," in *Executive Intelligence Review*, Sept. 6, 1991, Vol. 18, No. 34.

161. On Rudolf Clausius, see footnote 40 of Chapter III.

162. On Kelvin, see footnote 41 of Chapter III.

163. On the "Second Law of Thermodynamics" as the work of Clausius and Kelvin in 1850, see footnote 17 of Chapter III.

164. Jeremy Rifkin, *Entropy, A New World View* (New York: Bantam Books, 1989).

165. Cantor's use of the term "equivalent," is in his *Contributions to the Theory of Transfinite Numbers.* Equivalence is not mathematical identity or scalar equality, but mathematical transformations of equivalent power. The concept can be likened to the equivalence of a new discovery about natural law made by a scientist, to the successful replication of that discovery in the mind of another scientist. The second scientist's thought processes are sovereign, and therefore not "the same" in a scalar sense of processing the same information and coming to the same conclusion, but once the same discovery is arrived at in his or her mind, an equivalent transformation of the power of his or her thought about natural law in the universe is accomplished. See also quotations and commentary in Dino De Paoli's article cited in footnote 13 of Chapter III, pp. 79-80.

Ultimately this is based upon Nicolaus of Cusa's discussion of *equality*, as a conception both religious and scientific, most clearly in Cusa's dialogue *De Pacei Fidei* (On the Peace of Faith). Equality is there identified by Cusa as the second person of the Triune God, that person who links the human being to the Creator. What Cusa expresses is, that through what Thomas à Kempis had called "the imitation of Christ" in human life, a human mind is capable of becoming "equal to" the mind of God. Clearly this does not mean anything like "the same," but rather as in the sense of "equal to the task," of participating in the mind of God and in God's task of Creation in some way. Christ represents (says Cusa), that each human existence can be "equal unto itself," unto the limits of its power to aspire upwards toward the knowledge of God. Therefore Cusa's conception of "equality" is embedded within a necessary, upward evolution of species, emphasized particularly in Cusa's works noted in footnote 68 of Chapter II: *On Learned Ignorance,* and *On the Vision of God.*

In Wiener's "information theory" schema, a ranking of living processes, as statistical phenomena, is on a simple scale of negative "H-Theorem" values. In reality, as Cusa's description of the necessity of a universal, upward evolution of the species requires, there can be no such simply probabilistic ordering of an evolutionary sequence. That harmonic ordering of the evolution which is congruent with the Golden Section is of this higher, Cusa quality of *equivalence,* not a mere indication of entropic probabilities.

166. For references on Bostick's *l'chaim* particle, see footnote 8 of Chapter II.

167. Kant, in his *Critique of Pure Reason,* relapses to a completely mysteri-

ous dualism between the human mind and physical reality, the idea of the *Ding an sich*, the thing-in-itself: "Objects in themselves are quite unknown to us, and that which we call outer objects are nothing but mere representations of our sensibility. The true correlate of sensibility, the thing in itself, is not known, and cannot be known, through these representations; and in experience no question is ever asked in regard to it." Immanuel Kant, *Critique of Pure Reason*, trans. by Norman K. Smith (New York: St. Martin's Press, 1965), p. 74.

V. Cold Fusion and Economic Recovery

As the writing of this report has neared completion, an economic recovery of the depressed United States lies just over the rim of the next precipice. The plunge into a full-scale depression, worse than President Hoover's, is now certain; the question is, what comes after that crash?

There could never be an economic recovery as long as the Thatcher-like policy presumptions of the Bush administration persist; only a smashing of the axioms of Bush policy, upon the rocks of precipitous financial ruin, could clear the way for a needed new policy structure, and thus, permit the building of the basis for national recovery. The obliteration of the cumulative U.S. policy trend of the past twenty-eight years, is the only hope for a genuine economic recovery during your lifetime.

By itself, our proposed cold fusion policy will not set off that economic rebirth. It *typifies,* in the sense of Cantorian *Type,* that species of policy rethinking which will bring about not only the needed recovery, but also a reversal of immorality in social policy of practice generally. The cold-fusion policy, as the issues have been signalled here, *typifies* a "science-driver" recovery of our now-ruined U.S. economy.

First, identify the disease, and then prescribe the cure. Before turning to that recovery program, consider the essential historical features of the postwar process leading into the present depression. Consider, in broad outline, the circumstances in which we find ourselves, and study a list of some typical features of the policy-shaping process which brought this planet's once most envied, post-war U.S. economy to its presently contemptible, disgusting state of bankruptcy and ruin.

Physically, the U.S. economy is already in a depression.

Most of the farms and industries which existed so proudly, twenty to twenty-five years ago, have gone out of production and employment. What remains in that quarter, is chiefly bankrupt or near bankruptcy; our industries, competitively—on a world scale—are chiefly in a state of looted dilapidation. Our national water and power systems, whose capacities have been collapsed to levels far below the nation's needs, are in a seemingly insoluble crisis.[1] Our principal public transportation systems, like most of our bridges and highways, are in various stages of threatened disintegration. Education and health-care institutions are undergoing a new round of savage budgetary triage. We subsist, to the degree various strata of our population do still subsist, by Washington's Attila the Hun-

style extortion of much of the world's—including some of the poorest nations'—suppliers, at artificially depressed prices, of essential goods which we have no longer either the labor skills nor operating productive capacities to produce for ourselves.

If we concentrate analysis solely upon *physical economy*, the United States economy was already plunged into a 1930s-style depression beginning no later than 1981.[2] More and more of family households know the reality of a 1980s depression from their immediate experience. There were chiefly three reasons a lying news media and a lying government were able to brainwash so many duped "baby boomers" and others into believing the hoax of a 1983-87 "Reagan recovery":

1. The massive post-1970 losses of the U.S. economy were camouflaged by unreported depreciation, totaling *literally trillions of dollars* of unpaid repair bills, in water and power systems, public transportation systems, urban infrastructure generally, and education and health systems.
2. The government shifted to fraudulent use of "post-industrial," rather than industrial, accounting standards, to measure the combined economic health of agriculture, industry, and basic economic infrastructure.
3. The growth of personal and corporate incomes from the parasitical sector of finance and services, was centered around cancerous 1983-87 growth of employment in connection with the greatest "John Law-style" financial speculative bubble in history.[3]

Since 1984, we have experienced a desperate, now-failing effort, by the successive Reagan and Bush administrations, to delay the inevitable, successive waves of collapses of banks, insurance companies, pension funds, real-estate-mortgage bubbles, and financial markets generally. This process of temporarily forestalling entered its end phases with the October 1987 Wall Street panic.[4] We are presently near the fag-end of those turbulent end phases.

So, although some future likenesses of Professor Milton Friedman will circulate fraudulent analyses of the Bush Great Depression, which date that depression to the onset of the next cyclical financial crises ahead, in physical reality, the depression has already been in effect throughout the 1980s.

It is essential that we examine more closely the case just outlined. The need for that analysis flows chiefly from a principle of scientific method, a principle we have stressed repeatedly in the preceding chapters. Policies of practice are analogous to geometry theorems; they are the fateful consequences of the set of axioms and postulates "hereditarily" underlying the way in which the policymakers (and policy-consenters) think. During the 1963-91 interval, the drift which permeated successive reforms in U.S. policy, in economic, in monetary, in financial, in educational, in scientific, and in general social matters, has been the "axiomatic" influence of the following three leading elements of a "cultural paradigm-shift" in hegemonic policy-shaping assumptions:

1. *Radical monetarism* in monetary, financial, regulatory, and economic policies (the introduction of the idiotic distinctions between so-called "macro-economics" and "micro-economics").
2. *Neo-Malthusian "post-industrial" cults' ideology.*
3. *"Frankfurt School"* and kindred efforts to rid policy-shaping and

law of the Judeo-Christian natural law centered upon the nuclear family household.

Thus, the developments of the past, now twenty-eight-year period, is not to be understood in any ordinary statistical way. It is an *entropic* species of *non-linear* series of the form A, B, C, D, E, . . . : It is the reverse of the *negentropic* kind of non-linear series which we used as "blackboard" illustration of successive, discrete phases of a single *Type* ("species") of valid scientific progress. It is such a non-linear series, but rather subsumed by an *entropic* Type. It is upon that *entropic Type*, that we must focus attention, both to understand, and to correct the causes of Mr. Bush's U.S. economic depression. By understanding the economic crisis in that way, we may define all the better the *Type* of remedy required.

Unless we address and change specifically those "axiomatic" features of popular belief underlying acceptance of the past twenty-eight years' "cultural paradigm" policy shift, there could exist no remedy for the Bush depression now gripping the United States. This is not only a deep economic depression, far worse than Hoover's; it is a classical tragedy enacted on our real-life's stage. As long as your neighbor clings stubbornly to those silly, gossipy, "other-directed" beliefs which most "baby boomers," among others, have come to share during the past twenty-eight years, there is no hope for you, "Dear Hamlet," or for our self-doomed United States. The enemy is that Bugger's "cultural paradigm" which we attack here; that, "Dear Hamlet," is that certain "something rotten in the state of Denmark" in this case.

Why Since 1963?

The assassination of our President John F. Kennedy defined the end of an era in U.S. public life. If that historic fact were not yet fully clear to most observers back then, or even during the second half of that decade, perhaps, it is beyond reasonable doubt today. To locate the significance of that assassination—and new attempts against France's President de Gaulle during the same period, and the shifting of Germany's Chancellor Konrad Adenauer—we should first examine the economic follies of the preceding Truman and Eisenhower administrations.

The post-war Truman and Eisenhower years are lately, understandably regarded with a nostalgia by many surviving members of my generation, and some others. Yet, in many ways, those years were a disaster, especially in respect to Truman and Eisenhower policies toward the U.S. economy. To understand the specific historic significance of the brief Kennedy years, we must consider the way in which Kennedy attacked, rather correctly, and successfully, the worst economic policy failures of the Eisenhower administration.

Kennedy's administration launched a vigorous economic recovery from the ruinous doldrums persisting into 1961, in the wake of the deep, 1957-58 recession. The key features of that successful Kennedy recovery package included:

1. The Investment Tax-Credit Tax-Reform.
2. The Moon-Landing Goal.
3. The Acceleration of Infrastructure Building.

Some apologists for Eisenhower's administration have insisted that the aerospace and infrastructure programs of the 1960s were already partially

under way during the post-Sputnik years of the 1950s. It would be misleading to argue, as those apologists have done, that Kennedy "merely accelerated" Eisenhower programs. In this case, *greater* or *lesser* represented directly opposing economic policies.

