the Campaigner

The Politics Of Modern Music

JULY 1980

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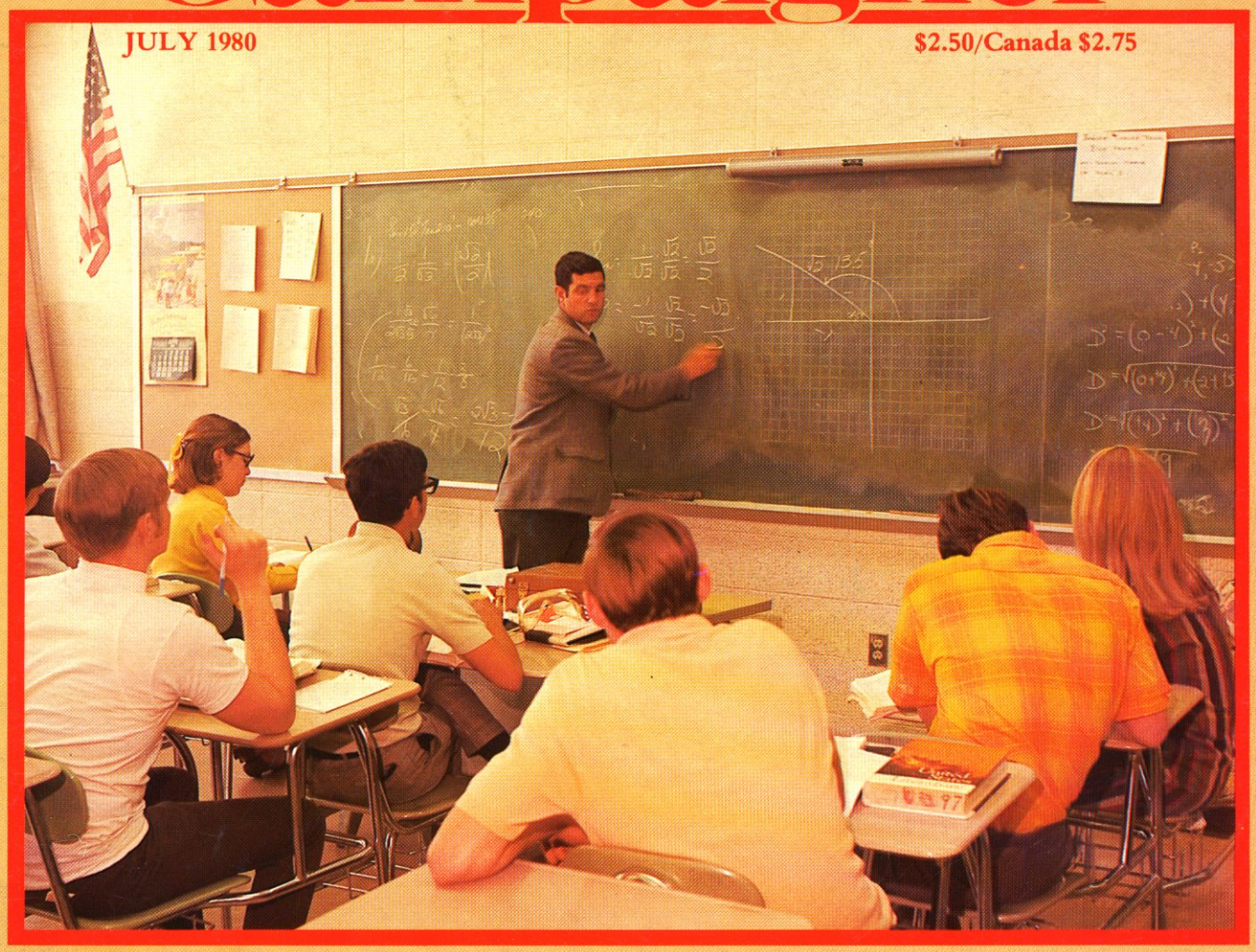
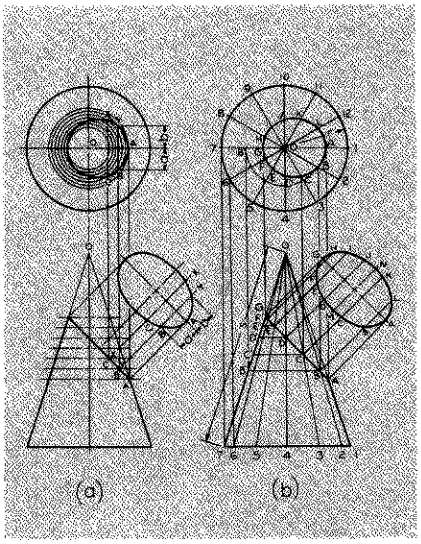


Every American A Scientist!

34 Soviet Math/Science Grads to Every American:

Getting U.S. Education Back on the Track



THE ECOLE POLYTECHNIQUE & THE SCIENCE OF REPUBLICAN EDUCATION

"It is better to have republicans without a republic than to have a republic without republicans." So advised the great French mathematician Gaspard Monge who, with scientist and statesman Lazare Carnot and a small group of collaborators, created the model for republican education. The Ecole produced many statesmen, but its most enduring contribution was its successful method of combining the most advanced concepts in physics and geometry with revolutionary engineering applications in construction, industry, and military science.

These achievements were made possible because of the Ecole's commitment to republican nation-building, which included its native France following the disastrous Jacobin terrorist phase of the Revolution, as well as the young United States. American republicans determined to reclaim our country from the Jacobin-modeled environmentalists will find the Ecole's educational method a blueprint for restoring America's moral, scientific and cultural excellence.

THE POLITICS OF MODERN MUSIC

Early in this century, the German musicologist Heinrich Schenker battled for the classical music tradition inherited from Bach and Beethoven against the ear-splitting and mind-destroying cacophony of Schoenberg and Stravinsky. Schenker not only debunked the pretensions of these violators of the laws of music, but also pinpointed their promoters: the very same British intelligence circles that have foisted the counterculture's rock, disco, and drugs on the youth of today. Although Schenker and his collaborators were defeated in their own day, in "Who Was Heinrich Schenker?—The Germany The Nazis Tried to Destroy," the battle for the Beethoven tradition is begun anew—this time, with the advanced epistemological tools needed to defeat these brainwashers once and for all.

Composer Stravinsky with LSD pusher Aldous Huxley in Hollywood.

SOVIETS 34 / U.S. 1

That is the ratio of Soviet to American high school students with one year of calculus or more, according to a recent study which concludes that American students are "incomparably far behind" their Soviet counterparts in science and math education. These disturbing findings are a stark rebuttal to the "deschooling" educational theorists who have turned American schools into "touchy-feely" playgrounds for drugs and promiscuity over the last decades. This new "education gap" must become the focus for a nationwide campaign to establish an American educational mobilization.

The Campaigner

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On the Cover
High School
Geometry Class
Photo: H. Armstrong Roberts

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EDITORIAL

Getting American Education Back On the Track

This July, a Presidential Review Commission will publish its findings on the relative status of Soviet and U.S. mathematics and science education. As a recently released report by University of Chicago professor Izaak Wirszup makes clear, the discrepancy between the two is shocking. The United States has fallen so far behind the Soviets that, as Wirszup states, comparison itself is made difficult. Coming as it will just before the Democratic and Republican nominating conventions, the Review Commission report should fuel a nationwide controversy which will directly affect the conventions.

According to Wirszup's study, over 5,000,000 graduates of Soviet high schools every year have completed a two-year course in the calculus, compared to 105,000 American high school students, who take a *one-year* course in the subject. If the precipitous decline in the country's moral standards is correlated with these statistics, the conclusions are staggering. A generation of American youth aged twelve to twenty-five has been consigned to the junk heap—burnt out and drugged, they are prepared only to compete for employment against Hong Kong coolie labor.

A comparison of what the Soviet student and his American counterpart learn is equally devastating. For example, the American ninth-year elementary algebra course is introduced in the Soviet sixth grade, and geometry, which is tenth-year mathematics in the U.S., is studied in Soviet grades six and seven along with introductory algebra. And this begs the question of the content of the curriculum studied in the two countries. For Soviet students not only study geometry for nine years—which is eight years more than a college-bound student in the U.S.—but their physical sciences course is similar. Thus, a subject such as algebra, which is taught as logical formalisms in the U.S., is presented in the U.S.S.R. as a subsumed part of the study of *physical geometry*.

Since Wirzsup is connected to both the Stanford Research Institute and the University of Chicago—the two institutions most responsible for the destruction of U.S. science/math curricula—it is not surprising that he does not emphasize the curriculum question. Even if the American student spends the same period of time studying subjects titled "Geometry" or "Calculus," or for that matter "Arithmetic," the introduction of the New Math in the late 1960s has doomed the student to learning to recite Bertrand Russell's Aristotelian version of set theory. Typically, the student responds to the New Math with an aversion that contributes to driving him toward an "alternative life style."

Add to the current erosion of science curricula through the influence of the anti-science environmentalist mob the most recent, most devastating attack on our children's minds: sex education for alternative life styles. While the Soviet student studies mathematics for twelve more years than his counterpart in the U.S., an American student in New Jersey will now be subjected to twelve years of mandatory sex education, according to a program just passed by that state's legislature. This course is openly aimed at encouraging students to accept alternative life styles, not only such "alternatives" as homosexuality, but also male and female prostitution.

Lessons include practice sessions in masturbating before mirrors and encouraging students to spend their time elaborating pornographic fantasies. Children in this program are warned to disregard parental attempts to impose outmoded values—just as the Hitler Youth were turned against their parents. In today's United States, old-fashioned morality is coming to be an unacceptable "life style" to our abused children.

Military and Political Implications

Wirszup quotes a speech by Soviet Chairman Brezhnev in 1966: "The field of scientific and technological progress is today one of the major fronts in the historical battle between the two systems." And certainly the report will provide a goad for those for whom a comparison of the illiterate, dope-smoking American army and the Soviet armed forces is the most impelling motive for action. We can expect to see the military implications of the education gap become a topic of public controversy once the Carter-appointed Commission releases its conclusions this summer—and a battleground in the presidential campaign. The only serious discussion among candidates, however, would have to be that between Ronald Reagan and Democratic

presidential candidate Lyndon LaRouche, since liberals Carter, Kennedy and Anderson all support in practice precisely those programs which drive youth away from science and toward pot smoking and promiscuity.

The Reagan campaign, however, is a muddled collection which includes economic policy advisors such as fascist Milton Friedman, even though it also attracts honest conservative Americans who hope that a Reagan victory will provide a moral presidency. This latter group of Reagan supporters are violently opposed to sex education in the schools, the New Math and the like. But, for lack of an understood alternative, they have tended to support the "back-to-basics" education reform movement, a program that would be worse than useless in equipping the nation to meet the challenge of a nuclear powered twenty-first century.

For all of us who agree that the nation must get back on the track, the argument remains: how? Only LaRouche has proposed a proven method to rescue American youth while at the same time returning the United States to its rightful place as the hegemonic superpower. This was the method tested by the French republican circle associated with the Marquis de Lafayette and John Quincy Adams.

The Ecole Polytechnique, created by scientists Gaspard Monge and Lazare Carnot at the end of the eighteenth century, is the model that proves the efficacy of the Platonic LaRouche educational method. The Ecole was created at a point in French history much like the situation today in the United States. The Jacobin movement, like today's environmentalists, used the Terror as an instrument to guillotine or exile France's leading scientists. In 1794, when sane forces under Carnot's leadership again took control of the government, they were faced with the simultaneous disruption of the national economy and military attack on the country by Hapsburg and British forces.

The method they used to create "Napoleon's" army—which was really Carnot's—was anything but a "return to basics." Not only did the French create the industrial capacity to mass-produce cannon under Carnot's leadership using Monge's discovery of descriptive geometry (which provided the basis for modern assembly-line production methods), but more importantly, Carnot, Monge and their collaborators trained the highly effective French army.

As Biot, himself an important French scientist trained at the Ecole, wrote of his experience as a student: "In three months, we went over the subject matter of three years' studies. This sort of existence, amidst the most exalted ideas ever dealt with by man, filled those years with true enthusiasm."

The United States must leap ahead in precisely this manner. This is the LaRouche educational method. *Genius can be created:* three years' work compressed into three months—if, and only if, the student has been elevated to an exalted existence. We cannot substitute the "back-to-basics" 3 Rs for today's miseducation. And neither can we turn to the Soviet Union as a model.

Soviet Education:
Better But Not Best

The Soviet science program is a cousin twice-removed of the Ecole of Monge and Carnot. Both

Continued on page 83

LETTERS

Dante

To the Editor:

I have not read a presentation of the work of Dante Alighieri anywhere so fitting, for beginners and scholars alike, barring none from Scartazzini down, as that made by Muriel Mirak in *The Campaigner* of April 1980.

It is very brief, measured by the comparative length of the presentations I have in mind with which I compared it.

In its own special way it contains the announcement and the realization of the long-awaited teacher-redeemer, that Virgil presages to Dante who will be such that *non ciberà terra ne peltro, ma sapienza amore e virtude e sua nazione sarà tra Feltro* ("I'll not be nourished by corrupt material/but by wisdom and love and utter virtue/ his native land will be between one point.") (*Inferno* I, 103-5) and circling the earth around back to Feltro, AMERICA.

If Dante were a book held by the Italians and others as it deserves to be, then Italy and others would not be in the position of Count Ugolino's children to be eaten alive by the Oligarchic leaders, their own supposed father, because they gave them birth.

I wonder if the J. T. Minchin translation in English does more justice to the Italian text and Dante for the English speaking.

Fabio Schettini
Brooklyn, N.Y.

The Editor replies:

Dr. Muriel Mirak, the author of the article, is currently teaching at the State University of Milan in Italy and could not be reached in time for her comments on your

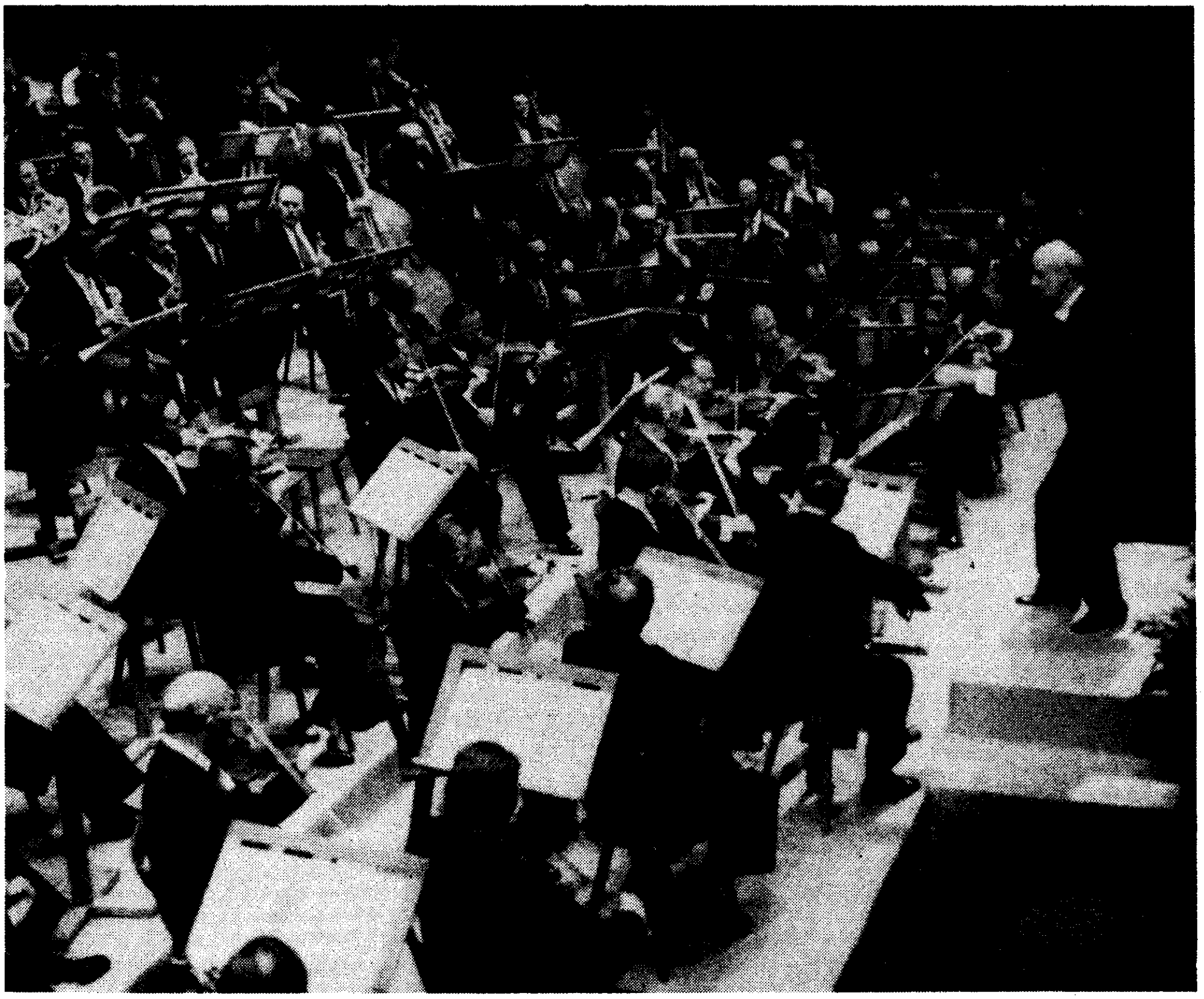
Continued on page 87

Who was Heinrich Schenker?

The Germany the Nazis Tried to Destroy

By Felix-Eberhard von Cübe,
Director, Heinrich Schenker Akademie Für Musik

Translated by Renée Sigerson



Schenker's collaborator Wilhelm Furtwängler conducting.

"The art of tones, however, is the continuous product of a centuries long development, and from nation to nation, from race to race, from century to century continues to be an art based on the same unchanging laws; *if it dies, not just one nation, but the whole of humanity dies along with it.*"

INTRODUCTION

by Peter Wyer

Heinrich Schenker, the great German musicologist responsible for the very fact that today's musical performers have access to authentic scores of the master works of the 18th and 19th centuries, wrote the above quotation in 1912 in the introduction to his monumental treatise on Beethoven's Ninth Symphony. Thirty-five years later, over a decade after his death in 1935, Schenker, together with the greatest musical exponents of the tradition established by Beethoven and Schiller, including the conductor Wilhelm Furtwängler, were subjected to a massive and vicious slander campaign which alleged, preposterously, that they were exponents of the proto-fascist forces which had brought the Nazis to power in Germany, and hence were "collectively guilty" of the crimes of the Hitler regime.

It was the Schenker circle, in fact, which had heroically but unsuccessfully defended the tradition of German humanism against the onslaught of the Weimar counterculture and the Nazi movement to which it gave rise. It is therefore not surprising that exponents of the circle around Schenker and Furtwängler have been among the first to step forward to join a renewed and potentially victorious crusade to restore greatness to our musical life, a crusade made possible by the political and scientific leadership of the greatest humanist of this century, Lyndon LaRouche.

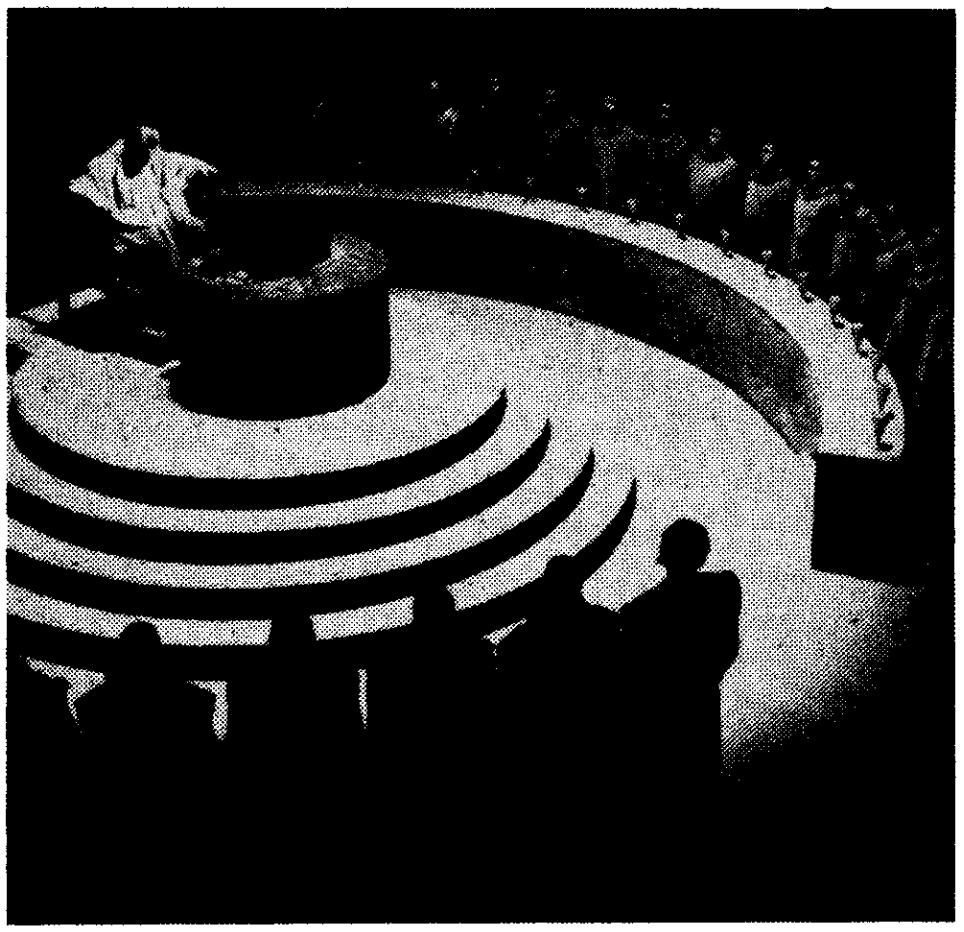
The following excerpt from *Death Struggle Or Rebirth of German Music*, an unpublished book by Dr. Felix-Eberhard von Cübe, is being released by *The Campaigner* upon special request from its author. It is a document of immediate relevance to a world whose "culture" is rapidly becoming synonymous with barbarism, and whose "music" has become a vehicle for undermining the very foundation upon which modern society is based: the Neoplatonic republican framework of *nation states* united by a global design for economic, scientific and cultural progress.

Within the last two years, and on an increasingly visible basis since January of this year, a rapidly-expanding coalition of musical forces (of which Dr. Cübe is a member) has developed around the campaign of Democratic presidential candidate Lyndon H. LaRouche, Jr., as well as within a number of Neoplatonic institutions which LaRouche has brought into being. The activities of this coalition aim at a full scale musical renaissance in the spirit of G.W. Leibniz and Friedrich Schiller, based upon an appropriation of Beethoven's compositional method for renewed application in public school classrooms, conservatories and concert halls. These activities have led directly to a resumption of the very *Kulturkampf* described in Dr. Cübe's book, which has been largely hidden from public view since the Nazi period.

The critical nature of the *political* issues raised by LaRouche's musical initiatives are attested to by the flurry of slanders against LaRouche, which represent his acknowledgement of Heinrich Schenker's positive role in defending the Neoplatonic musical tradition in this century, as well as his refutation of both Wagner and Monteverdi, as "proof that LaRouche is a fascist." These slanders are purveyed by the same circles and institutions which slandered the leading exponents of the musical tradition of Beethoven and Brahms in the same way, in an essential part of Britain's post-World War II "collective guilt" indoctrination of the German people.

A case in point is the Los Angeles-based Simon Wiesenthal Holocaust Center which has circulated such wild calumnies through media channels and among professional musicians. A chief funder of the Holocaust center is Atlantic Richfield, itself the main corporate sponsor of the University of Chicago-linked Aspen Institute, the most notorious British Intelligence-linked think tank in U.S. "cultural" affairs.

Today, the stakes in the battle for culture are embodied in the following question: will our society succeed in producting a new generation with the requisite moral-intellectual qualities to ensure the survival of civilization? Will we produce new Beethovens and new Schillers in the required numbers, or will that generation be made up of a miserable



Richard Wagner's operas were a political intelligence operation staged to psychedelically brainwash audiences with British-created "Nordic" cultist mythology. They provided the basis for the Nazi world outlook. Above, Parsifal.

collection of uneducated, sun-worshipping and drug-addicted "kooks"? The spiraling increase in lethal drug use among school age adolescents alone in the United States over the last year, combined with the advanced state of deterioration of the American school system, make the answer to this question grimly obvious—barring the success of the intervention now being mounted by LaRouche and his collaborators. The American public therefore must immediately come to grips with the terms on which this battle for a new musical system is being fought. Understanding the history of this battle in this century is one crucial aspect of this process.

Dr. Cübe was a long standing student of the German musicologist Heinrich Schenker and currently directs the Heinrich Schenker Akademie Für Musik in Hamburg. His book powerfully documents the story behind what Schenker and his colleagues, including the great conductor Wilhelm Furtwängler, perceived to be a final-hour struggle in defence of the musical tradition established by J.S. Bach, W.A. Mozart and Ludwig van Beethoven against the British-led forces which imposed the Versailles Treaty on Germany after World War I. The same forces created the Nazi movement and brought Hitler to power in the suceeding two decades. The fight to crush "German music" was central to Britain's geopolitical design.

Schenker, an associate of Brahms, became the unrivalled leader of the Beethovenian tradition following Brahms's death in 1897. Working directly with Furtwängler and other leading musicians in Europe, Schenker developed a method of musical analysis designed to put the best aspects of German musical performance tradition on a rigorous theoretical basis. Schenker insisted that a grasp of the essential features of the classical masters' *compositional method* must precede a competent interpretation of their works in performance. Schenker's theory remains valid to this day as an important step beyond the empiricist trends which have dominated musical education for the last 150 years and which find their roots in the reductionist theories of J.S. Bach's arch enemy, Jean-Philippe Rameau, (an associate of Jacobin progenitors Rousseau and Voltaire in 18th century France).

Both Schenker and Furtwängler's writings make clear that their concept of music was fundamentally Platonic. For them, music was an instrument for awakening in a mass audience those powers of creative mind ordinarily dormant and untapped. Through its power to unite the composer, performer and audience together in *dialogue*, the subject of which is the level of self-conscious creativity demonstrated by Beethoven's works, music demonstrated for Schenker and Furtwängler that creativity, though dormant in most individuals, is truly universal. In this respect they were essentially correct in presenting themselves as the rightful heirs to the estate left by Beethoven and Brahms.

Schenker's theory brought him into opposition to all of the currents which, in the post-World War II period, have been successfully promoted as this century's contribution to the musical tradition which once heard Bach, Mozart and Beethoven's own public performances and improvisations.

Schenker uncompromisingly attacked the works of the Paris school of composers around Igor Stravinsky, Maurice Ravel and Darius Milhaud as well as those of the Vienna "atonalist" school around Arnold Schoenberg, as not only musically inferior to Brahms but as downright fraudulent, composed in defiance of that natural law, common to both the physical universe and human reason, which is essential for genuine music.

The Parisian circle used "jazzed up harmonies" and random discords to emulate tribal barbarism in such works as Stravinsky's *Rite of Spring*. The Schoenberg school went further still, systematically eliminating all agreement between the notes and voices of their composition in a frontal assault against the foundations of the tonal system established by Bach, Beethoven and Brahms. Furthermore, Schenker insisted, such "composers" and their backers were not only ignorant and false, but malevolent in their design.

Music Is Political

Dr. Cübe, arguing against those who attempted to divorce Schenker's theory from his political views, emphasizes: "Those who disagreed with the testimony of Schenker's worldly and political expertise had no more agreement with his testimonies of expertise in music." Dr. Cübe here brings to the fore the very issue which makes Schenker's battle against musical empiricism of life and death importance today.

As documented by his pamphlets of the 1921-25 period, excerpted below, Schenker understood well that the battle for the contrapuntal tradition of Brahms and Beethoven was inseparable from the fight to save Germany as a nation-state following the crushing "war reparations" terms imposed by Britain's Versailles Treaty. At the same time, Schenker perceived this battle to be a fight for the survival of the human race itself, as documented in his preface to Beethoven's Ninth Symphony quoted above. Faced with the spectacle of an entire generation of youth rendered intellectually and morally imbecilic through the effects of mind-destroying and addictive drugs, reinforced by drug-promoting "rock and disco," are we not today in a position to judge the accuracy of Schenker's forecast?

Schenker was emphatically correct in identifying Britain as the governmental center of evil, then as now, and in his insistence on the identity of British cultural and geopolitical designs. The musical circles opposed by Schenker in Paris, London and Vienna were jointly entrepreneured through Rothschild funding under the direction of the top levels of Her Majesty's Secret Intelligence Service, including Lord Bertrand Russell, the Chamberlains, H.G. Wells and his protégé Aldous Huxley, working through the heavily drugged 1920's "Children of the Sun" homosexual literati cult and other proto-fascist societies on the continent.

The avowed long range objective of the British Round Table circle was to plunge the world into a "New Dark Age," arresting economic, technological and population growth in favor of the descent of civilization into conditions of tribal barbarism in which the nation-state would surrender sovereignty to supra-national institutions under British control. The epistemological basis for this effort was the philosophy and aesthetics of Aristotle. Through the Aristotelian divorce of music and culture from "politics," that is, from morality and reason—and through sufficient cash flow in appropriate directions of artistic patronage—the music of Ravel, Stravinsky, Schoenberg, and, in America, of Gershwin, Copland and John Cage, music based upon nothing other than fascination with sensual effects, was spawned as an

A punk rock concert and Stravinsky's Rite of Spring *ballet. Though designed to manipulate the pornographic fantasies of different audiences, the content of both barbaric cult rituals is the same—and springs from the same British intelligence psychological warfare nexus.*

essential deployment on behalf of a "New Dark Age." Beethoven and his music were explicitly attacked and derided by the same circles.

Within these circles, ideological controllers such as Schoenberg's controller, the Frankfurt School's T.W. Adorno, and the drug-infested Parisian cultural salon of Gertrude Stein, insured that the doctrine of the necessary and inevitable collapse of civilization was the active premise of their members' artistic activities. Consequently it was perfectly lawful that such leading exponents of the Paris school as Darius Milhaud and Leopold Stokowski graduated after the war to membership in the British Planetary Citizens society, promoting the advent of a fascist "one-world" order alongside the Club of Rome's cannibalistic director Aurelio Peccei and the United Nations' Ervin Laszlo.

Anti-Semitism Versus German Music

The funding and promotion of musical anarchists such as Ravel and Schoenberg was not enough to ensure the advent of a "Dark Age" culture. The British Round Table knew that such an objective required the complete destruction of the Platonic tradition in music—which in modern times is the German musical tradition culminating in Beethoven and continued in the music of Brahms.

This objective was in turn identical to British geopolitical design: the destruction of the cultural and scientific heritage of Leibniz and conversion of Germany into a marcher lord against the Soviet Union, to derail prospects for a U.S.-European-Soviet industrial development alliance which would finish off Britain as a world power. To further its objective, the British oligarchy forced to maturity two of its own nineteenth century cult creations, the racist Pan-German "Ultranationalists" and the Zionists. Out of the German racialists was congealed the British-funded and nurtured Nazi party which built the slave labor-based German military machine for deployment against Russia. Zionism, portrayed as a "reaction" to Nazi anti-Semitism totally controlled by London, provided a synthetic, non-German sense of national identity for Jews, trapped between the "opposite" poles of Nazi murderers and the Zionists. As part of the assault against German culture, leading Zionists circulated the line that German music was the tradition culminating in Wagner, and was consequently inherently anti-Semitic. In particular, this vicious falsehood played upon the fact that many of the most outstanding German musicians (and indeed cultural figures generally) were German Jews.

The musical counterparts of the Nazi-Zionist duality were Richard Wagner and Arnold Schoenberg respectively. Ironically, Schoenberg (who in his early years styled his music after Richard Strauss, later to be a ranking cultural official in Hitler's government), guided by the Frankfurt School's Adorno, became a champion of the Zionist cause, composing a series of works during the war years and after, epitomized by the screeching cacophony of *A Survivor From Warsaw*, designed to evoke the "holocaust" mentality—the same mentality fostered by the Nazi collaborators among the Zionists who knowingly consigned masses of Jewish people to the Nazi death camps.

On the other side of the false dichotomy stood the overtly fascist music of Wagner. Through Round Table emissaries such as Houston Stewart Chamberlain, in tandem with feudalist families such as the Bavarian Wittelsbachs, the Dionysian music and racist "volkish" mythologies of Wagner's operas became the cultural battle cry of the Nazi movement (as it had been of the dawn of the Zionist movement many decades earlier). The Bayreuth circles including Wagner's family became prominent figures in the Nazi Party, even openly retaining their allegiance to Hitler *after* the war in a number of instances.

Amidst the inferno of Weimar culture, between the Scylla and Charybdus of Wagnerian racism and Schoenberg's nihilism, Schenker and Furtwängler fought an heroic but epistemologically flawed battle to save "German music." Dr. Cübe informs us that Schenker's 1921 essay on "The Mission of German Genius," alluded to in his book and partially excerpted below, was a message addressed to the Jewish intelligentsia of Germany and Austria. In direct opposition to Schoenberg, whose Zionism Schenker perceived to be a mere pretext for a willful assault on the very foundations of German culture, Schenker was telling these layers: "identify yourself not as a Jew but as a German republican, i.e., as responsible for determining, through the fight against Britain, the cultural fate of humanity."

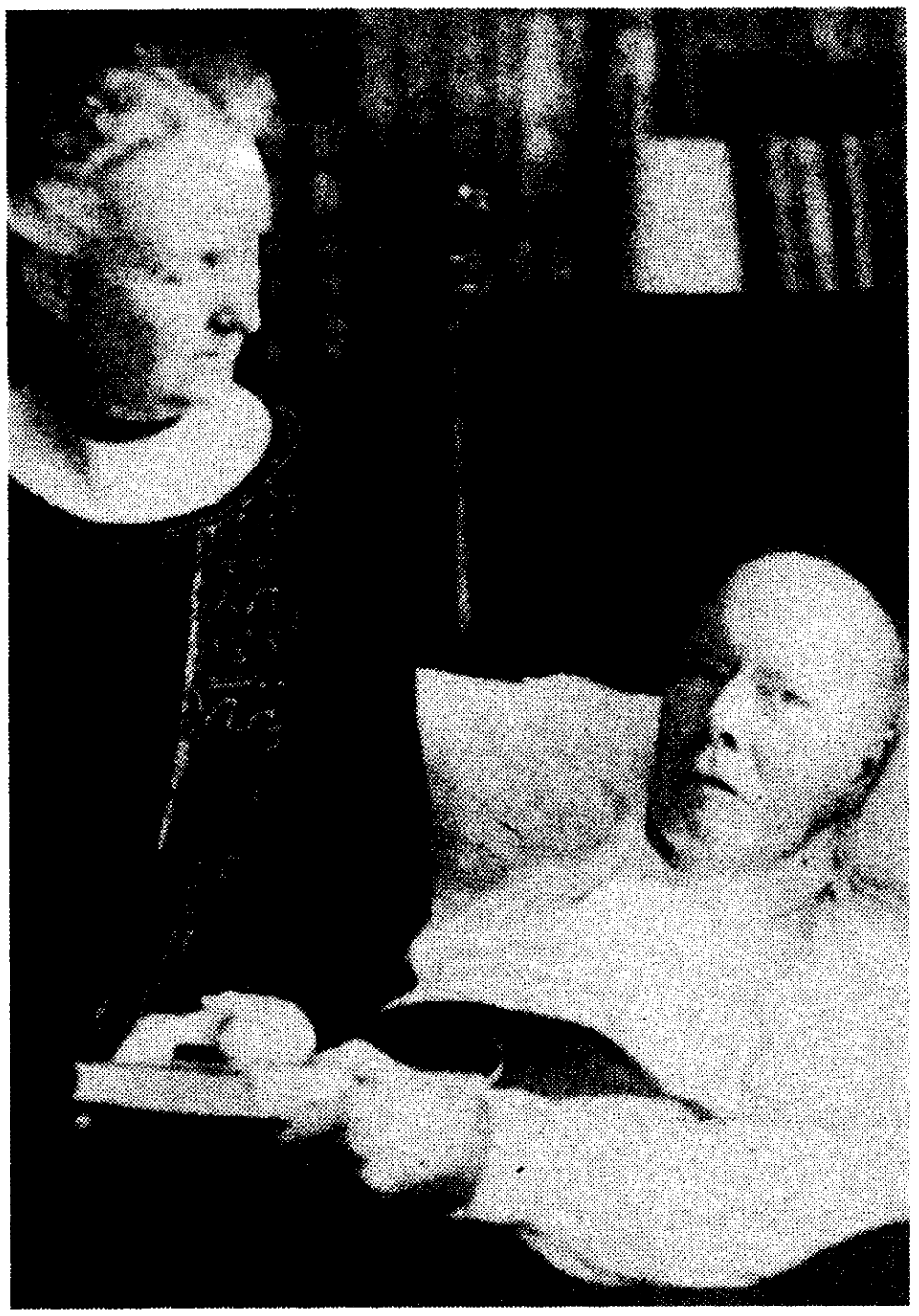
Behind Schenker and Furtwängler and shaping their political outlook were the factions in Germany which were opposed to Britain and the Nazis alike. They were the republican nationalists who had fashioned the Rapallo treaty with the Soviet Union as an economic alternative to the Versailles "reparations." These factions attempted to eliminate Hitler on several occasions, but were foiled by British intervention.

Schenker and Furtwängler's defense of German culture failed. The very traditions which they attempted to defend had already been seriously contaminated by British empiricism at the time they inherited them. Whereas Leibniz and Schiller sought a renaissance of the human spirit in the context of a global grand design for progress on all fronts, scientific,

economic and cultural, with appropriate emphasis upon rigorous Neoplatonic education, Schenker, Furtwängler and the factions with which they were allied fought defensively to preserve the sovereignty of the German state and the integrity of German culture against the London-controlled Nazis. As a result of the inroads of the 19th century romantic movement on their epistemological outlook, the basis upon which Bach, Beethoven and Schiller had been generated was mysterious to them, hence their romanticized notion of "German genius."

From the same flaw flowed Schenker and Furtwängler's inability to fully divorce themselves from the music of the Rothschild-funded mercenary Richard Wagner. Although recognizing Wagner as a political enemy and his music as the single most important cause of the collapse of composition into nihilism after Brahm's death, Schenker nonetheless ultimately accepted Wagner as "a master of German music." He could not rigorously distinguish the quality of Wagner's genuine contrapuntal *skills*, used for the purpose of flooding the higher faculties of reason in a sea of sensualism, from the quality of mind which *created* the tools and techniques appropriate by Wagner towards a wholly different objective, that of Beethoven's late works, Schiller's poetry and drama, and Leibniz' Grand Design. As a result of the same flaw, Schenker's attempt to reappropriate the compositional method of Beethoven was also ultimately inadequate. As a result of these flaws, Schenker and Furtwängler's message to the German people was

Above, a self-portrait by the inventor of the twelve-tone non-music system, Arnold Schoenberg, reveals that his talent in painting matched his musical abilities.
Left, Igor Stravinsky with the creator of the counterculture, Aldous Huxley. The exponent of musical barbarism and the prophet of LSD met frequently to share their evil designs.



garbled. The cultural environment in Germany was ultimately determined by their fascist antagonists, and the German people marched like obedient sheep to World War II and the gas ovens.

Amidst this nightmare of British-orchestrated confusion, Schenker, whose manuscripts were burned by the Nazis and whose wife and daughter died in a concentration camp after Schenker's death in 1935, was himself viciously slandered as a Nazi, together with Furtwängler, as a crucial feature of Britain's "collective guilt" psychological warfare program for Germany during the occupation period.

Despite Schenker and Furtwängler's flaws, such a monstrous fraud was only possible through a virtually complete suppression of Schenker's own writings after the war both in Germany (as noted by Dr. Cübe) and in the U.S. The recently released English edition of Schenker's *Free Composition* reiterates this libel in the forward by Yale's Allen Forte.

Who ran the "collective guilt" operation against Schenker and Furtwängler? The very same circles who had entrepreneured "Dark Age" culture before the war. In 1947, in an article in the American Musical Review, Michael Mann, the brother of Thomas Mann and a close associate of Theodor Adorno, launched the slander campaign against Schenker, and also targetted Felix-Eberhard von Cübe. Subsequently every musician and theorist who in any way threatened to fight for the principles embodied in Beetho-

Above, Eva Wagner, daughter of fascist composer Richard Wagner, with husband Houston Stewart Chamberlain. The British-born Chamberlain moved to Germany, where, on behalf of the British oligarchy's cult-creation drive—out of which the Nazis were formed—he published numerous "race-science" tomes. Chamberlain, kinsman of Hitler-appeaser Neville Chamberlain, was revered by the Nazis as an intellectual founder.

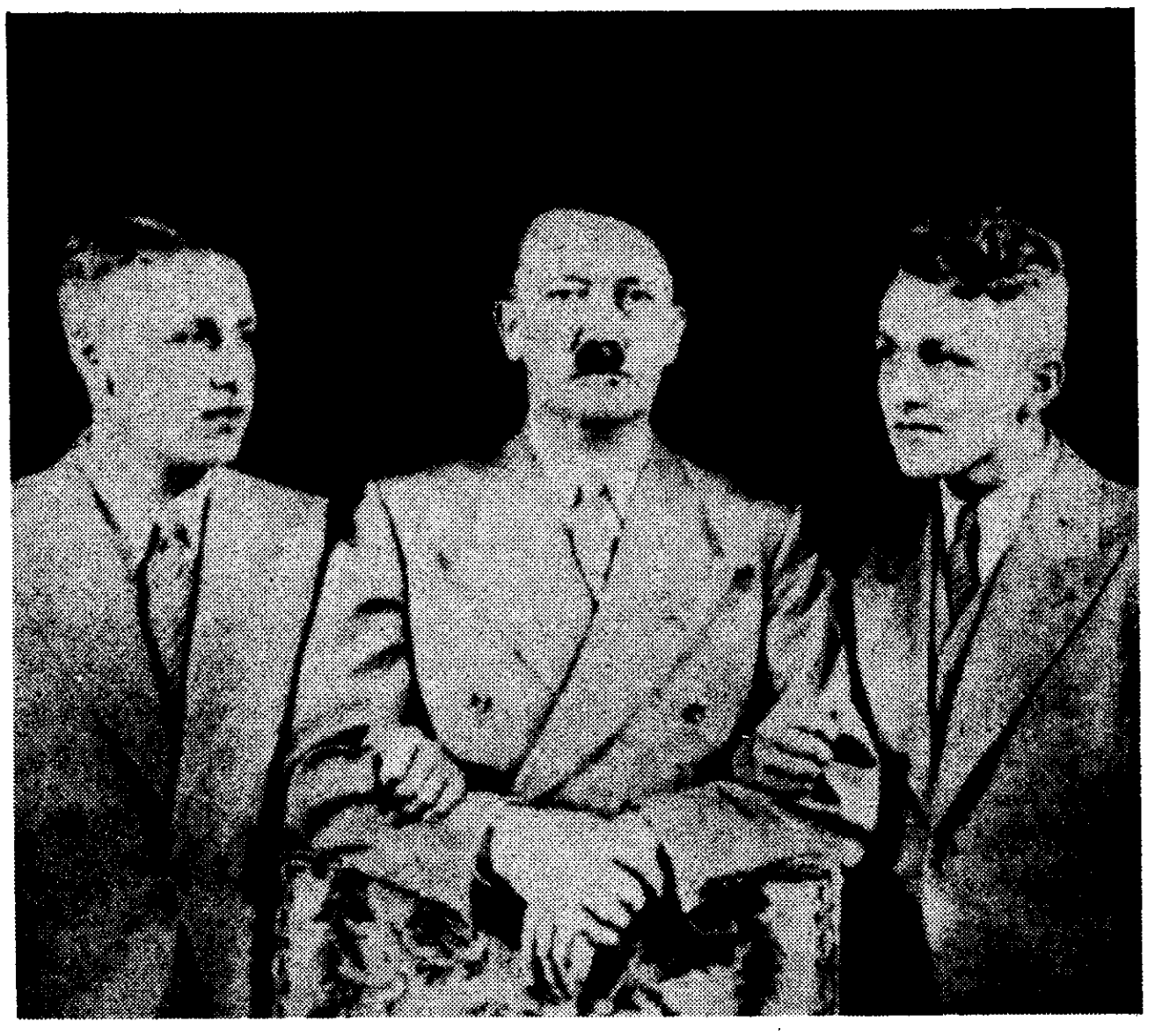
ven's music was subjected to the same vicious operation, publicly and behind the scenes. Many, such as the late Ernst Oster, were ultimately psychologically broken and forced to "adjust" to an environment which accepted the noise of Schoenberg and his post-war followers, such as Stockhausen, as real music.