During the mid-1950s, Eisenhower had virtually mothballed a Huntsville rocket program which could have put a satellite into orbit by about 1955.[5] Even when Khrushchov had succeeded in putting up the Sputnik,[6] Eisenhower did not unleash the U.S. Army's Huntsville, ready and waiting capabilities; only after the humiliating failure of the competing U.S. services' "Flopnik" programs, was Redstone allowed to unfurl its capability. Thus, under Eisenhower, there would not have been a viable U.S. aerospace program at the beginning of the 1960s, if Moscow's Sputnik had not shamed the Republican administration into tolerating a post-1957 spectrum of aerospace-oriented science-education and cohering projects and programs.

It is necessary, to put the details into a proper historical context, to note the points of similarity among the recovery measures of President Kennedy, and the philosophy of practice of such European leaders as President Charles de Gaulle of France,[7] Chancellor Konrad Adenauer of pre-1964 Germany, or Italy's nation-building Enrico Mattei. We may, with apologies to Apollo priest Plutarch, see a parallel in, on the one side, Kennedy's succession to the Eisenhower 1950s, and de Gaulle's superseding of the rotting, decadent French Fourth Republic. Looking beyond 1963, we compare Kennedy's economic successes with President Johnson's disastrous aping of Prime Minister Harold Wilson's Britain, and so on. Such comparisons—fore and aft—are required, to put sharply into focus the terrible, downhill trends in U.S. economic policy of practice since the assassination of President Kennedy, nearly twenty-eight years ago.

Ask, what did Kennedy do, in the early 1960s, which Truman should have begun during the late 1940s, or Eisenhower during the 1950s? We shall soon come to that. Then, we shall see what puts the Kennedy years into a specific historic focus, and shows more clearly the pathological character of U.S. economic policy-shaping since 1963.

The follies of the Eisenhower administration's economic policies are epitomized by the influence of the President's key economic adviser, Federal Reserve Chairman Arthur Burns. On these accounts, the differences between Truman and Eisenhower were minimal.

What the U.S.A. should have done, coming out of World War II, was to have shifted a large ration of freed-up industrial capacity and labor force into a combination of accelerated infrastructure building, and a great enlargement of the advanced machine-tool sector's output, rather than the lunatic kinds of austerity measures deployed. In the take-down from peak levels of Korean War mobilization, the Eisenhower administration made what were, relative to altered circumstances, the same principled kind of errors as Truman earlier. On this account, if one considers the significant changes in secondary features of general economic circumstances which had occurred over the 1946-52 interval, the philosophical differences in economic policy thinking between the Truman and Eisenhower administrations were mere rhetoric, politically cosmetic.

The similar flaws of economic policy in those two preceding post-war administrations place the historical character of the Kennedy administration's achievements in clear focus. There were fundamental differences in U.S. policy-making after Kennedy's assassination; but, there were some significant points on which Johnson and Nixon resumed the blundering errors of Truman and Eisenhower. Acknowledging those points of similar-

ity puts the fundamental differences into clearer focus. To appreciate the significance of this point one must consider the following addenda to the earlier chapters' identifications of principles of economic science:

1. We have already stressed, repeatedly, that the primary source of both the increase, and even mere maintenance of potential population-density, is the realization of scientific progress as increases in the per-capita and per-hectare productive powers of labor by means of both increases in the per-capita standard of nuclear-family household "market basket," and technological progress in both the design of goods and the relevant productive processes.

2. The link between scientific progress and technological progress in product and mode of production, is the relationship between the experimental apparatus of a valid crucial experiment, and the corresponding new technological principle of design employed by tool builders.

3. These technological advances require a twofold increase, in quality as well as quantity, in power supplies employed. Quantity must increase geometrically; "energy-flux density"[8] of applied power must be increased.

4. These technological advances require increases in water supplies per-capita and per-hectare.

5. These advances increase the per-capita and per-hectare quantities of both *ton-mile hours* and *ton-mile-hour-dollar*[9] of required density of freight transport per-capita and per-hectare.

6. These advances cannot be realized adequately without coordinate increases in (a) fundamental scientific progress,[10] in (b) buildup of the technologically advancing machine-tool sector, and (c) fostering of capital-intensive, energy-intensive modes of investment in the new technologies which fundamental scientific progress is developing "upstream" from the production line.

The design of a sound monetary, tax, and financial policy must be subordinated, "enslaved" to the mission implicit in these connections. Here, on this point, lies the United States' single, original, and most important contribution to the science and practice of political economy, a principle of which virtually all U.S. university graduates today are pathologically ignorant, a principle which Truman and Eisenhower violated savagely, with rather disastrous ultimate results.

The first use of this principle occurred in the pre-1689 Massachusetts Bay Colony. The Colony issued its own "fiat" (paper) currency, which was used to provide an adequate medium of circulation of the product which might be supplied by domestic productive capacities. The development of the Saugus Iron Works is dramatic illustration of the success of this monetary policy of practice.

The British Crown disagreed violently; a tyrannical Royal Governor was sent to shut down the prosperous growth of Massachusetts.[11] The Bay Colony's economy never fully recovered from the loss of this sovereign right to such a monetary practice. However, Cotton Mather campaigned for its restoration; Benjamin Franklin campaigned for its universal employment. Thus, it became a cornerstone feature of national banking policy in Article I of the U.S. Constitution draft of 1787-89, and a key feature of President George Washington's American System of political economy.[12] Ignorant observers have ridiculed such a monetary policy under the rubric of "greenbackism," and have foolishly insisted that such a policy is inher-

ently inflationary. Since most Americans are nearly as ignorant of economic principles as our university economics graduates, the issues must be spelled out a bit, before returning to the subject of the historic significance of Kennedy's economic-recovery measures.

How National Banking Works

Our present U.S. Federal Reserve System is, among its other faults, *unconstitutional*. Look it up, as the fellow said: How does Article I of the *Constitution* specify the issue of U.S. currency? "Where and when," one challenges apologists for "the Fed," "was that provision of our Constitution repealed by amendment?" Never, of course. [13] Now, put that provision of Article I—which (later) U.S. Treasury Secretary Alexander Hamilton had a hand in drafting, with Treasury Secretary Hamilton's *Report to the Congress on the Subject of a National Bank.* View that report in conjunction with two other key reports to Congress by that Treasury Secretary, *On the Subject of Credit* and *On the Subject of Manufactures.* There you have the germ of the "American System of Political-Economy," as later elaborated by Mathew and Henry C. Carey, and by Friedrich List. [14]

This "American System" was installed by President George Washington, overturned—to disastrous effect—by Gallatin-duped Presidents Thomas Jefferson and James Madison. [15] It was restored under Presidents James Monroe and John Quincy Adams. It was wrecked in 1832, causing the 1837 Panic, by bankers' agent and President Andrew Jackson. It was partially restored by the Whig Party under the leadership of Speaker of the House Henry Clay. Under Presidents Pierce and Buchanan, the nation suffered disastrously. [16] President Lincoln's brilliantly successful economic mobilization for war was conspicuously informed by American System principles. [17] President Andrew Johnson was a British liberal's delight, a national economic and social disaster. The destruction of U.S. sovereignty in its monetary affairs was effected through the treasonous U.S. Specie Resumption Act of the late 1870s.

The final blow to the U.S. Constitution's monetary law, came through the immoral actions of former President Theodore Roosevelt, in running a Bull Moose "spoiler" candidacy, to elect Federal Reserve advocate Woodrow Wilson as President. Since that time, "Hamiltonian" American System principles have been employed only in a distorted, partial way, as U.S. war-economy mobilizations. With the Hemingway figure of Theodore Roosevelt, the Buggers had won—apparently forever.

Nonetheless, as the two great U.S. depressions under that Federal Reserve System highlight this fact, the "Hamiltonian" American System remains the only sane choice of U.S. economic policy which the United States has experienced, or observed in use among other nations, [18] to the present day.

Although writers including Benjamin Franklin, Alexander Hamilton, Mathew Carey, Henry C. Carey, Friedrich List, and others, have documented the principles of the American System as thoroughly as any liberal or Marxian competitor has been presented, the modern development of the American System, as a system, has been accomplished only by the author of the present proposal-report. Therefore, some additional points of special reference are now summarized here.

From moment to moment, all of the domestically produced wealth of the national economy is produced by one hundred percent of its available labor force. This labor force is, in turn, a portion of the total population of family (and quasi-family) households of which the total population is composed. The family household produces the new individual; so, the generic family household, as an expression of a Cantorian *Type,* is the locus of the continuing existence of the nation, and of the human species

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as a whole. It is the development of that family, including its new individual, which is the proper primary referent of any sane economic policy, or economic science.

The labor force acts to produce those physical-economic changes on which depend the existence and process of continuing reproduction of the household as a whole. Thus, through the action of the labor force *as a whole*, do the households reproduce the preconditions for existence of that reproductive process which is the nation—mankind—*as a unit-whole*. Thus, through scientific and technological progress as a *process* of change characteristic of the cycle of labor, creative mental life, reason is the characteristic of labor and economy.

Let us now represent the bare statistical relations to be considered, using graphical diagrams and flow-lines among such bars as raw illustrations. Then, next, we return to the simple non-algebraic (e.g., cycloid) forms, to show the meaning of the apparently st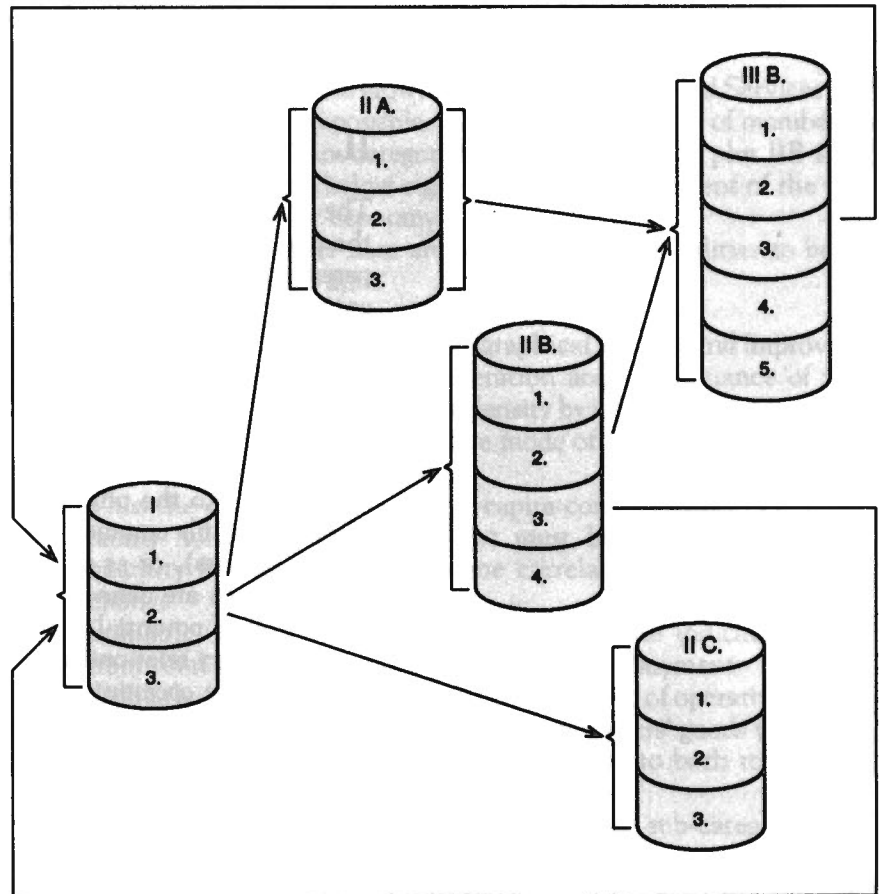atistical constraints of successful growth through capital-intensive, power-intensive[19] modes of technological progress.

The successful development of an economy may be represented usefully in that statistical framework just outlined. The principles of measurement serve as a set of guidelines for bankers, statesmen, and borrowers, respecting the proportional application of sources of funds to various qualities of investment, and also as guidelines for determining the relatively more or less favorable terms and conditions associated with each class and type of loan of either national or private funds, or a mixture of both. A description

Census

II Labor Force

1. Highly Skilled
2. Ordinary Industrial, Mining + Manufacturing
3. Agricultural

A. Operatives

1. Scientific, Engineering + Related
2. Educational, Medical + Related
3. Administration + Services
4. Waste

1. Unemployed
2. Immorally Employed
3. Uselessly Employed

C. Waste

I Households

1. Senior Adults
2. Economically Active Age Adults
3. Youth, Including Post-Adolescent Students

III Production

III A. By Technology

III B. By Social Output Classification

Infra-Structure

Producers' Goods
- Machine tools
- others

Households' Goods

Goods of Administration + Services

Waste Goods
- Military
- other

Flow Diagram of Census

of the physical-economic objectives implies the appropriate monetary, tax, and financial practice.

As we have stated in earlier chapters, the elementary function of physical economy, is the *increase of the average productive powers of labor*, of the society as a whole, as measured in terms of the *variable rate of the rate of increase of potential population-density*. This mode is *capital-* and *power-intensive*, as already indicated. Within those primary terms, the conditions for growth of a physical economy can be expressed in terms of a set of *implicitly non-linear* inequalities.

Consider some relevant highlights of this practical approach to the subject-matter.

Focus now on columns I, II, and IIIb. First, take each of the columns *seriatim*.

I. Households

The rise in the level of technology requires several interrelated changes, producing a population better fed, longer lived, healthier, of higher levels of morality and culture, better educated in *science*. This requires a converging of the "school-leaving age" asymptotically upon some upper limit, approximately twenty-five years of age. This requires a longer-lived adult population, and therefore substantial increases in the ratio of senior adults (e.g., over sixty to sixty-five years of age) to total population.

This requires "smaller class size" in schools, at all levels, ever-higher levels of scientific rigor of teachers at all levels, and so on.

This requires a constant increase in the quantitative/qualitative content of the *family households* per-capita market basket, and increase of the quantity, and raising of the cultural level of leisure.

Such are the demographic inequalities.

II. Labor Force

The total labor force of a society is a *rather* well-defined function of the family (and quasi-family) households. *Abandoned children* of working parents' working hours, are not the stuff of which sane future adults are made generally. The family supplies available wage-earners to the economy, according to a sane standard for the internal life of the child-rearing family household. That is a subject unto itself; it is sufficient, that the fact of the point's existence be noted here.

This labor force's employment must be analyzed first in respect to the total society's total relationship to nature. This relationship is defined with respect to the physical changes we recognize as physical products (such as tangible commodities of households' or producers' consumption-market baskets), or as physical forms of basic economic infrastructure. These *changes* are defined functionally in respect to changes in the rate of increase of potential population-density.

The primary relationship of labor force to nature is represented by the activity of the *operatives*.

These operatives are primarily as indicated:

A. Highly skilled industrial or mining operatives, general operatives, and agricultural operatives.

B. The usefully employed *non-operatives* we defined functionally, as shown, among (1) science and engineering and related professionals, (2) education, medical, and related professionals and quasi-professionals, (3) necessary functions of administration and services, and (4) waste. By "waste," in this case, we signify employment whose form is a useful one, but whose application does not foster increase of potential population-density.

C. The category of *Waste*, as distinct from wasteful employment of "non-operatives," signifies employment, or unemployment, which is intrinsically wasteful or worse in *form* per se.

These components of the total labor force, IIA and IIB, most emphatically, are applied to, distributed among, the categorical sub-sectors of IIIb. Begin analysis with IIA's distribution in terms of rations of operatives employment in each category of IIIb: (1) Infrastructure, (2) Producers' Goods, (3) Households' Goods, (4) Goods Used by Useful Forms of Administration & Services, and (5) Goods Used in Waste (wasteful applications of useful forms of productive activity).

So, in IIA, as technology and increase of potential population-density advance together, agricultural (and related) employment approaches asymptotically some ultimately "smallest possible" ration of the total labor force, perhaps in the vicinity of one percent. Simultaneously, the ration of "highly skilled operatives" increases as a percentile of total operatives.

On IIB, the ratio of employment in science and engineering professions, should increase as a percentile of total employment. Today, in the U.S.A. or Japan, for example, it *should* lie between five and ten percent of the total labor force. This increase is principally a function of the operatives' component of the total labor force, and is associated most closely with a highly skilled component of the operatives' sector.

IIB 2. Employment of Professionals and Quasi-Professionals in Education, Medical Care, and Related Categories of Infrastructure must increase with technological progress, and with required increases in longevity, health, and productivity.

IIC 3. Employment in the growth of Administration and Services is to be constrained as much as possible. That is, the sum-total of members in the labor force employed in categories of IIA 1, 2, and 3, plus IIB 1 and 2, ought never to decline below eighty to eighty-five percent of the total labor force—in a healthy economy.

Those are the first-order data and constraining inequalities to be applied. In summary, these are:

1. There must be the indicated demographical and cultural improvements, correlating with the generation and maintenance of an increase in potential population-density by means of a continuing capital-intensive, power-intensive mode of investment in scientific and technological progress.
2. Thus the direct and indirect per-capita content of the standard family household's market basket must be increased in both quantity and quality, in the same correlation as demographic change.
3. Similarly, there must be a continuation of the indicated shift from rural to urban-industrial operatives' employment.
4. Similarly, within urban-industrial employment of operatives, the ration of employment in production of producers' goods (including infrastructure) must be increased relative to both total employment of operatives, *and total labor force.*
5. Similarly, the rations of employment in two sub-categories of non-operatives' employment must increase: science and engineering; and the social infrastructural sub-categories of health and education. The first should be between five and ten percent of total employment in the U.S.A., Canada, France, Germany, Japan, etc. today. The first is keyed to technology production; the second to the correlation between technology and required shifts in demographic profiles of statistically standard family households.

These statistics, inequalities, land-use functions, and so on, correspond to a series of input-output tables, one for each historical moment of a constantly changing array of such tabular values. The result, this series of tables, is a representation of a non-linear, negentropic series of the now-familiar form, A, B, C, D, E, ... It is desired by the society which is both economically literate and sane, that the flows of credit into various sectors of the economic process cause a result corresponding to the prescribed inequalities. A sane "capitalist" economy is, like the U.S.A. under President George Washington, a nation which has rejected the British liberals' "Adam Smith's free-trade" dogma, and has chosen instead a policy akin to that of President Washington's Treasury Secretary, Alexander Hamilton.[20] That policy is known as "the American System of Political-Economy."

The primary objective is to effect investment in advanced technologies, and that in a *physically* capital-intensive, power-intensive mode. However, to implement more advanced technology, it is indispensable to provide support in the form of expansion and technological improvements *in all dimensions of* infrastructure. That is to say, that the general advancement of technology requires:

increased water supplies per-capita and per-square-kilometer.

increased power per-capita and per-square-kilometer.

increased energy-flux density of power applied.

increased completion rates of ton-kilometers-hours-dollars of freight moved.

better health care.

better education.

and so on.

If the quality of infrastructure declines, the potential level of realized technology and productivity per-capita and per-square-kilometer declines. Now, that said, resume our comparison of the pre-Kennedy, Kennedy, and post-Kennedy "models" of economic policy.

Let C equal current operating costs of production facility at eighty percent utilization of capacity. Let S represent the fixed investment in that capacity. Let P represent the rate of profit.

Let R equal rate of profit.

Now compare two "blackboard" cases.

$S_1 > S_2$;

$C_1 = C_2$; and

$R_1 > R_2$.

However, $C_1/S_1 < C_2/S_2$.

Thus, $P_1/(C_1 + S_1) > P_2/(C_2 + S_2)$.

So, $P_1 > P_2$ by the product of $(C_1 + S_1)/(C_2 + S_2)$.

These relations exist because the investment in new technology (C_1/S_1), was based on P_1 being greater than P_2 multiplied by the dividend of $C_1 + S_1/C_2 + S_2$. Although products produced by means of S_1, are probably lower in unit-price than with S_2, the higher productivity offsets this. That is the "classical" classroom-blackboard basis for the investment in S_1, rather than S_2.[21]

Years ago, United Auto Workers Union (UAW) President Walter Reuther argued, ignorantly, against automation, that machines do not buy groceries or passenger cars. This argument used by Reuther is known as the "buy-back" fallacy. The false argument runs thus. The purchasing power of a nation is the sum total of the money paid out as costs and expenses, paid-out money which becomes purchasing power. Thus, the "buy-back" argument runs, "labor-saving machinery," if it is successfully profitable, lowers the total amount of the nation's paid-out costs and expenses, and thus lowers the purchasing power of the nation. To many, that line of argument has been convincing; convincing or not, it is a falsehood, a shallow sophistry.

The margin of increase of money supply originates as a margin of credit issued. This margin of monetized credit, when redeemed by valuable goods, becomes new purchasing power in general circulation. That conversion is the key to showing the folly of the "buy-back" fallacy. It is key to the kind of monetary, tax, and financial policy which the Eisenhower administration should have followed.