In the United States this operation was run by Israeli Intelligence, U.S. Naval Intelligence, and the institutions responsible for the MK-Ultra project which spawned the rock-drug counterculture beginning on the Pacific coast. In this, Adorno played a major role, as did Aldous Huxley and Huxley's close friends Igor Stravinsky and T.S. Eliot. A case in point is the translator and expurgator of Schenker's early treatise *Harmony*, the University of Chicago's Elizabeth Mann Borghese, who is currently linked to U.S. Naval Intelligence through her specialty work on underwater law of the seas. The daughter of Thomas Mann, the wife of the co-founder (with the University of Chicago's president Robert Hutchins) of the Aspen Institute's Giuseppe Borghese, Mann Borghese's "Aristotelian" (i.e., de-politicized) version of *Harmony* constituted the pretext for over twenty years for the suppression of Schenker's other major writings in this country.

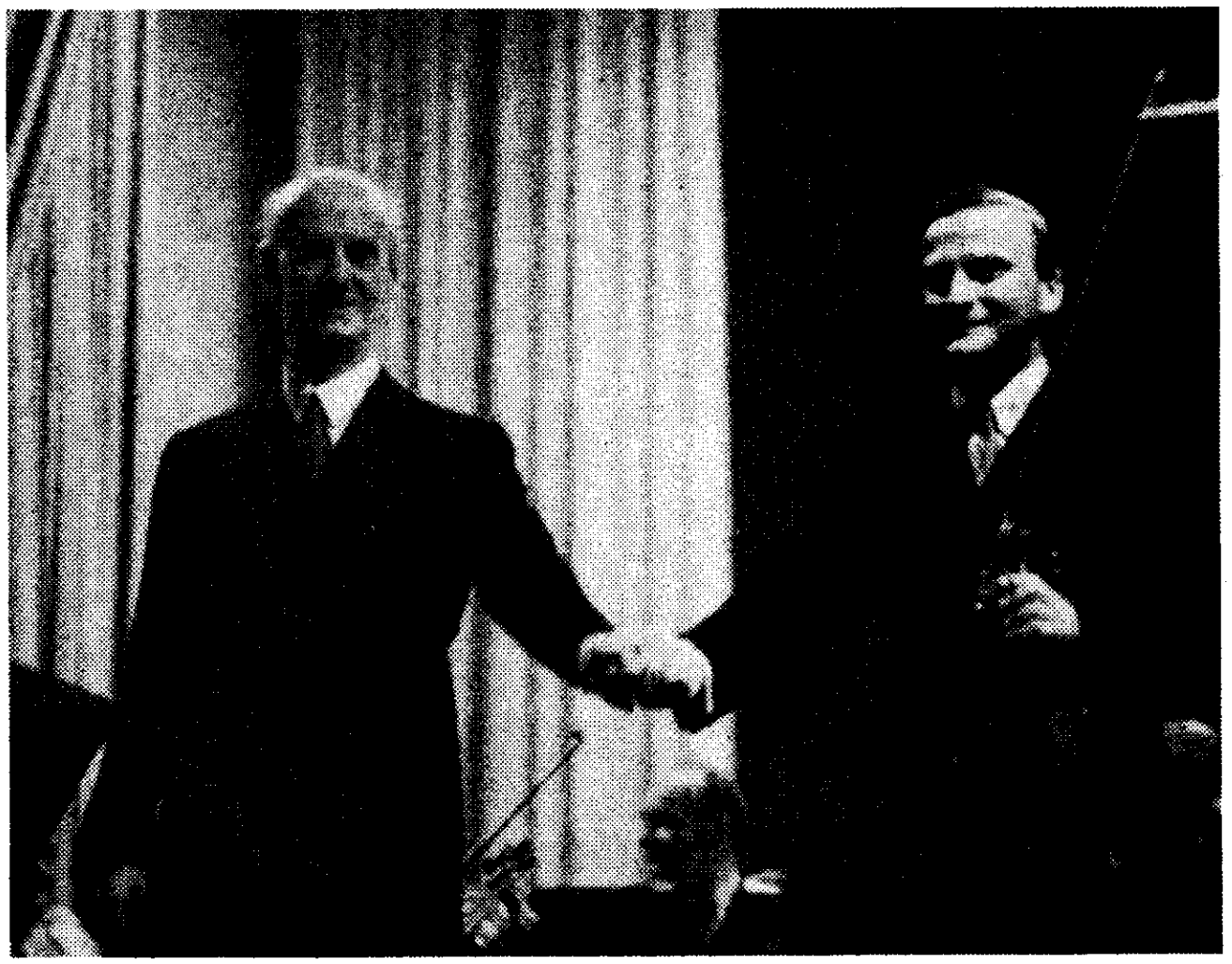
Out of U.S. Naval Intelligence came the entirety of the electronic side of post war popular musical culture, developed in the late 1930's under the supervision of "one worlder" Stokowski. This technology, combined with Adorno's expertise in orchestrating major shifts in popular musical "tastes," became, under the auspices of the Radio Research Project based in the Princeton-Columbia University axis, the basis for the transformation of American music into rock as well as of the postwar "electronic music" craze. (To this day the Moog electronic synthesizer at Columbia University is guarded by naval officers and requires security clearance to enter!)

In the Los Angeles suburbs a home away from home was established for Stravinsky, Schoenberg, Huxley et al., again under the psychological counsel of Adorno. Completing the circle, Stravinsky, Thomas Mann, Darius Milhaud and others became founding trustees of the Israeli Intelligence-linked Aspen Institute and hence locked into the University of Chicago network. This circle's presence in the California staging ground for the MK-Ultra project which created the rock-drug counterculture was not a coincidence.

This concatenation of institutions and networks has controlled every aspect of American culture in the post-war period. They ran the "collective guilt" witch hunt against proponents of the Schenker-Furtwängler tradition continuously throughout this period as an essential arm of that control mechanism. The same forces are now surfacing once again, with the same slander lines, now directed at stopping LaRouche's musical and cultural advances.



Wagner's family stood in the innermost circle of Hitler's friends and supporters. At far left, the British-born Winifred Wagner, wife of Wagner's son Siegfried, greets her "dear friend" (and rumored lover) Hitler. Winifred, the director of the Wagner cult's Bayreuth Festival until the collapse of the Nazi regime, publicly avowed her "undying friendship" for Hitler only last year. Left, Hitler with Wagner's grandchildren Wieland and Wolfgang. Their favorite pastime was playing with "Uncle Adolf's" army revolver. Both have been directors of the Wagner family-run Bayreuth Festival.



Furtwängler and violinist Yehudi Menuhin. The two artists were viciously attacked and threatened with physical violence for their postwar collaboration by Zionist lobby thugs. Under Furtwängler's baton, Menuhin produced classic performances of Beethoven and other masters, but capitulated after Furtwängler's death, and is now a sitar-strumming proponent of ersatz "Eastern music" and jazz.

LaRouche Versus Schenker

Today, the profound inseparability of the music issue from that of the political organization of society, clearly established by Plato, is uniquely embodied in the figure of Lyndon LaRouche. Perhaps the first since Leibniz to grasp this principle in fully practical terms, LaRouche is the only public figure currently visible fighting the political and cultural battle, from the Neoplatonic standpoint, as a single effort. LaRouche, through his economic policies and role in shaping what is now the European Monetary System, as well as through a critical advance in the science of econometrics, personally constitutes the counterpole to the fascist "one world order" sought by Britain through its various channels of influence. At the same time, LaRouche's approach to building a new musical system in America and elsewhere uniquely defines the cultural alternative to a "New Dark Age."

For LaRouche, even more directly than for Schenker, music is an epistemological war. It is a war for the very minds of the population, for the moral and intellectual qualities which will determine very shortly whether civilization as we know it will successfully enter the twenty-first century. At the same time, the question of reclaiming Beethoven's compositional method is for LaRouche a fight for the totality of scientific method necessary not only for musical advances beyond the framework of Beethoven's late works, but for the scientific and technological breakthroughs necessary in the immediate period ahead to insure the survival and development of the human population worldwide.

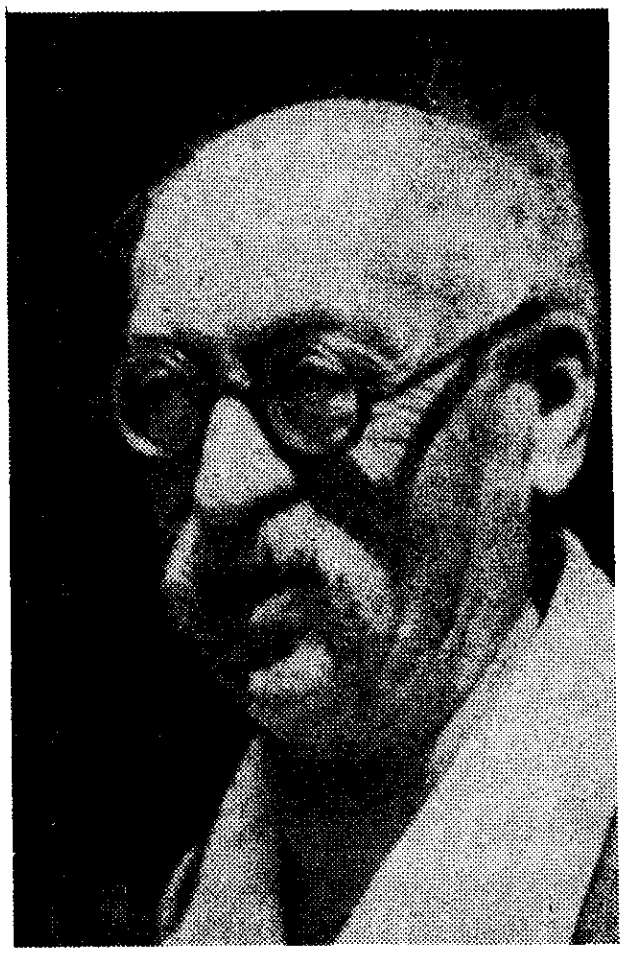
Unencumbered by the stultifying baggage of 19th century romanticism, LaRouche has approached the issues of compositional method and musical performance from a completely fresh standpoint—that of having reunified the perennially dichotomized categorization of knowledge into the science of the mind (*Geisteswissenschaft* including music, poetry, etc.) and the physical sciences (*Naturwissenschaft*) into a single coherent conception of natural law, governed uniformly by the poetic principle as understood by Plato, Dante and Leibniz.

With these tools in hand, drawing at the same time from the rich practical musical knowledge embodied in Schenker's books and essays, LaRouche and his musical collaborators have successfully harnessed the essential features of compositional method inherent in Beethoven's late works for efficient application to music education from the elementary school level on up. In doing so they have solved a number of musicological problems involving the mature works of Bach, Mozart and Beethoven, heretofore unapproachable by even Schenker and his circle.

With these powerful tools already being successfully put to the test in elementary schools in various parts of the U.S., as well as in the context of the preparation of definitive performances of major works in the classical repertoire, the succession of a new generation of musicians and composers competent to supercede Beethoven's late works, and of an audience capable of comprehending them, is a foregone conclusion, save for one nagging question: Will the urgency of the present situation and the stakes in the renewed *Kulturkampf* against Britain's "Dark Age" mercenaries be adequately recognized and acted upon to allow this reawakening of the Beethoven tradition to run its natural and rightful course?

Who was Heinrich Schenker?

This chapter from the book Death Struggle or Rebirth of German Music? *by Felix-Eberhard von Cübe was translated by Renée Sigerson.*



At right, Heinrich Schenker (d. 1935). His widow and child were killed by the Nazis at Auschwitz. The Nazis suppressed his writings.

Who was Heinrich Schenker really? The reference books give only very skimpy information about him. He was born on June 19, 1868 either in the small city of Wisniowczyki, Galicia, or in a village in that region. What is known to me about his youth is only what he himself once briefly revealed, namely that it was dominated mainly by three things: poverty, iron diligence and an irrepressible drive toward the musical arts. Schenker was a Jew; like my grandfather, apparently of Sephardic origin, for he was tall, red-blond, and possessed a disposition which I am compelled to describe as ennobled.

It is not known to me where he attended school. He once told me that every conceivable obstacle made his school years more difficult than the subject matter itself; the actual hurdles he would always take on after brief preparation in a single spurt. Since he took his doctorate in Vienna, we can assume that he was a student of Anton Bruckner's for four semesters. After completion of his studies, Schenker undertook an extended concert tour, among other things as the accompanist of leading soloists, such as the singer Johannes Messchaert and the violinist Joseph Joachim. Later on he delivered lectures on music history, and become a collaborator of various journals, such as *Die Zeit*, Maximilian Hardens's *Die Zukunft*, and the *Musikalischen Wochenblatt*. In the volumes of these publications from the last decade of the last century, extraordinarily fascinating pieces by him would have to be retrievable, which, published together, could make up a book which would be in no way inferior to Alexander Borrsche's well-known *Trösterin Musik*.

Schenker was also close to Brahms. He spoke to me about Brahms frequently and with deepest admiration, as well as of his own fortune in having experienced in person "how he," he, who he recognized as the last great German master of composition, "powerfully and profoundly continued the original German succession from Bach through Händel and bore, entirely alone, the great burden of a Beethoven, Schubert, Schumann." (cited from Schenker on Brahms in *Die Zeit*, May 18, 1896.) Schenker himself reported again in detail on his acquaintance with Brahms in the *Deutschen Zeitschrift*, (XXXXVI Volume of Ferdinand Avenarius's *Kunstwerk* of May 1, 1933) two years before his own death.

Brahms had recognized and encouraged Schenker's exceptional gifts. He especially praised Schenker's keyboard playing, and advised him on his compositions—a very rare distinction—a series of which, mostly for keyboard, Schenker published at that time. As a direct result of his interchanges with this last living great master and through the influence of his presence, Schenker became aware of his own actual mission. He, whose early works were far more powerful, original and promising than Schoenberg's early attempts, *sacrificed* the career of a composer *in order to save the German art of composition!* The crushing knowledge that not even Brahms's powerful presence could bring to a halt the invading process of decline evident all around, that Brahms's contemporaries and successors "had fallen asleep," led him to the insight that he alone—and oh, how bitter must this realization have been for him—with his so much weaker poeti-

cal-musical powers, would be even less able to stem the tide of this collapse. Thus, he committed himself to give and to leave behind for his contemporaries and future generations such a precise, clear, and unmistakeable presentation of the fundamental nature-given laws of art and their development by the great masters of music that even in the event of a *complete dying off of the original capacity to give witness to artistic creation,* future, healed generations would at least be assured of *the possibility of learning musical composition anew.*

Schenker knew exactly the dark forces that emerged at that time to attack the foundations and topple the edifice of German musical composition, an edifice that has been erected by great masters over centuries. His belief in the healing, sustaining power of truth in knowledge of *immutable* natural law and its strength to defy the subversion of dwarves was so unshakeable, that he devoted himself exclusively to the affirmation of the good and right. He could only rarely be moved to present the evil and false with the same clarity. "All that will perish left to itself" was his constant answer to my urgings. To one of his youngest students, Hans Wolf (who had first been my student, as I was Vrieslander's), he repeated in the last years of his life: "The Danube River has dead tributaries, and that is just like Mssrs. Schoenberg, Berg, etc. There is something there, but it is swampy. The greatest demonstration against Schoenberg is the *population;* it has never gone along, and never will. There are never two high points of achievement for an art. Schoenberg has already gone through one; a second, as he is now cultivating, can never come to fruition. Schoenberg creates homunculi in music; he is a *machine*. Machines are supposed to be replacements for human power, to be a surrogate. Now, indeed there are surrogates, for example, for traveling, the auto. But never can there be a surrogate for the soul! A process so complicated [as "serial technique"—Cübe] is incomprehensible to the soul. It must crumble like dust of its own accord. One does not even need to write against it, *as it will perish in short left to itself.* The product from Schoenberg's machine is *unusable* (from *Der Dreiklang*, Jonas and Salzer, publisher, Krystall-Verlag, Vienna, Vol. 7, Oct. 1937).

What a fateful delusion even a genius such as Schenker can succumb to—not so much in connection with the issues themselves, but in the judgment of the nature of their dangerousness—is shown by the progress of events to the present. *With certainty*, the atonal (key-less), bitonal (double-key), polytonal (multi-key), dodecaphonic (limited to 12 equally important notes) and electronic (mechanically produced tone pitch, length and volume) "progress"-madness which, in our antihuman age of violently realized "orders of concepts" (ideologies), finds more than sufficient encouragement, will "perish of its own devices," but not by any other means and not before this raging, devouring cancer inflammation will have stomped out in Germany—lock, stock and barrel—both the capacity to *produce* as well as to *understand genuine music, if this madness is not first brought to a halt.*

Nonetheless—as an old Arab saying goes—"every fruit hits the earth, no matter how high the tree." Today, we can no longer await or trust that something "will perish of its own accord." Now, this madness and its accompanying crimes are being written and acted against: with words, with musical notes, with conviction and with deeds.

At the start of his work in composition, Heinrich Schenker found himself confronted with the situation as to how music was being looked at, described in a previous section of this book; the same situation which oppressed me before I got to know his books. The entire theoretical-practical system of teaching did not even suffice to account for the past, let alone match up to the demands of the present or future. Schenker liked to report to his students that Bruckner, his teacher, whenever he presented one of the usual bone-dry theorems on the blackboard, would say, "Look at it, m'boys, that's the rule. Nat'rily, I'd never write like that!"

What is the student supposed to do with a pile of rules which the master himself doesn't even follow? How many must it have been who recognized the intolerableness of such nonsense. But, man's heaven is his comfort. He prefers to have others zealously think falsely for him, than to mobilize himself to think correctly for himself. It is only for this reason that again and yet again any sort of nonsense will be chewed over, written down and disseminated before one simply tested and confirmed truth is established.

So, for example, it had apparently never occurred to anyone before myself to compare the *numerical justification* which Hindemith gives in his *Instruction in Composition* of his Twelfth "Series" No. 1—upon which the entirety of the rest of his conclusions in the book are based and about which Hindemith cooly claims that they are simpler, more orderly and less artificial than all previously developed methods of determining notes, which can lead to goals never before achieved. I compared this explanation with an exactly similar and despised earlier method. I did this and de termined thereby tht Hindemith's alleged "new proposal" agreed, note by note, with the ancient calculations of a certain Didymos of Alexandria, with one *single* exception, which comes from Pythagoras of Samos. Indeed, Hindemith's method is thus not less artificial, but essentially more intricate than that of the cited gentleman from ancient times. (Hindemith, *Instruction in Composition,* B. Schott's Söhne, p. 50ff.)

Schenker's first real act, his first energetic breakthrough toward reestablishing correct perceptions of music was the *reseparation of the harmonic from the melodic dimension*. In other words: He broke with the custom carried forward since Rameau, to—in his words—treat music "like a wurst being sliced into pieces"; that is, the observing of each chord in itself isolated, at the moment of its sounding, thereby taking no or only inadequate notice of the temporal succession of the melodic voice leading. His second major service was that he no longer limited himself to demonstrating harmonic events merely via those notorious "examples" which, like anatomical preparations, have so little life in them. Rather, for each and every point, he introduced living sections from the colorful abundance of the great works, thereby fostering in students, simultaneously, correct listening to the tonal foreground and an actual understanding on their part of musical phenomena. He proceeded in the same way with the teaching of voice leading, not only by freeing the contents of the old rules of counterpoint from their disguises in "harmonic exercises" and thereby making them fruitful in the way they were intended to be, but also in proving that and how these laws, in the further developing art of counterpoint, effect background development.

Thus, Schenker began his series of music-theoretical writings with the 1906 *Harmony*, published by Cotta. The ideas and intentions described above are stated in the opening lines of the preface of this work:

> The work presented here is an attempt to establish a bridge—a real and practical bridge—*from composition* to *theory*, in contrast to those theoretical works of other authors, who present their theories quite apart from art itself, as if they emerged solely from their own efforts.

The *Two-Part Strict Counterpoint* followed the *Harmony*—similarly published by Cotta—in 1910. It may be instructive to highlight here the difference of character, rooted in profound considerations, between Schenker and Schoenberg—who, like Schenker, was a Jew. Namely, one year after Schenker's *Harmony*, Schoenberg issued his *Harmony*. In contrast to Schenker's work, which, created out of painful and the most noble human and artistic motivation, transmitted knowledge rooted self-evidently in the lawful development of what had been historically transmitted, I immediately recognized Schoenberg's *Harmony* as hopelessly mired in the oldest Rameauianism. With confused and unfocused attempts to "break out" of a dilettantish framework, completely uncomprehended and—even worse—unfulfilled lawfulness, the work could only justify a passing smile from me, a modest, diligent student. I quote here that which Hugo Riemann, himself a full-blooded Rameauian, could figure out to say about Schoenberg's text, in his musical lexicon:

> His harmony text, issued 1911, is a strange hodgepodge of theoretical *backwardness* and *prejudice* [and that was said even by Riemann!—Cübe], based on S. Sechter's system, and hypermodern negation of all theory. The naive admission of the author that he had "never read a history of music" reveals the secret of this *unexampledly dilettantish* piece of make-work. The "art handiwork" which Schoenberg purports to give—thank God—is still estranged from public taste. (Hugo Riemann, *Lexicon*, eight edition)

Thus wrote Riemann back in 1915. Schoenberg's theoretical and practical products remain unknown to public taste to this day, despite numerous audacious and massively fallacious methods used to make them convincing, and with which they are extolled today.

Dr. Felix-Eberhard von Cübe directs the Heinrich Schenker Akademie für Musik in Hamburg, West Germany, an institution devoted to continuting Schenker's musicological tradition. Born in 1903, von Cübe was a student and close associate of Schenker's during the 1920s. He was also personally close to Furtwängler from early childhood. He founded the Hamburg Akademie in 1931 on the request from Schenker that he assume leadership over the activities of the Schenker school in Europe. The Hamburg Akademie was closed by the Nazis in 1935, the year of Schenker's death, and did not reopen until 1947. Since that time von Cübe has continued his teaching activities and has authored many articles and several books. He is widely recognized as one of the very few of Schenker's followers to have significantly expanded Schenker's methodological approach while adhering to its essential tenets. A practicing musician, von Cübe is the author of an impressive catalogue of compositions including concertos for piano, violin, compositions for piano solo, and other chamber works.

Von Cübe personally has made the present and other manuscripts available to Campaigner Publications, publishers of Lyndon LaRouche's works, in recognition of Mr. LaRouche's role in taking up the fundamental issues fought for by Schenker.

One of the best indications of whether something is *true* art is precisely that it *needs no advertising*—exactly like good politics! Nevertheless, going back to the before-mentioned approach, already in the opening sentences of the preface of his *Two-Part Counterpoint*, Schenker had formulated in strikingly prophetic terms, his unfathomable grief about the collapse of comprehension for music, even among experts living during Brahms's period, and about the rapid decay of composing itself following Brahms's death:

> We are witnessing a Pompeii and Herculeneum of music! All musical culture is in ruins, even the tonal construction material has been destroyed—the musical foundation upon which artists have always erected their own works, by going beyond the bare blueprint of the harmonic series. The most imaginative, the most created of all the arts as it were, the one which has undergone the most frequent and most intense birth pains and which was therefore the last art form to be mastered by us—the most youthful of all the arts, music—is gone!
>
> To be sure, society is still entirely unaware of this grim state of affairs, and people are still intoxicating themselves on great words and high-sounding phrases. People are putting great emphasis on the "Twentieth Century," on "progress"; they are ecstatically praising the "Zeitgeist" and everything "modern," and see themselves surrounded by an abundance of "genius": composer "geniuses," conductor "geniuses," virtuoso "geniuses." All of this without giving the slightest thought to how thoroughly incompatible all these ecstasies are with what they say right afterwards about the "sterility" of our times, how "production is at a standstill," and even about the loss of all artistic potency, etc. Heaven knows how these charming people manage to make "ascendency" rhyme with "decline"!
>
> The riddle and the contradiction in all this readily solves itself, however, since collapse is the sole, grim fact of life, whereas there is an almost total absence of truly positive, artistic powers.

In answer to these painstakingly chosen words, voicing the agony of the *only man* who had real knowledge in those times, Schoenberg dared to include the following—and let us state it calmly!—base taunt in his *Harmony* as a rejoinder:

> If indeed he (as I hear) speaks of and asserts in his latest counterpoint book that today no one can compose any longer, then, that does not rate above the yearnings of an invalid for "the good old times." Without doubt, one must not be satisfied with one's own age. However, not because it no longer is the good, old, by-gone age, but because the improved, future, new age is not yet here. Such unfounded attacks mean nothing more than that we must defend our art against them.

It is impossible to imagine a greater degree of thoughtlessness and irresponsibility—to speak mildly—than Schoenberg reveals with the three little words in parentheses "as I hear." Without having read Schenker's book himself, he ventured to pass judgment and thereby claim that Schenker launches unfounded attacks. Aside from the fact that Schoenberg's "art" is not even treated in Schenker's book, it would be quite possible for someone in Schoenberg's frame of mind to see it as an "attack" if a surgeon were to take a scalpel to a cancer. If, moreover, the correctness of Schenker's knowledge has not already been proven through his overall work, this will be accomplished at the latest through my precise demonstration of the agreement of Schenker's approach for revealing the organic interconnectedness of the content of musical composition (Constitutional Analysis) with fundamental physical and mathematical lawfulness. Today, moreover, it has been irrefutably determined by modern, comparative music theory, that Schoenberg's entire case, starting at least around 1910, has *absolutely nothing to do* with the concepts which we have derived from the span of evidence left by the great (and lesser) masters up until Brahms as being pertinent to what is "music." An explanation of what it was then which occasioned Schoenberg to do what he did, must properly be sought in my view in the field of research of the history of the mind (i.e., historical psychoanalysis). This, of course, is a branch of *medical* science.

In the year 1912, there appeared in a Universal Edition, on contract from this publisher, that work by Schenker which, in a single blow, made him known for the first time to a very broad circle of readers. This was his *Presentation of the Contents of the Ninth Symphony by Beethoven,* through which the major conductors, such as Furtwängler (who later worked methodically alongside Schenker), Bruno Walter, and others became attentive to his thoughts. (To this day, this book—which has become rare—is still borrowed from me by young conductors and conducting students.) After Schenker had gone through his initial, still groping concept of *actual organic coherence* in musical composition in the fourth chapter of the first section of the second part of his *Harmony* ("On the Form in the Large"), one finds in

this work on Beethoven's "Ninth" a direct reference to his later major work, the *Free Counterpoint*—still under a different title—in the following comment:

> A content which in itself is as perfect as that of the Ninth Symphony reveals *tonal laws of creativity* which most other human beings certainly do carry around in their own hearts, but which genius alone can effectively realize by virtue of its natural gift. In another location, in my *Outline of a New Theory of Form,* I will furnish proof that these laws are by no means mere *arbitrary inventions* of the individual artist, but belong to the domain of all human beings.

Here, all those who may have doubted their own musicality while listening to, or being *forced* to listen to "modern" music, perhaps even believed they should doubt their own mental health, can now breathe a sigh of relief, and take joy in their own undamaged musicality. *For* musical natural law *binds the hearts of the musical geniuses with the hearts of their musical listeners in a fashion which can* never *occur from the actually strictly arbitrary "discoveries" of the concoctors, deceptive and unmusical, of "Festival-fad-Music."* All of the ass-licking publicity which the advertising men, quack scientists, remunerated and richly domiciled factory managers and wholesalers and retailers of this commodity pour into the already mishandled ears of their consumer-victims can do nothing to alter this fact.

The increasingly popular practice during concert and radio programs of intentionally situating unnatural sound-concoctions, for example, *in between* works by Bach and Beethoven, so that the audience is forced to listen to this offensive garbage, because only the very few among them will muster the courage and internal authority to ostentatiously leave the hall, is for me no less aggressive an assault on individual freedom than the infamous practice of *marriage brokering,* which also, in fact, must have served the purpose of unloading rotten commodities. One remembers the temperamental outbursts of the public in the past with longing: if the public were to arouse itself today to answer *rotten fruits of the mind with rotten fruits from the field,* then the producers would preside with somewhat more caution in consideration of the costs incurred for insurance on conductors' tuxedoes and shattered instruments.

It is known to me that *musical* radio listeners almost 100 percent of the time turn off their radios or put them on a harmless volume level during "modern" performances. Whenever I myself have to listen to such a broadcast for professional reasons, which unfortunately is frequently the case, my very musical family banishes me to a closed-off room in which I still must put the radio on as low a volume as possible.

In addition, there exists outside of the well-paid beneficiaries of the antimusic industry a certain portion of the public, which as a product of a mindless, thoughtless form of pomposity, best characterized by the untranslatable word "Snobismus," delivers at the end of such a piece (which can only be determined by the program notes or by the cessation of any activity on the stage) an apparently self-satisfying clapping noise. In connection with these music-concoctors and their clap-delivering followers, I always remember the anecdote told about the discoverer or promoter of the game of bridge, Culbertson. It is said that one day, he accepted the invitation of a London Ladies Bridge Club to give them the honor of his presence. When the proud club leader asked him whether he was pleased by the game of the members, Culbertson said, "Madame, here the game of bridge is not played, but rather the game of playing the game of bridge."

In the next nine years, Schenker allowed the ideas which were flowing from his discovery to ripen to maturity, expanding them also by researching through numerous works in the music literature of all time, looking for confirmation and reconfirmation of his find. Then, in 1921, the first volume of a pamphlet series which he named *Der Tonwille* (*The Will of the Tone*), appeared. It was published by the Verlag Albert J. Gutman. In these periodically released pamphlets, Schenker presented the first results of his researches to the public as preparation for his major work which would appear 15 years later, one year after his death.

In the first volume of the *Tonwille,* in an introductory essay entitled "On the Mission of the German Genius,"* Schenker confronts the forces and powers which had committed treason against the development of genius, in that they deserted its ranks. With ruthless poignancy, he illuminates thereby the historical circumstances which, acting as continuous causes over time, led to the catastrophe of the First World War and the events following it; causes which he grasps and presents, essentially, as a catastrophe of the soul and of morality. This essay, which is akin to "An Address to the German Nation," demonstrates that the most precise understanding of a broad-scale development (which in many respects is similar to today and even still prevails), as well as its most perceptive explanation, cannot always be found on the side of the professional historians or politicians. Schenker even predicts the Second World War in that he writes that "the entente today is laying the basis for new

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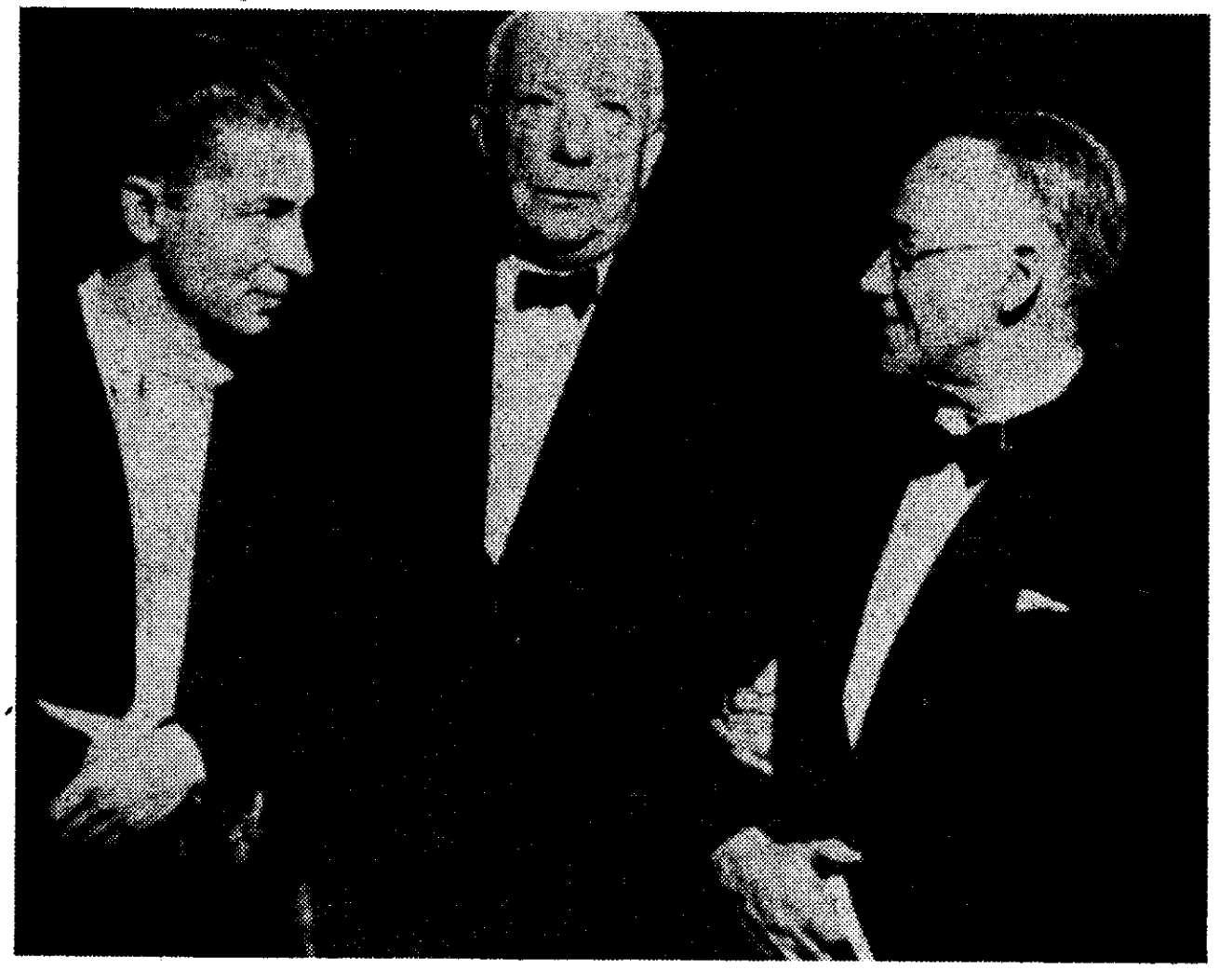
* This essay is excerpted below—translator.



Richard Strauss (center) was appointed by Hitler to a high-ranking post in the culture ministry as recognition of his service to the Nazis. Herbert von Karajan (left), an enthusiastic Nazi, was judged "Denazified" and put forward as the definitive exponent of Beethoven and other German composers—largely in consequence of his "stormtrooper" podium manner and performance content—by the same British intelligence networks who libel Furtwängler and Schenker as Nazis. Ironically, Strauss was the artistic model, mentor, and patron of Arnold Schoenberg, who made his musical career as a spokesman for Zionism.

wars in Europe, inviting thus new, greater guilt to the old." (And was it much different, in fact?)

Schenker's flights into the realm of politics were held against him on many sides, and it was said of him later that he thereby did damage to the rest of his work. That is *incorrect*! For one, it is incomprehensible why intellectuals who, with their farsightedness, can sort out causes and effects which extend beyond the framework of their narrow expertise directly into social existence, are only permitted to write about their world view if their names are Dante, Rabelais, Goethe, Lichtenberg, Herder, or whatever. Secondly, those who disagreed with the testimony of Schenker's worldly and political expertise had no more agreement with his testimonies of expertise in music.

Schenker's formulations are sharp-edged, his questions socratically solid, precisely on the mark and very uncomfortable. He writes, thus, in 1921 (!!!):

> The death-dance of the uncreative has begun! Citizens and workers are poised in a battle for *profit*, millions poised against millions, no longer millions against individuals! Still, they are fixed in the *gifts* of kings and princes, of artists and thinkers, of whom, in their lack of education they know nothing; still they consider expropriation and thievery acts of their own creativity—except, what will they do, when the supply of gifts gives out?*

Now, we have learned what they will do! The destruction of genius took its revenge through a general attack of imbecility on the unprotected fields of art—unprotected after the extinguishing or rejection of the reign of genius. In politics and in the business world, imbecility is a danger to life and livelihood, therefore we tend to defend ourselves against its manifestations there more effectively, if not always successfully. Art, however, abandoned and defenseless because bereft of genius, was overrun and conquered; *none* of those who lead war without reservation "to defend the most sacred possessions of the people" thought (or are thinking) about protecting this most sacred possession in peacetime—or should we say "in-between-war" time?—from those who really threaten danger. Quite the opposite! Whenever politics or business (i.e., the *real* "most sacred possessions") demand, in every case and at all times, short shrift will be made of the arts and artists, without any consideration of the eternal laws of art or of the loyalty of its servants to these laws. Now, the Sorcerer's Apprentices *have* the spirits, which they called upon, and will never or only through greatest difficulty give up twelve-tone and electronic abominations, purposeless scribbling, and a literature against which one must warn one's children, as formerly one did against wolves and vagabonds. *When* will the

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* As a matter of curiosity, it should be noted that after the Second World War, the *Tonwille* pamphlets—presumably because of this paragraph and other observations—alongside Grimm's Fairy Tales and everything else, was put on the Allies "banned" list, although a strict ban against Schenker's works had never been pronounced by the National Socialists. [In fact many of Schenker's works and manuscripts were destroyed by the Nazis, according to personal communication from the late Ernst Oster—translator.]

Stravinsky with his crony, the drug-taking sodomist poet and playwright, Jean Cocteau. The degenerate Parisian literary and cultural circle around Stravinsky was no less committed to fascist irrationalism and bestialism than Strauss and Wagner.

maestro come, who will drive these spirits back into the broom closet where they belong? I know: the *Other,* the noble, good, true, just and beautiful survives also, even today. But *how* does it survive? And *where?* And what power does it wield still today over the soul? And how long can it survive in any case?

The copies [of the *Tonwille*—translator] have rare value today, and whoever owns and understands them cherishes them as valuables. In total, ten issues appeared through 1924. They contain introductory remarks on Schenker's major discovery, which he had named the "Theory of the *Urlinie.*" A large number of quotes, various commentaries and fragments aimed at facilitating comprehension of the theory, as well as the first analyses of numerous master works of musical composition, which though still in their initial phase of technical presentation, present a nonetheless already elaborated and pedagogical illustration of their *purely musical* essential content apart from any interpretation (hermeneutic) or other theorizing gossip, allowing for the first time the identification of this content *in its unified coherence.*

When I came to Vienna to see Schenker, the sixth issue of the series had just appeared, which in 1925 was turned into a yearbook under the title *The Master Work in Music* of which three further issues were brought out by the Drei-Masken-Verlag. In 1922, the *Strict Contrapuntal Polyphonic Composition* was released as a followup to the *Two-Part Strict Counterpoint.* I was extremely happy during the years I studied with Schenker, which for me, were what one would call today "sensational;" while I would prefer to describe them in that both my soul and my understanding, as well as my emotions and creative resources, were sparked and fostered in a heretofore unimagined way, so that I found myself, so to speak, in a constant mood of excitation. In a forthcoming research paper and description, I would want to report in detail (and I am planning a special piece on this) on my memories of the most important attributes of this extraordinary, truly German-spirited man, who in his work has not been matched by anyone in our century in genuine originality.

In this book, however, it is necessary above all to attempt to present the essence of Schenker's discovery of the "organic coherence" in musical art; and to do this in a way that also accesses a sufficiently clear concept of the *nature* of this discovery and its underlying features for the benefit of the layman. In consideration of this task, it will not be possible to demonstrate step by step how the knowledge of interconnectedness (of coherence) and the lawfully continuous progression of ideas in genuine master works of music along with their mutual interweaving with the spiritual experience of the listener developed progressively over time. Those experts who wish to especially pursue this course of investigation can do so themselves without need of anything more than the existing literature.

Therefore, I will stick to my concern of making the reader familiar with these matters through an approximation of the same sequence which I myself have gone through to the present, thereby giving an account of the development of a new art of musical

experience, which survives today following Schenker's death and apparently for many generations to come, and will draw musicians and music researchers onto its path, with rich materials to be worked out and observed. (To be sure, what is involved for example is the progressive examination of the *entirety of the musical literature* from the standpoint of this discovery.) At the conclusion of this work, the German art of musical composition will lie before us, *rediscovered* and to a certain extent even *newly discovered.* Simultaneously, the resuscitation of German music in the realm of creativity will have been achieved, so that once again there will be *German tonal poets,* who will write *German music*—even if fate has decided that the proud succession of the great German masters irrevocably ended with Johannes Brahms, never to be repeated, just as the succession of the great poets in ancient Greece remained unrepeated.

Schenker's great discovery did not become clear to him with romantic suddenness—"Eureka, I've got it!"—but represented simply the necessary consequence of a long practiced, patient art of empathy and observation driven from a very advanced standpoint, with the highest, self-critical precision. It is a discovery which can be easily compared and explained, for the benefit of laymen, with generally valid laws of life. Schenker names his discovery, appropriately, "the organic in music."

As he traversed, innumerable times, the pathways of thought of the great masters in their living works, gradually the hidden entranceway opened for him to the world of musical genius and to that way of thinking and conceiving which is able to unify, in one all-encompassing glimpse, the joyful simplicity of the underlying laws of nature as well as the multiplicity of foreground events, bounded as only the genuine masters could.

To grasp the multiply interconnected within the most simple, and at the same time be able to command effortlessly at the absolute extremities of the most highly developed technical accomplishments of art the laws of nature, seemingly irrelevant in their uniformity and lack of differentiation, is the *single secret* of all truly great art, and a most rarely bestowed capacity. Aristotle and Goethe liked to use the Greek word *entelechy* to describe this (which translates into: "to possess perfection *a priori*"). Goethe exhaustively circumscribed this concept with the translation: "a definite form, which, living, develops itself."

That the great masters were entirely self-conscious of this mode of creation, and moreover, all fully resemble one another in this respect, is proven by a few statements, which should elucidate at this point the identified unique quality of the genial, creative thought process. Thus, Mozart wrote to Baron von Swieten in answer to a question connected to this matter, as follows:

> It inflames my soul, whenever I am not disturbed, that is, then, it grows continuously and I broaden it ever wider and brighter and the thing *becomes truly almost complete in my head*, even if it is long; so that from that point on, I view it *with a single glance*, exactly like a beautiful picture or a stunning human being, *from above, in my mind*, but also by no means do I hear it in my imagination *in succession*, as it will have to come after this pont, but rather *as if everything is together at once*. This is really a treat. All of the finding and doing proceeds in me only as if in a powerfully beautiful dream: but—the *overhearing, everything thus together, is without doubt the best.*

Beethoven writes:

> I carry my thoughts around with me for a long time, often very long, before I write them down. During that time, my memory remains so true to me, that I am certain not to forget a theme which I have grasped once even after years. I change a great deal, reject and try anew as long as I am satisfied with it; then begins, *in my head* elaboration in breadth, in the small, at the heights and depths; and as I am self-conscious of what I want, the underlying Idea never leaves me; it rises, it grows aloft, *I hear and see the picture standing in its entire expansion as a single torrent before my mind*, and there remains only the work of writing it down, which proceeds quickly, whenever I set aside the time—since, in the meantime, I have taken up much other work also, although I am certain not to confuse any with the others.

Josef Haydn observes:

> This is what so many of our new composers lack: they string up one morsel after the other, *they break off when they have scarcely begun*; and then, it also doesn't fit with the heart, if one has listened to it.

Philipp Emanuel Bach, Sebastian's greatest son, formulates it:

> One must have a goal *for the entire piece!*

Johannes Brahms, here again short on words and to the point, once told a man seeking advice, only:

> More from the *whole thing!*

His humor led him another time to answer a woman sitting beside him at table, who was disturbing him with incessant questions:

> You see, my publisher orders them that way!

A *painter* should also be allowed to speak to the understanding of genial work, as a comparison and for confirmation. Ludwig Richter writes:

> . . . *for the whole must be there in preference to the parts*; it is the first and the origination, and the particular must first develop out of it. That is *in conformity with nature* and *thus genius creates*, also without knowing the law.

Contrast to such—truly rare—revelations, which give to the attentive understanding a beneficial glimpse into the blue depths of genuine, creative, genial souls, something like the following, taken from Ernst Krenek, one of the "modern" recording technicians, whose statement is one of the typical confessions, massively played up today in a kind of rage of self-exposure ("soulful Exhibitionism"):

> The orchestral work "Chain, Circle and Mirror" represents in the course of my works, the last preparatory step to a total serial integration. [As to "total serial integration," compare Haydn's words "they string up one morsel after the other"—Cübe.] Although at the time of its composing—winter 1956-57—I already had quite precise ideas about drawing in the factor of meter, this had not yet been subjugated to the control of serial considerations. In this piece, nevertheless, I employed to particular ends an element which appeared to me ever more essential for the setting up of workable time-series, namely the idea of "rotation." By that, I understand a continuous exchange—again, serially controlled—of tones within the chosen series. Series, whose final tone overlaps the beginning tone of the next series, form the "chain." [In other words, a kind of tone-dominoes game—Cübe.] The "circle" results from definite note-permutations [which Krenek unfortunately only very indefinitely defines here—Cübe.] The name "mirror" relates to the fact that the opening theme, at definite points in the sequential plan for the notes [does the listener perhaps have a text book delivered to follow it?—Cübe.] is repeated in a mirrored form.*

So, with terrifying dismay, it becomes clear how dangerously far advanced already is the *dehumanization* of music and the *subjugation* of the "composer" to a self-driving automation—fixed, emotionless, coldly calculating and necessarily, in the final analysis, excluding the "composer" himself. Also clear is Krenek's fear of being outdone by the already fully automated machinery of the Cologne-Stockhausen-Eimert Team, as shown by his assiduousness in looking for a way to associate himself with the "prescribed" line of "serial time-control" in a manner reminiscent of East bloc self-criticism. The only thing which is not clarified at all for the listener by such gab is Krenek's "music" itself!

Following the above counterposition, it is practically unnecessary to explain this for those who are musical. But in the course of this writing, it will be explained even more precisely why listeners, in so far as they are musically talented—that is, are equipped for direct perception of lawful coherence in music—and have remained honest, *want absolutely nothing to do with and are even unable with the best of intentions to understand* such monstrosities, made of child-like and childish fantasizing about miscomprehended and distorted tidbits about a (relativized) force doctrine (physics), catalyzed through certain new, but in no way conclusive observations. For the initiated, it suffices to point out that with the tools of modern technique—quite apart from the fact that they do not qualify for composing in the sense in which that was understood by the great masters—one can never meaningfully play extemporaneously (improvise)!

A language in which it is not possible to deliver an impromptu speech whose content can be immediately understood by another who similarly has command over this language, is no longer a language, but a secret code such as are used for intelligence reports. If music, *this second mother-tongue of the Germans*, is no longer simply comprehensible and plausible for any musical human being, but must first be decoded by an explainer whose decoding whenever possible takes many times *longer* than the sound-construct being decoded, then the name "music" is no longer acceptable for such creations from what a musical understanding can only call a *demented mind*. No one should stand up at this point and assert that *he* can "hear" something which is, so to speak, "above" *my* ability to perceive! I would only be compelled then to apprise the person in question in detail as to the extent of the gap between his and my real capacities to perceive.

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* Taken from the program notes of the *Bayrischen Rundfunk*. [Ernst Krenek, a member of the Vienna circle around Schoenberg, was also a collaborator of the Frankfurt School's T.W. Adorno in psychological profiling studies in how to create "a taste" for successively more degraded forms of popular music in the population at large, both in Europe and America—translator.]

My studies with Schenker were confined for the time being by the status of his work and researches. I worked through with him his "strict polyphonic counterpoint." Also, the thorough bass lessons of Philipp Emanuel Bach, whose practical examples Schenker was able to explicate in a fashion which made clear, very quickly, the enormous amount of theoretical knowledge a genius such as Philipp Emanuel had at his disposal to bring to bear on the fine, internal structure of music, although he had to resort to and satisfy himself with no less a demanding pedagogy for its presentation than the theory of the thorough bass. Nevertheless, he succeeded—by dint of his genius—to at least bypass scarcely one important feature of free counterpoint, even if the premises of this art would have to be obscured by such an approach for the less gifted. Otherwise, Schoenberg for one, and many others would have been made to understand that they were to derive these premises from their reading, as Heinrich Schenker understood he was to do. Later, Schenker commented at length on Emanuel Bach's thorough bass system from the *On the Correct Method of Playing the Keyboard*. Unfortunately, I have no knowledge as to how this extremely valuable commentary came to be left out of his literary remains.

Having become intimate in this way with the deepest secrets of the musical art of writing, the precondition was set for me to push forward my own compositional work with energy, while, through the avenue of *understanding* as well as of *experience*, to make entirely my own Schenker's discovery of the underlying laws of the art of tonal poetry.

Schenker never wanted to be seen held up during his life as a man of *science*, but always only as an *artist*. (In view of the disdain which burgeoned even then in musical science toward all the purely *technical* aspects of music, and since the scientists increasingly began to displace themselves on the utter fringes of the musical arts such as its history, research into sound and vibrations, or specialized in and limited themselves to anatomical, physiological, bibliographical, ethnological, aesthetic, psychological and sociological issues —for *all* of which *a devoted musical gift is not unconditionally required!*—this emphasis on the *artistic* on Schenker's part appears entirely understandable and consistent.) Similarly, it took me a long time before I myself came to the conclusion, and had worked through to the decision, that Schenker's discovery, developed through a purely intuitive approach, needed to be given supplementarily an irrefutable, precise scientific anchoring. This proved subsequently to be that much more urgent, as an attempt was made to brush off Schenker's results with much more premeditation when the more clearly its dangerousness to the dark aims of "fashionable modernism" was recognized over time, by putting it in the category of an "isolated, subjective interpretation." Recently, the blatant lie has been in waiting that Schenker's theories have "validity only for music up to Brahms." This lie even takes on the appearance of truth if the fact, ironically proven through Schenker, is remembered that the requirements of natural laws, as they distinguish the works of the geniuses unmistakably and inimitably, can only be demonstrated up through Brahms. That does not mean however that these laws *no longer operate* after Brahms, but rather show the dreary state of affairs of the *disappearance* of the *capacity* to *realize them* in the 20th century. Precisely this sad fact can be proven *no better* than with aid of Schenker's analytical method.

Heinrich Schenker strove for many years to bring the above identified *Genial Thinking* into a form of presentation which would make it recognizable, understandable, and—to the extent that this is even possible—*acquirable* to the musician. The deciding facts (of which a few are in no way previously completely unknown, but have only not been correctly recognized in their true essence and above all in their active force and breadth) are the following, temporarily cited without proofs, which will appear in a later section:

1) *Every genuine work of art of so-called absolute music* (that means of a music which bears its reason for motion *in itself*, in contrast to music which merely *accompanies* a dramatic setting, a poem, a dance, a film or radio show, a cult ritual or anything of that nature) **always** *contains a kernel-configuration, named "Ursatz," which corresponds to a general creative law of nature, and from which the entire, purely musical* **content** *of the work including its form takes its point of inception and its development.*

2) Correspondingly, every so created, genuine musical work of art, is derivable from (reducible to) this "Ursatz."

3) The demonstrable *absence* of an Ursatz-kernel configuration in an absolute composition *excludes with certainty* the use of the concept "musical art work" in connection with the same.

4) Audible perception (akroamatic perception) of music, in a musical person, in correspondence with this natural law, is so ordered that he will experience this *absence* of the Ursatz-kernel configuration in an absolute composition as *unsatisfying*, and lengthy violations against the resultant secondary laws from this basic law will be experienced as *repugnant*.

5) To aspire defiantly for an alleged "education" of musical listeners toward a *hearing facility* other than this *natural* one is a *futile approach*.

6) Whoever claims to be nevertheless *pleased* by a composite of tones or noises in which it cannot be proven that the above-named natural lawfulness is at work (for example, twelve-tone or electronic "music")—that is, that he finds awakened in him an impression of beauty, order and symmetry—is either *unmusical*, or a *liar*, or a *coward*.

7) The three possible Ursatz-kernel forms are always composed of a) an upper voice, named the "Urlinie," which *moves downward* from the third, fifth or eighth tone of a scale to the first or basic tone (tonic—which is the same thing as the 10th, 12th, or 16th tone of the so-called overtone or "Formant" series falling to the eighth tone) and b) always of a so-called "bass arpeggio," which rises from the tonic of a scale to its fifth tone (dominant), and *falls back* to the tonic (or, moves from the second to the third of the overtone series and back), which is also named the "Ur-cadence."

8) *Single tone coherence* is thus *demanded by natural lawfulness* for the entire content and developmental unfolding of an absolute composition.

9) *Violation* of this natural law, as carried out for example in atonality, bitonality, or polytonality, dodecaphony and panserial electronics, is *thereby absolutely equivalent to violation of the concept of music.*

10) The above laws are also effective in the cases mentioned in (1) above, in which non-absolute musical art forms have been socialized with other categories of art, whenever the pieces in question are *complete in themselves*, particularly as is the case in art-songs.

In the framework of this book, it is not possible to go into the other relevant variations and mixed-types.

From *"The Mission of German Genius"*

The essay excerpted here was originally published as the lead essay in the first volume of Schenker's journal Tonwille (The Will of the Tones) *in 1921 and was translated by Renée Sigerson.*

What democracy is, we can see today clearly enough.

And as we see it today, democracy has been preached, understood and practiced throughout barren Western countries for the last centuries—in the West, where not a single drop of that genuine mother's milk has flowed to the eternal infant of mankind, which sweet and sacred milk nurtures, making possible and prosperous growth; not even a workable substitute for this was given, merely stones, wafers of poison were offered. It was according to the path of such a democracy that the typically Frenchified, vulgar "Enlightenment" of the Encyclopedists, of Rousseau and Voltaire worked, which we can best describe as the finest outgrowth of philistinism: namely, that guillotine, that "Temple of Reason." (We mean French Reason, which in typically French fashion, under a Napoleon, turned its path to plunder and robbery.) In addition, the hypnotizing usurpation of Anglo-Saxon ideology in England and North America are the same thing. Because the common folk, just like mediocre men, enjoy presenting what they experience and say as something completely new, simply because they do not know how often before exactly the same things were lived through and said, for this reason, the Western peoples have declared their democracy a complete first and have thereby, as we can see, made the best of it. What, however, have they achieved?

. . . On top of the shameful defeats suffered by the people of the West and the South on all battlefields came the most shameful defeat of all: Versailles and St. Germain. This is where Western democracy—measured against what it presumed itself to be—became, *in bello veritas*, identical with the utmost moral depravity, filthiest lying, with unparalleled incompetence, crassest ignorance, with violation of human rights, deception, blackmail, theft of private property—yes, even with infantile personal behavior. In no previous epochs of humanity—not in antiquity, and also not in republics—have peoples ever demonstrated such an abysmal moral and spiritual level as in Versailles under the sign of democracy and the common man.

(Even savages and cannibals following their proclivities are more noble and pure than those savage and cannibal hordes of Versailles who strut about with their paper-thin veneer of Christianity.) Four or

five pieces of human refuse, who happen to be responsible for their populations according to the law of democracy, with openly advertised, scornful unscrupulousness (always the reverse side of spiritual inferiority), have engaged in some miserable petty bargaining with the fates of countries and peoples, and for purposes of looting, have brazenly attempted to pass off to contemporaries and future generations as a victory what in fact fell into their laps all too easily as a fruit of the most detestable treachery. This is where—and herein lies the kernel of humanity's so-little understood tragedy—not merely the contending governments, kings, presidents, and other leaders, but also the peoples themselves were disgraced, dishonored, and (to use a phrase from the Old Testament) "made to stink."

The entire globe stinks with the *foedor Britannicus;* it must be aired out. . . .

. . . The principle and practice of the Englishman—the Magna Carta for himself, a noose for everyone else; his own house his castle, but other's houses belong to him too—surely gives us no hope for enlightenment from this vulgar, depraved character. Just as unprincipled behavior and honesty are two different things, so are England and true culture. Nothing is therefore more revolting and repellant than to see how the English, after they have brought their booty to safety (as they have at this moment) turn around and once again act like a friend of humanity, culture, and religion. And their scholars (whom Schopenhauer dubbed "orthodox Oxford oxen") who only yesterday bared their teeth at the hand originally offered them by German scholars, today (mind you, the booty is secure!) ingenuously reach out their own hand, naturally with the air of themselves being the prime leaders of reconciliation, fraternization, morality, and culture! Oh, these English turtles! How we must pity the poor German-Austrian children who, for the sake of better nourishment, have to breathe in the stuffy air of their jackal murderers of yesterday! . . .

[We will achieve nothing if] in order to please the enemy, who in Western-democratic fashion is mostly concerned about paying his bills, we assume guilt for the war and put responsibility for the crimes of the war entirely upon ourselves. Nevertheless, the first guilt of the entente is proven—to the satisfaction, moreover, of such unquestionable witnesses as a Jaurès who, using documents of the Russian secret archives, states that the war (and this is also admitted by many British and Americans) was launched with the Russian mobilization orders of July 30, at 7:15 in the evening, after which the Austrian mobilization followed on July 31, at 11:30. This is asserted apart from the numerous other undertakings by the enemy peoples which laid the groundwork for the war over a longer time. . . .

We will achieve nothing . . . if we continue to . . . allow certain writers to make loathsome those "workshops" and "organizations" because they do not yet understand that our enemies are committed to the destruction of precisely these institutions, in order to plunge us, that much more easily, into a final poverty in which the superior German intellect can be finally forced to halt. It is precisely these same

Let's Do Away with the Phrasing Slur

This essay by Schenker is from the first volume of his yearbook Das Meisterwerk in der Musik, *first published in 1925. It was translated by Sylvan Kalib (unpublished doctoral dissertation) and is available on University Microfilm).*

In the first part of this essay, Schenker has rigorously refuted the prevalent editorial practice of altering the composer's original slur markings in the works of Mozart, Beethoven, Schubert, and others, in favor of markings reflective of a romanticized approach to the performance of those works. Schenker points out that the composers' markings, which indicate which groups of notes belong together in a musical phrase, are integral to the content *of the musical conception. The romanticized approach tends to eliminate such articulated distinctions by grouping all of the notes of a phrase into an all-encompassing "phrasing slur." After dealing with the musical issue, Schenker unexpectedly puts the discussion on an entirely different plane by pointing out the epistemological coherence between this approach to musical editing and British geopolitical design, making allusions to the policies of "nations of the enlightenment"—like Great Britain—toward individual nation states. In fact, British editorial scholarship reflected through the time of Schenker's writing exclusively the "phrasing slur" orientation.*

—Peter Wyer

writers who tomorrow will speak with envy of the worldliness of other peoples, with Germany—betrayed by them—ridiculed because of its poverty and narrowness.

[We will achieve nothing] also as we permit German humanity to be so condemned from the ground up by certain philosophers and philosophizing world-travelers, who have never had a single thought about the connection between human soil, elitism and genius; better that they finally comprehend how humanity lives at once a double-life in geniuses and others, how genius is actually other than the soil of humanity out of which it grows, in the same way that an oak is something new, other than the earth's soil in which it is rooted. How nonsensical it is to demand of the earth that it be earth and plant at the same time, and, similarly from human soil, that it be soil and at the same time genius, when in fact only human soil of a certain kind can produce this or that genius, precisely as only this soil bears a specific fruit.

We have seen how the phrasing slur violates the form, changes and disfigures the structure and articulation of the individual parts, damages the motive in details and in its connections, and thus how it simply obliterates that which constitutes the work of a masterly synthesis.

Today, it has already penetrated into all piano transcriptions, even in scores, for which the least excuse is given. But if one considers the fact that among all instrumentalists, it is precisely the pianist who plays the least musically, less musically than wind and string players, simply for the reason that he is not equal to the characteristic nature of piano composition, which demands a thorough education in all branches of musical art, then one has one more basis for assessing this disaster.

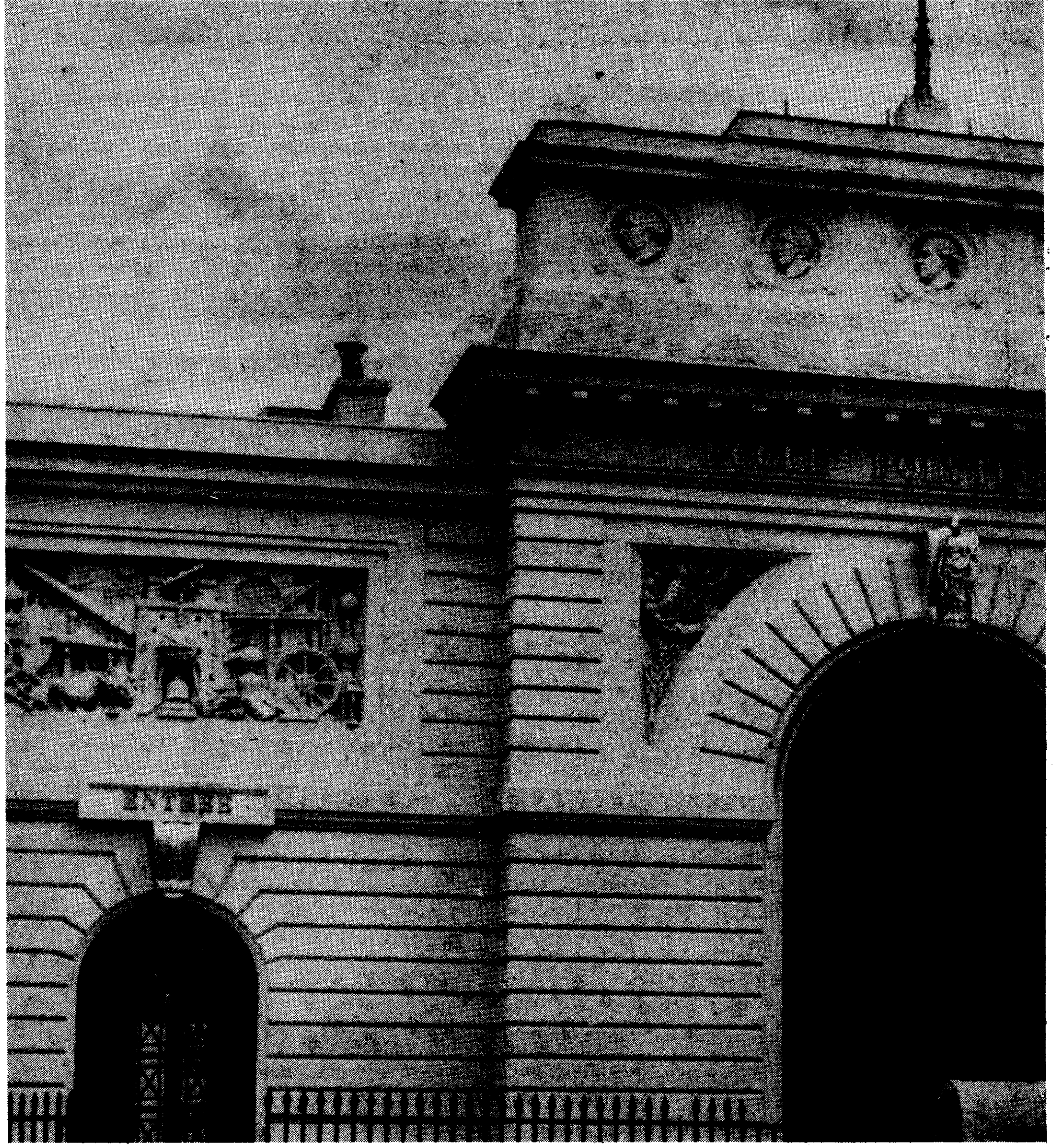
Since mankind has as yet been unable to develop an approach to the creations of the great masters for reasons of human inadequacies, in the future, such an approach to the works of the masters will be made impossible because of external reasons resulting from the phrasing slur. One could say, under this one stroke music fell like a tree! There is no longer a Bach, a Handel, a Haydn, a Mozart, nor a Beethoven; their spiritual trace is wiped out.

How could all this have come about so dismally beyond description? I do not believe that I am in error when I say that the musician has lost his power of musical clairvoyance, the power of tracing the very last connections; and as a consequence, he has also lost the ability to appreciate details for himself as well as in service of the synthesis. The spirit of the musician has become lazier in direct proportion to the weakening of his character. Musicians evade difficulties instead of truly coming to grips with them; they have made things convenient for themselves. They have pursued personal and financial success, until finally they have become lost while hustling in those activities.

I believe that I am not in error when I relate this negative attitude to social and political ideology, which views unity only as uniformity. Has not a large phrasing slur been permeating the entire world for about the last two centuries, drawn by a few presumptuous nations of the so-called enlightenment over all other nations, as if they were the editors of the book of mankind—in contradiction to their individuality as well as in contradiction to the concept of a higher, organic unity grown out of contrasts? Hence everywhere, in political and social life as well as in the arts, the same laziness is seen—the same mania to achieve unity through uniformity, only in order to escape the obligation toward particularity, to which even the unswerving stalwart is no longer equal; uniformity has become a catchword. Just as the masterworks under the editors' phrasing slurs stare at us as uniformity, this is exactly the way all music under the phrasing-slur of the enlightenment stares at us as uniformity, whether it be the work of a genius or not. Add to that the spirit of servility of the German, of whom Jeremias Gotthel's excellent parable is fitting: "Jacob was a good lad by nature, who always conformed to whatever was shown him, and since bad demonstration is more frequent than good, his grandmother so often told him: Jacob, you are an ass and will remain so!" And thus the danger is exceedingly great that the German musician is utterly forfeiting music, since today he almost makes no distinction anymore between, for example, Moussorgsky and Mozart, Stravinsky and Bach, Ravel and Handel. If he does, then at best he concedes progress to the newer ones.

And yet I am convinced that the political and social phrasing-slur uniformity can defraud mankind only temporarily of its true, higher unity. Mankind will not permanently remain a discord in God's creation; Nature itself will force mankind back to particularities as the only true vehicles of unity.

Likewise in music, the true unity will someday be regained. I believe in the German love of truth and integrity; if he would only recognize his error, and ultimately become aware of what the good, true and beautiful depends upon, then we should be able to count on him.



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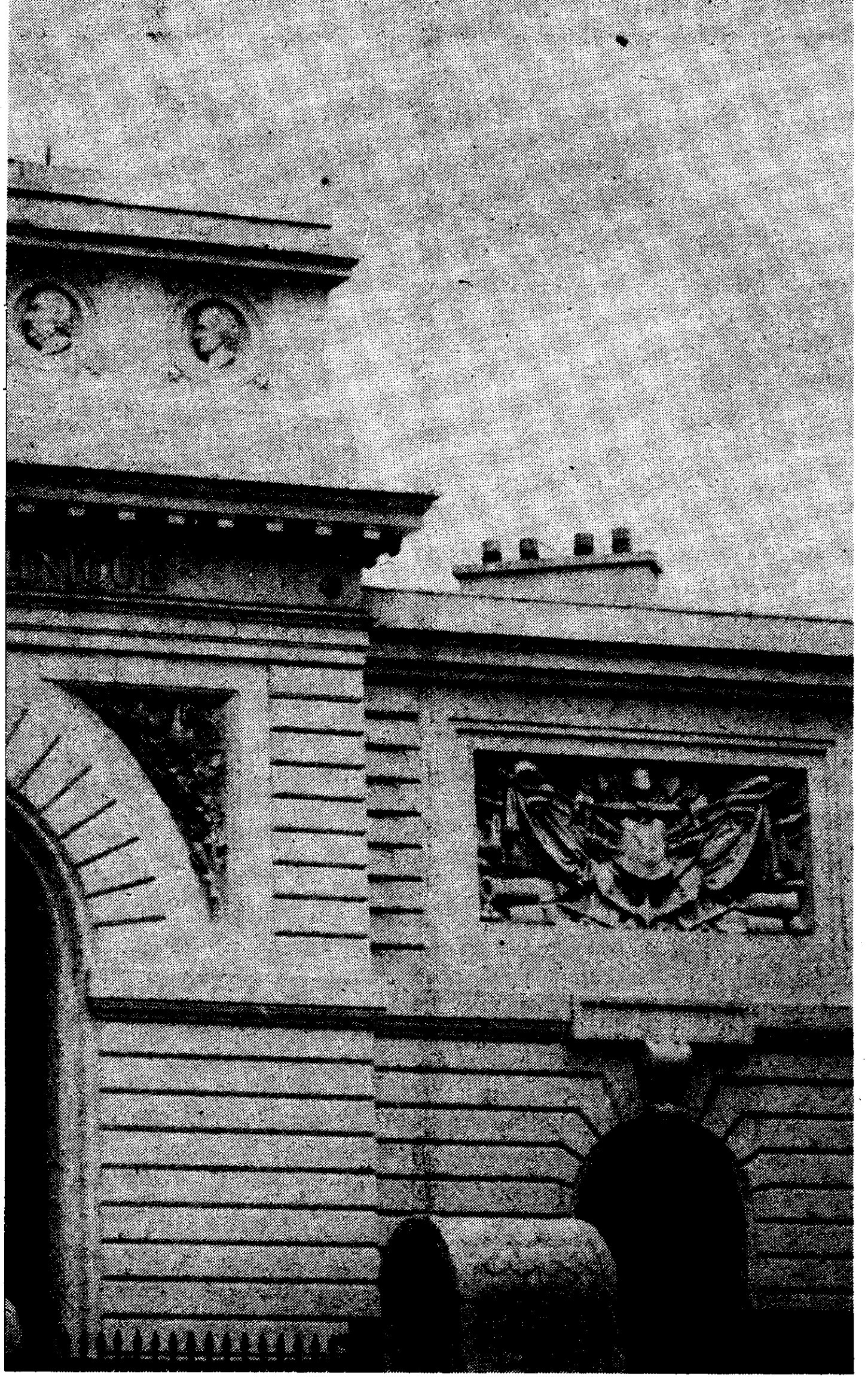


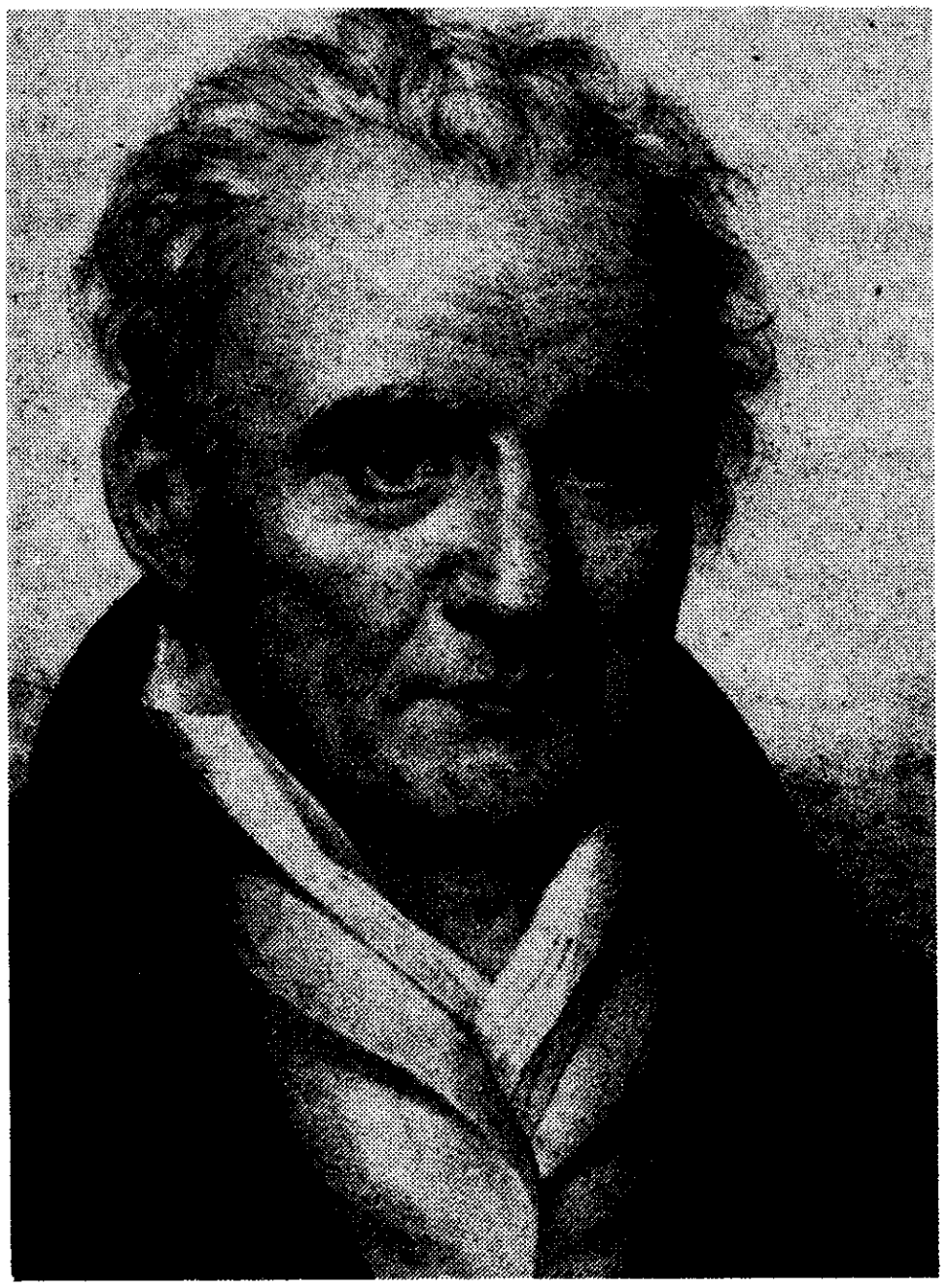
Education

by Claude Albert

What was really at issue during the years of the French Revolution has been so widely mystified that people generally believe that the mere "democratic rights" and "freedom" enjoyed by citizens of France and other European nations today were the main victories of that revolutionary period, victories we owe to the Jacobin and *sansculotte* movement and the storming of the Bastille. It is high time we debunked these prevailing frauds and threw into the dustbin of history the British-controlled crowd—the Mirabeaus, Dantons and Marats—who pass today for the leadership of the French Revolution. More important, it is high time that the men who led the *real* French Revolution, whom British efforts in the 19th century succeeded in relegating to lower historical rank or burying under even deeper slanders, be fully known for their crucial contribution to the advancement of human civilization.

The greatest accomplishment of the Revolution was in fact embodied in the creation of the Ecole Polytechnique, the highest institutional expression of a broad effort by the French Neoplatonic elite around Gaspard Monge, Lazare Carnot and Prieur de la Côte d'Or to build a true Republic, not only in France but throughout Europe. This project had nothing to do with granting the population the "freedom" to be ignorant or the democratic "right" to reject scientific progress, as the *enragé* liberals would propose. For them, freedom and the human rights of a republican citizenry meant the possibility for broader and broader layers of the population to have access to the highest level of knowledge, and thus contribute to the general prosperity of the nation.

These humanist leaders had to wage a relentless fight against British-induced chaos, subversion and



Gaspard Monge

terrorism—not to speak of vicious British-inspired empiricism—and they led this fight on a broad, unified front where the most advanced principles of military science, education and political economy served one single, coherent republican policy determination. The battle which went on then was not the rigged "Jacobin-vs-Gironde" confrontation nor, as the simplistic Marxist class-struggle scheme would describe, was it just between the feudal-aristocratic regime and the emerging bourgeois capitalist order. The real battle was fought against the British bestialist outlook and policies embodied in Voltaire, Rousseau, Mirabeau and the anti-science "ecologist" mobs manipulated by Pitt and Marat as an instrument to prevent the establishment in France and Europe of republics allied with the Americans by the heirs of Henri IV, Colbert and Leibniz, the republicans committed to promote scientific, economic and social progress as the necessary condition for human dignity and morality.

The significance of the Ecole Polytechnique does not lie, however, merely in the institution itself, which was unfortunately rapidly diverted from its original purpose. The Ecole represented a historic and scientific *breakthrough,* the epistemological solution to a grave crisis, because it was a higher form of social organization of humanist knowledge that gave a crucial impulse to scientific and technolgoical progress throughout Europe. We can say that without the Ecole the accomplishments of the Göttingen school of mathematics and modern physics would not have been possible; without the Ecole, we could not account for the reemergence in the second half of the 19th century of the Leibnizian scientific current with Pasteur, Vernadski, Poincaré, and de Broglie.

Now, the question for us today is how this handful of men, "born to extend the frontiers of the human mind," as their younger collaborator and student Charles Dupin said, succeeded with so little means and under the most hostile conditions in militarily defeating a powerful coalition and in educating the seed-crystal republican cadre force that built the world's modern nations. What was their secret, their method? To understand this today is absolutely no rhetorical exercise, but the very condition for the world's pro-humanist leaders to defeat the present Anglo-American plan for "controlled disintegration of the world economy" and a new era of barbarism, and to face up to the gigantic task of bringing about a New World Economic Order and, moreover, an Age of Reason.

The British Plot

Before looking at the Ecole itself and some of its immediate implications, you must get a sense of the ghastly economic, political and social climate in which it was created, which was marked by the infamous *sansculotte*-led rampage against science and education.

Fearing that the upsurge which broke out in France in 1789, as a reaction against the inability of the feudal *ancien régime* to meet society's basic needs would lead to the repeat of the American Revolution and creation of the republic committed to progress hoped for by the Lafayette-led American party in France, the British set out immediately to pull together a European-wide war coalition, using Prussia and Austria as stalking horses, to crush France and potentially dangerous republican developments on the continent. Inside France, Finance Minister Necker and the Swiss financial circles he belonged to launched the Gironde merchant operation whose aim was to turn France into a British-modelled state controlled by the Geneva-Amsterdam banking axis. The idea was to base this state on the payment of the French debt, of which the Swiss owned the major part, and gear it toward a British-type of imperialist policy, looting its cities and the young American republic and engaging in the slave trade. The econ-

omy was sinking under the *"assignats"* operation, the funny-money based on expropriated Church lands which proliferated while the value of the *assignats* remained fixed, as the land was not cultivated. Wild speculation took place as agricultural commodities produced in the slave plantations of the French colonies arrived in Europe, and the payment of the Swiss debt was secured through the product of such merchant-monetarist looting.

In 1793, the British-centered financial houses, which controlled a much smaller part of the French debt, decided to escalate their war against France, as it represented a danger not only as a potential republican state, but even as a rival merchant Empire. The British gave their operations an "anti-slavery" and pro-Jacobin turn, thus inducing a major inflation crisis in France, by cutting it off from its supplies of West Indies' products by supporting Toussaint L'Ouverture's rebellion against white farmers in the islands. As a result, all the independent Swiss banks collapsed, and the others, namely the Protestant banks, moved onto London's side.

With the whole banking system that controlled France collapsed, the British and their Jacobin agents plunged the country into major economic and social chaos and set up the rule of the Terror. Famine broke out as monopolists stored grain for speculative ends. The little that existed in the way of an educational system had been totally dismantled with the expropriation of the Church properties and suppression of religious teaching congregations, which were practically the only educational institutions at that time. Colleges had been closed or were deserted. The majority of the male youth aged 18 to 25, the future teachers, had been enrolled in the armies.[1] The noose of the outside enemy forces was tightening around the country's neck, while the French armies were struck by complete disarray: the newly mobilized troops were untrained and unorganized, and the army command had been severely bled of large numbers of officers who deserted or fled Jacobin persecution.

The onslaught against science, which had started at the onset of the Revolution and culminated in 1793 with the suppression of all the academies, including the Academy of Science, is perhaps one of the best examples of the hand that manipulated the mobs and Jacobin fury; for, beyond the institutions, the target was the entire humanist scientific elite, on whose shoulders rested the future of the nation, and who, as far as the most important figures were concerned, had welcomed the Revolution as the dawn of a new political and social order.

A few months after the storming of the Bastille, virulent attacks broke out against all the academies and the Academy of Science in particular. "Royal

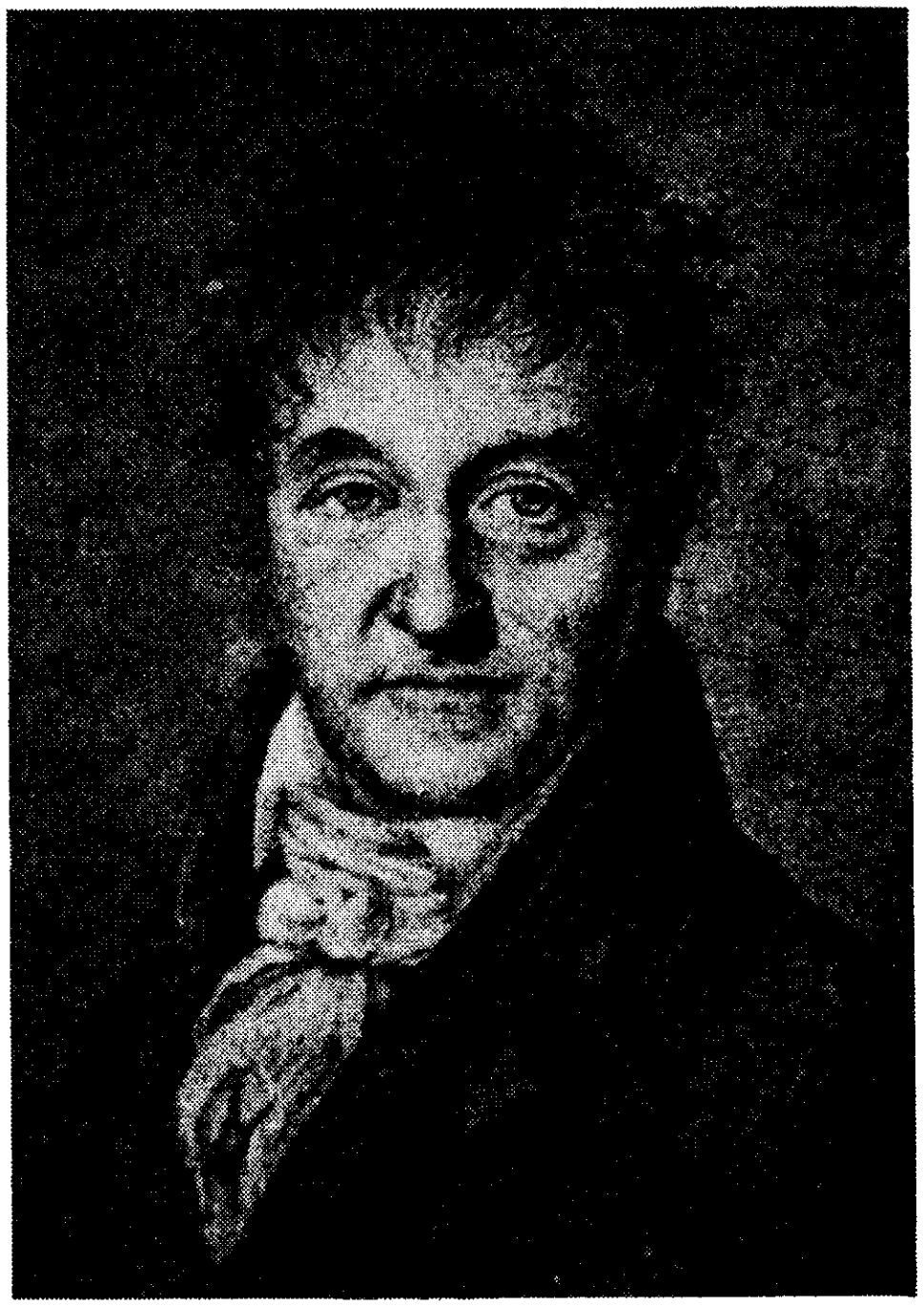
Monge As a Teacher

Monge was never satisfied with simply explaining to his students scientific theories and their applications during regular classroom instruction. Rather, he would take his disciples wherever nature's phenomena and works of art could make these applications palpable and interesting. The region surrounding Mézières, because of its variety, mineral wealth and irregularities, is highly suited for demonstrations in physics and geology. At the same time, this region, having been exploited by industrious men, contains several factories, either for civilian or military production. Monge would study the phenomena of nature and of industry with equal intensity; he acquired at that time the practical knowledge that was later to contribute forcefully to saving his country, and he was eager to have the studious youths benefit from it.

During these excursions, made on holidays during the best times of the year and into the most beautiful places, Monge's imagination seemed to grow and grow just like the sights offered by nature. He would transmit his ardor and enthusiasm to his disciples by turning applied research on material objects, which would otherwise have appeared only as laborious study done inside a classroom through abstract considerations, into the exciting pleasure of observation.

From time to time, in order to reach some factory faster without going around to the roads and bridges, Monge would ford a stream when he came to it without interrupting his explanations to the students, who continued to surround him in silence, completely engrossed in the truths he was revealing to their intelligence. So great and magical was the power he exerted on their minds!

From Historical Essay: The Philosophy of Science *by Charles Auguste Dupin.*



Lazare Carnot

academies smell of slavery!" the *sansculottes* clamored in the streets. Nobles, who made up the majority of the Academicians, became suspect by nature. Most of the Academicians were targetted for being "pensioned by the King," including convinced revolutionaries. By 1790, slanders and attacks escalated and a veritable war machine was set up with the publication of a raving pamphlet calling for the "suppression of all the canons of sciences, arts and literature," and accusing the Academicians of "eating the food of forty households" and being "instruments of Royal tyranny."

Needless to say, the Academy of Science, which had been founded by Colbert in 1666 upon Leibniz's direct recommendation, had nothing to do with some parasitical aristocratic salon, as the mob rantings would imply. A direct heir of Colbertian policy, the Academy was an integral part of the government and the highest scientific authority in the state. All national inventions were systematically submitted to this scientific body in view of practical applications, while the various government ministries commissioned it for specific tasks on a regular basis. Members were expected to engage all year long in productive activities, which were generally regarded as intense. This was especially true after the 1770's under the combined impetus of the revival by Trudaine and Forbonnais of a dirigist, neo-mercantilist policy based on industrial progress (a lot of field work had been done on metallurgical technology to build the national steel industry, notably by Monge himself) and the influence of the "American System" whose great emissary Benjamin Franklin had organized humanist networks in France from 1777 to 1781, including from within the Academy of Science, of which he was a member.

In 1790, the Constituent Assembly had commissioned the Academy to elaborate a national uniform system of weights and measures, a task for which the Academicians deployed major efforts in order to develop it on a solid basis, notably through the adoption of the decimal calculus. However, the Academy's persistent requests for the instruments necessary to carry out this work remained unsatisfied; and this, despite the fact that the demand for such a uniform system had been emphatically put forward in the *Cahiers de Doléances*[2] throughout the country, and despite the fact that the Academicians themselves insisted that this task was truly "civic" in that it was the most immediate means to develop trade by increasing commodity exchanges nationally.

It was at that time that the psychotic British agent Marat stepped in to orchestrate the campaign against science and progress through his newspaper rag *L'Ami du Peuple.* A quick look at Marat's pedigree gives the full stench of what lay behind his rallying-cry for the *enragés,* "Academies are zoos where, at great expense, quacks and pedants are gathered." Marat had a long history of trouble with French academic circles, which had rejected him as an utter nut as early as 1766. After this he spent eleven solid years in England and then reemerged in Paris with a fraudulent title of "doctor of medicine" which got him a position as the doctor for the stables of the Count of Artois, a rather mentally ill person himself! Up to 1789, Marat repeatedly tried to enter the Academy of Science with the help of various frauds, and Franklin's theory of electricity was one of his favorite targets. In 1788, he shifted to the political sphere proper and, using the wildest sort of lies and concoctions, flared up the mob against the "aristocracy of knowledge" which, according to the 1793 "Law of the Suspects," was to be prosecuted in the same fashion as that of birth.

The Committee on Public Instruction issued a decree in 1793 eliminating all the academies. Some of the best minds of the nation did not escape the terrorist slaughter. Bailly, a famous scientist and the mayor of Paris, was butchered. The Duke de La Rochefoucault, Franklin's former personal secretary, was lynched by the mob on the way to the guillotine. The great

chemist Lavoisier, who tried up to the last minute to salvage the Academy's work on the weights and measures system, was executed. Monge himself was repeatedly harassed and nearly rounded up as an "émigré" for having been "too soft" with officers from the nobility and the Girondine camp during his tenure as Navy Minister in 1792.

As a result of the Thermidor reaction against the Terror in 1794, through which Robespierre was eliminated, Lazare Carnot, a strong defender of a centralized state, took control over the Committee of Public Safety, the revolutionary governing body, after defeating the Barras-Tallien faction which represented the Bordeaux merchants, the financial interest which built their fortunes on speculation on army supplies and the peasants who profited from the expropriation of Church properties, which favored decentralization and restoration of the monarchy.