The Eisenhower Case

What the Eisenhower administration did was as follows.

First, as the intensity of war-fighting in Korea was lowered to the diplomatic requirements of Panmunjon and related negotiations, the U.S. government re-enacted the essential features of the unnecessary traumatic conversion of the economy from the World War II war economy.[22] The result was a bitter recession, roughly comparable to 1946-48 in form, although mild relative to the later Eisenhower recession and post-recession doldrums of 1957-61. What the administration then did, was to rely

upon an increasingly reckless form of "consumer credit"-driven expansion of production and employment, an expansion which led, inevitably, to an early and deep collapse, into the worst post-war recession, by February-March 1957.[23]

This short-lived, consumer credit-driven Eisenhower recovery of 1954-56 was typified by the speculative madness of the way in which retail and new car sales, and numbers of dealerships were expanded. The consumer credit financing of these sales became a speculative financial bubble, which blew up, lawfully, inevitably, at the beginning of 1957.

Two fictions were characteristic of financial sales of new cars during that period. The first was the combined "packing" of the new-car price, and related, wild overpricing of the allowance on the used car trade-in. The second feature *should remind us of the insanities of the 1980s real-estate boom*: the assumption that the "trade-in" value of the financed new car would enable the buyer to liquidate readily a "balloon note" concluding the series of thirty to thirty-six monthly repayment notes on the financing of the new-car sale. This latter feature was key to the triggering of the 1957 recession. During 1956 the point was being reached ever more frequently, that the unpaid balance still owed on what had been originally a new car purchase, exceeded by far the price at which an identical make and model could be purchased at a nearby used car lot.

What should have been done, instead of a consumer-credit expansion, as typified by this new car sales case, was a capital investment-led expansion. Instead of relying upon consumer-credit expansion, the Eisenhower administration should have kept consumer credit prudently tight, and focused credit expansion into long-term investment in technologically progressive infrastructure and productive capital of, chiefly, agriculture and industry.

Instead of expanding the total consumer-goods purchasing power by increasingly reckless consumer short- to medium-term indebtedness, the administration should have increased total consumer purchasing power by means of the higher per-capita wage levels of technologically progressive capital expansion. It is the increase of the total households' cash pay envelope purchasing power, through the combination of job expansion and skill-related employment upgrading, which is the proper basis for a durable growth of the households' goods market.

Interestingly, the Eisenhower folly on this account was the General Motors folly. Henry Ford had conceived the automobile as a household's long-term investment medium in a capital good of a household/farm. Christiania/Wall Street-linked General Motors had introduced the sweat-shop ideology of the New York City Seventh Avenue garment-manufac-turing industry into automobile marketing, and thus, into automotive manufacturing. Robert Strange McNamara was the instrument to intro-duce the "Seventh Avenue sweatshop" mentality to Ford Motor Company operations.[24]

The difference in the two approaches may be illustrated as follows:

The "Seventh Avenue," or "horizontal" approach of General Motors-style season marketing, which Wall Street's "loony" Robert Strange McNamara carried into the politically defeated Ford Motor Company of the 1950s, is in direct opposition to the "verticality" of the sane, industrial approach. The industrial approach changes the composition of total corporate and sales products, to increase the relative portion of high-technology producers' goods. It is this relative expansion of producers' goods production and sales, which increases both the scale and per-capita incomes of industrial employment, thus avoiding the horizontal

approach's tendency to seek a speculative boom based upon misused consumer credit mechanisms.

To illustrate this important point, take the case of hypothetical automotive manufacturer "A." With technological progress, "A's" passenger vehicles divisions produce an increased volume of units, of improved quality, with a reduction in operatives in all these divisions combined. Shall this lead to a corresponding margin of increased unemployment among the employees of "A"? Not if the sane industrial approach is employed.

The normal line of promotion within the ranks of operatives in an integrated aerospace/automotive enterprise (such as "A" should be) is from "the general operative," toward machine-tool specialist, and so on. If "A" takes the industrial approach indicated, this firm coordinates technological advances in its passenger vehicles divisions with increasing production and marketing of classes of capital goods cohering with its overall technological requirements.

A sound such enterprise should employ about five percent or more of its total operatives force in research and development, or should support an outside research and development vendor to supply such an effect.

Government plays a critical role in shaping the economy on this account.

First, government at various levels (federal, state, county) either builds and operates the needed basic economic infrastructure, or provides regulation of privately owned public utilities to the same net effect. This investment is a large component of the nation's total long-term, productive capital investment, and is the most important such investment— upon which the feasibility of every other investment depends.

The production of currently and foreseeably needed capital improvements in basic economic infrastructure, is the proper, principal "driver" in increases of both total employment and per-capita productivity.[25] The same is true of capital- and power-intensive investments in improved technology, generally.

Imagine an entire economy analogous to the enterprise "A," above. As technological progress enables us to produce a higher per-capita value of households' consumption market basket with a smaller fraction of the total labor force than earlier, instead of shunting the redundant margin of operatives into the ranks of the unemployed, or useless low-paid services employments, this margin should be absorbed by job upgrading, into the domain of capital goods production.

Thus, if the new issues of U.S. currency notes authorized by Congress are entrusted for lending to a national bank such as Hamilton's or Biddle's United States Bank, the following practice is to be desired.

The national bank may lend these notes either directly to borrowers, or the loan may be issued, in cooperation with the national bank, by a private member-bank of the national banking system as a whole.

Generally, federal, state, county, and municipal infrastructural agencies would prefer to borrow directly from the national bank. In federal cases, this would be the rule. Private agencies would usually borrow through a private member-bank of the national system; customarily, the private bank would supply a significant portion of the total credit issued.

The chief purposes of national bank lending as a whole are two. First, to supply low-price long-term credit for capital improvements in basic economic infrastructure, and second, to foster optimal realization of the private sector's capacity to absorb new productive capital formation in connection with agriculture, mining, and manufacturing:

- in publicly owned basic infrastructure, the national bank is the chief source of such credit *for capital improvements;*
- in public utilities, national banking credit may be a major contributor of lines of such credit when the specific circumstances warrant this;
- in agriculture and mining, the national bank is a significant indirect lender;
- in the manufacturing sector, the national bank is a significant participant in capital loans which foster those kinds of capital-intensive, power-intensive investments in technological progress which have the relatively greatest beneficial impact upon the economy as a whole.

Since the new circulation of U.S. currency notes is, in these cases, always tied to a corresponding increase in physical wealth produced, there is no inflationary impact in lending in a manner analogous to progressively issued construction notes. In the degree that lending fosters capital- and power-intensive modes of investment in technological progress, that impact is *deflationary.*

Thus, technological progress effected so, means an expansion of the scale of the economy's per-capita output. The monetary support for this marginal expansion of scale of product produced and sold, is properly supplied by the national banking mechanism, in accordance with provisions within Article I of the U.S. Constitution.

Eisenhower and the Fourth Republic

Earlier here, we said that it would be useful to see similarities in the contrast between Kennedy and Eisenhower, in the one case, and between President Charles de Gaulle and the French Fourth (and Third) Republics, in another case.

Under the leadership of King Louis XI, France was not only re-created as the first modern form of nation-state republic, but as a leading economy as well. Under Mazarin's protégé Minister Jean-Baptiste Colbert, France became the world's leading nation in science, technology, and economy, until 1815. Although the followers of Descartes undermined France's eighteenth-century science, and although the Jacobin terror sought to literally decapitate French science, over the period of 1793-1814, Lazare Carnot and his collaborator Gaspard Monge revived science and kept France in first rank until the Bourbon Restoration. Thus, the relative scientific and technological stagnation which dominated French history from 1815 until de Gaulle's Fifth Republic, is an uncharacteristic feature of modern French history and culture taken as a whole, if the entirety of the span from the fifteenth-century accession of Louis XI is taken into account.

The problem of France's Second, Third, and Fourth Republics can be summed up in a word, "Buggery": the Bugger-like, Rosicrucian philosophical world outlook of a powerful rentier financial interest centered historically around that Baron James Rothschild so bitterly described by the great Heinrich Heine,[26] the France whose rentier corruption is so famously described by participant Honoré Balzac. That is the characteristic tendency of *rentier* Wall Street's Eisenhower administration—the United States mimicking the charlatan's empire of France's Napoleon III.

Thus notable differences aside, Kennedy's bold policy reforms in economy are an escape from the intellectual morass of the Eisenhower 1950s, an escape paralleling de Gaulle's rescue of France from the moral miasma of the Fourth Republic.

As President de Gaulle recognized in practice, the right agro-industrial program must fail, if it does not include a vigorous, leading science-driver component.[27] Three elements of the Kennedy recovery program were *indispensable*:

    I. Acceleration of Development of Basic Economic Infrastructure.

    II. Fostering Power-Intensive, Capital-Intensive Investment in Productivity Increases, Through an Investment Tax-Credit Program.

    III. Taking on the Federal Reserve System, In Defense of the U.S. Constitution.[28]

    One additional feature was *essential*:

    IV. Demanding Moon Landing as a Science Driver for the Economy As a Whole.

Without technological progress, in a capital-intensive, power-intensive mode, there is no substantial growth of sustainable improvement in productivity. It is essential to bring monetary, tax, financial, and economic regulatory policy into conformity with that principle. So, these four, and correlated features of the Kennedy economic recovery represented, without fear of exaggeration, a revolutionary "cultural paradigm-shift," away from the "Fourth Republic-like" moral and intellectual decadence of the "baby boomer"-vintage Eisenhower decade. Kennedy's economic policy was a revolutionary shift, away from a rentier, toward a "Hamiltonian" practice.

Unfortunately, if the Eisenhower decade was a purgatory of moral and intellectual decadence, the counterrevolution unleashed by the November 1963 assassination of President Kennedy, was purely a Crowleyite, Nietzschean, Dionysiac Hell.

The Credit System

Under the British central banking system, or our U.S. Federal Reserve System, for example, a financial oligarchy exerts a usurious dictatorship over the nation's money supply. Under such systems, which originate in ancient Babylonian tax farming,[29] the state issues money by either collection of money as taxes, or borrowing advance payments from private holders of nominal wealth in their capacity as tax farmers.

The only significant alternatives to this dictatorial rule by oligarchy are two: (1) that the state outlaw usury as a capital crime; (2) that the state, or an alliance between state and benign agro-industrial interests, provide an alternative to the oligarchic, usurious forms of tax farming and central banking. The best alternative developed thus far, is the American System of national credit and banking.