Together with Prieur and Monge (who was the engineering consultant-member of the Committee), Carnot managed, within the complex political arrangement of the Committee, to maintain a balance of forces favorable to reversing the most destructive features of Jacobin policies. In a situation which remained very precarious politically as well as militarily,[3] a plan to reorganize education was nevertheless among the first measures taken, with the founding of the Ecole Polytechnique a most immediate step. "A moment of storm would have been enough to bring down this lighthouse erected to science and to plunge France again into darkness," said Biot.

The political policies of Monge, Carnot and their immediate collaborators during the Revolution and after have been as much misunderstood and distorted as their overall role during the period has been downplayed. Beyond apparent formal blocs and contradictions—Monge belonged to the Jacobin Club but was strongly suspected of sympathy for the aristocracy and Girondines; Carnot was exiled first as a royalist after the leftist Fructidor coup, and a second time as an anti-monarchist in 1815, while being generally considered an opportunist—their policies were those of consistent, committed republicans who, because they placed the notion of common good above partisan "loyalty," were able to upset the British-rigged political game.

Above all, Monge, Carnot, and Prieur belonged to the transatlantic humanist conspiracy known in France as the "American party," i.e., the genuine republican movement which had arisen in support of the American Revolution: "The independence of America, victorious and confident with the help of our arms, had electrified the nation, and since then a thousand plans for political improvements germinated in every head; it was the subject of all conversation; upon returning from the other hemisphere, the troops were very flattered to be called the soldiers of freedom; one single spark could at any moment cause a universal conflagration." This was how one of Carnot's officers, Tissot, depicted the situation on the eve of the French Revolution.

As Navy Minister in 1792, Monge had been in close contact with the American Republic, and it was La Rochefoucault, Franklin's close friend in Paris, who introduced Monge to the Academy of Science in 1780, when Franklin was still present. Carnot, whose father knew Franklin, and for whom he himself had the greatest admiration, had this to say in 1805 in a famous declaration rejecting Napoleon's establishment of the lifelong Consulate: "It is not owing to the nature of their governments that the great republics lack stability, but because, being improvised in the midst of storms, their creation is always accompanied by passionate excitements. Only one was a work of philosophy, organized calmly: this republic still exists full of wisdom and vigor. It is the United States of North America which presents this phenomenon, and every day its prosperity receives increases which astonish all other nations. Thus it is that the old world had to learn from the new."

The "Ecole of the Pythagorases and Platos"

The Ecole Polytechnique was essentially a victory of "continental science" at a key historical juncture, when the fundamental antagonism between two world outlooks had been decisively exacerbated by the American Revolution and the victory of the American System of political economy over the British System. Historically, there have always been two opposed approaches to science corresponding to two broad epistemological standpoints: one which sees the universe as a collection of discrete particulars and phenomena taken as primary in themselves, and which attempts to define physical processes according to a set of fixed laws; and the other, for which it is not the particulars that are fundamental but the principle by which the totality which subsumes them is changed continuously, through the mediation of the particulars, to higher orders of organization. The first conception of the universe has been that of the "atomists," of Aristotle, Newton, Hume, Locke, Voltaire and Rousseau, and is the fundamental content of British empiricism. These reductionists want man to be bound to fixed laws, and they deny him the ability to create the tools with which higher sets of laws can be discovered. The second conception was that of Plato and the Neoplatonic current associated with Leibniz and the "hydrodynamicists" of the 18th century, whom the British hated for representing "continental science."

For Neoplatonists like Monge and Carnot, the object of science was to increase man's power over nature through his discovery and mastery of new laws of the universe, and they understood that in so doing, man engages in a process of perfection of his own mind, where the rationality of the universe subject to his mastery is reflected. Science allows the development of society toward higher orders of efficiency relative to human practice, and it is through this process that man has access to reason. Contrary to the British mechanists, for Monge and Carnot the finality of scientific progress did not lie in its practical applications as much as in the *morality* it gave access to. Science was necessary for them because it was fundamentally moral.

Such was the ultimate purpose of science as the great geometers and political economists of the early 19th century understood it. It was on this basis, faced with the Marat-led rampage, and Voltaire's obscurantism,[4] whose purpose was to prepare for the rule of British empiricism and bestialism on behalf of the British Empire's interests, that Monge, Carnot and Prieur proposed the extraordinary Ecole project as an essential application of the *principle of least action*, which had its full scientific expression in Carnot's physics, and which was a direct challenge to the British-induced notion of a fixed universe. For they planned the *Ecole* to be a forceful intervention at a crisis point that would set off a "shock wave" effect.

They consciously organized the Ecole on the principle of studying the *process* of science, the process of creativity which leads to scientific discoveries and by which one discovers the power of one's own creative capacities. And the rapid development of this power, its reproduction, its "remultiplication," as Carnot said, in the population to awaken the minds of people as quickly and as numerously as possible—this was the first condition for building a republican nation, and also the best weapon against British subversion. "Better to have republicans without a republic, than to have a republic without republicans," said Monge.

Before and during the 1793 military-scientific mobilization, the need for a single school of engineers which would embrace all the existing "corps" had been discussed often by Carnot, Monge and Prieur. At that time there existed four main engineering schools: the military school of Mézières, where Monge taught and where both Carnot and Prieur had been his students, the most sophisticated one, reserved for noble families; the artillery school of Chalone-sur-Marne; and the civil infrastructural engineering schools of Ponts et Chaussées and of Mines in Paris. The strict separation of those different schools was detrimental to all of them. The officers of Mézières, for instance, were forbidden to communicate their more advanced knowledge to the artillery men of Chalons, the most serious of whom had to go to Paris and take private lessons in physics and chemistry when they could afford to do so.

Lemblardie, then head of the Ecole des Ponts et Chaussées in Paris (succeeding Trudaine senior), had consistently pushed for a preparatory school where military and civilian engineers alike would be taught the "general principles of science." This, immediately, would put an end to useless rivalries between the different engineering corps, in light of the need for a competent technical and scientific cadre force in the country.

The Commission in charge of working out the educational and organizational plan for the Ecole Centrale des Travaux Publics, as the Ecole was called the first year, was selected among those scientists who had worked with the Committee of Public Safety and the Committee on Public Instruction, who represented in fact the leading core of the 1793 mobilization, including Monge, Prieur, Lamblardie, Fourcroy, Berthollet, Chaptal, Guyton-Morveau, Hassenfratz and Vauquelin. The central idea on which they worked was that all branches of public service should intersect in both theory and practice; that they all required the same overall basic knowledge of graphic arts; and that such general studies "could only be carried out under the greatest scientific authorities, in the very center of the arts, and under the supervision of the most distinguished scientists," as Pinet, an historian of the Ecole, put it. So, Biot explains, the Ecole was founded "first to train engineers; second, to spread enlightened men within civilian society; and third, to arouse talents which could advance science."

Gaspard Monge played an essential role in the founding of the Ecole and must be regarded as its actual "father." As a true republican scientist, Monge was primarily concerned with creating the means to achieve the economic and social progress which leads to morality, and the Ecole, encapsulating the best of the Neoplatonic tradition, was to be that tool. "It was an eminently philosophical, eminently national idea, to give each student in a public service a sufficient working knowledge of all the other services," said Dupin, who otherwise described the Ecole as a place "of Pythagorases and Platos."

The "Developments on the Education Adopted for the Ecole des Travaux Publics," widely circulated just prior to the decree establishing the Ecole itself in 1794, heavily bears Monge's stamp in suggesting, especially, that the need for scientific cadre was defined by the need for industrial progress—which, in turn, was necessary to consolidate the republic, as

Monge explained in the introduction to his *Treatise on Descriptive Geometry* (see Appendix).

Monge again played a major role in the additional elaboration of the "Instruction Plan for the Ecole," where the genius of the men who had already defied the crisis during the war mobilization using the principle of least action is apparent. At that time, the state had no funds, no credit. One million troops were called up on mobilization, but there were no weapons to give them. Up until then, bronze, iron, and steel, and even gunpowder for weaponry had been supplied by foreign countries, especially England and Germany. A national scientific mobilization was begun to remedy the disastrous situation. Monge directed all weapons production and undertook to create a massive and sudden development of the productivity of metallurgists, mechanics and chemists, training them and others in the new technologies which he, Berthollet and others had been working on. Thousands of skilled workers were trained during the mobilization. Monge went around to all the main foundries to introduce the new technologies and give intensive training sessions, backed up by the publication of a "Notice to Iron Workers," authored by himself with Vandermonde, which gave them "ideas which must guide you in an enterprise which is both helpful now and useful for our future industry."

The Ecole, similarly, had to initiate a process by which scientific progress would develop as efficiently as possible, despite the extremely poor means available. One major difficulty was getting rolling the initial movement for general instruction which would then transform the situation exponentially. This problem had been highlighted by the failure one year before of the Ecole Normale, a school where teachers were to be trained for the future national education system; where, in Dupin's words, "the very science of education was to be taught." The gap between the quality of education its founders judged necessary to offer and the low level of the students turned out to be practically insurmountable. This problem had to be solved for the Ecole Polytechnique, and it had to be understood much in the way a thermonuclear fusion device works: In order to get the desired plasma reaction and high release of energy, a very high energy-density input must be applied properly. Similarly, a way had to be found whereby high-density knowledge could be efficiently transmitted to the students, and Monge, in the most dedicated fashion, found this method, which actually made it possible for the Ecole to take off altogether. This was the "would be instructors" system.

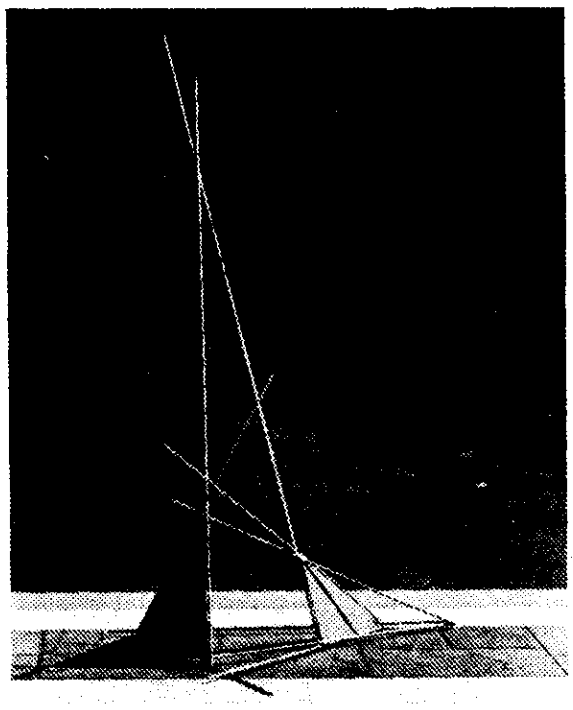
Out of the first 396 students admitted to the Ecole as a result of a national examination, only one-third had received something approximating a college education. The students were then divided into 25 "brigades," and each brigade was given a leader (*chef de brigade*) whom Monge selected among the most advanced students and whom he personally molded, through an intensive cadre school he directed, and through endless private lessons and seminars which he gave day and night.

The idea was that the brigade leaders would rapidly be in a position to ensure that all the students would progress along road "on which everyone had to walk with giant steps," by helping those with more problems, such that the highest overall efficiency would be reached. And the method proved to be correct: "At a time when public opinion, and the government itself, could vary from one moment to the next, to deny the Ecole Polytechnique a definite structure would have meant risking the whole undertaking. The creators of such a vast project had seen the Revolution from too close not to be aware of this truth. But nevertheless, they wanted a major trial run beforehand, through which to confirm their method, classify the students and demonstrate what could be expected from them. So, through a rapid succession of courses, they developed the General Instruction Plan. In three months, we went over the subject matter of three years' studies. This sort of existence, amidst the most exalted ideas ever dealt with by man, filled those years with true enthusiasm." This was Biot's testimony, a brigade leader himself who later became Pasteur's chemistry teacher.

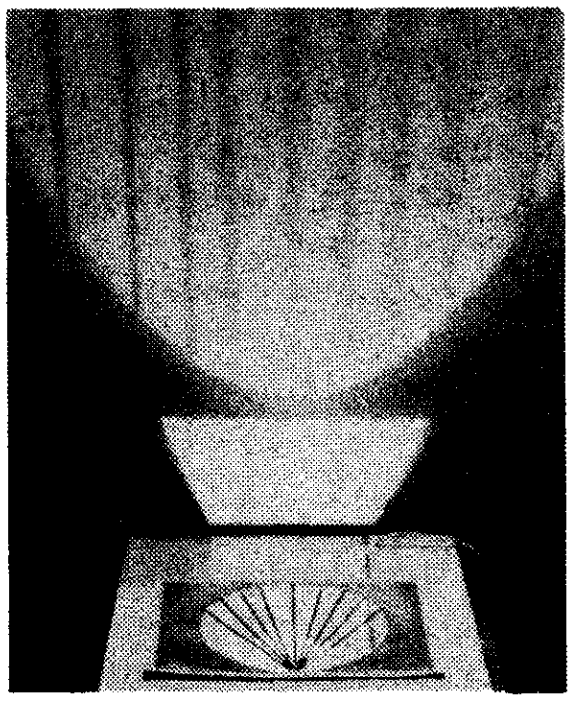
So, it was during those initial three months that Monge created the "would be instructors" through an enormous effort, and that the Ecole's curriculum was presented and tested. In addition, Monge taught his descriptive geometry in public for the first time (as it had been "classified" as a military secret at Mézières), always aiming at the best pedagogical results by using manuscripts to remedy the lack of textbooks, stone and wooden models, graphic heurisms, etc. As Dupin, Biot and many others reported, his outstanding qualities both as a scientist and as a pedagogue were greatly appreciated by his students, the most brilliant of whom were a direct product of his influence and the profound humanist developments of the first half of the 19th century. When offered the chance to head up the Ecole, Monge refused, so as to devote himself entirely to his teaching and research activities; however, de facto, he was running the show. Although all the *instituteurs*, as the Ecole professors were first called, were not of the caliber of Monge, the staff, as intended, included the highest scientific and artistic authorities of the country—names associated with the latest work done in mathematics, physics, and chemistry, such as Lagrange, Fourcroy, Berthollet, and Goyton-Morveau.

Teaching the Ecole Method Today

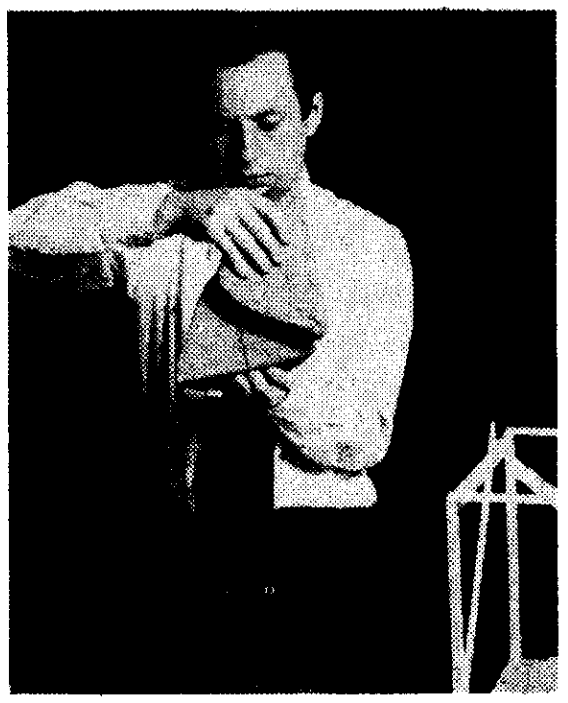
The construction of geometric models and devices by students is an important part of the pedagogy in a New York City class series offered by the International Caucus of Labor Committees, just as it was at the Ecole under Monge and Carnot. The class, taught by Uwe Parpart and Carol White, is a model for reviving the Platonic approach to mathematics and physics instruction which reached a high point in the French Ecole Polytechnique and the Göttingen University circles of Bernhard Riemann and Georg Cantor. Students have received an intensive review of geometry from the advanced standpoint of geometrical physics, in which the concepts of invariance, projective transformation and dimensionality—the *method* of mathematical thinking—have been concretized through solving problems that reflect the physical processes underlying geometrical abstractions.



1. Three-dimensional model illustrates Desargues' Theorem



2. Light box projects conic sections



3. Conic sections used to double a cube

4. Model of a hyperboloid

Pictured here are models constructed by students in the New York class.

1. A three-dimensional model of Desargues' (1593–1662) Theorem. While difficult to prove in two dimensions, the theorem is relatively easy to prove if approached from a higher-dimensional standpoint. Many of the commonly learned properties of plane geometry and objects in space follow from the transformation properties shown in this theorem.

2. The next three photos show aspects of the study of conic sections—studying invariances of the two-dimensional ellipse, parabola and hyperbola as slices of a three-dimensional cone. The light box shows the projective transformation of a circle into a parabola on a screen. The convergent lines are projected parallel and meet at the "point at infinity."

3. Solving the problem of doubling the volume of a cube of a given side, based on a reconstruction of the method attributed to the ancient Greek mathematician Menechmus. The solution, which involves the intersection of two parabolic sections cut from a cone of clay, demonstrates the sophisticated geometrical methods the Greeks used to solve "algebraic" problems.

4. Hyperboloid of revolution. The net-like structure is made entirely of straight wires, despite the overall curved shape of the resultant surface.

—Laurence Hecht

The *Journal de L'Ecole Polytechnique* was conceived as a major educational and propaganda tool (see Appendix). Its purpose was to present pedagogically some of the more significant aspects of the work done at the Ecole, both in terms of classes and research, so that such work could be immediately reproduced in other education institutions all over the country and beyond. This, the *Journal*'s editors said, was also to encourage practical applications of the scientific discoveries. The Ecole was to be a model, and all the material—the teaching methods, solutions to different scientific and technical problems, original lines of research, discoveries, experiments, equipment, etc.—which could help generate progress in human knowledge and activity in the population as a whole would be described, explained and reported on in the *Journal*. The Polytechnicians, far from being held up by the architects of the Ecole as some privileged elite, cut off from the population as the "keepers" of knowledge, were explicitly encouraged to view themselves as directly responsible for raising the population to a higher level. This was their moral mission.

There was another feature in the organization of the Ecole which owed itself to Monge and Carnot's exemplary republican commitment. Monge and Carnot were themselves rare cases of "plebians" who had succeeded in gaining admission to the Mézières school; both gained their scientific and military competence through bitter personal experience of humiliating battles with the *ancien régime* system, where military and scientific careers were the privilege of the nobility. This was absolutely incompatible with the development of a republican citizenry. So the Ecole students, who were for the first time ever admitted to the highest-level educational institution indiscriminate of their social origins, were supported entirely by the state for the duration of their studies. This was the precondition for giving the greatest number of citizens, from whatever social class, access to scientific training. Moreover, the founders of the Ecole had the students live with republican families in the capital, where they could find a supportive atmosphere for their studies, moral backing and adequate material conditions. Prior to the militarization of the Ecole, responsibility for internal discipline rested largely on the brigade leaders, who had been endowed with great moral and intellectual authority.

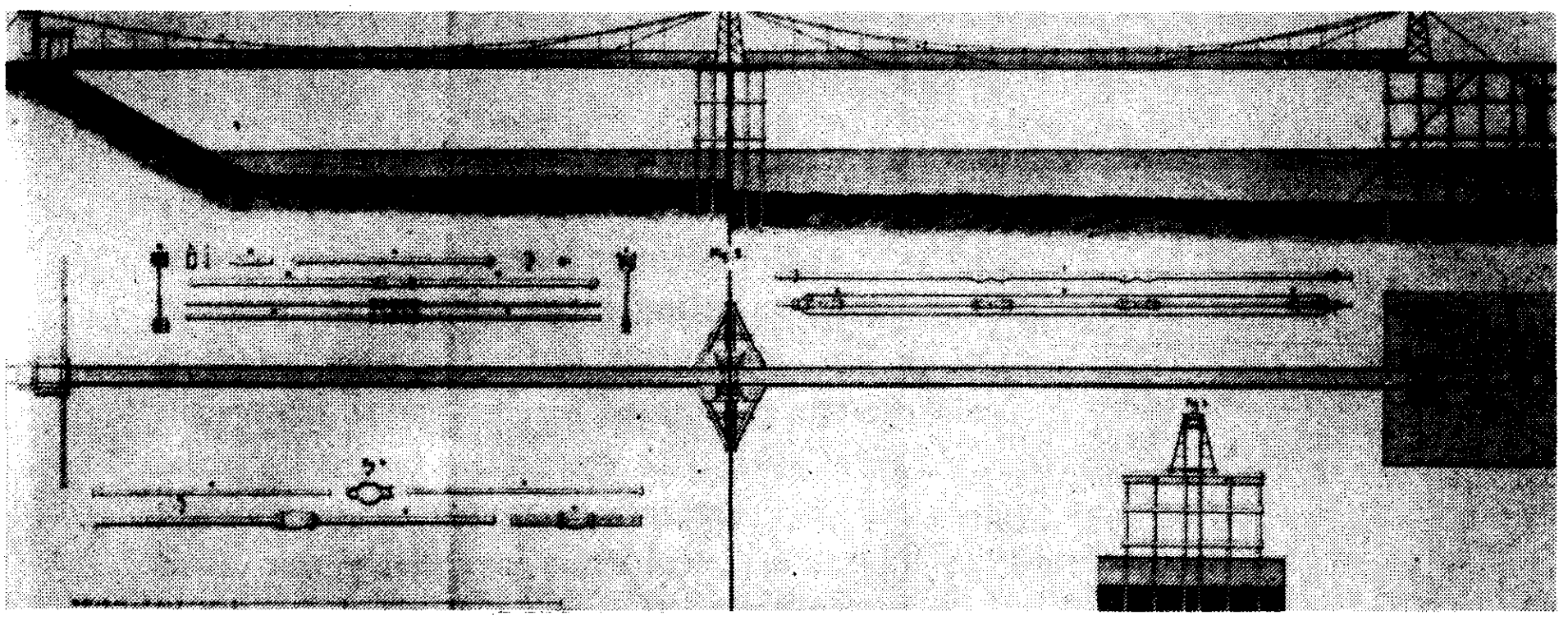
The Ecole as conceived by Monge, Carnot and Prieur survived less than ten years, despite their strong efforts to save it. Operations against the Ecole started, visibly, as early as 1795, one year after its creation. The Convention tried to "purge" the so-called anti-republican and anti-"civic" elements from the Ecole which had been accused of involvement in outside pro-royalist activities. Although a number of Polytechnicians probably did take part in the Muscadine "Jacobin hunts"[5] and related agitation, such a "purge" would have been most disruptive for the functioning of the Ecole, and such was its intended effect. Under the Directory, when pressed again to repress the so-called pro-royalist elements, the Ecole Council flatly refused, knowing full well that such a move was directed more against the Ecole itself than against any anti-republicanism. Along with the Interior Ministry under Baraillon, the Committee on Fortifications repeatedly tried to find pretexts for a "clamp down," claiming that the Ecole was "too privileged" compared to other engineering schools, and demanding its reorganization along military lines, as Napoleon was to impose later. Another type of subversion, from the inside, was that of teachers like the mathematician Laplace, who pushed in a reductionist way for a more "theoretical" orientation of the curriculum, which he denounced as too much oriented towards "practical" and "concrete" activities.

Although Monge was personally very attached to Napoleon, he fought tooth and nail to defend the Ecole against Napoleon's adulterations. Napoleon's idea of recruiting students from rich layers of the population was most shocking to somebody like Monge who, ever since his return from Egypt in 1799, had been giving his salary and retirement pension to help the poorest students. State funds allocated to the Ecole had already been drastically cut down in 1799, despite Prieur's virulent opposition.

Napoleon's 1804 decreee forcing the full militarization of the Ecole was rejected as "disastrous" by Monge, a decree whose principal objective was to impose so-called "military discipline." Students were then required to pay an enormous annual fee. The content of education sank rapidly, taking a direction which Pinet described as "fundamentally" opposed to the views of the Ecole's founders. Courses were cut down. Civil engineering courses were practically eliminated, despite Monge's strong opposition. The special structural engineering course was discontinued altogether in 1807, while "liberal arts" entered through the front door, with the establishment of "grammar" and "belles-lettres" professorships.

"Less for Science Itself Than for the Services It Renders to Others"[6]

Before going into some key aspects of the education given to the first Polytechnicians, it is important to see how the Ecole project was in its essential principles a clear expression of Neoplatonic thought, a direct continuation of the work accomplished by the humanist networks Leibniz shaped in the 17th century,



PLAN, SECTION, WOODEN and IRON PARTS of a 6 inch HOWITZER, for the HORSE ARTILLERY.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

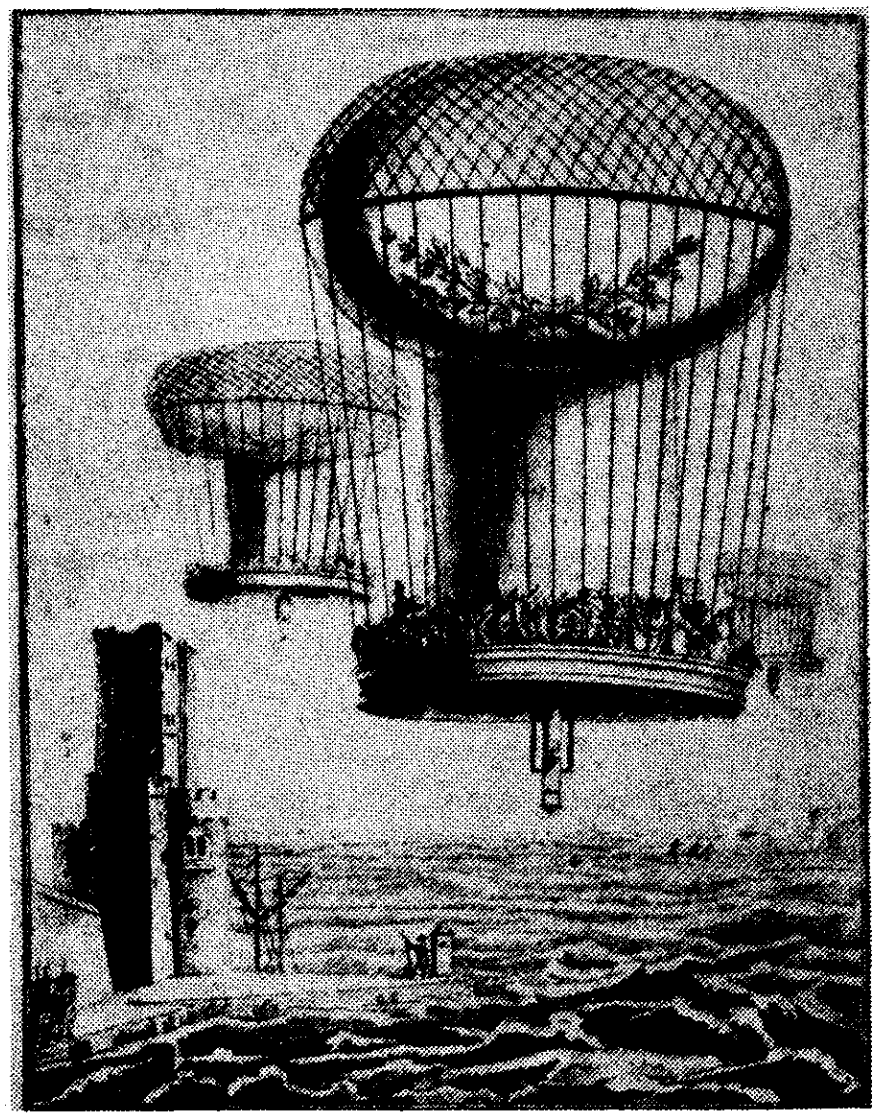
6 Inch
HOWITZER.

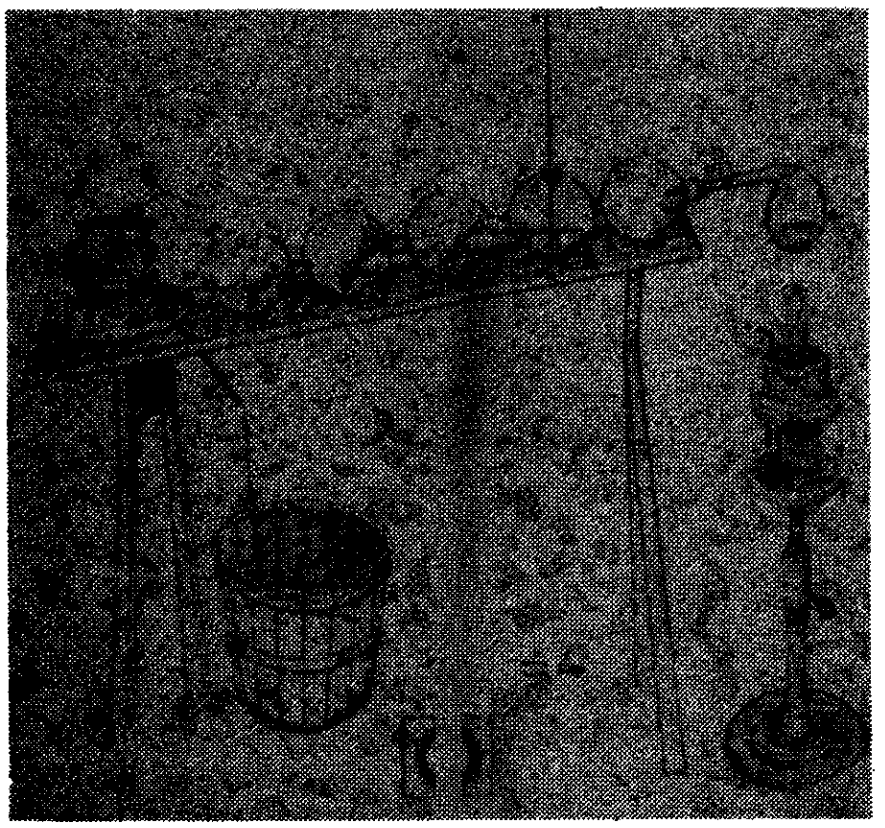
Fig. 19.

Fig. 20.
French Quadrant.

Fig. 21.
American Quadrant.

1 2 3 4 5 6 Feet.
1 3 6 9 12 Inches.





The Ecole's educational method and commitment to republican organizing laid the basis for rapid developments in technological applications. Clockwise from left, an orthogonal projection of a suspension bridge; an aërostat (balloon) designed for the planned invasion of England; Berthollet's apparatus for dyeing textiles; a page from a West Point artillery manual, demonstrating the deployment of interchangeable parts—a technology dependent on Monge's descriptive geometry.

which found its most advanced practical application in the "American System." Namely, the Ecole was the work of the great Oratorian Order on the one hand, and of Benjamin Franklin on the other.

Franklin, the "wise man from Boston," had been a member of the French Academy of Science by virtue of his discoveries on electricity, and he regularly attended the Academy sessions during the four years he spent in Paris as Ambassador of the American Republic. The "Modern Prometheus," as he was called by French humanists, enjoyed considerable prestige. He had established his headquarters in Passy, then a Paris suburb, which quickly became his "Versailles de la philosophie," and from whence he deployed major organizing efforts on behalf of the Idea of Progress that ruled the young American Republic. That is how he factionalized within Freemasonry—which gained some of the greatest French scientists at this time—against the British influence of the Masonic Duke of Orleans. In 1779, Franklin secured the leadership of the famous Lodge of Nine Sisters in Paris, the same year Monge joined the Freemason networks in Mézières. Under Franklin's impulse, the Lodge underwent a tremendous development over the next two years, especially in the field of education. As Carnot identified in his "Report to Napoleon on Instruction" (see Appendix), the efforts of the American Founding Fathers to develop education were held as exemplary. The Lodge proceeded to sponsor the first secular college open to the public, along the lines suggested by Franklin directly, where the emphasis was put on scientific education. This later became the Lycée de Paris, where Monge taught for about two years.

In organizing the Ecole later, Monge drew on his experience at Mézières, as well as on the methods used at the Schemnitz school, the inspiration for Mézières founded in Hungary by Empress Maria Theresa. Her doctor, Ingenhousz, was an old friend of Franklin and a friend of Monge as well. The Schemnitz school was famous for its chemistry laboratory, which Monge replicated at Mézières.

Both Monge and Carnot received their early education with the Oratorian Order and this, as we shall now see, was crucial to their later accomplishments.

The Congregation of the Oratory of Our Lord Jesus Christ in France had been founded in 1611 by the Cardinal Pierre de Berulle, a close friend of Richelieu, as a direct outgrowth of Henry IV's great educational reform project developed by a special Royal commission from 1595 to 1600. As a religious congregation, the Oratorian Order was approved by Pope Paul V in 1613 and encouraged to develop an educational vocation as an immediate rival and coun-

terforce to the Jesuits. While the Jesuits were largely located in the largest cities and taught the richest layers of the population, the Oratorians developed their colleges in the smaller cities, opening their door to the lower classes, with the Oratorian fathers often engaging their personal fortunes to help maintain the flow of poor students toward the Oratoire.

Despite the various difficulties the Oratoire experienced during the political turbulence of the 17th century—with Louis XIV's criminal revocation of Henri IV's Edict of Nantes—the Order always maintained a core of declared Platonists, whose leading fighters included scientist-philosophers such as Lamy, the head of the network in Anjou; Pelaud, who succeeded him after his exile; and Malebranche, who introduced Leibniz to Oratorian education. This core group waged a continuous fight against the Thomists inside the Order and the Aristotelians outside, embodied in the Jesuits. The Jesuits, the most fervent advocates of the Aristotelian system, had as their official teaching policy, "to follow Aristotelianism, not only in logic and metaphysics, but also in natural philosophy."

Under pressure from the state, many attempts were made in the second half of the 17th century to curb the Oratoire, which were met with strong opposition. The fight openly pitted Aristotelianism against Platonism, and in places like Angers and Saumur, most Oratorian teachers refused point blank to stop teaching the Platonic method; this led to the exile of Lamy in 1676. In the same period, both Richelieu and Mazarin had called upon major Oratorian figures to collaborate in their respective governments, while holding back the Jesuits—a situation later reversed by Louis XIV. The Oratorians regained hegemony after Guyton-Morveau initiated the expulsion of the Jesuits from France in 1762, but they too were finally suppressed, along with the other religious congregations, in 1792, in what one of their historians, Lallemand, described as a "violation of the Rights of Man"—given that, with them, the best of popular education was destroyed.

One of the principles on which education was based at the Oratoire was that the student had to himself be an educator in order to better learn. For the student to teach his younger companions was considered a source of great benefit, since he "would enjoy the pleasure of transmitting to the others what he knew, [he would have] a social and concrete goal to reach and [would be] faced with the necessity of perfecting himself in order to teach better," as an Oratorian, Father Houbigant, put it in 1720. This is why the Oratorians established very early a system of *regents*, that is, would-be instructors, on which Monge, himself a physics teacher at the age of 16 at the Oratorian College in Beaune, was to model his brigade leaders at the Ecole. After a few years, students were strongly encouraged to become *regents* and to follow and help out their younger college fellows through their studies for several years. After this, the *regents* had the choice of becoming full-fledged teachers, or priests, or leaving the congregation altogether to engage in secular activities. As a matter of fact, the majority of the Oratorian teachers were young *regents*, and it was among them that Platonism found its staunchest supporters.

In 1684, exiled in Grenoble, Lamy wrote a polemical book revealing the best of the Oratorian method, called *Dialogues on sciences in which, aside from how to study, one learns how one must use sciences as a way to get a just mind and a right heart.* The book, accompanied by *Reflexions on poetical art*, was written in the form of a dialogue between Theodose (Lamy) and Aminte (representing Oratorian friends of his who had stayed in Angers). The central theme is an attack by Theodose on the way philosophy was taught by recitations and commentaries on ideas, and his proposal is to directly use the history of the century's most significant experiments and discoveries in the fields of physics, chemistry and anatomy, by publicly reading original texts on these developments. Once presented, Theodose specifies, the thesis should then be publicly debated. What Lamy clearly means here is that the Platonic dialogue form should be an essential part of Oratorian education.[7] And to some extent it was, as classes always included a lively discussion between teacher and students. The *regents* task, in fact, was also to organize Platonic dialogues with their collegemates. This fundamental idea of Lamy, that "to understand well, one must teach," was most successfully applied later by Monge, whose classes at the Ecole Polytechnique, and before that at the Ecole Normale, were famous for the excitement he generated among his students by provoking them to debate the content of his courses.

What Lamy also meant is that the study of science and the study of philosophy is one and the same thing, and that scientific knowledge should be attained by the study of the process of science, by concentrating on the latest discoveries of the period. Because of the essential link between science and philosophy, the Oratorians considered it to be too narrow for science to be taught independently, which is why their educational programs did not separate out scientific education—this was left to the philosophy teacher. Typical was the case of an Oratorian Father who built a revolutionary aerostat (balloon) in Condem in 1785. As scientific material for study, the Oratorians selected the latest discoveries in the fields of electricity, differential and integral calculus, etc. This was part of

their effort to push for the development of exact sciences, as opposed to the sciences taught at the University of Paris which, in their eyes, "subjugated the mind to the rule of syllogisms."

The Oratorians were themselves an actual center of scientific culture, with many of their students becoming major scientists. The first professor of hydrography, Guillaume Denis, was an Oratorian who started his course in Dieppe in 1665. The Dieppe college had been the first Oratorian college established in France in 1616. It was there that the first mathematics professorship was opened, and that Pascal's conic sections in geometry were studied. Hydrography was a nascent science encouraged by Colbert in his perspective to develop waterways and hydraulic machines, so as to expand the economy. Hydrodynamics, as it was later called, developed some of the most advanced conceptions in physics, such as that of the shock wave, and has represented a key current of Leibnizian epistemology, running from Leibniz and his collaborators the Bernoullis, through Monge up to de Broglie.

The study of science was generally combined, or even subsumed under that of *history*, which was a major Oratorian innovation. The Oratorians had strongly reacted against the kind of history which was then exclusively taught—that of ancient Athens and Rome and the "empty science of commentators"; they regarded as vital the study of the history of Christian (modern) France. To the heroes of ancient Rome and Graeco-Latin mythology, which they denounced as a "culture impregnated with paganism,"[8] they counterposed the study of the French nation-builders: Charlemagne, Joan of Arc, Henry IV. The first lessons in this new conception of history, French history, were given by the Oratorians in 1634, *in French*, the vernacular language. They had initiated a major effort to study the French language as a living language, which expressed the soul of the nation-building process. All of their instruction was in fact given in French, as opposed to the Jesuits, who used only Latin. The Oratorians taught the new history so as to highlight the development of science, especially geography and geometry.

Among the Oratorians' other key innovations, we should mention the "public exercises," where students carried out experiments in physics and other scientific fields in public with their families, friends and the local population in attendance. The Oratorian colleges were usually well equipped with physics cabinets and scientific instruments, and the students were encouraged to effect scientific experiments of their own. The *regents* were also expected to write dramas, centering on the theme of man's inner struggle between the passions and duty, and those dramas were publicly performed. Every year, the *regents* would be sent to a different college, so that new ideas, methods and discoveries, born in the different colleges, could circulate rapidly. And the new "method" of teaching history, the history of the French nation-builders, was met with a "large, enthusiastic response" in the country, according to Lallemand.

The Oratorians emphasized in all of their education that it is not the amount of particular knowledge which is important, but the process of perfection of the mind for which the study of science is the *mediator*—the "capacity to think well." "Less for science itself than for the services it renders to others." To teach, for the Oratoire, was to be "a worker of light"; science was the means to create real Christian men engaged in perfecting themselves. "Our mind is not made for erudition," Lamy said, "but erudition is made for our mind; that is to say, we must use erudition as a way to order our mind and perfect it." Rejecting the value of knowledge of particulars alone, Lamy added, "Studies must become our substance; one must attain not the knowledge of men, but that of the universal man."

Geometry and the Philosophy of Science

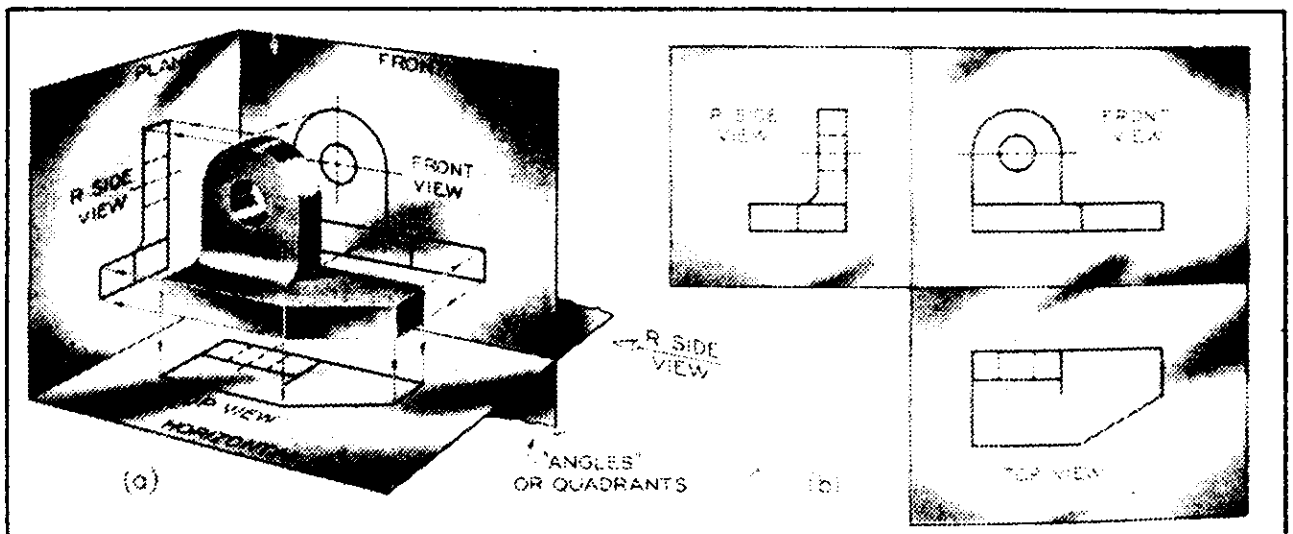
Man is in the image of God (a true Christian for the Oratorians) when he strives for the perfection of his mind through seeking the perfection of the universe. And God, the creative principle of self-perfection, was known to Plato and his heirs as the *Geometer*. On the door of Plato's Academy, one could read: "Let no one enter who does not know geometry," for geometry, as Monge, Carnot and Dupin understood it, is also the "philosophy of science."

This is why geometry played a key role in the education of the first seed-generation of Polytechnicians; not as a fixed set of axioms as it is unfortunately taught today in most schools, but because it represented a unique means to educate the mind to reason by conveying the idea of the coherence of the physical universe and of the corresponding coherence of the mind. For Monge, who made major contributions to this branch of science, the subject of geometry was primarily the way in which forms and figures are generated, rather than their fixed qualities; it was their changing relationships within evolving configurations. His idea was to convey the process by which he had come to his discoveries in several areas of geometry, a process he repeatedly identified as one of great excitement.

Monge's most famous contribution is what is called "descriptive geometry," which is, formally, the representation of three-dimensional objects on a two-dimensional plane. Each point in space is represented by its orthogonal projection on two perpendic-

Descriptive Geometry

Language of Engineers, Technicians and Skilled Workers



First Angle Projection

Since its formulation by Gaspard Monge, applied descriptive geometry has remained instrumental in solving engineering problems which would otherwise require tedious mathematical calculations. The rapid industrial development of the nineteenth century could not have occurred without it.

While still in school, Monge used a drafting method to solve an intricate military fortification problem, thus initiating the development of descriptive geometry. The principles of this new science were soon classified as military secrets, and Monge was compelled not to divulge them for many years. After 1795, the method was taught to educators at the Ecole Polytechnique and descriptive geometry, based upon Monge's work, became an important part of technical education in France and Germany. Monge's book, *La Geometrie Descriptive*, is still regarded as the basic text in the fundamentals of the science.

Monge's principles were brought to the United States in 1816 by Claude Crozet, a professor at the U.S. Military Academy at West Point. About a decade later the idea of manufacturing interchangeable parts was developed in the early armaments industry, and the principles of projective drawing were applied to these problems.

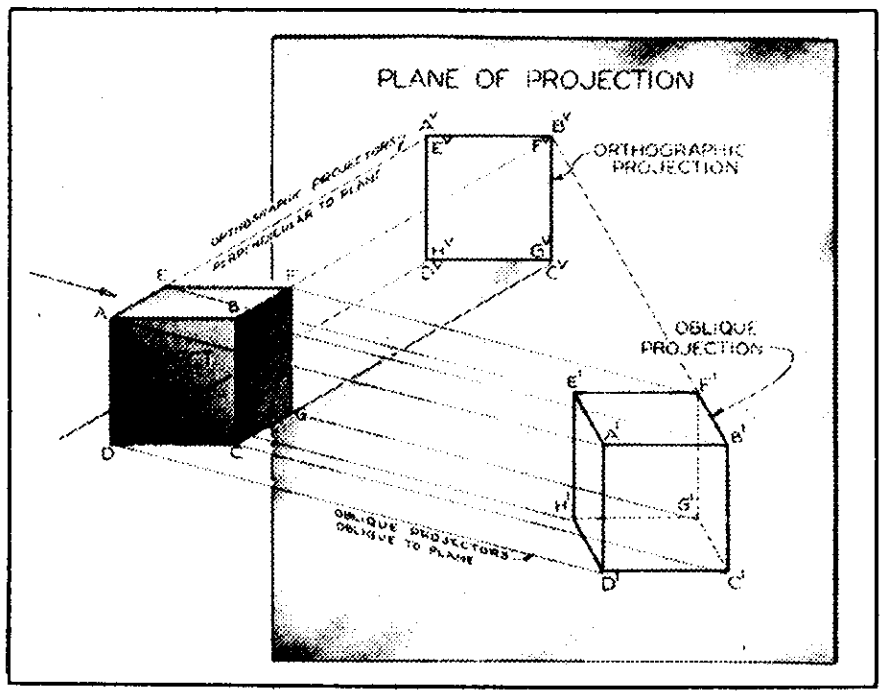
Descriptive geometry is particularly used to project a three-dimensional object onto a two-dimensional plane, such that the true lengths, shapes and angles of rotation which could not be measured before projecting the figure become measurable. (See *First Angle Projection* drawing). This property is the basis for preparing a technical drawing that can be used to construct the object.

A number of different methods have been developed using the principles of descriptive geometry. In an orthographic projection, parallel projection lines are projected onto planes perpendicular to them. In oblique projections, the parallel lines are projected onto an obliquely placed plane. Most of the drawings used in the engineering industries are prepared with the help of both orthogonal and oblique projections. (See *Orthogonal and Oblique Projections* diagram.)

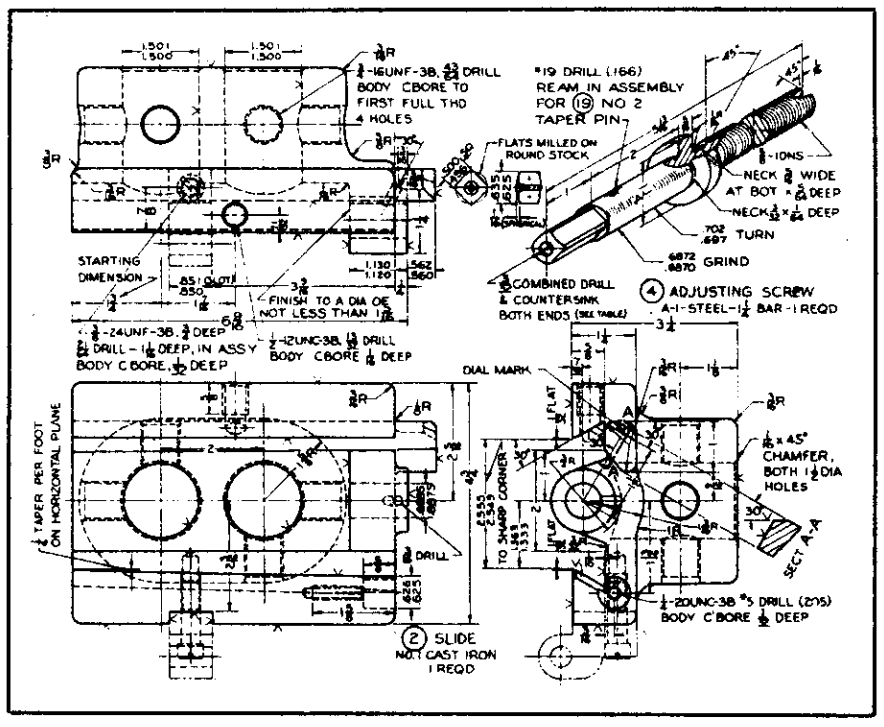
To build a machine, for example, a large number of different parts may be needed, and there are various ways these parts can be manufactured (e.g. casting, welding, forging, etc.). To a large extent the type of manufacturing process determines the type of technical drawing required. Once fabricated, these individual parts are assembled according to the drawing to complete the machine. Here the true length determination of the individual parts is absolutely essential if they are to fit together in the final assembly. (See as an example the *Vertical Slide Tool* diagram.)

Descriptive geometry is also used to determine the intersections of various conical sections and the surfaces that form them. In the example shown here, a right circular cone is intersected by a plane and then the truncated cone is "developed" to find the exact lateral surface of the cone. The lateral surface is the precise size and shape of the metal sheet which, when rolled conically, will fabricate the object. (See *Plane and Cone* diagram.)

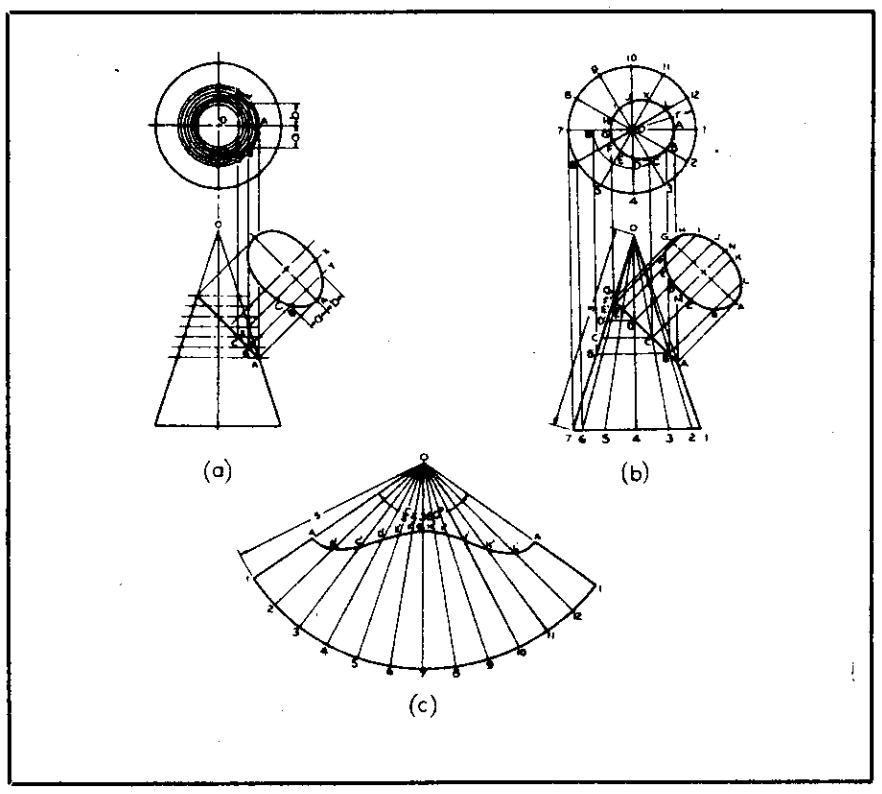
—Ramtanu Maitra



Orthogonal and Oblique Projections



Vertical Slide Tool



Plane and Cone

ular planes; the second plane is then supposed to be folded back onto the first through its rotation around their intersection, and the two projections are on the same perpendicular axis. This was a conscious extension of the work done a century earlier by Fermat, Desargues and Descartes.

This new branch of geometry came about as a direct result of Monge's active concern for the development of French industry, notably of metallurgy and mechanization generally. He knew that such a development could only be achieved by applying actual scientific method to the different areas of technology. At the time, a chaotic situation existed among the engineering methods used in various technical sectors, such that their efficiency was impaired in general by the thoroughgoing lack of standardization. Monge understood the need—if industrial progress was to be carried forward through higher technological efficiency—to recast all the existing disparate processes used by the different technologies. So he synthesized a new concept by seeking the common principle underlying all the engineering techniques and space-connected problems, and found that, by posing the different engineering problems associated with different technologies in a geometrical form, a similarity arose which allowed those problems to be solved with a two-orthogonal-projection method.

What is key here is that his approach to solving the inefficiency of existing technologies—an approach which is the keystone of all the other aspects of his work—is based on the general principle of the "continuum" developed by Leibniz. Monge could solve the problem because, instead of looking for particular solutions to the mass of different problems, he looked for the "invariant" which would solve all of them by locating them in a lawful, higher ordering. As a matter of fact, descriptive geometry was actually a tool to achieve altogether higher technological levels, as it was a means to translate into geometry the global conceptions of more complex and advanced engineering projects which demanded a higher level of division of labor; it was a "language necessary to the man of genius who conceives a project, to those who must direct its realization, and finally, to the craftsmen who must themselves complete its specific aspects," as Monge explains in the Introduction to his *Treatise on Descriptive Geometry*.

Monge had started to work on the idea around 1775 and had developed it through his teaching at Mézières. He presented the fully conceptualized descriptive geometry to the public for the first time in a course at the Ecole Normale in 1794. When he was teaching hydrodynamics at the Ecole du Louvres in the 1780s, Monge carried out many studies and exper-

Geometry And Algebra

Geometrical figures which we conceive of being constructed lawfully are of such a nature that they can be represented by the abstract signs of arithmetic; and the general analytical shapes correspond to the general shapes of geometry. Every analytical operation represents an operation carried out in space, by translation or by transfiguration. In this way, complicated operations of higher geometry can be purposefully reduced into the simpler transformations of arithmetic signs representing the elements of geometrical extension. This is the advantage of analysis applied to geometry. Each algebraic operation can likewise be interpreted by visualizing in space the meaning of the language of algebraic symbolism, thus portraying thought to the imagination; this yields as great an advantage as applying geometry to analysis.

Beautiful mathematical discoveries are never the result of a mechanical or so-to-speak blind combination of abstract signs. The mind, to use a phrase of Montaigne, because of its intuition, must always precede the mechanical march of arithmetical manipulations. It is this province of the mind, guided by more or less certain laws, by more or less direct conclusions, and often by a simple foreshadowing of what must or must not be the truth, that constitutes the philosophy of science.

The new geometry, because it gives the mind the means to portray through representative space the operations carried out in analysis, has therefore served this philosophy most powerfully.

From Historical Essay: The Philosophy of Science *by Charles Auguste Dupin.*

iments on hydrodynamic machines, and considred the study of a "theory of machines" as an integral part of his course on descriptive geometry. He started a general classification of machines (which was later completed by Hachette, a student of the *Ecole* and one of his close collaborators) which had great influence in the 19th century among authors of treatises on mechanics. Up until Monge, scientific circles had approached the study of machines from the standpoint of their individual details, whereas Monge's standpoint was to find the underlying, global conception.

Among Monge's crucial contributions was his work on the generation of surfaces (three-dimensional surfaces were a source of great difficulty at that time). Monge noted that although the surfaces used could be of any number of dimensions, what was fundamental was *their mode of generation.* One can deal with different families of surfaces (cylindrical, conical, or of revolution), and the surfaces of each family are generally defined by the same partial differential equation.

Monge's reply, in a discussion with his students at the Ecole Normale, to a follower of Condillac (a French disciple of Locke and Hume) who argued that to understand geometric elements, one must follow the "logical order" of solid, surface, line and point, is significant. Monge replied by showing that developable surfaces, as opposed to fixed bodies, are most useful for engineering as well as for the theory of projections and the process of algebraic analysis—and therefore he insisted on the importance of classifying surfaces on the basis of their mode of generation. "To say that a surface is of revolution means to supply the knowledge of how it was generated; it means to indicate the larger family to which it belongs; it means to prove that it has all the qualities which fit the whole family in general," Monge explained.

Monge worked, for instance, on a new method to simultaneously represent points, tangent planes, curved lines and different singularities of surfaces. The approach stemed from his global conception of spatial configurations, and consisted of considering all surfaces to be "formed by the movement of a curved line, or of a constant form when it changes position, or with its form and position in space varying simultaneously. Thus a cylinder can be considered to be engendered by the shifting of one of its generative lines or of a directive line, or by the transformation of a straight section." This conception of space, which permeated all of Monge's work, is directly linked to the most significant contribution in analytical geometry, which French Newtonians up to Monge had reduced to the Cartesian rectilinear coordinate system. For Fermat, Desargues and Leibniz had replaced the conception of geometrical space as the space

between rigid bodies and figures studied as such, with space that was a continuum of moving bodies.[9,10]

In the exercises given to his students, Monge tried to develop their sense of "geometrical intuition" as much as possible. "The student must be in a position, on the one hand, to be able to write in terms of algebraic analysis all the movements he can conceive in space, and on the other, to continually represent to himself the moving spectacle in space of which each of the analytical operations is the language." For him, as well as for Carnot and the great geometers they educated, there was no opposition between algebraic analysis and geometry, which were instead viewed as two complementary aspects of the same branch of science.[11]

"The scientific influence of Monge went far beyond the walls of his Ecole and the frontiers of his fatherland and gave its impulse to the development of geometry which was then to begin in Germany. I myself grew up, thanks to my teacher Plucker, in the tradition of Monge," said Felix Klein, who reflected this tradition in his famous Erlangen Program (to which Bertrand Russell, the father of the "new math" aberration, reacted a few years later with his *Principia Mathematica.*)

In another debate with his students, Monge was asked why he had not introduced the method of orthogonal projections directly in teaching his descriptive geometry. Monge answered that he had to "follow the natural march of the mind: I had to show you the nature of the spectacle we have always before our eyes. I had to excite in you the emotions which such a spectacle properly produces. And if, among you, there is one who, during the first lesson or while reading the first session, had his heart start pounding, then that's it, he is a geometer." For Monge, and even more explicitly Dupin and Carnot, knew that the essence of geometry, like any science, does not lie in the mere instrument it represents to effect changes upon the world—although that in itself is necessary—but primarily in the mental process prior to the actual manipulation of the instrument, by which the scientist comes to create *hypotheses* which can be later verified through the mediation of the instrument.

This is what Carnot called "genius itself," what Dupin called "the philosophy of science [which] precedes the material march of mathematical manipulations," and what Plato called the "higher hypothesis." It is the principle by which the creative individual attains real knowledge, and under which the knowledge of particular things and particular scientific tools for seizing particular physical processes is subsumed; the knowledge which has enabled man to move to higher levels of knowledge throughout Platonic and Neoplatonic history.

This process was consciously identified by Monge, Carnot and their direct heirs as characteristically associated with the emotion of joy. As Monge put it, this joy is the very condition for being a real geometer, somebody for whom geometry is the means to grasp the moving principle of the universe, and not just a fixed body of knowledge. Upon reading what Carnot and Dupin have to say on this higher geometry (see Appendix and accompanying boxes), any honest mathematics teacher today should be duly convinced of the viciousness of the "new math," this product of British reductionism which, in place of the coherence of the universe, simply submerges both the coherence and the emotion of joy under a flow of abstract and absurd symbols.

It is only by sensuously understanding this "poetic principle" underlying creative mentation in the different domains of science, as well as great art such as poetry and music, that man can reach reason. So, the real goal of the educational efforts deployed by Monge, Dupin and the other key Polytechnicians was to have more and more people understand this process and freely cultivate it for the benefits of all of humanity. This was the secret, the totally open secret of their drive to "set bonfires" throughout the country and beyond. And in that, they were genuine republicans in the Platonic sense, for to bring the population to *morality* was to bring it to reason. Morality was in their eyes synonomous with reason—let us not forget that the term "reason" had unfortunately suffered terribly in those years from the Jacobin cultism which had reduced reason to an unreal, cold and ludicrous "Supreme Deity."

As a matter of fact, those republicans were poets. In the case of Dupin, this meant efforts to convey the conception of higher geometry, in a highly poetical language[12]; for Carnot it meant writing actual poems, for which Prieur wrote music. Hyppolite Carnot told of how his father, working on military or scientific problems, would often stop, pace his apartment up and down, and start singing a poem that he would write down in the middle of his equations or military plans. The poetic principle of creative mentation was a subject of joyous festivities, for Carnot belonged to the Society of the Rosati in Arras, a society of poets and lovers of good wine, whose banquets were the occassion for the creation of poems and musical pieces. Aside from the influence of Mozart on this and other similar societies, that of Franklin can be clearly recognized, whose "drinking songs" are famous. There was nothing Dionysian in those gatherings; they were a celebration of human reason and creativity, as in Plato's *Symposium.*

Drawing and artistic design were also given a prominent place in the Ecole curriculum, next to

mathematics, physics and chemistry. Here is how the painter Neveu described his program on that subject: "In its most elevated definition, [painting] will also be the art of exciting the mind through the sensations,[13] of acting on the soul through the eyes; it is through this that it achieves its full importance and rivals poetry, in that it can, just like poetry, enlighten the mind, warm the heart, excite and nourish higher sentiments. We will make people feel the help it can lend to morality and to government; and how, in the hands of a skillful legislator, it will be a powerful means to inspire horror of slavery and love of the fatherland, and to lead men to virtue." Neveu opposed the idea of having the student merely "imitate" drawing or painting without understanding the real meaning of it. For him, imitation could only be conceived as a means for the student to "grow" along with the painter himself. "Painting, to fulfill the notion that enlightened men have always had of it, must elevate itself to a higher conception; it must speak to man's intelligence . . . awaken the imagination, keep up great memories and sustain great thoughts . . . it is then that it arises to its full dignity, that it rivals poetry." The rules of composition of great paintings (Leonardo da Vinci was referred to here as the "universal master") were approached from the most advanced geometrical standpoint, in what amounted to the first public presentation in France of the "general principles of art,"—art being no longer this "mysterious," arbitrary thing, but an intellectual achievement of man susceptible of appealing to reason and being judged by reason.

The Egyptian Expedition: A Leibnizian Project of the Ecole

The Egyptian expedition of 1797 was the first field deployment of the Polytechnicians, as well as *a direct application of a plan which Leibniz had proposed a century earlier to Louis XIV.* In the context of his Grand Design for a European entente of sovereign republics, Leibniz had imparted to France the mission of civilizing North Africa and the Mediterranean, so as to extend Neoplatonic influence. This plan had been later taken up by Louis XV's Prime Minister Choiseul, but had been blocked by Madame de Pompadour, a protector of the anti-industry Physiocrats. It is practically certain that Monge, during his stay at the Navy Ministry, got hold of and studied documents related to this plan.

We will not concentrate here on the military aspects of the expedition, however, but rather on its unprecedented overall humanist, scientific dimension.[14]

A scientific Commission was set up by Monge and Berthollet, including some fifty members competent in mathematical sciences and their applications (geometers, astronomers, physicists), civil engineering (engineers for public works, geographers, mining engineers), natural sciences (chemists, zoologists, botonists, mineralogists), literature (orientalists), doctors and surgeons, musicians, architects, designers, engravers—of whom a third were young Polytechnicians. The main idea guiding the Commission and the Egypt Institute immediately established upon the arrival of French troops headed by Monge, Bonaparte and Fourier in Cairo was the "conquest of new facts to contribute to the development of the country . . . happy and content with the sole pleasure attached to discovering truth." As soon as the expedition set foot in Egypt, the engineers were dispatched to draw a map of all the cities and the coast, and they drew up in addition a major "geometrical plan of Alexandria" and environs which, according to Jomard, a Polytechnician geographer and former brigade leader, could have "filled up an atlas." The Cairo Institute, headed by Monge, had for its main task "the progress and propagation of illumination in Egypt; of research, study and the application of natural, industrial and historical facts concerning Egypt." It had four main sections: mathematics, physics, political economy and the arts. The question of what education was to be

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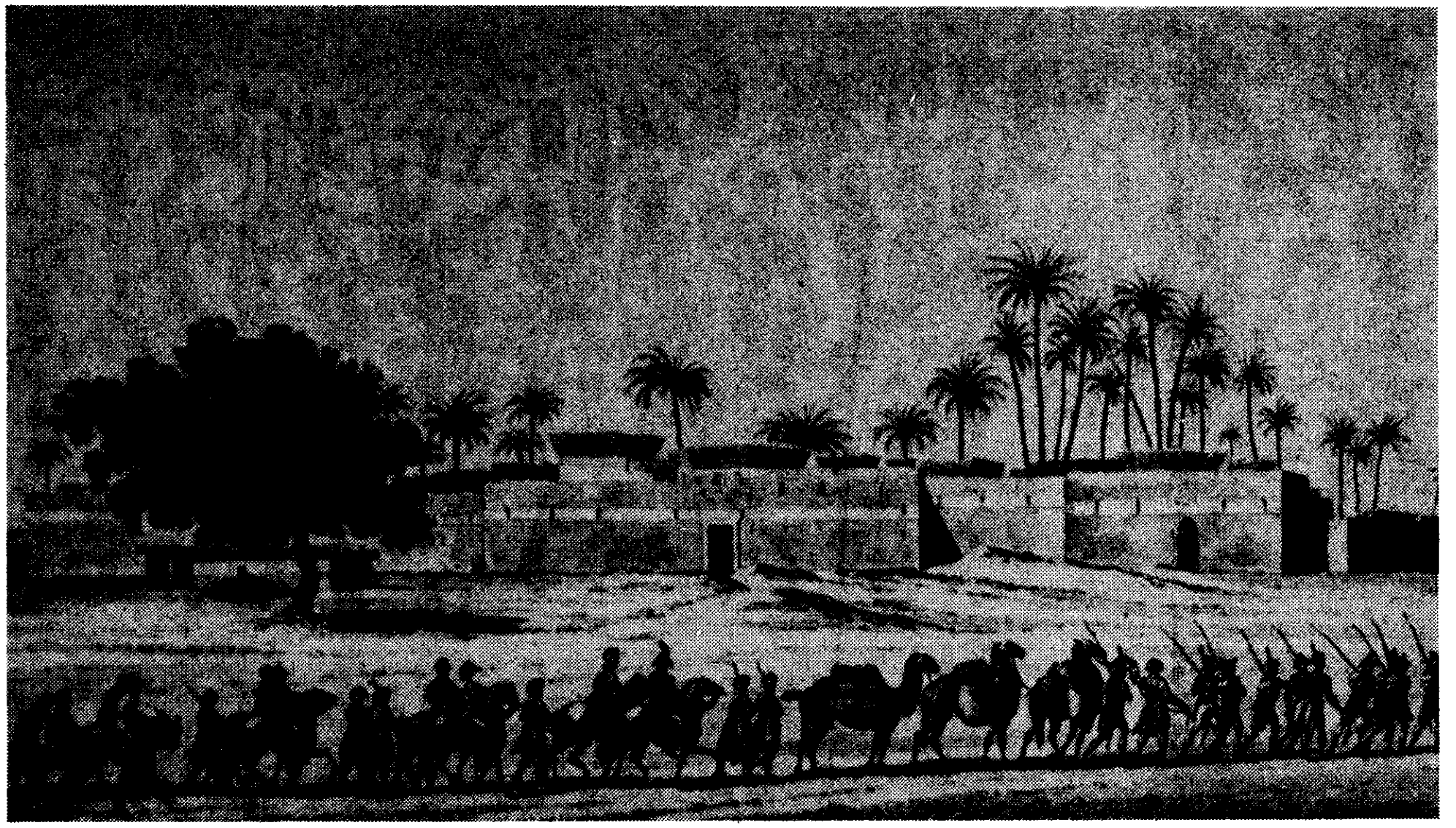


During the 1798 Egyptian Expedition, the Ecole mapped Egypt's geography and resources and upgraded its economic infrastructure by building roads, repairing canals, and through extensive construction. At the Ecole's Egyptian Institute, native scientists were trained to replicate the Ecole's teaching methods among the population. Above, an exploring party including Berthollet and Fourier. At left, Monge in discussion with Napoleon in the Egyptian Institute.

given to the local population was the very first thing studied.

A broad study of the Nile region was undertaken. Engineers fixed the waterways, the main dikes and roads. The Alexandria waterway was drained and made navigable. An initial project for a Suez canal, linking up the Mediterranean to the Red Sea, was studied by Bonaparte. Public buildings were restored. New crops were introduced along with irrigation systems.

One of the first things the French did upon arriving was to set up a printing shop which produced *daily publications in French and Arabic,* addressed both to the French troops and to the local population, con cerning the military situation and all the scientific, engineering and artistic work being done in Egypt. Writers and journalists were part of the expedition, sending reports and books back to France so that the French population would be informed on the progress of the expedition. Art museums and theaters were opened. Physics experiments were organized in public, so as to familiarize the local populations with science. This is why great emphasis was put on the launching of aerostats (balloons), which were deemed suited to favorably "strike the imagination of the population." Berthollet's chemistry and physics laboratory was opened to the public. A rich public library was organized at the Institute, while special scientific schools were opened in the region. Doctors studied the specific health problems affecting the local populations. Indigeneous poetry and music were also studied very closely and "learnedly enriched" with European literature and musical culture. Two periodicals were put out, the *Courrier de l'Egypte* and the *Décade Egyptienne,* which were intended to spread the results of this work "to all corners of France."

The engineers realized a full geographical, topographical and statistical analysis of the country. A census was taken of the population, infrastructure, machinery and industries while the sites of old cities was carefully noted and most historical sites studied. There are indications that remnants of the Arab Renaissance were closely investigated.

This program was undertaken despite great dangers, as it was a full war situation. Many an engineer or a scientist perished. Monge himself nearly died of a very serious illness. During a rebellion against French troops in Cairo, all scientific instruments were destroyed; the Commission had them rebuilt from scratch!

Every night, the Commission met in the Cassini-Bay Gardens under the leadership of Monge and

Fourier to discuss the many projects in an atmosphere described by Jomard as exceedingly joyful—which led thereafter to lifelong friendships among the core of Polytechnicians and their collaborators. "Leibniz was not wrong when he advised France, two centuries ago, to occupy herself with introducing into this beautiful country of Egypt the gentleness and the civilization of her customs, the science and the arts of her children!" wrote Jomard. "We strove to give some reality to the dream of a great man," and it was a good thing, Jomard concluded in his report on the expedition, that there were scientists such as Monge and Fourier and a school like the Ecole Polytechnique to realize it.

"To Elevate Mankind to Human Dignity"

The next task undertaken by the Polytechnicians, another concrete application of the republican principles they had been steeped in, was the launching of a large-scale movement for the education of an industrial labor force, as the great political economists Carnot, Monge, Dupin and Chaptal knew that the primary resource of society from which to expand the economy is located in an ever increasing productivity of labor power. And for this, not only scientists, engineers and technicians have to be trained in increasing numbers, but the labor force as a whole must have access to the type of knowledge necessary to assimilate productively the new technologies introduced in industry. This led to a two-pronged educational effort: the "industrial education movement," as it was called, and a parallel drive for basic, elementary education for all children, essentially sponsored by Carnot when he was Interior Minister during Napoleon's Hundred Days in 1815.

The essential accomplishment of the industrial education movement was the creation in France of a whole network of Arts and Manufactures schools and conservatories. In the schools, the future engineers and technicians were directly trained, while the conservatories were engaged in massively upgrading the skills of working people through evening classes. The explicit concern of the industrial educators was not empiricist training of workers in fixed skills, but developing their capacity to quickly acquire the new skills demanded by scientific and technological progress. On this, A. Guettier, a professor of industrial sciences at the Arts and Manufactures School of Angers, was most explicit: "The duty of the government is to give working people the necessary moral capacity to enjoy their rights and to exert them with reason, intelligence and conviction. . . . A priority is to give the population an educational system whose branches interlink so as to form a complete whole." Industrial education, "aside from its immense influence on the moralization and emancipation of the masses, must be a public necessity. Not only does it close the door on revolutions by channelling the ideas of the population towards the sources of agricultural, industrial and commercial labor . . . but, with the special knowledge that it spreads, it tends to increase the wealth of the country by developing production and improving it on the twofold account of quality and production cost." For Guettier and the others, such education was to "enable the mere operative to reach the highest functions of engineer and industrial manager." Guettier had proposed a major centralized system of industrial education in the 1840s whose centerpiece was a University of Arts and Manufactures modeled on the scientific and industrial arts subsumed within this program.

For Carnot, generalized popular education was immediately necessary in order to "successively elevate all the individuals in the human species to human dignity." At that point, the structure of basic education was totally inadequate for the perspective of rapid development held by Carnot. The means to launch the needed, massive literary effort in terms of credit and teachers did not exist. And here again, the active principle used to solve the crisis was the principle of least action.[15]

This was accomplished through the rather spectacular measures associated with what was then called "mutual education." To remedy the lack of teachers, schools, pens, paper, books and pedagogical material, and yet quickly educate as many children as possible, one teacher was in charge of classes of up to 1000 children at the same time—which he had a few months to teach how to read, write and count with simple methods that required a minimum of implements!

The key here was that the teacher was assisted by selected children acting as "would-be instructors." As Carnot explains it so beautifully in his Report to Napoleon on Instruction (see Appendix), this "principle that generates new teachers"—the same as that behind the brigade leaders at the Ecole and the *regents* at the Oratoire, and fundamentally, that of the Platonic dialogue—was, through the exponential reproduction of knowledge and teaching skills among the children, indeed the most efficient way to reach rapidly the required levels of literacy in the population.

Contrary to the British version of "mutual education" as sponsored notably by the East India Company, in which the education given was minimal so as to form a labor force out of which British imperialist interests could extract maximum loot, the Carnot-initiated movement in France conceived of it as a long-term investment, or high-energy input, so to

speak, of a quality such that the child was given the potential for later attaining the highest level of knowledge and activity. In 1815, Carnot created the Commission on Elementary Instruction, which led to the Society for Elementary Instruction, an outgrowth of the Chaptal-headed Society for the Encouragement of National Industry.[16] Carnot attacked the British-influenced, reductionist conceptions of those members of the Society for Elementary Instruction for whom the sole reason for educating the population was to develop industry and trade. Carnot instead was planning a political reform of education based on republican principles, where the ultimate goal of education was morality and human dignity, men and women of reason.

The controversy which took place around the introduction of *music* and *geometry* in mutual education is highly indicative in this regard. This was opposed by precisely the same people, on the grounds that instruction "should be limited to useful knowledge" and "not lead children to the ambition given by too advanced knowledge." Two names are associated with the successful introduction of the teaching of music and geometry beside the 3 R's, which was one of the most crucial innovations of mutual education in France: Louis Benjamin Francoeur and Guillaume-Louis Bocquillon Wilhem. Francoeur, a former brigade leader educated by Monge, was a mathematician and a musician (his father had been the director of the Opera's orchestra and music superintendent to Louis XVI), who taught mathematics at the Ecole Polytechnique and was secretary of the Society for Elementary Instruction. He organized the geometry curriculum for the children, supervised the methods to be used in that as well as in teaching music, and played a major role in the creation of singing classes in the mutual schools. Francoeur, who was personally very close to Carnot—he offered to hide Carnot in his house following Waterloo, which later caused him to be fired from the Ecole staff—was always pushing the Polytechnicians to create popular schools and take up educational responsibilities wherever they could.

Wilhem was a musician and a tutor in mathematics, who taught music at the Saint-Cyr military school as well as at the Ecole, and was known for his famous anti-British songs.[17] He was a great admirer of the composer Cherubini, who was a correspondent of Beethoven in France, and used his music as educational material with the children. His outstanding contribution, aside from the method he elaborated to teach music in the school and a musical guide he wrote, was the creation of an *Orphéon*, a huge chorus, where children from different regions would meet periodically to sing canons and various songs. The beautiful idea behind it was that in this way the children from different parts of the country would get to know each other, and singing together would create links among them. When Cherubini died, Wilhem wrote a Requiem for him which was sung by the children of the *Orphéon*. Wilhem also organized free evening music and singing classes for adults.

According to Francoeur, Wilhem's teaching method was based on the idea of constantly progressing toward higher levels, with a solid base as a starting point. The objective was to give the population "happy harmonies made to propagate moral thoughts, generous passions." This objective would have been missed, Francoeur specifies, "without scientific conditions and if [the method] had been merely empirical" instead of relying on scientific principles. One of the most successful results of Wilhem's musical method was in psychiatric hospitals, where the moral state of the patients reportedly greatly improved after several singing sessions.

Here is how Wilhem was viewed by musical circles at the time: "He believes that man has a sense of the beautiful only in order to better learn how to be good; that art is a universal agent whose power must be enriched and guided; that its *seed-crystal* is ever-present, but that a few initiators have the task of bringing it forth and developing it among the masses. From this, stems his noble idea of the great musical gatherings which substitute the most noble pleasures for the basest sensual delights; from this, come his perseverant efforts to transform first Paris, and then all of France, into an immense choir, a conception full of poetry and virtue which heretofore will not die out, but will travel the world over."

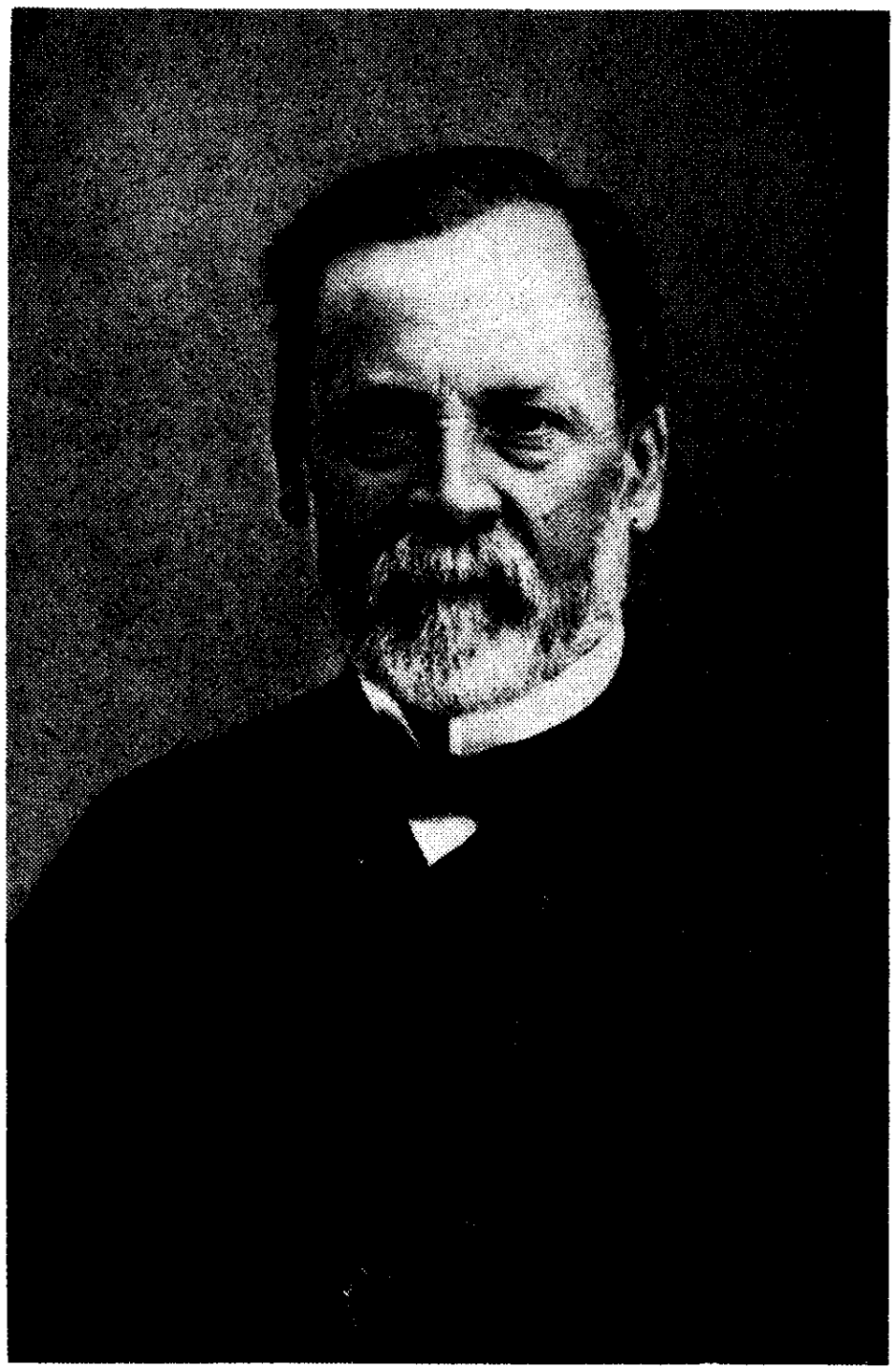
Pasteur on "Enthusiasm"

It is fitting that we conclude our review of the history of the Ecole Polytechnique with an excerpt from a speech by Louis Pasteur, who continued the tradition of the Ecole in the latter part of the 19th century, delivered to the French Academy of Science in 1882.[18] This speech, which remarkably echoes Carnot's poem "Ode to Enthusiasm"[19] written at the turn of the century, captures the secret of the Neoplatonic elite which created the Ecole: the "inner God" principle.

Let us live up to the fight the founders of the Ecole Polytechnique led, for a world ruled by reason. Let us feel the joy of bringing such a world into being, by awakening the inner God in all of humanity. This will be *our* ode to enthusiasm.

* * *

"Positivism sins not only through methodological error. There is a considerable gap in its seemingly tight net of reasoning. . . . The large and obvious flaw



Louis Pasteur continued the traditions and scientific outlook of the Ecole in the second half of the nineteenth century.

in the system consists in that the positivist conception of the world does not take into account the most important of positive notions—that of the infinite.

"What lies beyond the starry vault of the heavens? More starry heavens. So be it! And beyond? Pushed by an invincible force, the human mind will never cease asking itself: What is there beyond? Does it want to stop either in time or space? Since an endpoint would be merely a finite dimension, greater only than those that had preceeded it, no sooner does the mind begin to envision it than this implacable question returns, and the mind cannot quell curiosity's call. . . . Positivism gratuitously brushes aside this positive and fundamental notion, along with its consequences for the life of society. . . .

"Are not the science and passion of understanding nothing else but the effects of the spur of knowledge, put in our souls by the mystery of the universe? Where are the real sources of human dignity, of liberty and of modern democracy, if not in the notion of the infinite before which all men are equal.

"The spiritual bond situated [by the positivists—ed.] within a sort of lower-level Religion of Man cannot reside elsewhere than within the higher notion of the infinite, because this spiritual bond must be associated with the mystery of the world. The Religion of Man is one of those superficially obvious and suspect ideas which brought one eminent psychologist to say: 'I have thought for a long time that the person who has only clear and precise ideas must assuredly be a fool. For the most precious notions harbored by human intelligence are deeply behind-the-scenes and in semi-daylight, and it is around these confused ideas, whose interrelations escape us, that the clear ideas gravitate, extending, developing, and germinating themselves. If we were cut off from this background, the exact sciences would lose the greatness which they draw from the secret rapport they hold with those infinite truths whose existence we can only suspect.

"The Greeks understood this mysterious power below the surface of things. It is they who bequeathed to us one of the most beautiful words of our language: the word *enthusiasm*, [which means] inner God.

"The greatness of human actions is measured by the inspiration that gives them birth. Joyous is he who carries within him an inner God, an ideal of beauty, which he obeys: an ideal of art, an ideal of science, an ideal of his nation, an ideal of the virtues of the Gospel. These are the living sources of great thoughts and great actions, and all of them are lit by the gleam of the infinite."

Notes

1. Jean-Baptiste Biot, who was among the first Polytechnicians, described the environment in which the Ecole was founded as follows: "The general outpouring which the Revolution provoked had spread up to the universities. . . . Rebellious gangs of women and children of all conditions were constantly coming to interrupt studies, forcing the youth to rally around their dirty banner. . . ."
2. The *Cahiers de Doléances* were offices open to the Third Estate throughout France where grievances about the *ancien régime* could be filed.
3. In his report on the constitution of the Ecole after the 9th of Thermidor, Fourcroy attacks "the enemies of public instruction in France" who "wanted to eliminate the 'lights' whose influence they feared. The committees have gathered sufficient evidence of the existence of a conspiracy against the progress of human reason. It has been demonstrated to them that one of the conspirators' plans was to annihilate the sciences and the arts, in order to march toward domination through the remains of human knowledge, preceeded by ignorance and superstition."
4. Voltaire, far from being an advocate of "enlightenment" was a vicious slave trader, fundamentally opposed to education, human progress and reason.
5. The Muscadins were gangs of royalist youth who took over the streets of Paris from the sans-culottes after the 9th of Thermidor, beating up Jacobins and revolutionaries with sticks.
6. This was the motto of the Congregation of the Oratorians.
7. The Protestants reportedly forbade their students to go and see the Oratorian Father Andre Martin, the author of a book on the philosophy

of Saint Augustine and a professor at Saumur, as they would always come back turned into Catholics!

8. Paul Lallemand, the author of *An Essay on the History of Education in the Ancient Oratory of France* (1888), says that if, instead of "being fascinated by the heroes of ancient Rome . . . the men of the [French] Revolution had guided their deliberations with an in-depth knowledge of the past, and discerned in light of experience the new requirements of ideas and customs, not so much blood would have been shed."

9. The significance of Monge and Carnot's key work on geometry, which opened the way to non-Euclidean, Riemannian geometry, was not lost on the French Newtonians. Poncelet, a direct follower of Monge and Carnot who strongly defended the Leibnizian "principle of continuity" whereby geometrical truths "apparently removed from one another are linked in a continuous chain which enables a flurry of particular truths to be embraced in one theorem" (as he himself said), was attacked as a crazy promoter of "four-dimensional romantic geometry" in the first half of the 19th century.

10. Probably the best synthesis of Monge's work is Charles Dupin's *Essai Historique sur les Services et les Travaux Scientifiques de Gaspard Monge* published in 1819. What is key here, in terms of the development of non-Euclidean geometry from Fermat to Gauss and Riemann, is the work that Monge did in applying analysis to geometry on "surfaces which envelop an infinite number of other surfaces." His approach, as summed up by Dupin, is the following: Consider curved surfaces as envelopes of the space in which an individual surface can move, in which the form may or may not be constant, and whose position is variable. The points forming a curve given by each position of the generative surface is what Monge called the *characteristic*. The *characteristic* curves, where the envelope-surface is in contact with the generative surface in each of its successive positions, are themselves enveloped by a curve, an *arête de rebroussement* (so to speak, a heading-off of the edge) which serves as the linking point for two sheets of this envelope surface. The *characteristics* of the envelope-surfaces depend only partially on the nature of these surfaces, as they are essentially determined by the form of the generative surface and the lawful process of its changes in position. For example, a circular straight cone, considered as the envelope of the space in which the plane turns around a point, has a straight line for its *characteristic*. When considered as the envelope of the space in which a sphere of a variable ray moves, it has a circle as its *characteristic*; considered as the envelope of the space in which an ellipsoid of constant form moves, it has an ellipse as a characteristic, etc. (Without getting too technical concerning the method by which such movements can be translated into equations of different orders, what Monge considered to be most important in his theory of envelopes is that one can, by operating with partial differential equations, directly obtain the differential equations of the *characteristic*.) The *arête de rebroussement* is clearly a singularity point, a transformation point from one *characteristic*, i.e., manifold, to another, to use the Riemannian terminology.

11. The reductionist dichotomy between analysis (algebra) and geometry was effected later in the 19th century and directly opened the way for the disastrous "algebraic symbolism" of modern mathematics.

12. Edgar Allan Poe's polemic on the mathematician and the poet in "The Purloined Letter" is most relevant here. Poe, an intelligence officer of the American Republic and a cadet of the Polytechnique-modelled Military Academy at West Point, most probably knew directly the actual Dupin whom he represented in his "fictitious" detective C.A. Dupin as a spokesman for the Neoplatonic method of investigation through hypothesis, as opposed to the British empiricist method. In "The Purloined Letter," Dupin shows that the superior mind, which challenged the empiricist efforts of the police by hiding a letter where the police cannot find it, cannot be that of a mere mathematician, but can only be that of a *mathematician who is also a poet.*

13. Obviously, the "sensations" to which Neveu refers here have nothing to do with what the "sensualists" Locke, Hume, Condillac *et al.* were talking about when they reduced man to a "creature of sensations," i.e., bestial instincts. For Neveu, what is important in great painting is the *emotion* it brings forth, which is the source of the generation of creative thoughts, ideas—a process which the British bestialists denied altogether.