All economic theory and practice is divided principally into two types: (1) the doctrine that wealth flows from the borrowing and circulation of an original hoard of money; (2) the opposing view that the origin of wealth is production, and that money is merely a means of fostering the circulation of that produced wealth.

Under President George Washington's American System, to which this report proposes we return, two forms of banking enjoy a cooperative existence to their mutual advantage. The one form of banking is "Hamilton's" national banking; the other, is the entrepreneurial, usually state-chartered, regulated system of private banking institutions. In this division of labor, the power to create *currency (legal tender)* is absolutely a monopoly of the federal government, as provided under the relevant terms of Article I of the U.S. Constitution. The division of labor is, summarily, as follows:

1. The President of the United States requests from the federal Congress, a bill authorizing the Secretary of the Treasury to create and circulate a specified issue of United States non-interest-bearing currency notes as legal tender.
2. The U.S. Treasury might place such newly issued notes into circulation as cash payments for federal government purchases or payroll on current operating account. It is preferred, by far, that all payments on account of federal government operations be paid from sums accrued as paid-in tax revenues and tariffs.
3. The preferred, customary method of introducing a new issue of currency notes into general circulation is through lending. Two channels for lending might be employed: loans issued directly by the U.S. Treasury, or loans issued against new currency issues which have been placed on deposit with a chartered bank of the United States.[30]
4. Loans issued by a chartered bank of the United States are properly restricted by guidelines, which, in turn, are established according to statute, by an executive order of the President. These guidelines cover all non-emergency loans issued by that bank, as follows:

The functional classes of borrowing agencies are broadly defined by aid of a cross-grid of three classifications, each with associated subordinate elements, as follows:

Consider the following, brief illustrations:

Useful Bank Lending
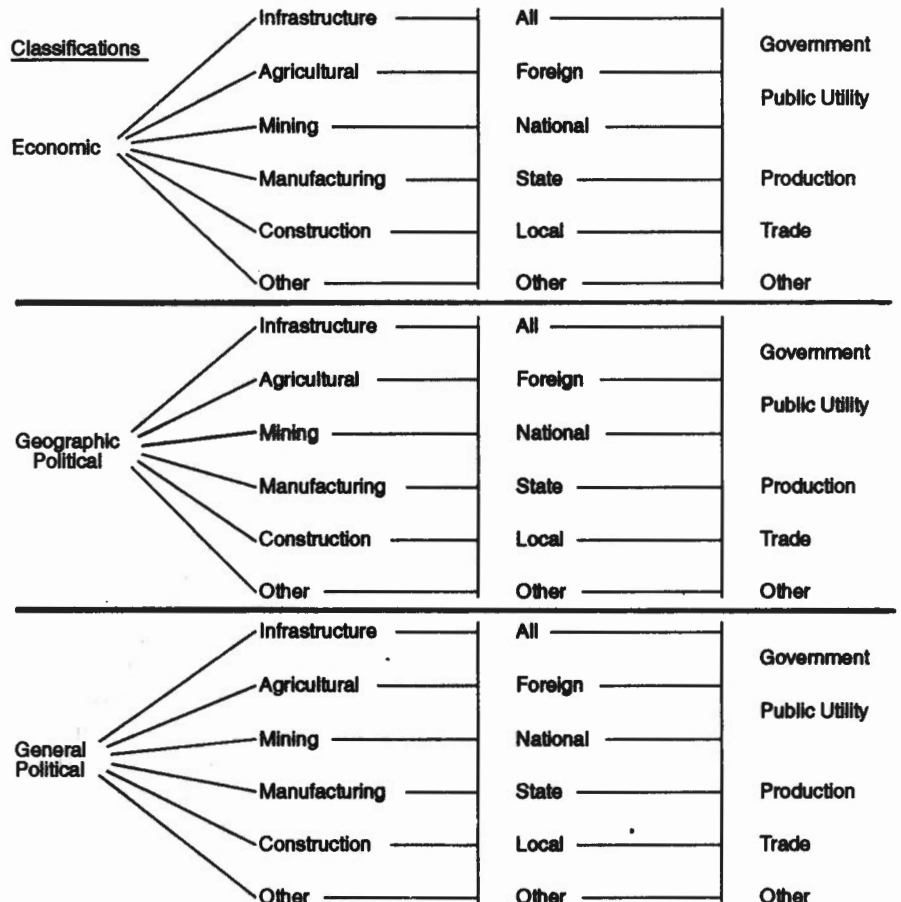
The urgent national fresh-water development needs of the U.S.A. are reflected chiefly by a combination of one major project, an expanded NAWAPA project,[31] plus a policy of fostering state-of-the-art desalination applications and other water-treatment programs of localized application. A very large percentile of total U.S. water development investment during the coming fifteen to twenty years is represented by that package. Similarly, the largest single component of *new*[32] national transportation investment during the coming two decades, is represented by a modernized nationwide railway network, featuring high-speed friction-rail (principally for freight) and magnetic levitation (initially, principally for intra-urban, suburban, and long-range passenger travel).[33]

In the case of major power-generation expansion, we have also a clear—if presently controversial—choice. The only practicable sources of major power supply during the coming hundred years are nuclear fission and nuclear fusion. This should be used for the following principal applications: electrical power, industrial and other process heat, water management, and production of hydrogen and related fuels for internal-combustion and analogous vehicles.[34] And so on, for infrastructure. A few major, national projects, and dovetailing state and local programs, cover most classes of national need over the next generation. The relationship of these programs to potential productive investment in population support is fairly described as "calculable." Also, the manpower and other resources required for each of these projects is estimable by any relevant consortium of engineering firms.

Similarly, it is feasible to calculate the impact of such projects upon the economy. The "draw-down" of available labor force is calculable, and also of materials and other semi-finished and finished producers' goods. The impact of the increased monetary purchasing power generated by relevant margins of increased sales of households' and producers' goods, is thus also calculable. Also, the increase of the federal, state, and local tax revenue bases is calculable. Those increases in gross monetary purchasing power and tax revenues ought to be applied in proportions consistent with the constraints (non-linear inequalities) consistent with real growth. Such a latter effect can be fostered *indirectly* through the marginal effects of proportional allotments of lendable new issue of legal tender through the private banks of the national banking system.

The nation as a whole is divided into its obvious economic regions, as groups of states. The loan officers of the chartered national bank, are supplied with "flexible budget" guidelines for loan-participations by type and by state within region. The loan officers are the channel through which member private banks conduct business respecting participation of the chartered national bank (e.g., a U.S. Bank) in lending programs.

Those, in rough sketch form, are the outlines of the system.

The national bank is engaged in medium- to long-term lending, and only by exception in short-term lending.[35] Most of the loans' value lies within two categories: principal lending-support for designated projects; or sub-categories such as public utilities' capital improvements.

The proper economic functions of non-usurious banking, from this vantage point, are typified by examining three types: (1) the indicated type of chartered national bank; (2) the savings bank; and (3) the commercial bank, this latter the usual partner in the national bank's loan-participation programs. It is the distinctive function of the latter type which is now scrutinized.

The economic function of the commercial bank lies within what is fairly described as its "lending based upon a prudent assessment of business risk." This function is derived historically from such precedents as Tudor

England's issuance of patents of temporary monopoly to inventors and their business partners in ventures producing and marketing that invention. Thus, consider only notions of "business risk" cohering with the effective production and marketing of a useful improvement in technology. Consider, from this standpoint, the proper division of economic responsibility between government and the entrepreneur.

For example, no sane nation would allow its military or law-enforcement agencies, or courts, to be delegated to a private enterprise. In the case of law-enforcement agencies or courts, "privatization" is transparently a form of *corruption per se*. We cannot leave it to the private entrepreneurship to decide whether some communities in the nation do, or do not have adequate public transportation, fresh water, power, and so forth. However, at the opposite pole, we could not permit the majority of the citizenry or government to decide upon what useful ideas will be allowed to be fostered in general communications, or in the marketplace. It is the history of mankind, that the most useful conceptions, upon which the existence of modern society significantly depends, came into practice as the opinion of a relatively tiny group, or even a nearly isolated single person.

Indeed, the fact that all valid scientific discovery depends originally upon the sovereign authority of an individual mind's mental-creative processes, signals the necessity of certain classes of individual entrepreneurship for human progress, and hence continued existence in general. Some societies may disagree with that view; if they persist in such an opinion, they will be ultimately destroyed, as communist society is being self-destroyed before our eyes today.

There is a middle ground, between those matters in which government must intervene, to promote definite directions in scientific and technological progress, and, at the opposite pole, areas to which the principles of free speech are rightly extended, to preclude government interference. The middle ground, is that into which government may or may not choose to intervene, and may do so whenever reason shows this to be more than merely desirable;

1. Government must, of course, demand a minimal level of competence in pre-science and science in public education. Witchcraft is not to be tolerated as a substitute for geometry.
2. Government must support scientific research to the degree obligations of government cannot be adequately fulfilled otherwise. The current HIV pandemic illustrates this point. Beginning 1985-86, the federal government lied officially about the dangers of what is called today HIV infection, because as Surgeon General Koop and others argued, the federal government did not wish to be panicked into new massive expenditures under the then-prevailing conditions of major budget crisis. Saving Gramm-Rudman was considered more important than saving human lives. How many people have died, or will die, avoidably, because of the callously inhuman decision by the federal government then? The proposal for a colonization of Mars, is another example of this issue. Fifty, sixty and more years ahead, our posterity will face challenges which they could not solve, unless we begin an appropriate Mars colonization "crash project" now.[36]
3. The cases of the Manhattan Project, President de Gaulle's successful, "dirigist" approach to the development of France's Fifth Republic, and a highly profitable Kennedy "Moon-landing" aerospace program,[37] illustrate the kinds of large-scale, ostensibly

optional, government "crash science-oriented programs" which sound governments will always be seeking out.

Otherwise, as indicated, government bears the responsibility for arranging the supply and maintenance of an adequate per-capita and per-square-kilometer's development of basic economic infrastructure for the territory and population of the nation as a whole. This includes the element of mandatory, not optional technological progress, and also the scale and capital-intensity of that investment.

To appreciate adequately the nature of a proper prohibition against government interference, we must strictly define the term "freedom," to equate "freedom" with creative powers of reason, as "creative reason" is defined in preceding chapters of this report. In this instance, the economic issue of science policy assumes the form of the proposition: What must government not leave, by its own omission, to the functions of individual entrepreneurs; and where must government not interfere with freedom of scientific inquiry and advocacy by a person, groups of persons, and business entrepreneurships?

It is the duty of government to foster, and to defend, a policy of capital-intensive, power-intensive productive investment in scientific and technological progress, as the general policy of the nation. This duty of government is expressed ordinarily in the form of development and maintenance of a well-regulated system of infrastructure, of national banking, and of taxation policies. This ordinary expression is properly supplemented by long-term so-called "science-driver" projects.

The Newton-versus-Leibniz controversy, continuing into the present time, is a prime illustration of a related problem of national science policy. Western European civilization, and now most of the nations of this planet, depend for their existence upon at least a certain minimal level of technology of general practice, and also a certain, at least minimal rate of scientific and technological progress in connection with that general practice. Thus, it would be criminal, in effect, for any government to proceed in opposition to scientific and technological progress. Thus, since we must reject as insane and immoral all anti-science policies per se, we are left with the kinds of disputes typified by the continuing Newton-Leibniz controversy.

In this matter of the Newton-Leibniz issue, to the degree that government knows that Leibniz's views are relatively the correct ones, to what degree must we permit Newtonians, for example, the prerogatives of "protected free speech"? Shall we, therefore, tolerate the peddler who sells strychnine, atropine, opium, and mycotoxin as "natural foods"? When do we come near to the obligation to prohibit poisonous ideas of such or kindred quality? These are not easy questions to answer rightly; other matters of principle must be considered first. We shall lay the basis for doing so, after summarizing the successive disasters of the past twenty-eight years of post-Kennedy U.S. economic and related policy-shaping.

After Kennedy

The assassination of President Kennedy coincided with the unleashing of an interacting set of prepared economic, financial, monetary, and cultural changes in the axiomatics of public morality—a "cultural paradigm-shift." Taken as a whole, these axiomatic changes are fairly grouped under the "New Age" rubric.

1. *In economics:* a shift away from a rising standard of productivity and household life, based upon fostering scientific and technological progress, toward the utopia of a "neo-Malthusian post-industrial society."
2. *In finance:* a shift toward deregulation and unbridled financial speculation, premised upon the unfettered practice of usury.
3. *In monetary affairs:* an end to the gold reserve basis, and stable currencies of the postwar Bretton Woods agreements, in favor of a usurious speculator's "floating exchange-rate" system.
4. *In cultural affairs:* a combination of the satanic (Dionysiac) rock-drug-sex counterculture, with kindred effluent of the Theodor Adorno "Frankfurt School" and Brigadier John Rawlings Rees' London Tavistock Clinic.

Case in point: The Johnson administration proposed to take down the Kennedy aerospace program significantly, on the pretext of freeing money "from space" for "the war on poverty" at home. This hoax, known as the Great Society, plunged the darker-complected minorities, on the average, successively, notch by notch, lower down on the socio-economic ladder, while also bringing to an end the genuine economic growth generated by the Kennedy crash aerospace program.

This change, cutting aerospace savagely, had been recommended to the Johnson administration by the London Tavistock Institute's Rapoport report on the effects of the Kennedy aerospace crash program. The burden of the Rapoport report: Aerospace was capturing the imagination of the majority of the population, was fostering greater admiration for scientific achievements, and was having the undesired (by Tavistock) effect of promoting a spread of increased rationality within the U.S. population. The aerospace program was promptly set back.

Case in point: Wrecking Bretton Woods came in six successive phases.

Phase 1: Johnson's mid-1960s slashing of aerospace fostered a serious recession. This played into the London-orchestrated collapse of the British pound and the U.S. dollar, over the November 1967-November 1968 interval.

Phase 2: Dragging that imbecilic quality of economic illiteracy known as the "free trade" dogmas of Professor Milton Friedman (and later, Prime Minister Margaret Thatcher) into the White House, with the newly elected President Nixon, ensured the 1970-71 collapses which behind-the-scenes plotters used to maneuver Nixon into wrecking the last remains of the Bretton Woods gold-reserve agreements, and plunging the world into the accelerating spiral of speculative-inflationary orgy known euphemistically as "the floating exchange-rate system."

Phase 3: The Kissinger oil-price hoax of 1973-75.

The first, 1972 outbreak of the scandal surrounding the Kissinger-created "White House plumbers' unit" assisted Kissinger in aiding London to unleash "a new Middle East war," and to set up Secretary of State Rogers later to be dumped in favor of Kissinger's appointment to hold Rogers' job, in addition to his original post at the National Security Council. This enabled Kissinger's masters in London and Kissinger himself to orchestrate the famous "oil-price hoax" of the mid-1970s. This shock caused more serious immediate damage to the world economy than the 1970-71 monetary crisis. In fact, the effects of the oil-price hoax were used by London and London's agent Kissinger, to shape the new monetary agreements established at the 1975 Rambouillet monetary conference.

Phase 4: The "Project 1980s" plan for "controlled disintegration of the economy."

This project was prepared during the 1975-76 interval at the New York branch of Kissinger's London (Chatham House) masters, the New York Council of Foreign Relations. The papers[38] were assembled under the direction of future Secretary of State Cyrus Vance and future National Security Adviser Zbigniew Brzezinski. The Carter administration carried out the policies of these papers, including the 1979 appointment of a Federal Reserve Chairman, the Paul A. Volcker who announced that he regarded "controlled disintegration of the economy" as an acceptable policy.

Phase 5: Deregulation of banking and transportation.

Circa 1978, the Carter administration moved to bankrupt the nation's prosperous airlines and trucking industries, and many smaller communities of the nation, by pushing deregulation through the Congress.[39] Today, we observe the results of that. Banking deregulation, the key to the 1980s wipe-out of the nation's S&Ls, and of the leading commercial banks, too, was set into motion in 1978, by the proposal to allow the Hong Kong and Shanghai Bank to take over the New York-based Marine Midland Bank.

The issue of the HongShang takeover was essentially this. By allowing the drug-money-laundering banking system of the British Commonwealth's "offshore" zones to take over U.S. banks without full audit transparency, the Carter administration, and Federal Reserve Chairman Volcker,[40] opened up the U.S.A. not only for full-scale flood of illegal narcotics, but a takeover of our financial system by the financial institutions behind the Asian and South American drug-lords. It happened, just as this writer and his associates warned back in 1978 and 1979.

Phase 6: 1982 Deregulation.

The last major phase of the collapse of the U.S. economy was set into motion in 1982. Once that year had ended, certainly by the summer of 1983, the U.S. banking system was doomed to plunge into successive waves of bankruptcy, with ultimate results for the entire banking system, and the economy as a whole, far worse than President Herbert Hoover's Great Depression of the early 1930s. By the second half of 1987, a new depression was in full swing.

August-October 1982 was the last chance to save the U.S. banking system in its then-existing institutional form. On that issue, this writer was on the front line, trying to save the banking system which did not seem to wish to be saved from its own acts of mass suicide down the road.

During the months of June and August 1982, this writer produced a book-length special report, entitled *Operation Juárez*, which was delivered at the beginning of August that year.[41] This report had been prepared at the May-June request of certain key officials of Central American and South American governments, as an action package for the case of a financial blowout which the writer had forecast to hit Mexico and other states no later than September 1982.

In August 1982, the crisis struck as this reporter had forecast throughout the preceding months. For several hours, approximately, the international financial system hovered at the precipice of a global chain-reaction collapse.[42] U.S. President Ronald Reagan's telephone conversation with Mexico's President José López Portillo arranged stop-gap action to delay the crisis.

Mexico's President acted at home, taking first steps along the lines proposed by *Operation Juárez*. Unfortunately, under pressure from a savage gang led by former U.S. Secretary of State and British foreign intelligence agent Henry A. Kissinger, the governments of Argentina and Brazil withdrew their backing for Mexico. Kissinger flew to Mexico, to meet with President López Portillo and his successor, Miguel de la Madrid. The measures which could have saved Mexico from usurious looting by

Kissinger's fellow hyenas were terminated. The collapse of the U.S. banking system, which *Operation Juárez* would have prevented, was merely postponed, and made inevitable.

A U.S. Congress apparently gone mad rammed through support for the policies of Kissinger and for the insane banking deregulation measures supported by then-Vice President George Bush. So, as long as the lunatic Kissinger and Bush financial policies of 1982 remain in force, the U.S. financial system must continue to fly ever-nearer to the precipice. Beyond that is no mere depression-level financial collapse, nothing relatively as mild as Hoover's Great Depression of the 1930s. What is now visibly in progress, already at the verge of terminal collapse, is a disintegration of most among the principal financial institutions of the Anglo-American financial system—worldwide.

Since that autumn of 1982, we have already experienced the spring 1984 banking crisis, the October 1987 collapse, the 1988-90 collapse of those eaten-out carcasses which remained of the pre-1979 savings and loan industry, and now, a growing roster of leading financial institutions which are "brain dead" relics maintained solely by the Bush administration's taxpayer-funded life-support system.

The Intellectual Decay of Management

The mayfly celebrity of a dangerous idiot, Harvard University's economics professor Jeffrey Sachs, is like a fresh, epidemic outbreak of herpes, a sign of a deep, perhaps mortal mental illness pervading the currently reigning "yuppie" generation of Anglo-American economic life. The quality of competence we associated with high-performance industrial-corporate management as recently as the early seventies, is past retirement age. Their replacements in top posts, during the late 1970s, were, on the average, intellectually inferior in every way; the next wave of promotions following that, during the middle to late 1980s, was chiefly pathetic by comparison with all predecessors. Sachs, and his milieu at Harvard, MIT, and elsewhere, typify the very worst results of this pathetic, downward trend in mental and moral qualities.

The nature of this mental and moral decay is typified not only by the phenomenon of a vicious ignoramus like Sachs; prior to the late 1970s, only a handful of querulous economics illiterates would have been duped into admiring something as banally fraudulent as Professor Milton Friedman's "Free To Choose" television series. In a saner time, when average concentration-span was significantly longer, the babbling of Britain's former Prime Minister Margaret Thatcher would not have been tolerated.

We have to consider not only the malignant, dangerous illiteracy of a Professor Sachs; we must account for the abysmal intellectual level of a relevant public opinion which tolerates such obvious rubbish as Sachs' "shock therapy."

At first inspection, the cause of this collapse in the intellectual quality of our population has been neither genetic nor accidental. In short, the cause is "Buggery," perpetrated by "Buggers" ranging from William James and John Dewey, through Bertrand Russell, H.G. Wells, the American Family Foundation's roots in MK-Ultra, Brigadier John Rawlings Rees' London Tavistock Clinic network, and the Communist International project of subversion commonly known as Theodor Adorno's and Hannah Arendt's "Frankfurt School." The names of the projects by which the intellect and morals of the U.S. population were intentionally destroyed, include Hollywood, the "Radio Research Project," "soap opera," and the

"rock-drug-sex counterculture," the "new math," "sensitivity training," and related mass-brainwashing modes.