14. The Egyptian expedition was likely the first actual large-scale anti-British operation of the French republican leadership after 1789 and the constitution of the British-controlled war coalition against France. The idea of a decisive operation against Britain was not new. Plans for a raid on England had been discussed among Monge, Carnot, and their collaborators since 1793. In fact, an invasion of England had been planned by the humanist leadership of the French army and navy during the American War of Independence, when French troops first experimented with the "grand tactics" used later by Lafayette and Rochambeau on the American battlefields and by Carnot in Europe against the coalition. Carnot's idea at that time was to destroy Ostend and Amsterdam first, so as to deprive London of its foremost continental banking outposts and cut off British trade with India. But the necessity to contain the internal enemy, e.g. the *Chouanerie*—the cult-ridden, bestial peasantry of the west of France who were rebelling under the pro-royalist, anti-republican banner—sucked all the resources that would have been otherwise available for an attack against Britain, and the offensive was postponed several times.

In 1795, Carnot envisaged creating a Dutch republic and occupying the left bank of the Rhine, so as to deal the Prussian side of the coalition a major blow. Bonaparte's plan for an Italian campaign against Austria was adopted one year later. Monge, who fervently advocated installing republican governments in all of Italy, accompanied Bonaparte as the head of an Art Commission charged with drawing a plan of the major art works in the country, particularly those inherited from the Golden Renaissance. Before returning to France with the famous Campo Fiormo Treaty in 1797, which defeated Austria, Monge took part directly in the establishment of the Cisalpina Republic, which incorporated the cities of Modena, Bologna and Ferrare.

In April 1796, a plan was devised to send 200,000 troops against England, once it had been isolated as the last member of the coalition. In the event such a huge landing operation could not be mounted, Carnot considered landing boatloads of convicts and *Chouans* rounded up in a purge of the west of France onto the English coasts. Another proposal was to send a French expeditionary force to Ireland to support the Irish rebels against England.

At the beginning, the Egyptian expedition was somewhat ambiguous, in the sense that British agent Talleyrand, the French minister of foreign affairs, wanted to get Bonaparte out of the way in order to establish a British-modelled constitutional monarchy in France. This intention was successfully judoed by Monge and Fourier, a student of Monge and later an outstanding mathematician who, along with Monge and Bonaparte, was part of the team leading the expedition.

The influence of the Commission and Institute's development effort started to be felt politically with the emergence of the Mohammad Ali government in 1812. The idea was that Mohammad Ali, who had been trained, as well as his son, directly by Napoleon, would fight the Ottoman Empire and help France get the British-controlled Berbers out of Algeria and take control over the whole Mediterranean.

This grandiose project was militarily defeated by the British after their destruction of the French fleet in 1799, but Napoleon's officers remained in Egypt for twenty or thirty years after that and trained Mohammad Ali and his son Ibrahim's army as a modern force to outflank and destroy the Ottomans. This tradition was forcefully revived at the end of the 19th century by French Foreign Minister Gabriel Hanotaux and the "Colonists." Their Grand Design was inspired both by Leibniz and by the earlier efforts of Richelieu to create a "new France" abroad, under the guidance of the Oratorians for educational and religious matters in the settlements. The development of the United States of America, a Richelieu-supported project, was explicitly conceived as the model for the French republican colonization of Africa, as opposed to the British conception of "Empire." Although the 19th-century Colonists were defeated, they left behind them in Africa a kernel of humanists who have been educated in the tradition of Monge and Dupin, and who represent today the elite for the future Renaissance of that continent.

15. During the scientific-military mobilization, Monge applied the principle of least action to achieve higher efficiency in building fortifications. The problem facing the engineers was the transfer of excavated earth from its place of origin to the site where the fortifications were to be built. Monge put the problem this way: Given two equivalent volumes, one must find the points in the second volume where every molecule of the first volume must be transported, such that the sum of the products of the molecules multiplied by the space of the transfer is minimal—that is, the direction of transport for each molecule so that this minimum is satisfied.

16. In a parallel effort, Carnot organized a Council on National Industry of scientists (Monge and Berthollet), industrialists and brokers, whose task was to study the technical and financial problems impeding industrial development. This was combined with the creation of "savings banks" by Dupin, Chaptal and their collaborators, where the teachers and worker-students of the Arts and Manufactures conservatories were encouraged to deposit their savings so that a pool of liquidity could be immediately invested in industrial projects (this idea had been suggested by Franklin earlier). Reportedly, Monge and Carnot were actually thinking of creating a national bank for development.

Carnot had otherwise expressed his concern for political economic affairs in 1793 in a report he wrote following a tour of the southwest of France: "There should be an annual report on the state of France written by scientists and artists [i.e., technicians] who would have been dispatched everywhere, into the actual places, to gain direct experience, discussion and elaboration of each of the subjects. This report should include, in methodical order, everything those scientists or artists would have been able to gather on the state of the population, on agriculture, mines, manufactures, communications, production, trade, and generally, everything which is the concern of political economy, including also observations, reflections, and projects which they judge capable of contributing to the greater prosperity of the State. Such statistics, whose importance the British have so long known, should be presented every year, at a fixed date, to the legislative body, and it is in them that [this body] would find the mathematical bases without which it is impossible to ever reach a reasoned system of administration." (Although Carnot refers here to the British "Domesday" practice, his suggestion has nothing to do with establishing an inventory of fixed resources, as the British did, but instead of investigating the immediate *potential for developing* national resources.)

17. In 1802 and 1803, Wilhem composed two famous songs in Saint-Cyr, following the capture by the British of French ships (in time of peace). One was a *Chant guerrier pour la descente en Angleterre*, ("War Song for the Attack on England") and the other one was called *Tremblez, Tyrans des mers* ("Tremble, tyrant of the seas").

18. Pasteur repeatedly called for a revival in France of the deep commitment to scientific progress embodied in the Ecole. On the eve of the crisis which led to the Franco-Prussian War and the Paris Commune, Pasteur drew the parallel with the situation in 1792, when "the dangers seemed at one point to be beyond all possible efforts," stressing that France owed its survival then to "its scientific superiority." As is clear from the excerpt, Pasteur's understanding of human creative mentation made him reject positivism, the French version of John Stuart Mill's utilitarianism as fundamentally anti-human. Among the many slanders Pasteur had to endure after his death was that of being called a "positivist."

19. The first two strophes of Carnot's *Ode à l'enthousiasme* are:

Sublime essor des grandes âmes,
Enthousiasme, amour du beau!
Principes des nobles flammes,
Eclaire-moi de ton flambeau.
O rayon d'essence divine!
C'est à ta céleste origine
Que je voudrais puiser mes chants:
Déjà ma voix s'est élancée,
Epure, agrandis ma pensée;
Donne la vie à mes accens.

Tu n'es point une folle ivresse,
Tu n'es point la froide raison:
Tu vas plus loin que la sagesse,
Sans sortir de sa région.
Instinct délicat qui devance,
Et les conseils de la prudence
Et les calculs du jugement.
Instruit par la simple nature,
Ta marche est toujours prompte et sûre,
Et ton guide est le sentiment.

Appendix

From the foreword to the

Journal Of the Ecole Polytechnique

The subject of this journal, published following a decree of the three Committees of the Convention in charge of the Ecole Centrale des Travaux Publics [the Ecole Polytechnique was first called by this name] is in the intent expressed by these Committees' decree, namely: to justify the application of monies supplied by the Republic to educate scholars; to encourage them and their teachers through the publicity given to their work and their commitment to direct their studies so that they tend toward perfection; to offer a model suitable to guide other teaching institutions; and lastly, to spread the most useful knowledge in the arts and sciences, and to cause their range to be broadened by new discoveries and appropriate applications. . . .

[The school] consists of about 400 students who have demonstrated, in an examination, proof of their intelligence and acquired knowledge in the elements of arithmetic, algebra and geometry; and, as these students must one day become engineers in various fields, or active in professions which require training in the sciences or the arts, they are being taught those areas of mathematics and physics which are in fact the basis of the knowledge needed to carry out these various walks of life.

The school's instruction is thus divided into two main branches. The first includes, on the one hand, mathematical analysis, with its applications to geometry and mechanics; and on the other hand, descriptive geometry, divided into three parts, stereotomy, architecture and fortification.

Drafting is included, either as a less-rigorous but often only possible description of objects, or as an art of judgment.

The second branch deals with general physics and with chemistry. The latter is divided into three courses: the first deals mainly with saline substances;

the second with vegetable and animal substances; and the third with minerals.

All these studies are completed in three years.

It should be added that the school is conceived in such a way as to place much more emphasis on the experiments the student can do with his own hands than on that which he may learn by listening to his teachers or reading books.

In effect, this is the best way to fix acquired knowledge in the mind, to be assured of its correctness, and to be certain that it is fully grasped. The student's assembled handiwork is, furthermore, the best witness to the use he has made of his time. . . .

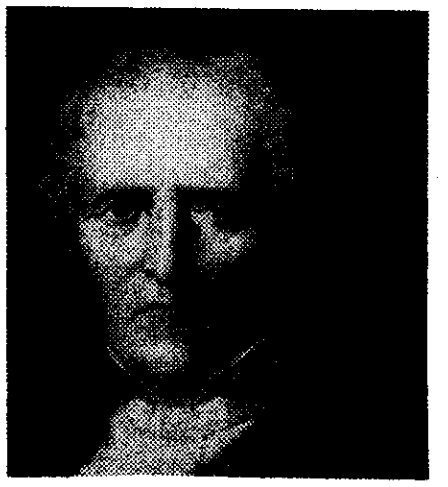
At this moment, when public education in France is about to be reorganized, one cannot stress enough the necessity of forcing students of all ages to experiment and construct with their own hands; otherwise, they will have only superficial notions and will remain incapable of working persistently at a task. . . .

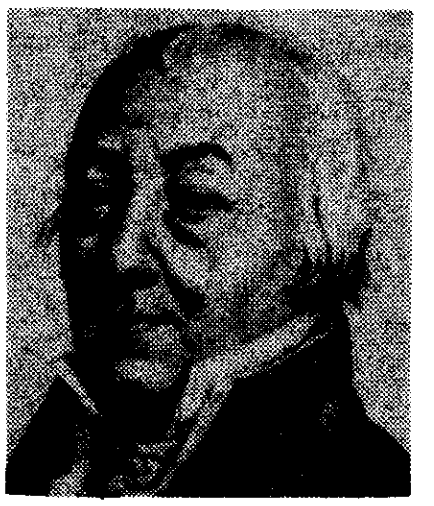
The workbooks of this bulletin will appear monthly. They will contain reports, generally written by the teachers, each dealing with his own area. The reports will review the work done that month in each field. Discoveries and elegant solutions to problems, made either by the teachers or their students, will also be inserted. The workbook will contain interesting demonstrations. The teachers and other officials attached to the school can also publish papers on the arts or sciences, on any subject, so long as they contain truths useful to be widely known or such new things as advance general enlightenment. . . .

Concerning the course in physics, the experimental demonstrations held for the students are intended, to the extent possible, either to observe some new phenomenon, or to correct errors in the explanation of a familiar one. . . .

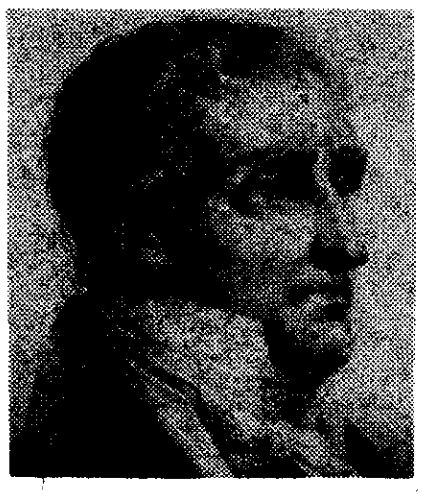
The initial idea of how to proceed was to give preliminary courses, each lasting three months, in which each lecturer would present a concise picture of the science he would later deal with. Apart from other advantages, the result was a valuable set of course outlines from which the present curriculum is derived. . . .

If one imagines for a moment youths, chosen on the basis of their knowledge of basic mathematics, gathered in an amphitheater, listening one after another to the lecturers who, in the space of three months, present them with a magnificent picture of the sciences and arts whose details they will come to know during their stay at the Ecole; if one then sees these students, dividing themselves into brigades of twenty each, working in classrooms for six hours every day, drawing the numerous objects of descriptive geometry which they are taught; if, from there, one follows them to a room decorated with everything which can embellish their imaginations and develop their taste for drawing, which they practice during the last three hours of the day, alternating with the study of analysis during the same time period; if, finally, one finds them again for two days out of every ten, in chemistry laboratories, carrying out experiments themselves, after having received their lecturer's lesson, and there relaxing, through physical exercise and the excitement of so many interesing objects, from the intensity given on other days to the more serious study of mathematics—what an exciting spectacle! Who will not feel joy and pride to have contributed to the instruction, to the first experiments, to the progress of a youth who is so dear to the Republic for the hope he gives her! . . .





The activities of such scientists as Berthollet, Fourcroy, and Fourier (from top to bottom) were reported to the French nation in the Journal of the Ecole Polytechnique.



Appendix

From the

Treatise on Descriptive Geometry

The following is the Introduction to the Treatise on Descriptive Geometry *which Gaspard Monge hastily put together in 1794 on the basis of the written material he had circulated to back up his course at the short-lived Ecole Normale. This* Treatise *was indispensable as a textbook.*

* * *

In order to remove the French nation from the dependence on foreign industry in which it has up to now found itself, we must first direct national education toward the knowledge of the exact sciences—something which has been totally neglected up to this day—and accustom our craftsmen to handle all kinds of instruments which introduce precise measurement in their work; consumers, becoming thus sensible of exactitude, will be capable of requiring it in diverse areas, will pay the necessary price for it, and our craftsmen, familiar with it since their early years, will be in a position to reach it.

Secondly, we must popularize knowledge of a great number of natural processes, indispensable to the progress of industry, and take advantage, for the advancement of general instruction, of the nature of the happy circumstance by which we have at our disposal the principal resource necessary for this.

Finally, we must spread among our craftsmen knowledge of technological methods, and of those machines whose object is either to reduce labor or to give a greater uniformity and a greater accuracy to the results of its work; and in this respect, let us admit, we have much to learn from foreign nations.

We can fulfill all these objectives only by introducing a new direction to national education. This must be done first by familiarizing those young people who have the intelligence with the use of descriptive geometry—both those who have inherited wealth, so that they may be in a position to make a more profitable use of their capital in regard to both themselves and the State, and those who have no fortune other than their education, so that they can one day derive a greater price for their labor.

The art of descriptive geometry has two main objects: [First, to accurately represent three-dimensional objects by two-dimensional drawings.] From this point of view, descriptive geometry is a language necessary to the man of genius who conceives a project, to those who must direct its realization, and finally, to the craftsmen who must themselves complete its specific aspects.

Second, to deduce from an accurate description of bodies all that necessarily follows from their respective shapes and positions. It is a means of looking for the truth. It offers unending examples of the transition from the known to the unknown, and since the objects to which it is applied offer the most ready demonstration of this process, it must be included in a national education plan. Not only is it appropriate for exercizing the intellectual capacities of a great people, thereby contributing to the perfecting of the human race, but it is also indispensable to all those workers whose object is to shape objects into definite forms; and it is essentially because the methods of this art have been so little diffused up to now that our industry has progressed so slowly.

We will thus contribute an advantageous direction to national education, by familiarizing our young craftsmen with the application of descriptive geometry to the mechanical drafting necessary for the greatest number of arts, and by using this geometry for representing and determining the elements of machines by means of which man, by putting the forces of nature to work, so to speak reserves for himself no other work in his operations than that of his intelligence.

It is no less advantageous in terms of spreading knowledge of natural phenomena, which can be turned to the profit of the arts.

The charm accompanying these applications will work to overcome the distaste which men have in general for mental concentration, and make them find pleasure in the exercise of their intelligence—something which most regard as difficult and painful.

Appendix

Geometry And Physics

From *General Considerations on the Applications of Geometry* by Charles Auguste Dupin.

* * *

People who begin to learn advanced geometry do not suspect what delight they will one day experience in this work. They only see, in the basic rudiments of the science, an inextricable chain of abstract propositions, thorny demonstrations, and descriptions that tire and repulse the intelligence.

Indeed, the study of the basic conceptions of three dimensional geometry is a very difficult one. One has to learn to represent to oneself, in the form of an idea, surfaces and curves, whose more or less complicated forms vary infinitely. One must see them through the eyes of the mind, cutting through each other, touching each other, enveloping one another, according to given conditions. But when this intellectual work has made us familiar with the properties which characterize the main kinds of curves and surfaces, it seems as if a new order of conceptions has been created in our minds. We discover general, unchanging relations, which are the laws of spatial figures. These mathematical truths, far from being abstract, present themselves to our intelligence through visible, and in a sense palpable aspects.

This is how imagination, which seems foreign to purely rational conceptions, creates, in a sense, a new world where the objects, subjected in their position, figure, and movement to unchanging laws, present everywhere ideas of order, constancy and harmony.

When we then move from that geometric world to the reality of the physical world we find, in the space that matter occupies and through which it moves, the abstract forms that science had imagined. The general laws to which those mathematical abstractions are subjected find application again and again. The human mind discovers with a surprise formed equally of pleasure and admiration that the universe and its phenomena embody in their existence the indelible mold of those ideal forms and theoretical laws.

Do we want to understand the immense difference between this new way of envisaging nature, and that by which the vulgar and ignorant envisage it? Let us take the spectacle of the heavens as an example.

To the eyes of a layman, a solid concavity, called the heavens for precisely this reason, the firmament, is sprinkled with luminous points, seemingly all at the same distance from the spectator, and resembling torches dispersed over an azure vault. When one looks for a long time, one can see that they change position *vis á vis* the earth; some even approach or move away from each other; but they wander in space, following unannounced and untraceable paths. Thus, to the eyes of ignorance, everything appears insignificant and limited within the immensity of the universe and the harmony of movement of the worlds.

The geometer who contemplates the heavens discovers a totally different spectacle! His thought interrupts the continuity of the celestial vault and the supposed equality of its distances from the earth. He creates an idea, a measure of those distances, the size of which he has discovered with his intelligence and which seems incommensurate with the size of objects as we grasp them through our senses.

When he studies the movement of celestial bodies, he no longer regards them as wandering accidentally in the sea of space. He imagines their invisible routes with precision. He imagines the straight-line path followed by the light arriving from other heavenly bodies to our own globe. He imagines the circle within the curve described by each point of the rotation of the planets and their satellites on their respective axes. For him the ellipse is traced in the skies—it is the orbit made by each planet as it revolves around the sun. The focus of this ellipse is a point which, in his mind, coïncides with another immaterial point, the center of the body which gives us light, days and years. He draws through this center a mathematical axis, around which he sees all the bodies of our planetary system orbiting.

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He conceives of a plan of unchanging direction and constant position *vis á vis* this system, which without depending on years or centuries transports itself with the entirety of the planets and their satellites throughout the immensity of celestial spaces. . . .

Thanks to the knowledge of these geometrical forms, eclipses—which once filled infant nations with terror, which appeared to them to reverse the laws of nature and be signs of even greater catastrophes to come—are now only the determined intersection of a developable surface, the limit of the shadow of one heavenly body cast onto the spherical surface of another. And the prediction of eclipses, their position, duration and intensity, which was long considered to be a revelation only the divinity could make known to mortals, is now nothing more than the solution to a simple problem.

With these advanced conceptions, the universe ceased to appear to man as an incoherent picture of elemental matter, which whim would randomly scatter or unite, unveil or hide. Human intelligence gradually came to know that a sublime geometry reigns over the relative movement, shape, size and position of all heavenly bodies. By applying this admirable theory, our knowledge has reached the point of knowing all the representative parts of space that have been, are, or will be the locus, center, axis or orbit of the perpetual movements pursued by the great masses of our planetary system, down to its slightest elements. Thus, in space and in time, from the infinitesimal to the infinite, everything is subordinate to the laws of mathematics.

In contemplating these unchanging and learned laws by which a Supreme Intelligence rules over time and the universe, wise men have not found a more worthy and sublime title to designate it according to its works than that of the *Eternal Geometer.*

Coming back to Earth and looking more closely into visible phenomena, we find again in all places and at all times the mathematical traces of the general laws of matter and extension. Similar discoveries attract us by their cause, but even more so by their consequences. They offer both a useful and interesting application of geometry. This application, although outlined by the ancient philosophers, has only in modern times assumed a character of universality, depth and importance. Thanks to it, physics has been raised from a conjectural science to an exact one, that is, a science whose precise truth is premised by mathematical means upon observation and experience.

The inspired works of the useful as well as enjoyable arts, those very arts which seem to stem from the imagination alone, all creations of social activity owe to science, whose service we wish to underscore, the harmony of their proportions, the exactitude of the shapes reproduced and the perfection of ideal forms. In the simple appearance of the Fine Arts, it is this self-same science that gives certainty and precision to the processes and results.

Appendix

Pure Geometry And Descriptive Geometry

From Historical Essay: The Philosophy of Science *by Charles Auguste Dupin.*

* * *

Regular operations that are to be carried out on bodies of any shape almost always depend essentially on the shape of the bodies to which the operations must be adapted. Thus, any marking off of fortifications done on the spot depends upon the lay of the land and must vary according to it, and the defense operations of a given place depend themselves upon the shape of the fortification. I could give a thousand other examples of the intimate connection between the shape of works of art or nature and the results man hopes to obtain from working on them.

In many specific cases and whenever necessary, more or less direct and exact means were sought for adapting mechanical operations to an object's shape. But, prior to Monge, no one had conceived of the idea of overall encompassing a means for defining the shape of a body; and from there, for arriving at a unfform method for deducing any shape required by man's industry from an initial given figure. This is the purpose of descriptive geometry, whose advantages are developed below.

Taken in its strictest accepted

sense, descriptive geometry is merely a technique, a set of methods used, by following certain rules, to represent whatever characterizes the shapes of bodies and their interrelationships. Descriptive geometry is a language of imitations with the advantage of being able to both depict and speak to the eyes.

But there is a more general, purely rational geometry of which descriptive geometry is just the graphic translation. One's mind must be especially trained by this general geometry in order to actually apply its considerations and precepts. One must be able to represent bodies' shapes in space and to combine them in an ideal fashion through the sole power of the imagination. The mind learns to see individual lines and surfaces, and families of lines and surfaces, inwardly and perfectly clearly; it acquires a notion of the character of these families and individuals. It not only learns to see them in isolation or in analogous groups, but can move them, combine them and foresee the results of their intersections, their more-or-less close contacts, etc.

In this way, the new geometry strengthens the imagination tremendously. It teaches you to grasp a vast set of shapes quickly and precisely, to judge their similarities and differences, and their relationships in position and size.

It allows the military engineer to glance at an irregular terrain and take in the general structure of its main forms and in what ways they are and are not advantageous for war-fighting.

It gives the civil engineer looking over the lay of mountains and valleys a sure viewpoint from which to judge, on sight, the overall direction most suited for tracing roads and canals. Thus tremendous groping around is avoided, and engineering drawings are needed only for the very small areas where it is then easy to determine the best subsumed direction to follow within the overall direction discovered at the geometrical glance.

An Ecole artist sketches the ruins of Hieraconpolis in Egypt. The Ecole stressed drawing instruction both for engineering and fine arts applications, and used it for extensive surveying in both Egypt and France.

Appendix

Report to the Emperor Napoleon (1815)

by Lazare Carnot

Sir,

An example for the advancement of reason exists, being provided by a country from the New World whose civilization is more recent but perhaps already better than that of what is called the Old World. When the Americans of the United States decide upon the location for a city or even a village, they first take care to bring into that locality a teacher, at the same time as they transport their agricultural implements. For these men of common sense, these sons of Franklin and Washington, well know that what is just as urgent for the true needs of man as clearing the land, building homes and providing clothing, is the need to cultivate the mind.

Since we find in European civilization that the inequality of fortunes which is the inevitable consequence of large societies leaves men with equally great inequality of means, how can the most numerous class of society be introduced to the benefits of at least elementary instruction and the advantages of primary education? Education without morality might well be nothing more than an awakening of new needs, perhaps more dangerous than ignorance itself. Morality must

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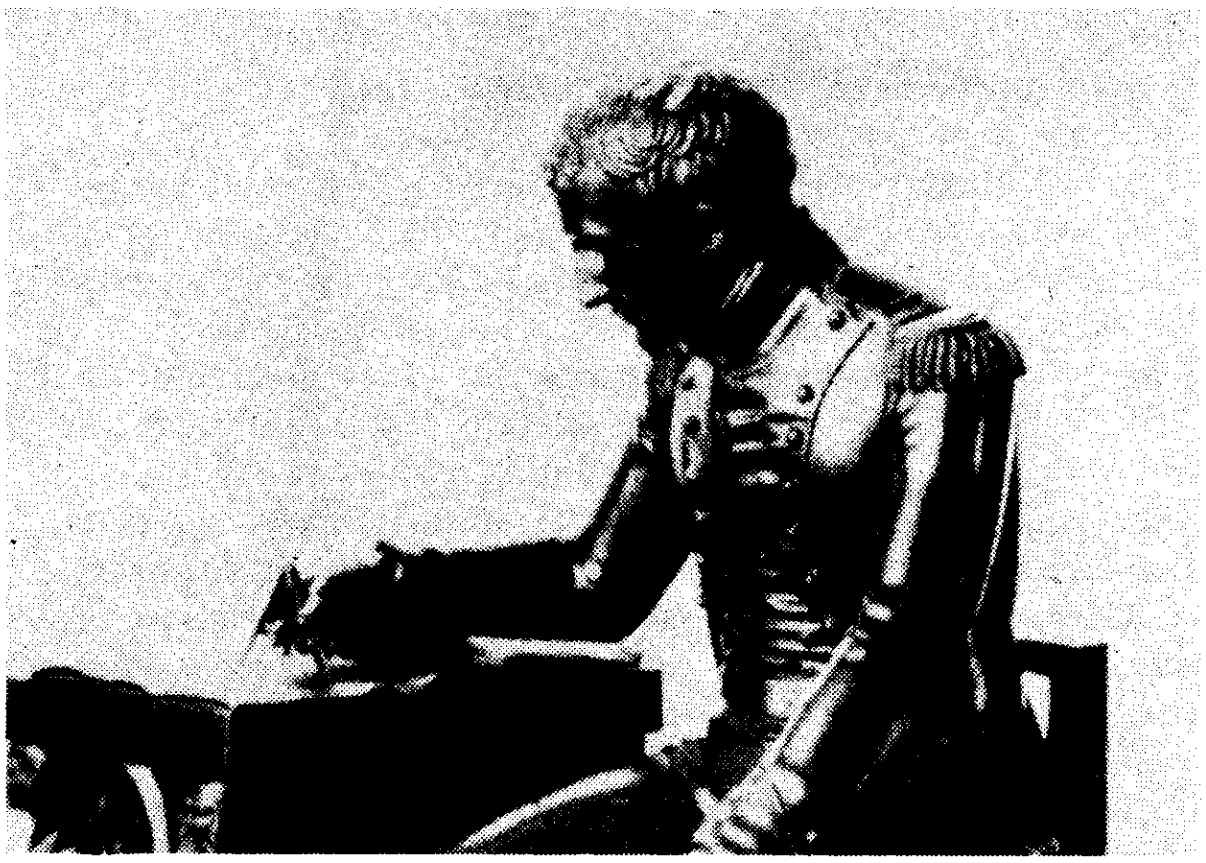
therefore advance hand-in-hand with education; but how then can the greatest possible number of men from the least favored classes be raised up to morality and education at the same time? This is the double problem which deserves the attention of every true friend of mankind, and which your Majesty himself wishes to solve by establishing a sound system of primary education.

When I point out to your Majesty that two million children in France require primary education, and that out of these two million, however, some receive only a very minimal education and the others receive none. Your majesty will then find not too tedious or unworthy of his attention the details I have the honor of presenting concerning procedures already used in some primary-education institutions, especially as these are the very means by which the majority of the developing generation will be able to enjoy the benefits of primary education, which alone is the true means of elevating each and every individual of the human species to the dignity of men. The point here is not to form half-scientists or banalized people, but rather to provide everyone with an appropriate education and thus create good farmers and workers, rendered virtuous through the basic elements of indispensable knowledge and the good habits which inspire love of work and respect for law.

In all aspects of political economy, great art consists in doing the most with the least possible means. Such was the



Statue of Napoleon Bonaparte planning military strategy—with a compass.

principle guiding several philanthropists who may be considered creators and directors of the primary education system. They wished to raise up a maximum of children with the least possible expenditure and with the help of the least number of masters. This was their principal idea, and is the means to obtain that result: make the children teachers of other children, for moral conduct as well as for intellectual material, through an almost electric transmission of the precepts that stem from a single teaching master. This master then finds himself multiplied on all subjects by his young representatives, who have been invested with various titles such as teacher, monitor and reading assistant, and this method of representing only one by and in all is successful enough to allow a single master to guide up to one thousand pupils.

We can find this remarkable method of mutual guidance in the establishments of Lycurgus; it is the key to all the procedures used by the primary teacher. Even more fortunate, this procedure—which reduces the number of actual masters by creating assistants through on-the-spot training in the needs of the school they direct—in this procedure, I say, is to be found a generative principle for new masters. When students, who have already been masters on the school-benches where only shortly before they had been instructed, leave the school where they counted for only a fraction, a thousandth of a fraction, they become themselves capable of bringing together and raising up to their own level a thousand other fractions, that is to say, completely and immediately capable of becoming masters of a class as large as the one they are leaving. And this new class with which we will charge them will likewise yield creations just as rich, and so on and so forth, forever increasing and multiplying proportionately.

The Wirszup Report

"Soviet Education—So Far Ahead that Comparison Is Meaningless."

In the past few months, policymakers responsible for American science and math education policy have been rocked by a memorandum on a 13-year Soviet scientific "educational mobilization of the entire population" written by University of Chicago mathematician Izaak Wirszup. Wirszup's report, which starkly states that U.S. science education is so far behind the Soviet Union's that "comparison is meaningless," is now circulating through the bureaucracy of the National Science Foundation (NSF), the National Academy of Sciences, and leading universities across the U.S. Its findings, challenging as they are to the sorry state of scientific and mathematical knowledge of American secondary school and college-level students, have provoked an official White House request for a policy review to be conducted by the NSF and the U.S. Department of Education. This review is to be concluded by July 1, 1980, and its findings presented to President Carter.

Wirszup authored this study as a follow-up to the earlier disturbing findings of a seven-volume NSF study entitled "The Status of Pre-College Science, Mathematics, and Social Studies Educational Practices in U.S. Schools," which documented American high school students' woeful incompetence in these areas. The Wirszup study was presented as a special memorandum to the Divisions of Mathematics and Computer Sciences and of Science Education, Development and Research of the NSF.

* * *

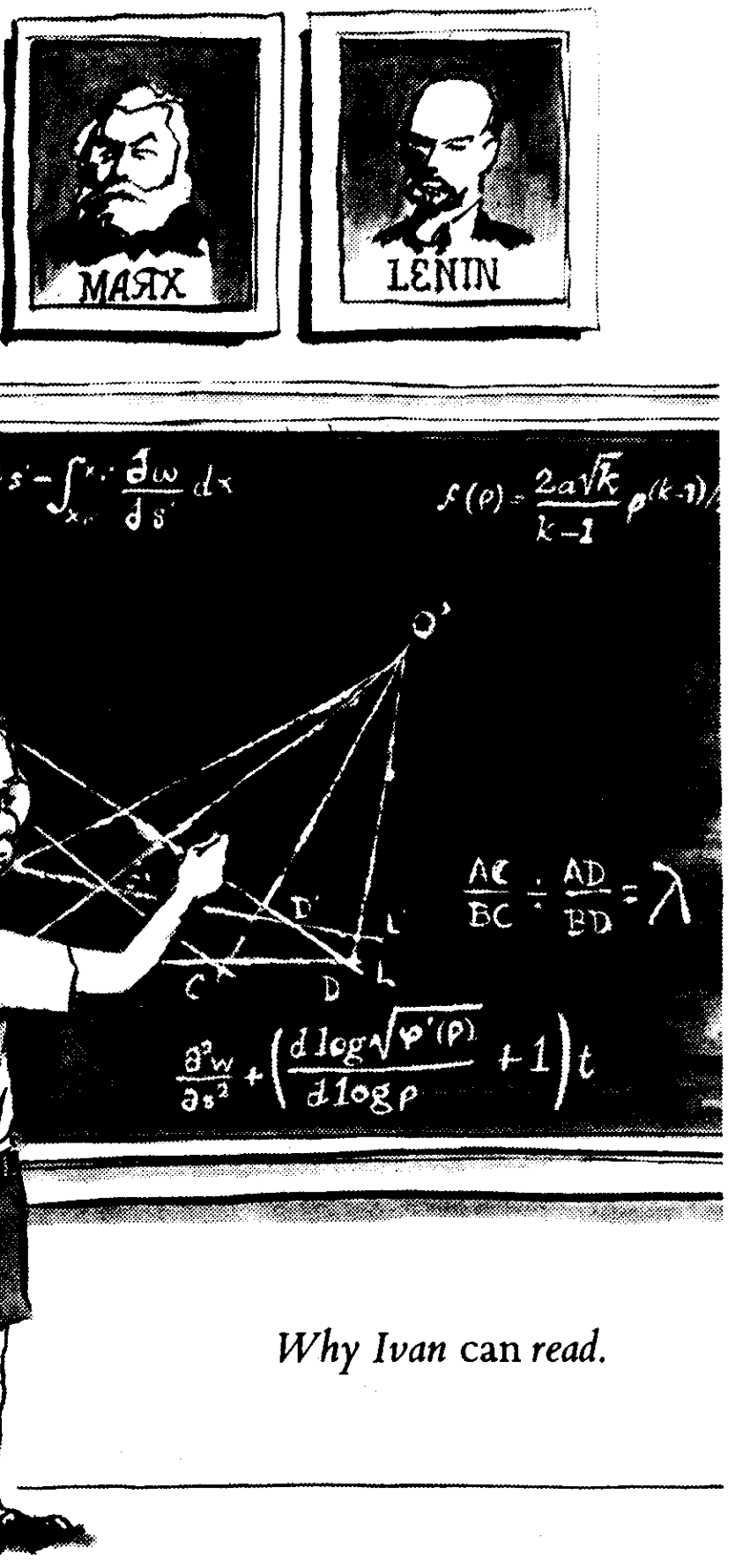
My investigations show conclusively that in the last decade the Soviets have made simultaneous quantitative and qualitative gains without equal in the history of their education, affecting the entire young population. They have dramatically restructured and expanded their multi-track secondary educational system, achieving particular success in the development of institutions that combine general education with the training of skilled labor (technical-vocational schools) and middle-level professionals (secondary specialized schools).

For the 98 percent of the school-age population that now completes secondary school or its equivalent, the Soviets have introduced science and mathematics curricula whose content and scope place them far ahead of every

other nation, including the United States. Their foremost scholars and educators are engaged in improving the school curricula and perfecting teaching methods in a concerted drive to provide mass education of unmatched quality. . . .

In order to appreciate the scale of Soviet educational expansion, it is worth remembering that during the Stalin era the secondary school graduation rate was as low as 4.9 percent—out of 1000 children entering the first grade in 1930, only 49 completed the tenth grade in 1940. In 1957—the year of Sputnik, and just prior to the Khrushchev reforms of 1958—no more than 1,728,000 students graduated from secondary schools. In June of 1978, however, after years of extraordinary investment and effort culminating in the introduction (1975) of compulsory 10-year schooling, over 5,000,000 students graduated from secondary schools of all types, a success rate of 97.7 percent. (In the United States, by contrast, nearly 75 percent of all 17-year-olds—about 3,150,000 students—graduate from high school.)

The major impetus for the tremendous changes that have taken place was a Nov. 10, 1966 resolution adopted by the Central Committee of the Communist Party of the Soviet Union following the Twenty-Third Party Congress. This resolution, entitled "On Measures for Further Improving the Work of the Secondary General Education School," addressed the demands of the "scientific and technological revolution" for a skilled labor force with a broader general education and a higher intellectual level. The resulting measures represented a total commitment to change in Soviet global educational goals and policies in relation to manpower needs, with particular emphasis on the individual's preparation for maximally productive service to the state.



Why Ivan can *read.*

These changes (which the Soviets call an "educational revolution") are tantamount to an *educational mobilization of the entire population:* an enormous expansion of the manpower training system, and radical curricular reforms brought about by an unexpected turn toward the individual and the development of his ability to do independent creative work.

Responsibility for the reform in general education schools was assigned to the highest scientific and educational institutions of the Soviet Union—the USSR Academy of Sciences and the USSR Academy of Pedagogical Sciences.

A team of scholars from both Academies, headed by A.N. Kolmogorov, has been responsible since 1964 for the entire school mathematics reform. Kolmogorov, one of the century's great mathematicians, worked in close collaboration with such outstanding scholars and educators as Markushevich, Gnedenko, Boltyanskii, Vilenkin, and Yaglom to set the goals of the new program, design the curriculum in every detail, decide on ways of treating various topics, and write the texts and manuals for students and

teachers. (Kolmogorov himself is the co-author and editor-in-chief of three volumes on geometry and two on algebra and calculus.)

The result of their 15-year-effort is a program for mathematics instruction that is modern in content, innovative in approach, well-integrated and highly sophisticated. It gives strong emphasis to theoretical foundations and logical rigor as well as to applications. The program culminates in a calculus course taught in grades 9 and 10. Moreover, the extraordinary Soviet research in the psychology and methods of learning and teaching mathematics has been applied in the new curriculum, which now surpasses in quality, scope, and range of implementation that of any other country.

In only ten years, the Soviet compulsory program for all students covers the equivalent of at least thirteen years of American schooling in arithmetic, algebra and calculus, and does so much more thoroughly and effectively. The American one-year geometry course offers but a very small fraction of the Soviet 10-year geometry curriculum.

We are confronted, for example, with the fact that *over 5,000,000 graduates of Soviet secondary educational institutions in 1978 and 1979 have studied calculus for two years, while 105,000 United States high school students have taken a one-year calculus course* (1976). This shocking situation is not ameliorated substantially by study at our institutions of higher learning. In the fall of 1975, only 397,000 American college students were enrolled in calculus courses. The majority of Soviet students at institutions of higher learning are studying engineering or science-oriented disciplines, and more than half of the 1,000,000 entering higher education each year have intensive training in mathematics, starting with a comprehensive course in calculus.

Still another consequence of the 1966 resolution was the emergence of *elective studies* in various school subjects. In addition to the compulsory school mathematics curriculum, which accounts for 6 hours per week in each of grades 1-8 and 5 hours in grades 9 and 10 (a total of more than 2000 class hours over ten years), *over 1.6 million students in grades 7-10 participated in elective studies in mathematics during 1973.* These studies, which extend and deepen the compulsory curriculum, were established primarily to foster habits of independent and creative work.

In addition, hundreds of thousands of youngsters take part in an exceptional range of extracurricular activities—mathematics clubs, circles, and olympiads—or study in unique secondary schools specializing in mathematics and physics—all designed to discover mathematical talent and to train it from the earliest possible age. These programs have been developed and refined by world-famous mathematicians such as I. M. Gel'fand, A. N. Kolmogorov, M.A. Lavrent'ev, and S.L. Sobolev over some 45 years and have proved immensely successful. The programs themselves and the vast and original literature used in conducting them have no equal in the West.

It is quite evident that the successful Soviet experiences and achievements in mathematics education are being applied with extraordinary fervor and commitment to the closely related areas of the computer sciences. The Soviets look upon automation of production and management as a key weapon for overcoming the inefficiency other aspects of their system impose on the economy.

Obviously, great difficulties could have been expected for the Kolmogorov school mathematics curriculum. It is clearly far ahead of any offered on a mass scale—an exceedingly innovative program in a country where the educational traditions are extremely strong, a program accomplishing what is still considered unattainable here: teaching two years of calculus to the entire young generation of a nation of over 260 million. In addition, all youngsters are required to complete five years of physics (including, for example, an introduction to Einstein's special theory of relativity), and four years of chemistry (including a full year of organic chemistry). These are compulsory school programs of the highest quality, which like the mathematics program have been prepared by renowned scientists (Academicians I. K. Kikoin and Y. B. Zel'dovich) and introduced after years of experimentation. Difficulties were perhaps inevitable if one remembers that this radical school reform coincided with the enforcement of compulsory secondary schooling and the accompanying explosion in the school population. For example, over a fifteen-year period (1960-1975) the enrollment in grades 9-10 (11) has increased more than four times, from 2.6 million to 10.8 million in all types of general education schools, and from 1.5 million to 6.2 million in the general-education day schools....

I do not doubt that the Soviets will overcome most of the obstacles. The Communist Party and the government are determined to adopt the highest possible educational standards and maintain the scale of mobilization they have recently achieved. The individual youngster, who is earnest, well-disciplined and intensely motivated, will pursue maximum education and training in spite of the dislocations involved. Not only is it the main criterion for success in a society that has become increasingly compartmentalized by educational achievement, it is practically the only safe avenue to a

more comfortable standard of living under Soviet conditions.

The persistent elitism of the Soviet educational system can be illustrated by data on admissions to various levels of schools in 1977:

After demanding competitive examinations, 1,017,000 persons were admitted to *institutions of higher learning*, of whom 613,000 entered day-session departments. Only the top 9-10 percent of the 5 million *secondary school* graduates were admitted to day sessions of higher institutions.

At the next level, 1,430,000 students gained admission, again based on competitive examinations, to the *secondary specialized schools (primarily* tekhnikums), which train middle-level professionals and white-collar technicians. Of these, 925,000 were admitted to the day-session schools, predominantly new graduates of the 8-year and 10-year general-education schools. The Soviet target is to have nearly one-fifth of its youngsters in a secondary specialized school. The adjective "secondary" here is an anachronism. These schools with 3-4-year programs, although designed mainly for graduates of the 8-year school, actually represent a much higher level. An examination of curricula and of text materials used in some *tekhnikums* indicates that with regard to professional-technical and science-mathematics content, their programs correspond to between 2 and 3 years at U.S. technical institutes or colleges.)

The remaining graduates of the 10-year schools (well over 70 percent), either go directly to work in various branches of the Soviet economy at the lowest qualification and salary rank or enter the technical-vocational school system, which trains skilled workers. In this case, they are assured a higher rank and an opportunity for more rapid job advancement. The young generation is increasingly obliged to follow the road of technical-vocational schooling, and the government's goal is to provide such training for 45-46 percent of Soviet youth.

The Soviets' current educational mobilization is characterized by intensive investment at all levels, with particular emphasis on the various types of secondary schooling which affect the entire workforce.

The system of *technical-vocational* schools has more than tripled enrollments since 1960, from 1,064,000 to 3,681,000 in 1977. The most modern and advanced of them, the *secondary technical-vocational* schools (3-4 years), offer both general education and technical training: 71 started operation in 1966, and have increased to 3,700 schools in 1979, with an enrollment of over 1,750,000. The technical-vocational system also includes the post-secondary *technical schools* (1-2 years), which show similar growth: 364 schools with 210,500 students in 1970, 1,000 schools with some 1,000,000 students in 1978 (projected admissions to these schools for 1980 will reach 800,000).

The long-established *secondary specialized schools* have also expanded; enrollment rose from 2,059,500 in 1960 to 4,662,000 in 1977-78. Similarly, enrollment in *institutions of higher learning* more than doubled in the period 1960-1977, from 2,396,000 to 5,037,000. (In 1977, 752,000 persons graduated from institutions of higher learning with training corresponding to our master's degree.)

In addition, over 36 million people learned new professions or improved their qualifications in 1977-78, and millions more studied in various establishments for continuing education.