This destruction of a large margin of the previously existing intellectual powers, and moral qualities of so large and widespread a ration of the post-1963 youth generations of the U.S. population, has been the explicitly intended result in a process of cultural subversion which began much earlier than CIA Director Allen Dulles' adoption of a British intelligence-directed, mass-brainwashing project known by such official names as "MK-Ultra." The forerunners of MK-Ultra include such Communist International-designed subversion projects as the "Frankfurt School" of Theodor Adorno, Hannah Arendt *et al.*, and also, related to the "Frankfurt School" the center of satanic orgies known as the mobster-directed Hollywood film and TV production colony.[43] The 1963 launching of the mass-recruitment phase of the Tavistock-linked, Crowleyite, rock-drug-sex counterculture had roots older than the freemasonic "Young America" cult of satanic Giuseppe Mazzini and that treasonous degenerate Albert Pike.[44]

The reader of approximately forty years of age or older, is aware of the greatness of the degree to which the average levels of mere literacy, concentration span, knowledge, and morality have collapsed during the past twenty-eight years. Twenty-eight years ago, an ideological quack such as recent British Prime Minister Thatcher would have been rightly classed in the same general category as Uganda's Idi Amin. A silly, but dangerous fascist, such as Harvard University economics professor Jeffrey Sachs, would have caused the scandal-ridden collapse of any U.S. administration caught sponsoring such a wretch, as the Bush administration has imposed Sachs upon looted, defenseless Poland.

More and more, as the older generation dies out, hastened to "death with dignity" by the greedy heirs called their "baby boomer" generation offspring, the intellectual, cultural, and moral level of the U.S. population has sunk lower and then yet lower. That population, ever more ignorant, ever more suggestible, ever more "other-directed," has succumbed more or less passively, to an ever-worsening pattern of atrocities in conditions of life, and in the Washington policies which foster those horrors. To read the daily newspapers and other popular periodicals of the day, to survey the preferred TV "news" and other mass entertainments, is to see so reflected the banality, ignorance, moral indifference, and worse qualities which the past quarter-century's *directed* "cultural paradigm-shift" has induced in the majority of the population. Is this, perhaps, a population which shows itself thus, to be a nation which has lost the moral fitness to survive? Is such a people capable of both recognizing and adopting those specific, radical changes in both popular and governmental behavior which are indispensable to the medium-term survival of the United States in its present institutional form?

The famous, thread-bare aphorism is, "whom the gods would destroy, they first make mad." In truth, whom the satanists would destroy, they first seduce into destroying themselves. It is the same thing, in appearance, in the end. Your greatest enemy sits there staring at you, luring you to your mind's self-destruction; it is your television set. That television set, and the imagined countercultural pleasures which it symbolizes, is your fatal, Faustian pact with Satan.

Satan Sells 'Junk Bonds'

Your pension has been stolen. It was stolen by a set of accomplices which includes President George Bush's cronies at Kohlberg Kravis Roberts, and which includes such Hollywood-styled news-media celebrities and

predators as Ivan Boesky and Michael Milken. The way it happened is typified by the following actual case, featuring KKR and Minnesota State Attorney General Hubert "Skip" Humphrey III.

The prelude to this unpleasant little true story occurs during the late 1970s, when Washington decided to take the pension funds out of the control of wicked unions, and put them under "professional" management. Next step, loot the pension funds, swapping relatively solid securities for "junk bonds." The junk-bond scam hit the big time, when KKR and others discovered the way to loot pension funds, unloading junk bonds in the way a batch of this was dumped on Minnesota by courtesy of watchdog "Skip" Humphrey.

"Junk bonds" is a name with an historically appropriate ring of irony to it. During the 1968-82 interval, neo-Malthusian ideologues such as Zbigniew Brzezinski and James R. Schlesinger transformed our once-envied agro-industrial power into a wasting heap of obsolescent, "post-industrial" rubble. Out of this rubble came the worst pestilence of socio-pathic financial predators since the fourteenth-century House of Bardi's scalawags, Biche and Mouche. The "Burkes and Hares" of modern financial parasitism,[45] such as Kravis, Boesky, and Milken, brought the business ethics of the "resurrection man" to such forms of legalized theft as "hostile takeover" and "leveraged buyout."

This business of "junk bonds," and similar forms of wildly fictitious financial wealth, compares unfavorably with the John Law speculative bubbles of the early eighteenth century. It is fairly described as mass insanity. It is the essence of what the Thatcherite 1980s came to signify by such yuppie catch phrases as "deregulation" and "free trade."

Back in the period 1966-73, when this writer was teaching a one-semester course in economics at various locations, one of the standard "professor's jokes" which crept into my lecture routine, concerned the ideal business firm of the so-called "technetronic age." Unfortunately, as years have passed since I last taught that course, in spring 1973, the reality has come to resemble that old joke.

I projected the trend of shifts in rations of employment, away from "blue collar" productive jobs, toward larger and larger proportions of employment in non-productive forms of low-skilled administration and services. If this trend, combined with merger trends, were to continue, one might imagine a not-too-distant time when all U.S. production was concentrated in a single firm, housed in a giant skyscraper, above ground, floor after floor filled with sales offices, executive suites, legions of clerks, and data-processing. The firm's production would be concentrated in the basement, where a single little old man, using a simple craftsman's tools, turned out daily the whole product administered by the occupants of the floors above.

What happens to the U.S. economy on the day that little old man retires, I used to ask.

Naturally, it is 1991, and the U.S. economy is not yet near that extreme; millions are still employed in productive "blue collar" jobs in agriculture, mining, manufacturing, and infrastructure. So, like most good jokes (and poor ones, too), I exaggerated a bit at the lectern. Yet, things were going in that direction, and now they have gone far enough that the economy is collapsing as a result.

1966-67's turn toward a hoax called the "Great Society" was a step in the direction of Robert M. Hutchins' *Triple Revolution* utopia. That was the first giant step downward in the direction pioneered by the ruinous British government of Prime Minister Harold Wilson. The 1967-68 wrecking of the original Bretton Woods agreements, and the later, 1971-72 scrapping of the indispensable gold-reserve arrangement, were giant steps downward.

The introduction of "environmentalism" and of "New Age" educational reforms, was a slippery road toward national bankruptcy. Secretary of State (and British agent) Henry A. Kissinger's 1973-74 petroleum-price hoax, was another major step down. The Carter administration was an economic and financial disaster from beginning to end, but all done under the direction of the "Project 1980s" package created by the real, Council on Foreign Relations creators and controllers of the Carter-Mondale administration. The two worst blows to the economy under Carter, were the launching of "deregulation" of transportation and banking, and the unleashing of newly appointed Federal Reserve Chairman Paul A. Volcker's policy of "controlled disintegration of the economy" in October 1979.

Nineteen eighty-two was the year of crucial decisions. The Reagan administration entered a deadly financial crisis during summer 1982, with my *Operation Juárez* on one side of the desk, and the wildly speculative looting policies of Walter Wriston, Henry Kissinger, and George Bush, on the opposite side. When my policies were turned down, the U.S. financial and monetary system was doomed to collapse hopelessly a relative few years down the line.

There we are at the brink, today.

Notes

1.   See "A Plan to Create New Water Supplies for North America," by Marcia Merry in *Executive Intelligence Review*, June 21, 1991, Vol. 18, No. 24.

2.   For a "real time" analysis of the course of the 1980-82 plunge of the U.S. economy (later called "the double-dip recession" by pundits), see the pamphlet "Stop Volcker's Depression!" published in 1980 by the National Democratic Policy Committee in an attempt to cause the impeachment of Federal Reserve Chairman Paul Volcker (available from Executive Intelligence Review).

3.   To quote the 1988 Nobel Laureate in economics, Maurice Allais, interviewed in *Le Monde*, June 27, 1989:

It has been possible to avert a collapse up to this point, but it is becoming increasingly difficult to cope with disequilibria that no one is really able to control and command. In fact, the past shows no instance where such ill-considered development of credit and indebtedness, did not finally lead to major trouble. . . .

The whole world economy rests upon gigantic debt pyramids that mutually sustain one another in a precarious balance. Never in past history had there been such an accumulation of promissory notes. Never had it been so difficult to honor such promises, probably. Whether it is currency or stock speculation, the world has become one vast casino where gaming tables are spread across meridians and latitudes. . . . Speculation everywhere is boosted by credit issuance, since one can buy without paying and sell without owning.

4.   The "Black Monday" stock panic of October 19, 1987 was forecast, with the causes for it in Reagan administration policy stubbornness, by Lyndon LaRouche in *Executive Intelligence Review*, June 6, 1987. LaRouche cited in his forecast, similar "private" warnings from European banking sources, to the one which he was making public.

5. See interview with Gen. John Bruce Medaris, in *Executive Intelligence Review,* August 18, 1989.

6. Sputnik was launched on October 4, 1957.

7. See Charles de Gaulle's three-volume autobiography, *Memoirs of Hope, Renewal, and Endeavor.* He was President of France twice, from 1945-48 and from 1957-69, the second time under the much stronger presidential system of the Fifth Republic, which was founded under de Gaulle's impetus in 1957.

8. In engineering shorthand, *energy-flux density* is often measured in watts per square meter. It is measured usually as the rate at which power passes through a unit-area, cross-sectional slice of a process. The concept is rooted in the founding of physical economy by Gottfried Wilhelm Leibniz.

9. The law of physical movement of freight is measured in tons moved per one mile (or a multiple thereof) per hour. Similarly, we use passenger-miles per hour. The countervailing consideration, is the social cost of delay in arrival of freight at its destined place of purchase for use. The greater the social cost of production of that freight, per ton, the greater the imputable social cost of delay. As a crude but broadly useful rule of thumb, we measure estimated social cost as dollars of assessed valuation per ton.

10. We define "scientific progress" as a Cantorian Type of ordering of a functional sequence of successive, valid, fundamental discoveries.

11. The Royal Governor was Edmund Andros, and his brutal crackdown against the Charter powers of the Bay Colony led to protracted political and social battles. See H. Graham Lowry, *How the Nation Was Won: America's Untold Story, 1630-1754* (Washington, D.C.: Executive Intelligence Review, 1988), pp. 20-38.

12. U.S. Treasury Secretary Alexander Hamilton, Report to the U.S. Congress "On the Subject of Manufactures" (1790), republished in *Executive Intelligence Review,* Jan. 3, 1992, Vol. 19, No. 1.