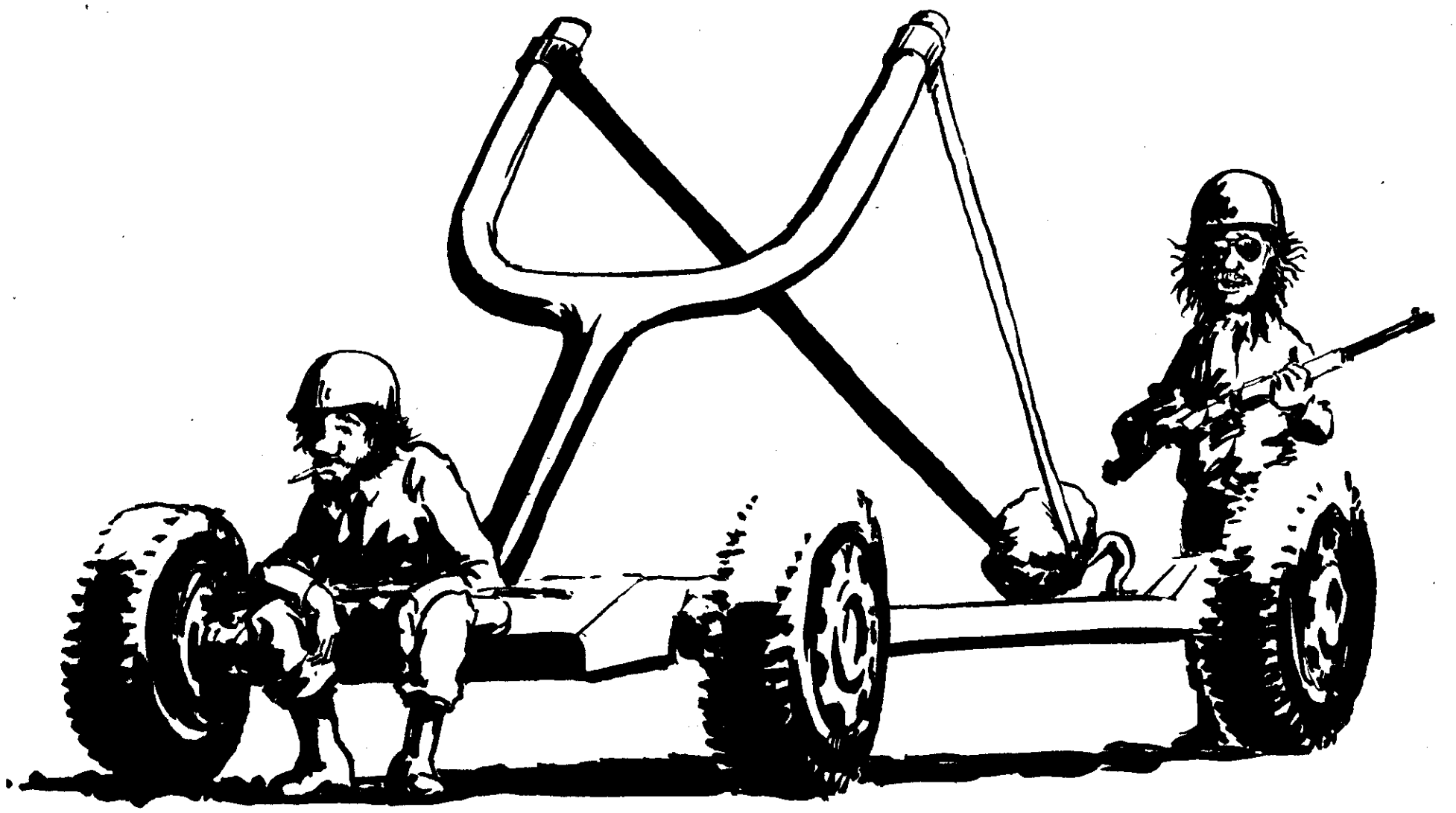
Returns on this educational expansion are already impressive, and they have only begun. During the Ninth Five-Year Plan (1971-75) the technical-vocational schools alone trained some 9,500,000 skilled workers, a figure projected to reach 11,000,000 in the Tenth Five-Year Plan (1976-1980). (2,119,000 skilled workers graduated from these schools in 1976.)

In 1977, the secondary specialized system produced 1,185,800 graduates, 70 percent of whom became professionals in engineering, agriculture, and management.

It follows that some 3 million skilled workers and trained middle-level technicians enter the Soviet economy each year. Their high educational and technical level promises to accommodate manpower needs, both industrial and military, by turning out more versatile and efficient workers for high technology production. This intensive effort is particularly important in view of the impending serious labor shortage in the European part of the Soviet Union.

In 1978, A. A. Bulgakov, Chairman of the State Committee of the USSR Council of Ministers on Technical-Vocational Training, reported on research showing that graduates of the secondary technical-vocational schools are more productive, efficient, and contributive of improvements to technology and production. They (a) advance in qualification rank twice as fast as workers receiving other forms of vocational training; (b) are more likely to learn new or combined trades (50 percent within 2-3 years of starting work); (c) participate more readily in rationalization and invention in their work (40 percent—4 times those without this training); and (d) increase their annual productivity 1.5 times more than their counterparts with different basic training. Bulgakov's data, derived from research at two Leningrad plants, need no further comment.

The effect of educational expansion on the labor force is re-



Defense Secretary Harold Brown recommends "less technical" weapons for our illiterate soldiers.

flected in a 1978 statement by M.A. Prokof'ev, Minister of Education of the USSR. He notes that 80 percent of the workers at the Volga Automobile Plant have completed either higher education, specialized professional, or full secondary education, and the remaining 6,000 workers are studying.

Anyone following the course of the Soviet educational mobilization, which has already achieved great success since its start in 1966, can see that this is just the beginning of a determined drive to achieve scientific and technological supremacy. L. I. Brezhnev has stated bluntly: "The field of scientific and technological progress is today one of the major fronts in the historical battle between the two systems."

It is extremely difficult to compare educational achievements in two countries as fundamentally different as the Soviet Union and the United States. Still, in order to give some idea of what has happened in the USSR in recent years, I would like to offer a preliminary comparative interpretation of Soviet secondary mathematics and science training in light of the three NSF studies.

Virtually the entire young Soviet population has been receiving *10 years of compulsory schooling in mathematics*, comprising:

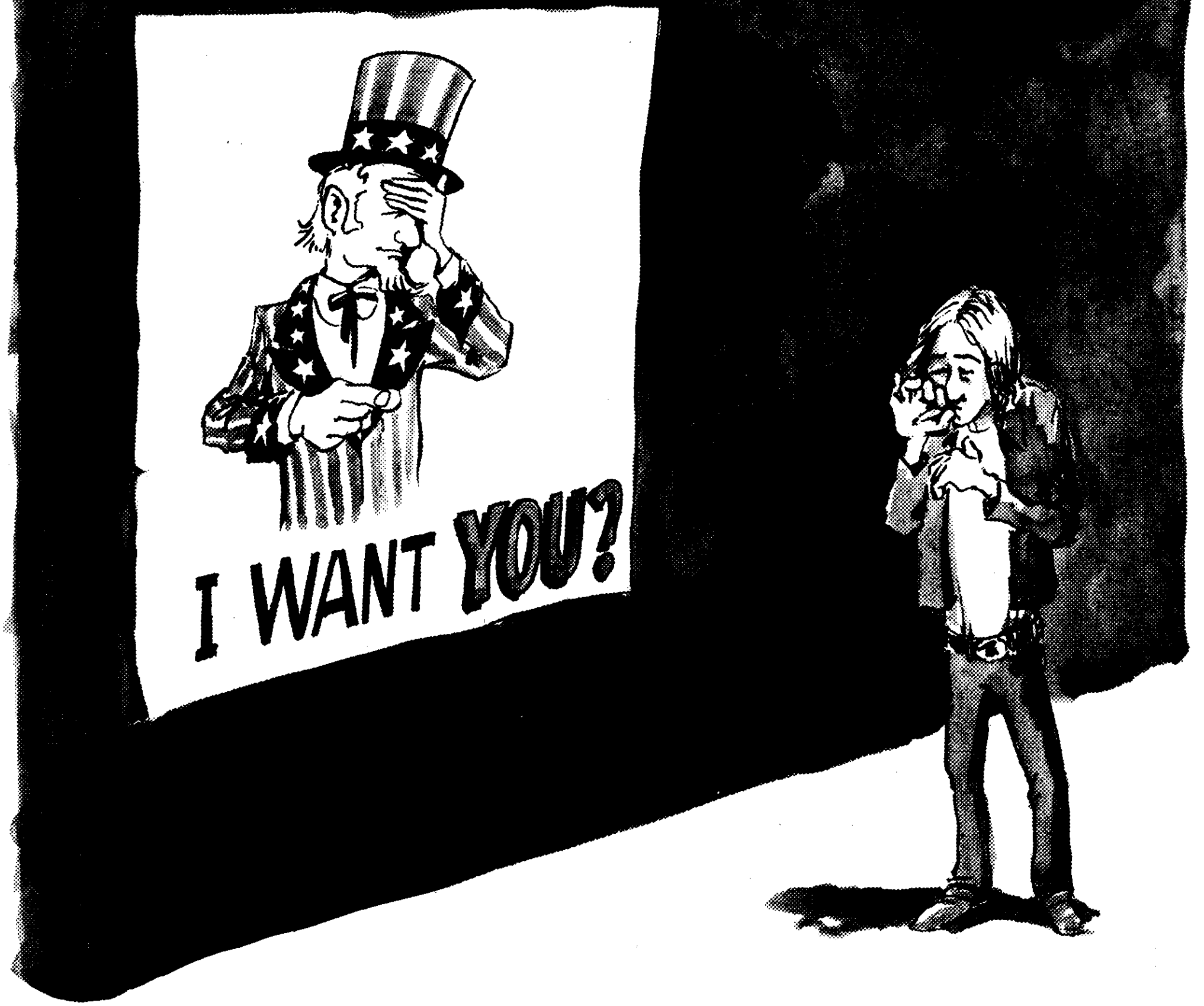
3 years of arithmetic (grades 1-3)
2 years of arithmetic combined with algebra (grades 4-5)
5 years of algebra (grades 6-10)
10 years of geometry (5 of intuitive geometry in grades 1-5; 3 of semi-rigorous plane geometry in grades 6-8; 2 of semi-rigorous solid geometry in grades 9-10)
2 years of calculus (grades 9-10; in the future calculus may be taught in grade 10 only)

In addition, the curriculum of the Soviet general education school includes:

5 years of physics
4 years of chemistry
1 year of astronomy
5 ½ years of biology
5 years of geography
3 years of mechanical drawing
10 years of workshop training

All of these courses are *compulsory*.

The NSF studies on *The Status of Pre-College Science, Mathematics, and Social Studies Educational Practices in U.S. Schools* ... show that of our high school graduates, 9.1 percent receive one year of physics, 16.1 percent one year of chemistry, 45 percent one year of biology, and 17.3 percent one year of general science. (Over 56 percent of districts responding to the survey indicated that they required no mathematics courses, or only



one, for graduation from high school.)

A very rough comparison of the content of mathematics programs in the two countries shows the following:

If we bear in mind that the upper 60 percent of our high school graduates are college-bound, it follows from the NSF *Studies* that an *average* college-bound U.S. high school graduate (*one in the 70th percentile*), or an entrant to one of our military academies, acquires the following background in mathematics and the sciences:

8 years of arithmetic, and possibly
1 year of general mathematics
1 year of basic algebra
1 year of geometry
1 year of advanced algebra or trigonometry
at most, 1 year of chemistry or physics
1 year of biology

Allowing that a U.S. high school graduate has acquired in primary school a science background equivalent to the Soviet—

3 years of natural science (grades 2-4)
3 years of geography (grades 5-7)
2 years of biology (grades 5-6)
1 year of physics (grade 6)

we find that a *Soviet secondary school graduate* who is university-bound, or entering a military academy, or one who is a middle-level professional or a skilled worker has, in comparison with his American counterpart, *on the average*, at least (in *years*, not hours):

1-2 years more training in algebra
8 years more in geometry
1-2 years more in calculus
4 years more in physics

3 years more in chemistry
3½ years more in biology
1 year more in astronomy
3 years more in mechanical drawing
6-10 years more in workshop

Many of the Soviets have an additional several years of elective courses and extracurricular activities in mathematics, science, or technical fields in school or at an institution of higher learning and in the Pioneer Houses.

The disparity between the level of training in science and mathematics of an average Soviet skilled worker or military recruit and that of a non-college-bound American high school graduate, an average worker in one of our major industries, or an average member of our All-Volunteer Army (in 1977 only 59 percent of the Army's entrants possessed a high school diploma) *is so great that comparisons are meaningless.* Consider, on the one hand, the Soviet's educational background in mathematics and science and, on the other, the American's:

8-9 years of arithmetic
1 year of algebra
1 year of geometry, at most

and no high school level physics, chemistry, biology, or astronomy.

The Soviet Union's tremendous investment in human resources, unprecedented achievements in the education of the general population, and immense manpower pool in science and technology will have an immeasurable impact on that country's scientific, industrial and military strength. It is my considered opinion that the recent Soviet educational mobilization, although not as spectacular as the launching of the first Sputnik, poses a formidable challenge to the national security of the United States, one that is far more threatening than any in the past and one that will be much more difficult to meet.

Afterword:

Deschoolers Reap What They've Sown

While the Wirszup report is a stinging indictment of the past decades' "deschooling" and environmentalist pied-pipers of the Aquarian Conspiracy, no concerned citizen is entitled to become complacent merely because the truth about American education is now out. Wirszup and the circles for which the report is written—while pained that they can't have dope and missiles too—are the very same persons who have brought American education, and with it our nation's youth, to this crisis point. The fight to turn around the disastrous situation in U.S. science education must be made by American parents, educators, and others concerned about American youth and American economic and military

Table 1

	Trained:		
	By the individual-and-team method	In schools of tech.-voc. education for a period of 1-1.5 years	After completing technical and secondary tech.-voc. schools
Production unit output per worker	258.7	320.7	529.2
Cost (in rubles) of mechanically producing one gear	.75	.59	.36

Table 2
Mathematics programs

USA		USSR
8 years of arithmetic 1 year of general mathematics or business mathematics (essentially a review of arithmetic)	=	The arithmetic and algebra training in Soviet grades 1 through 5 and part of grade 6
First-year algebra	=	Algebra in grades 6-7 and part of 8
One year of geometry	=	Geometry in grades 6-7
Advanced algebra Advanced mathematics Trigonometry	=	Algebra in grades 8-10

strength. Some knowledge of the background and reception of the report will make this point absolutely clear.

Isaak Wirszup is the director of the University of Chicago's Mathematics Department's Survey of Recent East European Mathematical Literature project, which was set up in 1956 to profile Soviet educational policy. One of its main projects, "research investigations into work by Soviet psychologists and mathematicians in the psychology and methods of learning and teaching mathematics," has been conducted as a joint effort of the UC Survey and the School Mathematics Study Group (SMSC) at Stanford University.

It is in the "set theory" New Math curricula devised by SMSG that one can locate a major reason for the collapse of American mathematical education over the past twenty years. The SMSG New Math push began throughout American schools after the flurry caused by the Kennedy "missile gap" scare of the early 1960s. In the lingo of today's Aquarian conspiracy kooks, the missile gap scare was the "entry point" for introduction of set theory into American education.

The application of "Aquarian" terminology is quite apt in this context. Stanford University and its linked Stanford Research Institute (SRI) have been the central spawning grounds during the past two decades for countercultural, anti-intellectual attitudes throughout U.S. higher educational institutions. A Stanford-SRI education professor, Willis Harman, pioneered (with U.S. Office of Education funding) the "Generating Alternative Futures" and "Changing Images of Man" projects at SRI which outlined how to make the counterculture the basis for brainwashing methods to be applied in universities, government agencies, and the media.

If we can see in Stanford-SRI the nexus of policymakers responsible for ruining American mathematics and science education through the New Math "Aquarian Age" one-two punch, we can locate parallel tracks in Wirszup's two other prominent connections: the University of Chicago and the U.S.-U.S.S.R. Joint Working Group in the Application of Computers to Management, a National Science Foundation sub-branch founded in 1972.

To take the latter first: while there is nothing intrinsically objectionable in applying computers to management, the general field of systems analysis has played a primary role since the mid-1960s in attempts to force a convergence of U.S. and Soviet thinking into a "holistic" one-world schema. (Systems analysis extricates from science the fundamental concept of *causality*, and puts forward as its replacement "value operators": decision tracks and formal-logical procedures to "guide" decision-making—invariably in the direction sought by the systems analyst.) This "holism" has been greatly detrimental to both countries.

In the same year as the launching of the NSF joint U.S.-Soviet project, the International Institute for Applied Systems Analysis (IIASA) was founded in Vienna under the joint sponsorship of ex-U.S. National Security Council director McGeorge Bundy and Club of Rome founder Aurelio Peccei. As Club of Rome literature takes pains to point out, systems analysis is only one device among many for undercutting the so-called hierarchical paradigm characteristic of modern industrial civilization.

Finally, the University of Chicago. While good scholars teach and learn at UC, including several who worked on the Manhattan Project during World War Two, the school has existed for decades under the noxious aura of the late UC president Robert Hutchins, a true believer in the British-oligarchical model of education that denigrates real scientific and philosophical training.

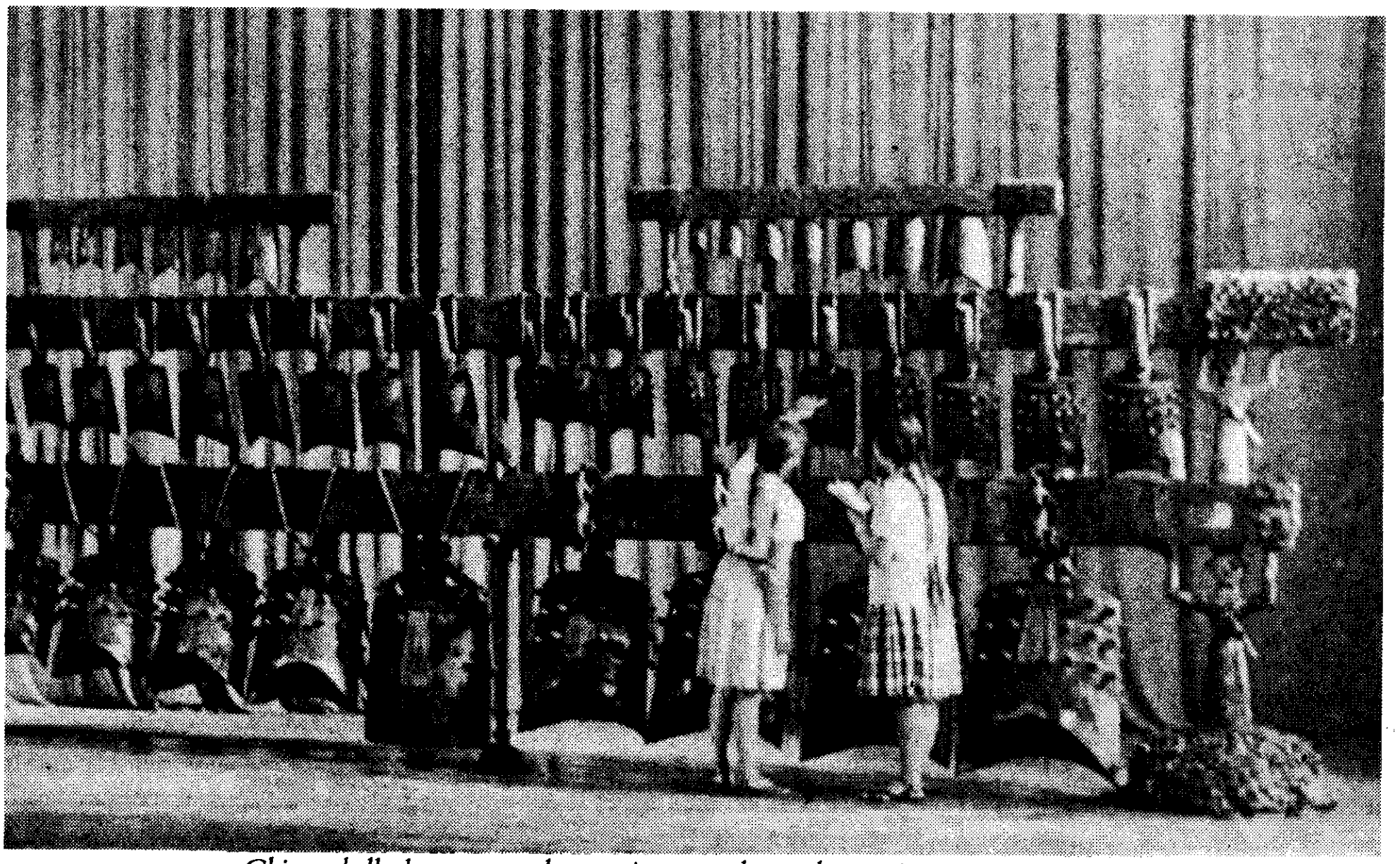
Hutchins can be seen as one of the godfathers of the counterculture/Aquarian Age. He sponsored the Santa Barbara Center for Democratic Institutions, home center of the post-industrial society, Triple Revolution psychosis of the early 1960s which triggered the creation of the Students for a Democratic Society. He was a founder of the Aspen Institute for Humanistic Studies, a passionately pro-feudal center of subversion of American education and scientific and technological progress.

Hutchins's revenge against the American System of development took one of its more ominous turns recently with the announcement that Aspen Board member Shirley Mount Hufstedler would become the first Secretary of the newly formed U.S. Department of Education.

Thus, in reading the Wirszup report, the reader should be conscious of the following irony: an alarm bell is being sounded on the state of American education by a man whose professional connections are with exactly those institutions responsible for the deterioration of American education in the first place!

Being aware of this makes the Wirszup report all the more fascinating, since it makes its point in a hard-hitting and indisputable way: the Soviets have for 13 years taken a path contrary to that in the U.S., which has resulted in their in-depth superiority in matters pertaining, as Wirszup correctly points out, to the security and well-being of the future generations of the United States.

—Mark Burdman



Chinese bells demonstrate that music was understood as a science 3,000 years ago.

Chinese Bells Reveal 3000 Years of Equal Tempering

It is a fairly incredible thing for a musician who studies the relevant historical records to find that, against all evidence, music historians today insist that our so-called "Western" music and its system of tuning is unique to the last 300 years. The historical record is replete with documentation of the existence of our "modern" tuning system throughout the past 3,000 years at least.

What emerges from the evidence at hand is the preliminary finding that throughout history there seems always to have existed, side by side, two distinct conceptions of the notion of music. The one viewed music not only as a legitimate science but as the queen of sciences, a tool for drawing out the powers of reason in the listener. The other view, which flourished especially during periods of civil degeneration, saw—and still today sees—music as an equally effective means for coking the flames of the infantile self, and produced highly effective music to this end.

Plato and Aristotle

The two distinct uses of music are best studied by comparing the writings of Plato and Aristotle. Plato's notion of music was shared and realized through Beethoven. Aristotle is a far better spokesman for the subversive use of music than certainly any modern figure. Evil though he was, he was still forced by historical circumstances to speak coherently of his subject.

Both Plato and Aristotle proceeded from the profound Classical Greek notion that music works through imitation. That is, music operates on the mind through its capacity to quite literally "imitate" the way in which the mind thinks. For Aristotle, as he carefully notes in his *Poetics,* music imitates what he calls the "passions": fear, anger, lust, pleasure.

Plato, on the other hand, makes abundantly clear throughout his dialogues that the sort of music which plays such a role is conducive to "evil." True music, which he uses interchangeably with the notion of "the Good," imitates the noetic processes of the mind. Hence he would banish from his republic those musical modes which he likes to term "effeminate" and "weak" in that they effect the passions through imitation rather than engaging the mind's creative powers.

NOTES

The Question of Tuning

The most easily accesible way to trace the existence of both types of music throughout the period of written history is by studying the different forms of tuning practiced. In brief, this is because instruments are tuned according to the dictates of the music being performed; and because music is a true science, it is possible within certain bounds to work backwards from knowledge of tuning practice and deduce some important aspects of the music of a period or a composer.

If, say, it is found that our system of equal temperament existed in a particular period, that would prove the existence of a highly developed understanding of modulation among keys, which can lead to the formulation of some rigorous hypotheses about that period's notion of counterpoint.

This is precisely what we have found. Equal tempering was practiced among at least some musicians in the China of c. 1000 B.C. This is testified to by the unearthing of a magnificent set of bells eight months ago which were tuned in precise equal temperament.

Still looking at China, we find the musician Ho Tchheng-thyen in 400 A.D. writing a very ingenious solution for determining the ratios appropriate to equal temperament. (The issue here is that the ratios resulting from equal tempering are irrational or radical, unlike the simple numerical ratios arising from any form of plain tuning.) Tchheng-thyen's solution was then picked up and developed further by the brilliant Prince Tsai-yu a thousand years later. Tsai-yu, a renowned musician and historian, also documents how the earlier scales had been systematically subverted in his country by the disastrous 15th century Ming Dynasty.

In the Renaissance

Turning to Europe, we find the famous Francisco Salinas in Spain of the 16th century using a combined mechanical and geometric solution for arriving at the correct ratios for equal temperament. His technique was borrowed straight from the Greeks, specifically Archimedes' Mesolabium, a geometrical measuring device which, among other applications, could assist in establishing the twelve equal tones of the tempered scale. The great Zarlino, the leading musician of the Italian Renaissance, used the same methods, and also advocated equal temperament.

In his *Sopplimenti Musicali,* Zarlino also cites Philo of Byzantium (2nd century A.D.) as another source for learning how to tune in equal temperament.

Zarlino and Salinas join Vincenzo Galileo, well known father of the well known scientist, in insisting that freted instruments such as guitars, lutes, and so forth had *always* been tuned in equal temperament. In this they were referring to the practice of the Arabs, whose greatest musician, Al Farabi, similarly wrote passionately from the scientific and epistemological standpoint on the need to temper all musical instruments.

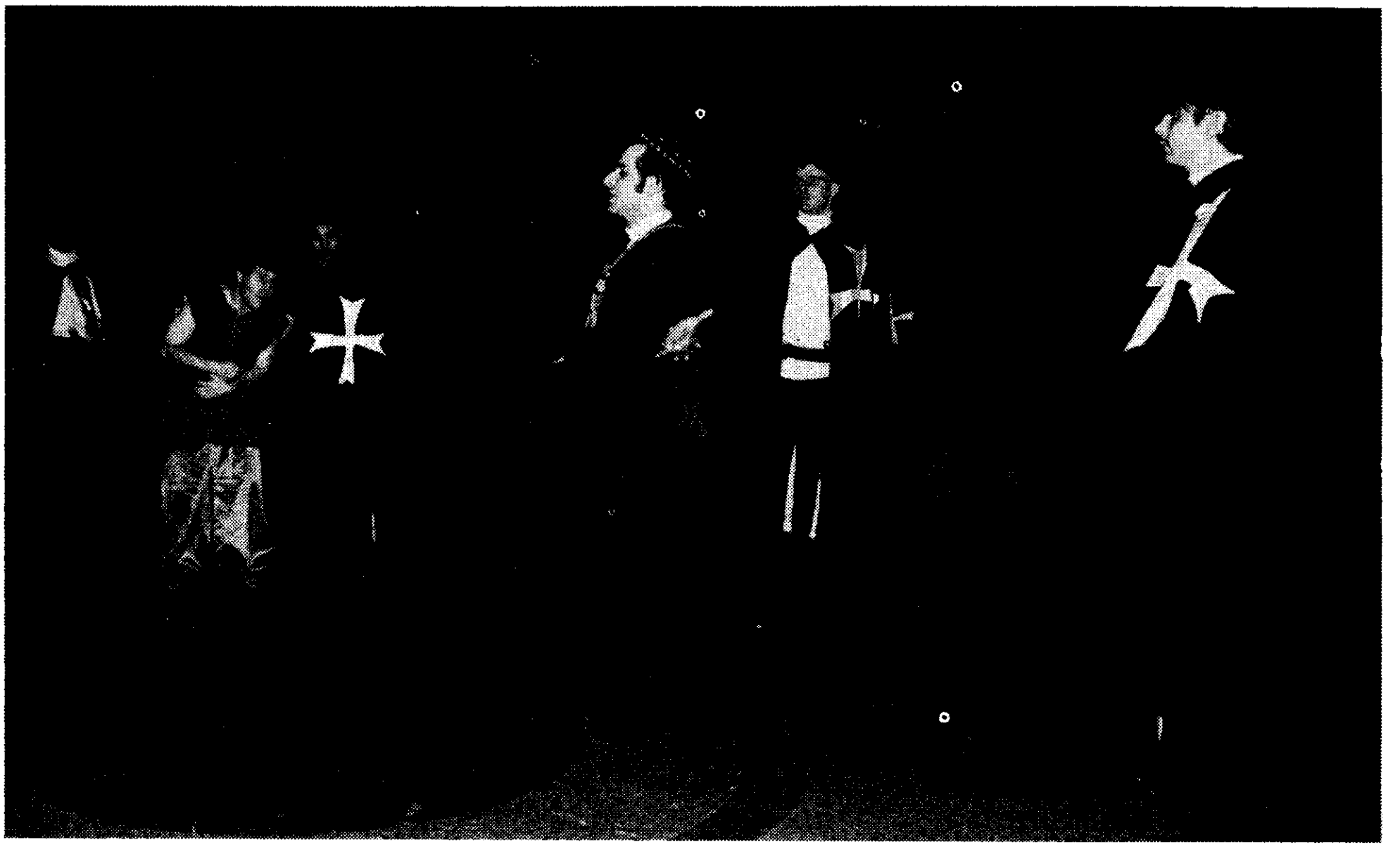
Friedrich Marpurg, the German 18th century composer, in discussing the equal tempering principles laid out by Kircher, the 17th century scholar and mathematician whose writings had a profound influence on Bach, goes so far as to say that Kircher borrowed from none other than Plato his method of arriving at the appropriate tempered ratios!

—Vivian Freyre Zoakos

Great Renaissance Drama Revived: *Humanist Academy Stages "The Jew of Malta"*

On May 18, the Humanist Academy Drama Group presented a spirited performance of Christopher Marlowe's often-slandered *Tragical History of the Rich Jew of Malta* with such extraordinary vitality and theatrical depth that the audience of 300 in St. Paul's Chapel of Columbia University in New York rose for a 20-minute standing ovation at the close of the five-act play.

The performance of Marlowe's politically timely and controversial play was conceived under the guidance of Christopher White to demonstrate that great classical drama in the Platonic tradition—from Aeschylus and the ancient Greeks through Cervantes, Marlowe, Shakespeare, and Friedrich Schiller—when adequately performed has all the Rabelaisian humor, impact and tension to move and *engage* the audience in an ennobling dialogue. The all-amateur Humanist Academy Drama Group is com-



The scheming Barabas and his slave Ithamore in the clutches of the real powerbrokers: the oligarchist Knights of Malta.

mitted to a process of recovering through successive approximations the lost science of great theater after 150 years of dampened and distorted stagings and decay through acting stylization. In their first full-length performance they ably realized under the direction of Cynthia Parsons the overall qualities of punch, irony, humor, and bite which Marlowe intended.

As with the great music of Beethoven, classical republican humanist theater in the tradition of Plato moves and enriches Man's mind and soul through the multivoiced dialogue between the actors and the audience.

The political punch of the performance is underscored by the fact that today, nearly 400 years after Marlowe wrote the play in 1589 or 1590, the same combination of evil forces so devastatingly revealed in *The Jew of Malta* still controls the world's fate. Marlowe's tragedy is set on the island of Malta, the international headquarters of the evil Knights of St. John of Jerusalem, an association of the oligarchical elite descended from the ancient slavocracy of the Roman Senate. Previous to Malta, the Knights had been at Rhodes from 1310 to 1522 until that island was captured by the Turks. Today the Knights swear allegiance to the Queen of England.

In the play the Rothschild-like Barabas, the rich Jew of Malta who is named after the common thief and murderer freed by Pontius Pilate instead of Christ, is the kingpin of world financial manipulation and usurious money-lending with apparent policy control over world trade and financial activity through a network of merchant bankers:

> There's Kirriah Jairim, the great
> Jew of Greece,
> Obed in Bairseth, Nones in
> Portugal,
> Myself in Malta, some in Italy,
> Many in France, and wealthy
> every one:
> Ay, wealthier far than any
> Christian.
>
> *Barabas. I. i.*

Yet, just as in the modern world top Zionist *Hofjuden* (Court Jews) like Rothschild, the Lazard brothers, André Meyer, and the Warburgs in fact are subordinate to the ruling oligarchical families represented by such elite associations as the Knights of St. John of Jerusalem, so in Marlowe's play it is the Governor of Malta and leader of the Knights, Ferneze, who ultimately out-manipulates Barabas, the Turks, and the Spanish.

Barabas, who dies a Dant-

Barabas forces his daughter Abigail to assist in a double murder plot.

esque victim in his own boiling cauldron, is after all of the same cut as his Turkish slave Ithamore. Ithamore deploys enormous power to kill, steal and conspire—power all given him by his master Barabas—yet underneath Ithamore is nothing but a slave who will perish.

As Barabas himself portends at the outset of the play, even world-wealthy Jews are bound by their impotence to consolidate political power:

I must confess we come not to be
kings:
That's not our fault: alas, our
number's few,
And crowns come either by
succession
Or urged by force; and nothing
violent,
oft have I heard tell, can be
permanent.

Barabas. I. i.

After betraying the Maltese Governor Ferneze and helping the Turks to successfully capture the city, Barabas himself is made governor. Terrified of political power, a position above his "station," Barabas uses every ounce of his cunning to give away his power immediately when he has it by re-allying with the imprisoned Governor Ferneze against the Turks:

I now am Govenor of Malta;
true,
But Malta hates me, and in hating
me
My life's in danger, and what
boots it thee
Poor Barabas, to be the Governor
When as thy life shall be at their
command?

Barabas. V. ii.

Just as the slave Ithamore, at the moment of his greatest power in winning over Barabas's trust, betrays his master, which ends in the slave's death, so "poor Barabas" places his own life at the command of his master Ferneze who takes it without thinking twice. Barabas' slavishness in relation to the real political power held by the Knights of Malta is mirrored by the whore Bellamira and her pimp Pilia Borza who display the pure venality of street hustlers in their quest for Barabas's gold. Despite their absolute lawlessness the little petty thieves are murdered—as Barabas is.

Laughter in Tragedy

Despite the burning strategic timeliness of *The Jew of Malta*, Marlowe's play and the performance by the Humanist Academy Drama Group were anything but didactic. As a trained Neoplatonic thinker, immediately influenced by the networks created in England by Giordano Bruno, Marlowe provokes the audience to think through rollicking Rabelaisian laughter. Marlowe's audience, like most of the good people in the United States today, behaved as if they were sheep who would believe any mythology and illusion peddled to them.

Marlowe takes such an audience of good sheep, ignorant of how the world really works, believers of childish Jewish conspiracy theories or Catholic conspiracies, and has them laughing their sides off in minutes. From the first scene on, Marlowe has his audience rollicking at the money-hungry Jew, who gets every stock stereotyped dig, and at the lecherous Friar, who can think of nothing but the curvaceous body of Barabas's daughter Abigail and the Jew's gold (roughly in that order). The audience in Marlowe's day would have laughed at Martin Del Bosco, the Vice-Ad-

Producer Christopher White continues Marlowe's Platonic dialogue with members of the Jew of Malta *cast.*

miral of Spain, who vows to have his invincible fleet protect the Knights of Malta from the Turks, as the play was first staged just months after the defeat of the Spanish Armada in 1588.

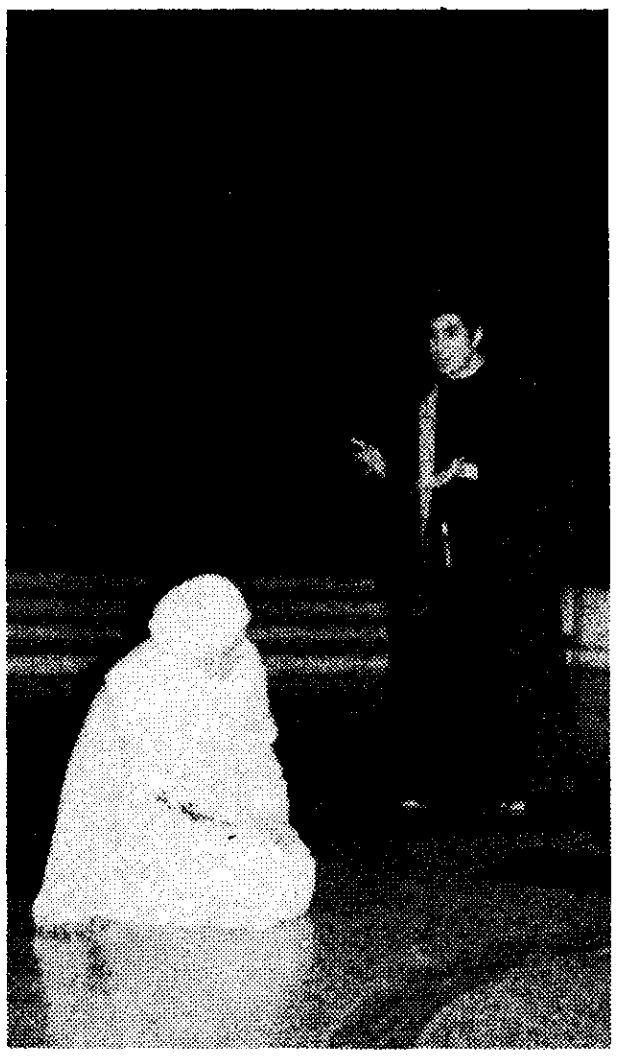
The audience laughs out their own stupid, sheep-like illusions and stereotypes, which can explain nothing about the unfolding affairs in the play or the world. This was also the secret method of Rabelais. The process was later employed by Beethoven in music through his method of provocation with a musical idea, in a joking or surprise manner, as the basis for further development.

As Marlowe's play proceeds, the audience is taken through a process where they continue to laugh at the same time that the most hideous horrors unfold—the poisoning of an entire nunnery, countless murders—creating an unbearable growing tension. Marlowe has led his audience to make their own realization: if you continue to behave like sheep with all your stupid stereotyped illusions, prejudices and political indifference then, dear audience, you are doomed for all eternity to be tortured and manipulated like animals by the Knights of Malta and their subordinate gaggle of Zionist financiers, corrupt clergy, and manipulated nations. As the maxim says: one laughs until it hurts. The old world outlook and illusions—the mental blocks toward higher development, more subtle and universal knowledge, and creative thinking—are shattered. The old geometry of fixed ways of thinking is untenable.

The quality of *laughters* employed by Marlowe and captured by the Humanist Academy performance is not in any way comparable to what is generally referred to as "black humor," which is employed to condition people to their own worst sense of helplessness. Instead, Marlowe leads the audience to experience ever more developed qualities of laughter which constantly expand the scope of thinking. You laugh your (old) head off.

Dialogue and Drama

The entire power of Marlowe's play depends upon engaging the audience in an actual dialogue—an intense "multivoiced" conversation, to put it in a way that emphasizes the musical quality of the process—which transcends the everyday spectator posture of mere sheep. The acting and staging by the Humanist Academy Drama Group, revolutionary in conception by comparison to the degraded professional standards of



"Ay, and a virgin, too, that grieves me most."

the last 150 years, worked brilliantly to emphasize the process of dialogue because it returned to the ABCs of how Marlowe and Shakespeare staged their productions.

The stage, as in the Globe Theatre, was a large squarish area protruding outward into the audience, such that the entire audience was sitting on one of the three sides of the actors unencumbered by a separating curtain. Incidentally, this approach has nothing to do with the device popularized as "theater-in-the round," which came into vogue with the existentialist performances of the twentieth century from Pirandello to the "Theater of the Absurd." Theater-in-the-round is designed to draw the audience into the helpless fantasy world of the play, usually to trap them in an insolvable dilemma. Often, the audience entirely surrounds the stage. The staging of the Marlowe play, rather, set up the geometric conditions for a dialogue to solve problems.

In the Humanist Academy performance scenery was not used, except for a clever employment of the chapel steps and pulpit to indicate various levels of action. The added advantage (despite the shortcomings of the acoustics) of staging in St. Paul's Chapel, a magnificent building whose interior is modeled on Charlemagne's Chapel at Aachen, is that the chapel itself became the "set" in which both actors and audience converse. Moreover, the historic setting of the play was evoked by the skillful use of costumes of the period—as on the Elizabethan stage.

The protruding stage gave maximum ability for the actors to convey Marlowe's continuous and rich usage of "asides." In particular, David Heller, who played Barabas with subtlety and irony, displayed a masterful ability through gesture, articulation, and movement to use the entirety of the downstage area (left, right, and center) to engage the audience in dialogue. The misnamed "soliloquies" actually function as private, almost secret, conversations between the main character and the audience "behind the backs" of the other actors.

Marlowe's Shift

The turning point of the play in Act III from an almost slapstick farce to tragedy was exceptionally well-captured by the Humanist Academy actors. In a few moments of a "stretto section" pure raucus laughter shifts into the quality of painful laughter which presages the inevitability of unspeakable horrors. The effect is like that in a musical fugue when different voices overlap at an accelerated rate, increasing the intensity—the stretto.

In closely placed and fast-paced scenes, the entire younger generation, those who could potentially make a better world, are murdered. Matthias, a young gentleman betrothed to Barabas's daughter Abigail, and Lodowick, Governor Ferneze's son, also betrothed to Abigail, kill one another in a sword fight contrived by Barabas (III, ii). In the Humanist Academy production the brutal irony of Barabas gleefully watching his satanic work was brilliantly emphasized by having Barabas observe the sword fight from St. Paul's pulpit. In rush the Governor and Matthias's Jew-hating mother to see their own sons slain at each other's hands.

In the very next scene (III, ii) Abigail, shocked at the horror of her father's deed, undergoes a true conversion to Christianity. In his wicked rage, Barabas has his slave Ithamore bring poisoned porridge to the nunnery where Abigail has gone. As Abigail dies (III, iv) she takes confession from the Friar and conveys her true conversion to universal principles. Yet, the debased and lecherous Friar who has heard her avowal of universal virtue responds with lust:

Abigail: Death seizeth on my heart,
ah gentle friar
Convert my father that he may be
saved,
And Witness that I die a Christian.
(*Dies*)
Friar: Ay, and a virgin too, that
grieves me most.
(III, iv)

One laughs uproariously but this is the laugh of horror and dawning self-realization. The audience squirms uneasily. Is there any way out of this horrible world?

Already, one suspects that it will be Governor Ferneze, the evil head of the Knights of Malta who

will prevail. The horrible punch of the play's last words by Ferneze—having murdered Barabas and imprisoned the Turkish leader Selim-Calymath—leaves the audience compelled to act against eternal slavery:

Content thee, Calymath, here
thou must stay,
And live in Malta prisoner; for
come all the world
To rescue thee, so will we guard
us now,
As sooner shall they drink the
ocean dry,
Than conquer Malta, or endanger
us.
So march away, and let due praise
be given
Neither to fate nor fortune, but to
heaven.

Ferneze (V, v)

Poetry and Drama

The performance of great theater like Marlowe's *Jew of Malta*, in Marlowe and Shakespeare's day as in our own, has the purpose of uplifting both the moral and cognitive powers of the population. The *Jew of Malta*, written in metrical verse with significant sections of rhyming couplets, is poetry of the highest order. The Humanist Academy Drama Group impressively displayed a control of the poetic language. Rhyming couplets are usually delivered in singsong declamation. In the Humanist Academy production, on one level the audience was not aware of the poetry except for certain moments when it was deliberately brought out for emphasis. On another level, the audience was always preconsciously cognizant of the poetic qualities of the language.

Marlowe and Shakespeare deliberately composed their plays in verse in order to raise the command of the English language that

Barabas disguises himself as a minstrel.

In April, *Campaigner* reported on teaching children geometry using the physical action approach of Archimedes, Leibniz, and Monge: "Genius Can Be Taught!"

In June, *Campaigner* posed the question of our nation's political leadership as originally dissected by founding fathers Quincy Adams, Lafayette, and Friedrich Schiller: "Will America Survive?"

In July, *Campaigner* both presented the facts about the Aquarian destruction of American education—counterposed to rapid Soviet advances in basic science and math education—*and* developed the model for renewed republican education for our country, in "Every American A Scientist!"

Coming in the August *Campaigner*

The
Grand Design
of
Christianity

If you're fed up with the myth that "liberal arts" are the exclusive property of the anti-science, environmentalist mob, read *Campaigner*—where every issue is a weapon in the battle to recreate America's republican heritage.

the Campaigner

(See reply card in this issue.)

made Milton possible. Today, with an entire generation of youth rapidly losing the ability to convey concepts through the powers of English, the performance of great republican humanist theater will be an absolutely crucial intervention into restoring the substance of the English language.

The overall accomplishment of the Humanist Academy Drama Group in presenting Marlowe's *The Rich Jew of Malta* will send political and cultural shockwaves throughout the United States. An all-amateur group in its debut, with virtually every actor on stage in public for the first time in his or her life—all the rough edges notwithstanding—succeeded in presenting a great classic drama on an overall level of conception beyond that of virtually every professional theater group in the last 150 years.