13. U.S. Constitution, Article I, lists among the powers which solely belong to the Congress, that of creating revenue—"all Bills for raising Revenue"—and paying the debts of the United States; and that of "borrow[ing] money on the credit of the United States"; all functions which are now regularly usurped without legislation, by the Federal Reserve.

14. Friedrich List (1789-1846) was most influential through his personal involvement in three different nationalist reform movements—the Prussian reform movement, the French Ecole Polytechnique circles, and the second generation of leaders of the American Revolution—and from the worldwide circulation of his *The National System of Economy,* published in English by A.M. Kelley and Co., Philadelphia.

15. See Anton Chaitkin, *Treason in America,* Second Edition (New York: New Benjamin Franklin House, 1985), pp. 35-93.

16. *Ibid.,* pp. 95-109.

17. See Allen Salisbury, *The Civil War and the American System* (New York: New Benjamin Franklin House, 1979).

18. The American System was explicitly admired and successfully copied for practice in Argentina, in Germany under Friedrich List, and by Russian Minister Count Sergei Witte among other locations outside the U.S.A. The American System also had significant influence in shaping the remarkable successes of the economy of the Meiji Restoration in Japan.

19. I treat ratios of allotment of portions of a labor force, etc., as subjects of a primitive analysis situs treatment of an appropriate set of torus functions.

20. President George Washington's administration was not a passive receptacle for the youthful Hamilton's economic policies. Historian Graham Lowry has shown Washington deeply imbued with the same outlook as Hamilton, within the conspiratorial tradition of Virginia's Lieutenant Governor Alexander Spotswood. See Lowry, *op. cit.*

21. That is merely a rule-of-thumb approximation; the correct function considers the effect of the choice of investment-allotment upon the rate of return consequently realized by the economy as a whole. That is, the sum of the optimal profits of the aggregate firms of an economy, does not define the profitability of the economy as a whole.

22. The First World War was followed by a relatively steep, unnecessary depression, caused by the same general policy considerations which guided Truman to cause the unnecessary monetary crisis and steep recession of the 1946-48 interval.

23. The recession actually erupted approximately February 1957, but was not "officially" recognized to be such until September of that year. The steep decline halted at the beginning of the summer of 1958, but the economy continued to "bump along the bottom" at approximately that same depth until the Kennedy recovery.

24. Effectively, the collapse of the Edsel program was Wall Street's victory over Ford; McNamara was Wall Street's commander of the forces occupying Ford's management.

25. In the cases of such elements of basic economic infrastructure as health and education, the causal bearing upon the productivity of the person ought to be obvious. Other elements of infrastructure, such as water, power, and transportation, come into relevant focus, when they are considered for their values per square kilometer. Relevant categories of land use are considered, and their per-capita values for land-use values per square kilometer.

26. Let us speak plainly: this is not a Jewish problem; it is a question of *Buggery*, a question of Buggery embedded in the Rosicrucian heritage. Do you know where that problem is lodged today?

27. In de Gaulle's case, the "science driver" which served to help restore both the French economy and the French national identity after the disaster of World War II and the near-civil war over Algeria, was nuclear science and technology. France under de Gaulle became the first nuclear power independent of the superpowers and the U.N., and went on to become the world's leader in nuclear energy technologies and nuclear-electric generating capacity.

28. President Kennedy in mid-1963 ordered the drafting of an Executive

Order, which explicitly ordered the Federal Reserve to cease the practice of creation of U.S. currency by Federal Reserve action in rediscounting of Treasury notes. The order would have left the Treasury solely authorized to issue currency of the United States, as required by the Constitution. The assassination of Kennedy intervened before he promulgated the order, and it was never recurred to by subsequent Presidents.

29.   The fact that the use of cuneiform, baked clay tablets, continued from pre-Semitic Sumer, through the fourteenth century B.C., is our best source of evidence on the antiquity of tax farming, and the decisive, directly causal role of this form of usury in bringing about the physical collapse of the Mesopotamian empires.

30.   LaRouche *et al.*, "1984 Independent Democrats' Platform," reprinted in *A Program for America,* The LaRouche Democratic Campaign, November 1985, pp. 281ff.

31.   The North American Power and Water Alliance (NAWAPA) plan was developed in the 1960s by the Parsons Engineering Company of Pasadena, California, as a comprehensive engineering plan for capturing the huge excess water runoff available in Alaska and northwestern Canada, and bringing this water down into a grid of canals and reservoirs spanning the entire western half of North America, including large parts of Mexico. The unrealized plan, had it been approximated during the intervening thirty years, would have avoided the increasingly severe water shortages now affecting the western United States, in particular. Maps, pamphlets, and films on the project are available from the Parsons Engineering Company; Lyndon LaRouche's 1984 campaign for the presidency commissioned a pamphlet updating the original NAWAPA plan entitled "Won't You Please Give Your Grandchildren a Drink of Fresh Water?" Today, water shortages are reaching the point, that reduced costs of producing fresh water by high-temperature-reactor-assisted desalination, is the best option for a relatively large, and growing problem of the U.S.A. and foreign needs.

32.   It is proposed that the U.S. economy reorient the greater part of its longer-distance transport away from superhighways, to high-speed rails (and magnetic levitation). Under such a policy, we must repair existing essential highways, bridges, and tunnels, but not expand highways *significantly* (i.e., two lanes of rail can handle the same number of ton-miles per hour as six lanes of superhighway, and at a fraction of the highway cost per ton-mile). Thus we say "largest single component of new national transportation investment."

33.   With superconducting available at a sufficiently low cost of capital investment, freight, as well as passenger travel, should move over to magnetic levitation.

34.   The use of hydrogen as a fuel for locomotives, aircraft, and trucks is more or less state of the art, or imminently so. The critical problem is logistical: the need for local production for hydrogen fuel and hydrogen-based fuel charges (as for fuel cells). Once that logistical bottleneck is conquered, the virtually non-polluting fuel cycle is a practicality for internal combustion engine vehicles generally.

35.   "Short-term": less than three hundred sixty-seven calendar days; "Medium-term": more than "short-term," but less than five years (maximum);

"Long-term": more than five years. These may be refined to take into account differences among rates of economic appreciation of relevant assets.

36. The outlines of the development of the surface of the Moon as a staging and resource base for the exploration and colonization of Mars, are found discussed as long ago as 1950 in the forecasts by space program pioneers such as Wernher von Braun and Krafft Ehricke, for the following stages beyond exploration of near-Earth orbit and the landings on the Moon as such. During the early 1980s NASA administrator Thomas Paine caused the circulation of plans for Moon and Mars exploration projects, within the agency and among its supporters in Congress and the Executive branch.

Then in May 1985, on the occasion of a memorial conference on the work of Dr. Krafft Ehricke, who had died in November 1984, Lyndon LaRouche elaborated a full, forty-year plan for the "return to the Moon" and the development of Mars colonization from an industrialized Moon basis. The LaRouche outline, staged in five-year target plans to the year 2026, included the placing in Mars orbit of optical and radio telescopes which would be able to revolutionize observation of the universe.

LaRouche's outline, which was immediately widely debated and "set the boundaries" of discussion of Moon-Mars projects since, was published in the paperback book proceedings of the Krafft Ehricke memorial conference. See *Launch the Age of Reason: Colonize the Moon and Mars* (Washington, D.C.: Schiller Institute, Inc., June 1985).

37. The most in-depth studies after the fact, of the impact of the Apollo Moon Project on the U.S. economy, such as that by Chase Econometrics, concluded that the NASA program during the 1960s had returned, for every dollar spent, about $15 in increased productivity of the work force, and in the creation of new industries.

38. Former Federal Reserve Chairman Paul A. Volcker, whose regime of up-to-twenty percent prime rates of interest launched the 1980s' wild speculation and looting of the industrial base of the U.S. economy, used the phrase "controlled disintegration of the economy" to describe the long-term objectives of the coming "deregulation" regime. This was part of Volcker's contribution to the 1976 set of papers called "Project 1980s," issued in book form in 1977 by the New York Council on Foreign Relations. Volcker's subsequent dominant role in 1980s U.S. government financial and economic policy, was illustrative of the way these papers were not merely circulated among the Establishment, but directly implemented by their authors.

39. Congress deregulated air transportation in 1979, trucking in 1980, and rail transportation in several steps from 1978-82.

40. See the book *Dope, Inc.*, by the Editors of Executive Intelligence Review, (Third Edition, Washington, D.C.: Executive Intelligence Review, 1992) which was written in large part as a result of a political mobilization in 1978 which attempted to stop the takeover of New York's Marine Midland Bank, by the old-line British opium trade bank, the Hong Kong and Shanghai Banking Corporation. The issue of the fight, which convulsed the New York State legislature and Banking Commission for a year, was the unregulated nature of the "offshore banks," of which "HongShang" was the oldest and biggest, and the refusal of that bank to be audited under established U.S. banking procedures. This is the hallmark of drug-money laundering, which, indeed, had been the reason for the foundation of HongShang in the nineteenth century.

The 1978 battle was finally decided when, despite the continued refusal of New York Banking Commissioner Muriel Siebert to approve the takeover of Marine Midland, Paul Volcker's Federal Reserve issued a ruling which compelled Siebert's office to accept the filings and reports of HongShang as adequate. This enabled the forces pushing the takeover through the office of New York Governor Hugh Carey, to prevail. In addition to clearly diminishing the sovereignty of the United States in regulating its financial system directly and through state governments, the Volcker ruling and the takeover effectively started the disastrous process of "banking deregulation," financial institutions' collapse, and unobstructed laundering of the enormous revenues of the drug traffic through the U.S. banking system.

41.   Lyndon LaRouche, *Operation Juárez, EIR Special Report*, Aug. 5, 1982.

42.   This was the expressed opinion of some leading international banking circles. All the essential factual features of that assessment have been multiply corroborated at the highest relevant levels in several nations.

43.   See *Dope, Inc., op. cit.*

44.   See Chaitkin, *op. cit.*, pp. 213-61.

45.   In Edinburgh, Scotland in the early part of the nineteenth century, there had lived "the notorious Burke and Hare, grave-robbers and murderers and ironically two of Edinburgh's best remembered sons. . . ." See Jenni Calder, *Robert Louis Stevenson: A Life Study* (New York: Oxford University Press, 1980). Robert Louis Stevenson told their real-life story in his short story *The Body-Snatcher*. "Resurrection Man" was the popular name for grave-robbers at that time. See *Selected Writings of Robert Louis Stevenson*, ed. by Saxe Commins (New York: Random House, 1950).