Great theater is one of the highest forms of art developed by great republican humanists in the tradition of Plato as a weapon against cultural banality and political sheepishness. Classical theater, like the music of Beethoven, engages an audience in dialogue and thereby transforms them into a higher quality of human being. If great theater is allowed to thrive in America, especially in the schools, it will be a crucial element in reversing the countercultural destruction of youth. Further, along with great contrapuntal music and geometry, theater can create the conditions for educating genius. A future generation must be given the alternative to a New Dark Age in the form of a challenge to produce an American Shakespeare. For this eventual goal, the Humanist Academy Drama Group has nobly taken the first steps.

—*Warren Hamerman*

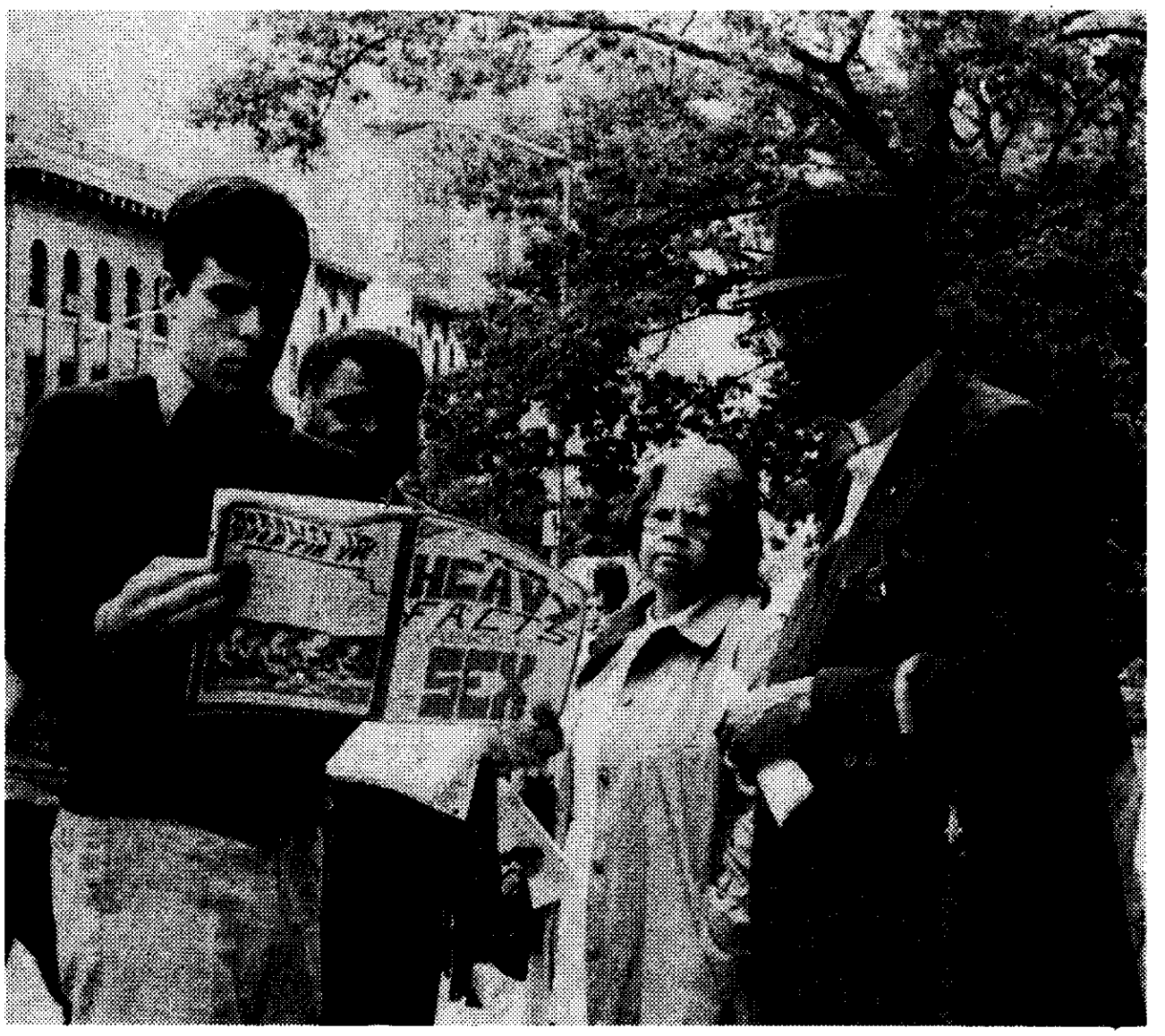
Citizens Group Battles "Sex Ed" Perverts

New Jersey high school students will soon be taught favorable attitudes toward homosexuality, prostitution, and promiscuity, and that any sexual fantasies and perversions are "healthy," if a program for mandatory sex education passed by that state's legislature is not reversed. Citizens for New Jersey, a coalition of concerned parent, religious, and civil rights groups, has created a storm of protest against the sex ed curriculum through leafleting, lobbying, and holding town meetings to warn the state's population of the drive to replace education with perversion. Spokesmen for Citizens for New Jersey vow to make the fight against sex education in their state a nationwide campaign, warning that the sinister nexus of designers and supporters of the New Jersey legislation seek to use that state as a launching pad for "sodomy is beautiful" curricula around the country.

Over the past six weeks, CFNJ has circulated 100,000 copies of a leaflet charging that the real goal of this program is to "turn your sons and daughters into mindless perverts who can easily be manipulated by anyone who offers him or her sexual gratification. They will have lost all standards for moral judgment."

Erotic Rights?

The guidelines of the courses being adopted in New Jersey were written by the Educational Foun-



A Citizens for New Jersey organizer shows parents samples of pornographic "textbooks" selected for "sex ed" brainwashing.

dation for Human Sexuality at Montclair State College and the Education Information Center. These institutions are part of networks set up to introduce sex education throughout the country, coordinated by the Sex Information and Education Council of the United States (SIECUS). SIECUS is central in the design of virtually all sex education material in the country.

SIECUS was founded by Mary B. Calderone, wife of World Health Organization official Frank A. Calderone. Calderone was cited by the Anaheim Bulletin, a southern California newspaper, as the owner of a theater showing acts judged obscene by the local district attorney and ordered closed. Another SIECUS board member, Isadore Rubin, is the editor of "Sexology," a pornographic magazine that publishes articles like "Seven New Sex Positions," "Dream of Wanton Sex," and "My Drive for Both Sexes."

SIECUS personnel have also been linked to the early 1960s MK-Ultra project, which, through the mass distribution of psychedelic drugs to unsuspecting victims, and similar "scientific" experiments, created the rock/drug counterculture. Citizens for New Jersey spokesmen emphasize that a particularly vicious aspect of the sex ed curriculum proposals is that today's school children, suffering from widespread drug abuse, are poorly equipped to resist the pornographic advances of the new sex "educators."

Legislature Punts

Citizens for New Jersey has taken this dossier into the New Jersey State Assembly, where a bill to halt the "sex education.' program, supported by intensive lobbying and organizing by Citizens for New Jersey, and introduced by Republican Marie Mueller, was narrowly defeated on May 19 after weeks of debate among legislators. The issue was remanded back to the State Board of Education for consideration.

Citizens for New Jersey has brought together around this highly charged issue a broad coalition of forces determined to win reversal of the legislature's decision at the school board level, or wherever necessary. At a town meeting on May 24, participants included representatives of the Newark area NAACP, the Baptist ministerial conference, the African Methodist Episcopal church and other protestant congregations, the Italian American Anti-Defamation League, and many other groups concerned to stop America's moral decline.

In a courageous statement to the meeting, Father Paul Wickens, Roman Catholic priest of St. Venantius Church in Orange, N.J., took Archbishop Peter Gerety of the Newark Archdiocese to task for supporting the immoral sex program. Father Wickens attributed Garety's action to "liberalism," which he dubbed "a mania, . . . a spiritual blindness."

Warren Hamerman, National Campaign Director for the presidential campaign of Democrat Lyndon H. LaRouche, told the attendees that LaRouche, whose campaign organization has worked closely with Citizens for New Jersey on the sex education issue, is making the opposition to the spread of "Sodom and Gomorrah" a major plank of his presidential campaign. Hamerman also stressed that the proponents of sex education not only are behind promotion of drug abuse, but that they are controlled by the same oligarchist elite which sees in such proposals a means for destroying national resistance to austerity and depression in the United States.

Magazine Launched to Fight Drugs

The first issue of a new magazine designed to "destroy the drug lobby" was released today in New York amid growing national concern over the drug epidemic.

Titled *War on Drugs,* the monthly is issued by the National Anti-Drug Coalition, a non-partisan coalition that was formed in 1979 with a program of reversing the trend toward drug legalization.

The first issue features a cover story on "Marijuana—a Deadly High," with an article by the world-renowned pharmacologist Dr. Gabriel Nahas demonstrating the devastating effects of marijuana on the brain and reproductive system. It is accompanied by a 50-state table of present marijuana laws in the United States, and a call for recriminalization of this so-called soft drug.

A second major feature exposes the British Intelligence project code-named "MK-Ultra" as a deliberated plot to spread LSD and other mind-killing drugs among American youth in order to promote the transition to a "new age" of decay of American industrial society.

Americans Ready to Fight

"The release of our June 1980 inaugural issue is very timely," editor Nora Hamerman commented. "The United States is being hit with an unprecedented heroin epidemic. And even the liberal press, such as the New York Times which editorially calls for decriminalization of marijuana, now admits the overwhelming evidence of the drug's damaging effects.

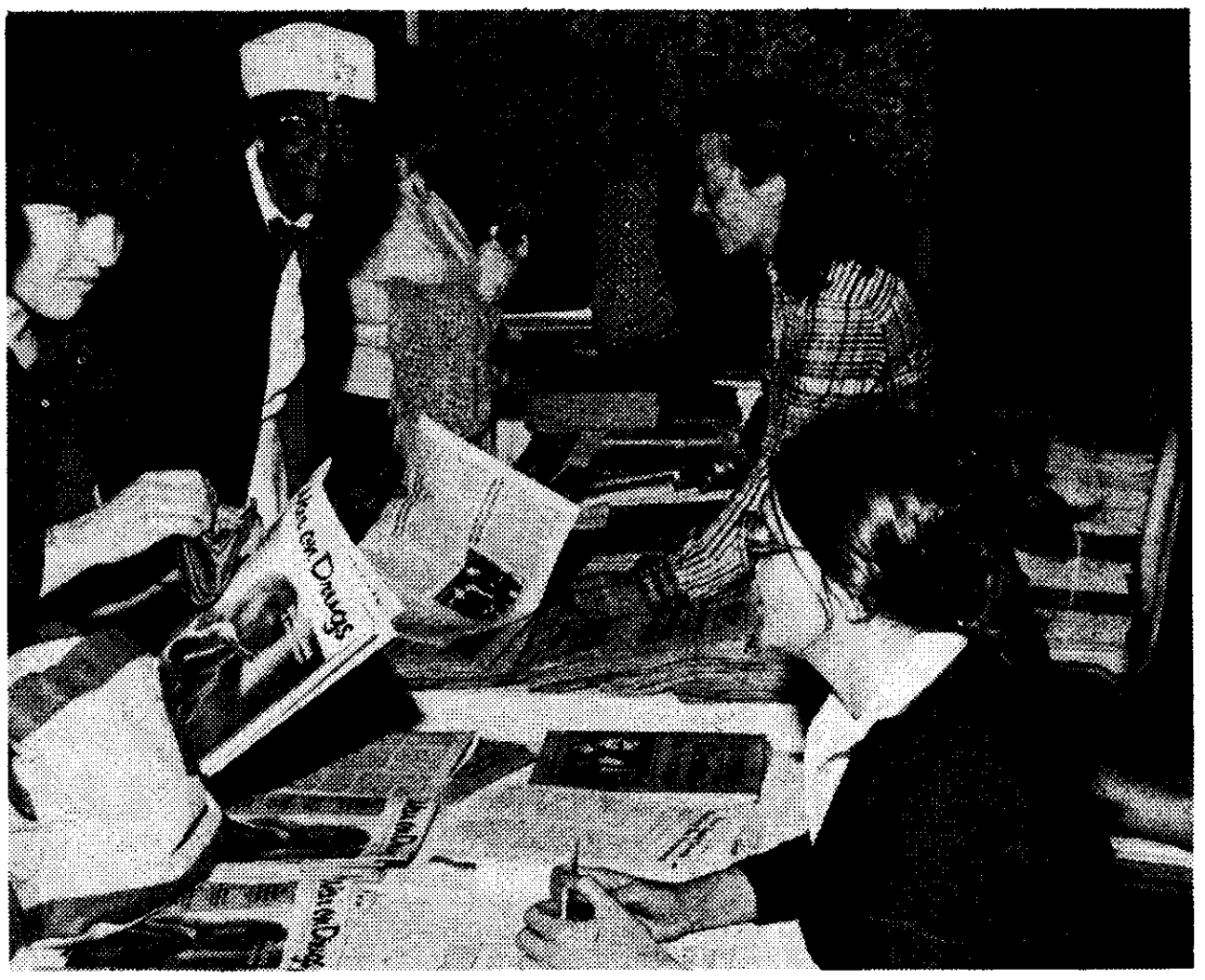
"When Dr. Nahas presented these results over a year ago to the New York-New Jersey Anti-Drug Coalition, the Times was still pushing marijuana as a soft drug," she noted.

Future issues will contain features on the hoax of drug use for "medicinal purposes only," plans to legalize marijuana cultivation in the United States, the scandal around the New Jersey Sex Education program and the not-so-accidential connection of rock music to drugs. Regular features include national and international news, profiles of the "Drug Fighter of the Month," the "Drug-fighter's Target," plus book reviews and letters.

The new magazine's editorial board includes such noted drug fighters as Kostas Kalimtgis, Jeffrey Steinberg and David Goldman, the co-authors of the 1978 bestseller *Dope, Inc.: Britain's Opium War Against the United States.* The book exposed in full documentary detail the financial cartel that backs the international drug traffic and its political protectors "above suspicion," and is credited with having launched the National Anti-Drug Coalition in the United States as well as fraternal coalitions in Colombia, Italy and West Germany.

War on Drugs editor Nora Hamerman, has been associate editor of the twice-weekly national newspaper *New Solidarity* for five years.

"We intend to make all elected officials, right up to the President, take a stand on this issue so critical to the future of our country," the *War on Drugs* editor commented. "Drugs are just the glue that holds together a conspiracy against the minds of America's youth. Americans are angry, and we are giving them the information they need to fight."



Members of the National Anti-Drug Coalition sell copies of the new magazine designed to end the drug plague—War on Drugs.

History of the Idea of Progress
by Robert Nisbet
Basic Books, Inc.,
1980
357 pages
$16.95

Can the Idea of Progress Be Saved?

Robert Nisbet's review of the "idea of progress" is the first such attempt at a comprehensive history of this idea in 60 years. Because the idea of progress underlies the actual physical advance of human civilization, such books are by definition significant interventions by the publishers to determine human history. Nisbet's is no disappointment in this regard.

The last prominent effort in the English speaking world, *The Idea of Progress* by J.B. Bury in 1920, aspired to shape the thinking of an entire generation of Americans who still understood the politics of Lincoln into a belief that progress was the equivalent of pragmatism. Nisbet's book represents a shift in the plans of the intelligence nexus that runs the major publishing houses in England and America. It is an effort to prepare the U.S. population for fascism—by shifting the content of the ruling ideology, progress, from pragmatism to mystical irrationalism.

At first reading Nisbet's synthesis of the idea of progress appears totally incoherent. It seems to have been carried out by a Columbia University computer search for all references to the *word* progress throughout recorded history. Only a computer could be so blind, one suspects, as to group the bestialist Hesiod, social Darwinist Herbert Spencer, and atheist-materialist philosopher Epicurus with the Neoplatonic Christian St. Augustine, and claim that they are all the models for an idea of progress which we should try to save today.

Eventually the purpose of Nisbet's apparent blindness becomes clear. While touching base with the predicates of material scientific progress and intellectual improvement which most readers will identify with the idea, Nisbet is gradually constructing a concept of "progress" that is coherent with the goals of mystical spiritual fulfillment in the fascist Aquarian Age.

"It was belief in the sacred and mythological that in the beginning of Western history made possible belief in and assimilation of ideas of time, history, development, and either progress or regress," Nisbet writes in his epilogue. "Only . . . in the context of a true culture in which the core is a deep and wide sense of the *sacred* are we likely to regain the vital conditions of progress itself and of faith in progress—past, present, and future." (emph. in orig.) (p. 357)

The only notable philosophical figure whom Nisbet sees as defining these conditions is the late Jesuit Teilhard de Chardin. "I am convinced that finally it is upon the idea of progress and faith in progress that Mankind, today so divided, must rely and reshape itself," Nisbet quotes de Chardin, and then proceeds to adulate the "fusion of science and religion" achieved by the Jesuit priest. He then identifies the current "major religious renascence" going on throughout all the major religions

St. Augustine

Spencer

of the world as the social force which may bring de Chardin's vision into reality.

What Nisbet omits to clarify is that this religious renascence is being deliberately organized by the group of followers of de Chardin, Aldous Huxley, H.G. Wells, and others who call themselves the Aquarian Conspiracy, in order to destroy mankind's obdurate faith in his lawful mastery of nature through science and reason. The Aquarians are fascist brainwashers. By redefining as progress precisely the psychotic submission to emotional, social, and economic breakdown of society caused by the political-economic policies of the Anglo-American financial oligarchy, the Aquarians are committing doublespeak. Only if they can keep total control over the levers of power and the intellectual environment—especially books and the media—can they expect to succeed.

Nisbet's perverse redefinition of progress is one important part of that controlled Aquarian environment.

The Case of St. Augustine

The cornerstone of Nisbet's entire case about the nature of progress is his analysis of St. Augustine:

"In Augustine, especially in his *The City of God,* all of the really vital, essential elements of the Western idea of progress are present: mankind or the human race; the unfolding, cumulative advancement of mankind, materially and spiritually through time; a single time frame into which all the civilizations, cultures, and peoples which have ever existed on earth, or now exist, can be compressed; the idea of time as a unilinear flow; the conception of stages and epochs, each reflected by some historic civilization or group of civilizations or a level of cultural development; the conception of social reform rooted in historical awareness; the belief in the necessary character of history and in the inevitability of some future end or objective; the idea of conflict of cities, nations, and classes as the motor spring of the historical process; and finally, the raptured picture of the future, set by Augustine in the psychological, cultural, and economic terms which would remain the essential terms of nearly all utopias in later centuries: affluence, security, equity, freedom, and tranquility. And justice!" (p. 76)

Nisbet's summary is written to be evocative of some of the fundamental predicates of Augustine's Neoplatonic conception, but it is a deliberate fraud. The giveaway lies in his description of human progress as a "unilinear flow" in time, and in his omission of the crucial Augustinian, Neoplatonic Christian concept—the nature of man himself.

Augustine's understanding of the nature of man corresponds to the fact that his major work is a discussion of *two* cities, the City of God and the city of the flesh, which he variously calls the City of Man or the Earthly City. Augustine is emphatic that man, as an earthly being, is necessarily a citizen of the second city, i.e., he is a creature of the passions and other bestial characteristics. However, through the grace of God, reflected in man's intellectual nature, man is also potentially a citizen of the City of God. The achievement of the heavenly city is not reached by negating fleshly existence—as in the martyrdom or mass suicides of religious mystics—or by striving for the ultimate apocalyptic goal but in achieving that ordered harmony in which God, the Creator and the Good, rules in peace on earth.

Augustine's concept rests explicitly on Plato's, as the following necessarily brief summary indicates.

Plato

Man is comprised of three natures (states of consciousness)—the bestial (bronze), the merely rational, emotive soul (silver), and the creative (golden) soul, which is man's reflection of the image of God. God, the Good, is reality—self-developing continuous creation. Man is evil when he tries to deny the reality of God, and God's image in him—evil is a defect, not an opposed rivalling force.

Man's progress consists of mastering and ordering his lower natures in accordance with the nature of God. As he discovers the lawfulness of God, he is simultaneously better able to govern himself and the universe, God's lesser creation, and to mold it beautifully, according to God's image. His individual spiritual progress is therefore matched by efforts to order the family, and the larger community, according to God's eternal law as comprehended by his reason.

But there is nothing in man's nature which says that he must choose to order his life and soul according to God. God gave him free will. Thus he can and has denied God's nature in him, and even the very reality of God himself. This course ultimately leads to destruction—yes, even the mass destruction of a New Dark Age. But by his very nature, mankind can choose this course.

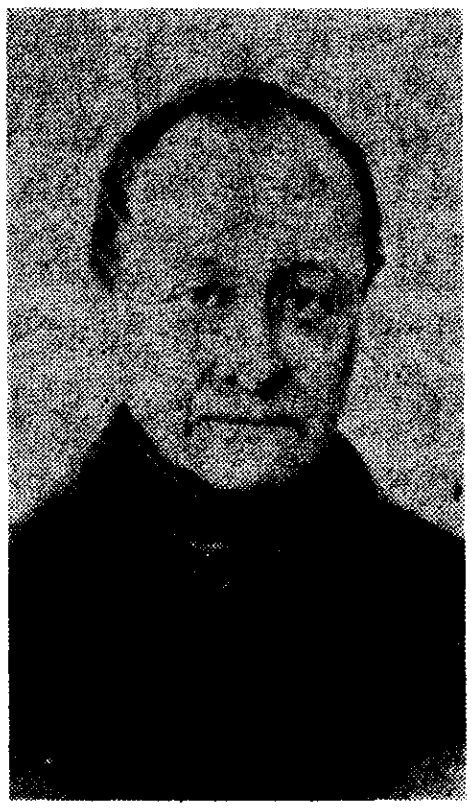
Thus, contrary to Nisbet, Augustine's conception of progress is not a belief in the "unilinear," "inevitable," "unitary," "continuous" advancement of human history into the other-wordly City of God. It is not the triumph of impersonal Providence. St. Augustine, like Plato before him and the followers of Lyndon LaRouche today, understood that the progress of humanity's Godlike reason is necessary if mankind is to survive, but that to achieve that necessary end will require a pitched battle against those evil persons who try to keep man within the limits of his animal or passionate nature, who insist on celebrating man's kinship with Mother Earth and cosmic energy, rather than asserting the dictatorship of God's Reason itself.

Thus it is that Nisbet twists reality, down to lying about Plato himself. Nisbet claims that Plato did not really have an operative conception of the connection between his World of Reason (Ideas) and the sensual world of change. And to support this outrageous view, he goes so far as to assert that Plato was an admirer of the pragmatist-rhetorician Protagoras, whose dictum "man is the measure of all things" Plato hilariously ridicules throughout the dialogue *Protagoras.* Nisbet claims that Plato's entire career of attacking the Sophists is irrelevant to his "evident" respect for this Sophist! It is as if a child simply refused to believe he had to move his legs in order to walk—so elementary is Nisbet's denial of reality.

The Second Time Around

Nisbet's aims are usefully compared with those of Bury. Writing out of Cambridge University, England, during the time when the British oligarchy was preparing the instruments and ideologies of mass social control now culminating in the Aquarian Conspiracy, Bury took the approach that the idea of progress is ultimately dependent on pragmatism, or utilitarianism.

Bury denied that Augustine, or Plato, or any philosopher prior to the 16th century had an idea of progress. That idea, he summarizes, was impossible until the conceptual breakthroughs made by Lord Francis Bacon and Descartes: 1) liberating science and philosophy from the "yoke" of subservience to the Greeks and Romans; 2) "a frank recognition of the value of the mundane life and the subser-



Comte

vience of knowledge to human needs"; and 3) "the invariability of the laws of nature." (p. 66)

There was in fact a qualitative breakthrough made in the history of progress during the Renaissance period. That breakthrough involved scientific work by Giordano Bruno, Nicholas of Cusa, and Roger Bacon which resulted in the development of all the principal means—especially social institutions, but also certain key inventions—through which the scientific and intellectual progress of great geniuses could be transmitted to masses of individuals. Those inventions were the printing press, the vernacular languages, and the very invention of the nation-state itself. But the method by which these breakthroughs were made, goes back to the method of Plato, and men of Reason before him whose names are lost to history.

Bury, ensconced at one of England's two major centers of epistemological warfare, undoubtedly knew this to be the case. Yet he follows through the "idea of progress" as advancing to a more and more materially deterministic process, which culminates in the work of the "social scientists" August Comte and Herbert Spencer.

Comte and Spencer were the conservative and liberal sides of the same coin of British radical empiricism. Both identified an inexorable march of progress in nature to which the ascent to reason by the individual was considered irrelevant, or impossible. Comte preached the inevitability of a new stable feudal order, Spencer the victory of the superior "master race" through an unfettered struggle between those competing for wealth and power on earth.

These are, in fact, the visions of the future nurtured by the British aristocracy which Bury then, and Nisbet today serve. They represent ideologies by which that elite justifies *suppressing* the means of scientific and industrial progress from the individuals they rule in order for them to maintain their own feudalistic power—despite the fact that such suppression will lawfully lead to mass genocide through starvation and war.

The fact that Nisbet, who deals with the Comte and Spencerian schema of "progress" in much the way that Bury did, feels he must go beyond this utilitarian ruling ideology signifies that the Anglo-American oligarchy finds it insufficient. Aristotelian utilitarianism—carried to its logical solution in Hitler's gas ovens—is not the engine of progress, and the remaining sane portions of the human race know it. So the mind-benders have opted for an ideology of mystical irrationalism instead.

America

The problem we face—as well as the progress they have made—is summed up in the situation within the United States today.

Although Bury never says it, and Nisbet gives it only passing mention, the U.S. has historically been the embodiment of the idea of progress. Starting from the commitment to progress in the Constitution itself, this country has been the engine for the transformation of millions of peasants into skilled workers, for the most advanced agriculture and industry, for the propagation of the faith in science and reason as the bedrock for government and social organization worldwide. The accomplishment of the United States, founded 200 years ago according to the precepts of Neoplatonic Christianity, has precisely borne out the truth of those precepts—not pragmatically, but developmentally over the practical test of time.

The centerpiece of destroying the idea of progress is destroying

History Of the Idea Of Progress

the United States. Otherwise America's very existence as a prosperous nation undercuts the capabilities of the British oligarchs-who claim the idea of progress to be utilitarian, mystical, or dead.

Since the World War II period the British oligarchy has made considerable headway toward destroying America. Using the educational system to propagate the lie that America was built on pragmatism, they are now reveling in the population's shock that pragmatism no longer works. They offer instead an "entry point" into the world of LSD, encounter group therapy, biorhythms, and "cosmic consciousness" where the ultimate progress is Death. Repeatedly shocked by the refusal of the majority of the American population to give up the belief in scientific and intellectual progress, they are now calling their Aquarian conspirators out into the open, to take over the presidency, to take over industry, to fill evey pore of life.

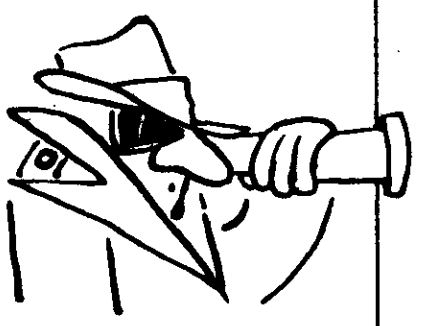
Whether they succeed or not will depend on whether the majority of the American population will fight for the idea of progress as St. Augustine correctly defined it, by wielding science and reason against the forces of evil now threatening to engulf mankind.

—Nancy Spannaus

The Petrograd Consignment
by Owen Sela
Dell
1980
394 pages
$2.50

SS-GB
by Len Deighton
Ballantine Books
1980
375 pages
$2.75

The Matarese Circle
by Robert Ludlum
Bantam Books
1980
536 pages
$3.50



A Readership in from the Cold

It is well known among the cognescenti that except for the publications of The New Benjamin Franklin House and a precious few other books, if you want to read about contemporary history, the best place to look is in the spy novel genre. This is not particularly anomolous. Much of contemporary history is being plotted in scenario form behind the closed doors of such think tanks as the Stanford Research Institute, the Hoover and Hudson Institutes, the Rand Corporation and so on.

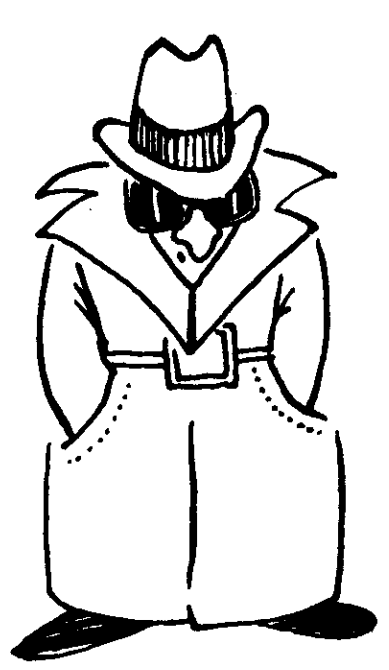
It is in these think tanks that scenarios for terrorism, assassination, and international economic and strategic dislocations are concocted, which are then fed variously to the radical fascist grouplets, the press, intelligence agencies, and governments. Therefore the scenario-style spy writer has a relatively easy job achieving verisimilitude. He is writing a scenario about a scenario. And in fact many scenario novels see the light of day relatively unchanged, as is the case of *The Crash of '79* by Paul E. Erdman, which describes an Anglo-American conspiracy to destabilize Saudi Arabia which is currently still operational.

All of this accepted, it is still with a shudder that one notices John Le Carré republished now in a "Classics" great books edition. Le Carré, a purportedly former employee of the British Foreign Office, is an interesting point of departure into the genre. Particularly so because unlike many other scenario books, Le Carré's are what I would call anti-historical. They are deliberately written to deceive about history, to perpetrate a lie. Their purpose is to describe British intelligence as an operation run by incompetent buffoons. Le Carré maintains the reader's interest by his ironic use of the anti-hero Smiley, his apparent frankness about the immoral cynicism which governs intelligence agency behavior towards its own operatives, and by offering a

SS-GB

The Petrograd Consignment

The Matarese Circle



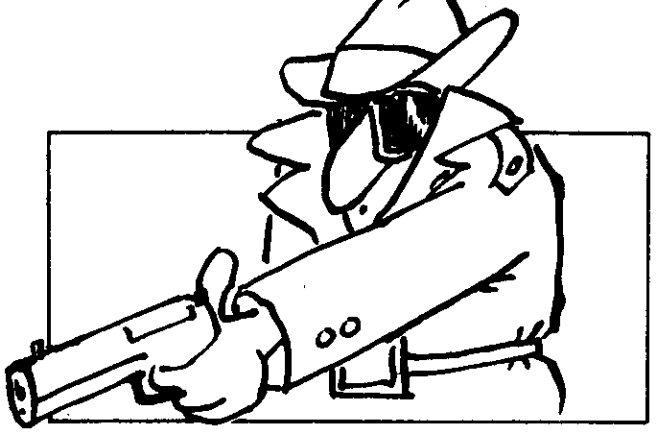
wealth of detail in general. Because we are getting so much apparent information about spycraft, and a delicious insider view of bureaucratic infighting, we allow ourselves to become convinced that here at last is the true Philby story—*Tinker, Tailor, Soldier, Spy* and so on. The big lie is not located in any individual plot. The whole conception is a deception.

William E. Stephenson's British Intelligence Special Operations Executive created the U.S. OSS which later became the CIA. The British have always controlled the CIA.The present Anglo-American conspiracy to destabilize the Middle East depends upon the operations of the British controlled Muslim Brotherhood. In a rigorous sense these operations do exhibit incompetent bufoonery. The Third World War which they are in process of accidentally detonating will destroy the Anglo-American intelligence community along with the rest of us. But unfortunately, British Intelligence is far from being the bunch of ludicrous has-beens described by Le Carré. Their designs go astray yes, but not without a trail of evils in their wake.

Two novels are to be recommended as interesting approximations of a historical account. The *Petrograd Consignment* by Owen Sela is an account of the Parvus plan to topple the Czar in 1917. The Parvus plan, named after Trotsky's controller Alexander Helphand Parvus, was a scheme to make Russia a grain and raw materials supplying dependency of Britain. The book is useful because it delineates the British role in creating the revolution and putting Kerensky in place. For the reader who understands Lenin's role in foiling Britain's attempts to turn Russia into a Maoist horror show, the account of Lenin's relationship to German nationalist circles is also a provocative reconstruction; however, let the unwary be warned. The Lenin in this book is a complete fabrication which portrays the Russian leader as a Hitler in the making. Furthermore, Parvus's own connections to the British are "overlooked" in the book. Nevertheless, the book is an interesting reconstruction. Otherwise it is fast-moving and entertaining.

SS-GB by Len Deighton has the unique distinction of copying the book-cover design of *Dope Inc.*, The New Benjamin Franklin House's best-selling exposé of British control of the international drug traffic. *SS-GB* is an entertaining account of the factional alignments between the Churchill faction and different sections of the SS after a German invasion of Britain. If you abstract from the self-serving heroics of the British author's treatment of the Churchillians and project the account into Germany, it bears a certain relationship to the actual British subversion of Germany which brought the Nazis to power and maintained them in control.

Lastly there is the *Materese Circle* by Robert Ludlum. This is another in the spate of Third Force spy novels—for example the *Tetramachus Collection* by Philippe Van Rjndt published in 1978 by Berkeley. For the Third-Force intelligence agency which controls assassinations and terrorism, read Permindex and you have it. Ludlum's book is the most popular of the recent three, no doubt because of its freer use of violence and pornography. It is fast-going, escapist reading, but its historical quotient is lowered by a deliberate deception. The connection of the thinly-fictionalized Kennedy machine to terrorism and violence is established, but then obscured. Ludlum ascribes the Anglo-Jesuit Dark Ages conspiracy as a plot by the multinationals to guarantee a *rate of industrial progress,* i.e. a conspiracy by pro-industrial techno-



cratic fascists, not anti-progress feudalists. Nonetheless the actual documentation of the existence of the Permindex Anglo-Jesuit intelligence-assassination bureau is useful, particularly since the Pallavicini family is given thinly-disguised top-billing along with the Kennedy machine as controllers behind the oligarchy's Permindex.

—*Carol White*

Person/Planet:
The Creative
Disintegration of
Industrial Society
by Theodore Roszak
Doubleday
1980
347 pages
$5.95

From Counterculture to Cults

Theodore Roszak's *Making of the Counter Culture* (1969) not only chronicled but also significantly shaped the development of the last two decades' "alternative life styles" movements, infusing them with the basic concept that Western man needs to transform his perception of reality totally in order to avoid ecological catastrophe and to free himself from the "tyranny of science and technology." Reject "the myth of objective consciousness," Professor Roszak counseled America's younger generation, and place magic and the irrational at the center of your existence.

Now, with the fruits of his earlier message being harvested in the form of millions of young minds deadened by drugs, rock music, religious cults, sexual perversity and the other accoutrements of the counterculture, Roszak has come forward with the latest phase of his so-called "human liberation program."

Whether or not Roszak's use of the words "creative disintegration" in the title of his new book is deliberately ironic, it is certainly apt. *Person/Planet: the Creative Disintegration of Industrial Society* is an explicit statement of the bestial ideology which the Council on Foreign Relations is foisting on the United States in order to seduce the population into accepting its fascist program for "controlled economic disintegration."

A charter member of the Aquarian Conspiracy, Roszak lays out a whole range of Aquarian kookery from Earth Goddess worship to witchcraft and death-cultism.

Building on his basic premise that the human species is just another of nature's creations, like a rock or tree, (hence his Person equals Planet equation, Roszak postulates that modern man's woes stem from his rape of Mother Earth through "excessive industrialism" and "Promethean aspirations." His proposed cure? For starters, dissolving urban industrial society: We must "disintegrate it *creatively*," he writes, "into humanly scaled, organically balanced communities and systems that free us from the deadly industrial compulsions of the past." Since the cities are inherently "rapacious" and an "imperialist cultural force," their populations must be relocated into rural, monastic-type communes (Roszak offers the Hare Krishna farms as models) where people will be given the chance to reintegrate themselves into the Earth through back-breaking physical labor without the help of overweaning technology. The purpose of this new monasticism (which Roszak at one point has the honesty to admit at least "sounds to some like a prescription for indigence; the project of winnowing work back from the machines by scaling down the industrial establishment . . .") is to *disintegrate* the national

identity and, in most cases, to throw off much of the dominant culture."

Resurrecting Gnosis

Never fear, though, Roszak has a new counterculture at the ready to replace the old one. As he describes it, the new culture will be a hideous combination of the worst orgiastic, superstitious rites of the pagan world. Calling for a resurrection of the "Old Gnosis"—the religious sect deliberately fostered by the oligarchical rulers of the decaying Roman Empire to subvert early Neoplatonic Christianity—Roszak praises the "various neopagan cults that have sprung up in America since the mid-sixties as part of the current religious and mystical revival . . . whose pagan sympathies stem from a serious desire to salvage the nature worship of the pre-Christian past and to adapt that lost sensibility to the needs of the time." Roszak is particularly fond of those "neopagans who speak of having an 'ecopsychic' mission and whose goal is to restore that vivid sense of dialogue between person and planet which represents the most significant meaning of magic."

Women who have struggled to free themselves from the stereotype images of the female as "more feeling" and "closer to nature" (i.e., less capable of thinking) will find Roszak's view of women's roles in the "disintegrated society" particularly enraging. Accurately profiling the vulnerabilities of women to manipulation into revolting against the rule of reason—a tendency encouraged by the fraudulent women's liberation movement, which, like the environmentalist, student, and black power movements was by and large a creation of the Aquarian conspiracy—Roszak writes: "Thus far, the neopagan sense of living personality in nature has found its sharpest focus and what may be its greatest cultural force in the women's liberation movement, where a lively concern for "feminist spirituality," has inspired an outspoken commitment to witchcraft, geomancy, and ritual magic. [Feminist neopaganism] is a significant contemporary attempt to invent a new (or perhaps I should say to revive a very old) relationship to the Earth, one which grants the planet its personhood and its sacred rights. . . ."

". . . [M]any sensitive minds have counseled us to welcome the traditionally feminine virtues back into our lives—the intuitive, the compassionate, the organically nurturing and trusting—as a life-giving discipline that will balance our society's technological excesses. . . . Clearly, there are those among us, at least in the women's movement, who recognize the ecological emergency of our time for the profound spiritual failure it is. They know we are not going to save ourselves with a quick technological fix and more efficient resource management. Rather, the [Earth] Goddess is going to have to be reborn in our midst . . . as living culture. Where the movement for women's liberation reaches to that awareness, it becomes something far larger and stronger than another political cause. In the depths of their tormented personhood, women . . . join forces, with the life of the planet and become her peculiar voice."

When Roszak attempts to explain the rise of the ecology movement by claiming that the Earth Mother spoke directly "to her children," it's hard not to guffaw. But despite one's impulse to dismiss Roszak as just another kook, what he's proposing is a deadly serious matter. The absolute coherence between his motley package of occultism, back-to-the-landism, and other manifestations of the New Luddites and the CFR-Club of Rome's program for kill-

ing off two billion of the world's population in the process of ushering in a New Dark Ages becomes sharply apparent in his elevation of death and dying to the highest level of human existence. The ubiquitous "death with dignity" movement which Roszak extols in the following excerpt is a pure creation of the CFR-Club of Rome; its avowed purpose is to help kill off two billion people by seducing the population into accepting death through famine, disease, lack of medical technology, and slashed energy consumption as "natural" and therefore good.

"Death," this human vulture exults, ". . . approaches most closely to the core of the personalist experience, a shadowed presence that throws our need for an authentic identity into bright and urgent prominence. Perhaps you have noticed the extraordinary popular attention . . . which death and dying have attracted in recent years: an attention not at all morbid or morose, but intelligently curious and candid. It is sometimes called 'thanatology' in our hospitals, but the concern is far more than a professional specialization. It is an effort to create what was once called an "art of dying," to take death "out of the closet" and into our lives as a stage of growth within our total human being. this is one of the foremost aspects of the new sense of personhood—this bravely inquisitive search into that most solitary, unique, and inward moment where our identity finds its decisive punctuation. It is also the aspect that lends a deep spiritual significance to the quest for self-discovery, reminding us again that inwardness is a religious direction."

Should the Club of Rome program which Roszak is fronting for be realized, an awful lot of us will be "decisively punctuated" a lot sooner than we ever expected.

—Kathleen Murphy

EDITORIAL

Continued from page 3

the St. Petersburg Academy and the French Academy of Science, a precursor of the Ecole, were products of the collaboration of Gottfried Wilhelm Leibniz and Jean Baptiste Colbert. But even a cursory reading of Soviet mathematical literature shows, despite the real accomplishments of the Soviet system, how far they too have fallen from the Leibnizian ideal of republican education which was realized at the Ecole.

Leibniz gave the name "The Principle of Sufficient Reason" to Plato's hypothesis of the higher hypothesis. By this he meant that reality can never be comprehended as a mere succession of events which lead linearly from one to the next. Any given set of facts or events can be understood only from a higher standpoint which perceives the apparent chain of causality linking these events as a grid of a geometric surface. Each particular event has its place on the surface, but its importance is only understood when the nature of the surface itself is known, and only then when it is clear how the surface as a whole is evolving; this is the deeper causality which underlies the sequence of events. Soviet education still references the Principle of Sufficient Reason, but only in a way which underscores their serious epistemological problems.

Mir Publishers of Moscow has published a series of English-language booklets that reprint Soviet school mathematics club lectures by leading mathematicians and physicists. (These lectures are themselves another indication of the Soviet emphasis on the importance of mathematics and science education.) One of them, *Proof in Geometry* by A.I. Fetisov, is written to explain to geometry students why an apparently obvious fact like the congruence of two given triangles must be subjected to proof. His general line of argument correctly deals with the deceptiveness of apparent sense-certainty; however, rather than going on to develop for the student the limitations of deductive proof—which defends against certain errors but cannot yield new knowledge—Fetisov writes:

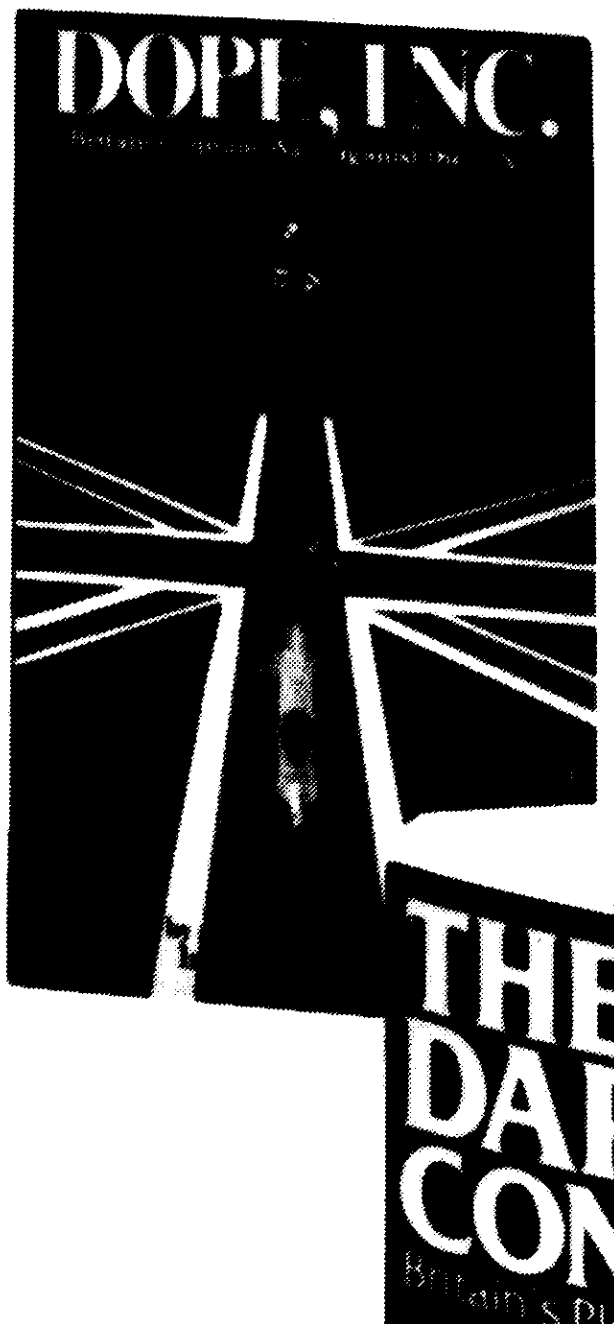
"The need for proof follows from one of the fundamental laws of logic (logic is the science that deals with the laws of correct thinking)—*the Law of Sufficient Reason.* This law includes the requirement that every statement made by us should be founded, i.e., that it should be accompanied by sufficiently strong arguments capable of upholding the truth of our statement, testifying to its compliance with the facts, with

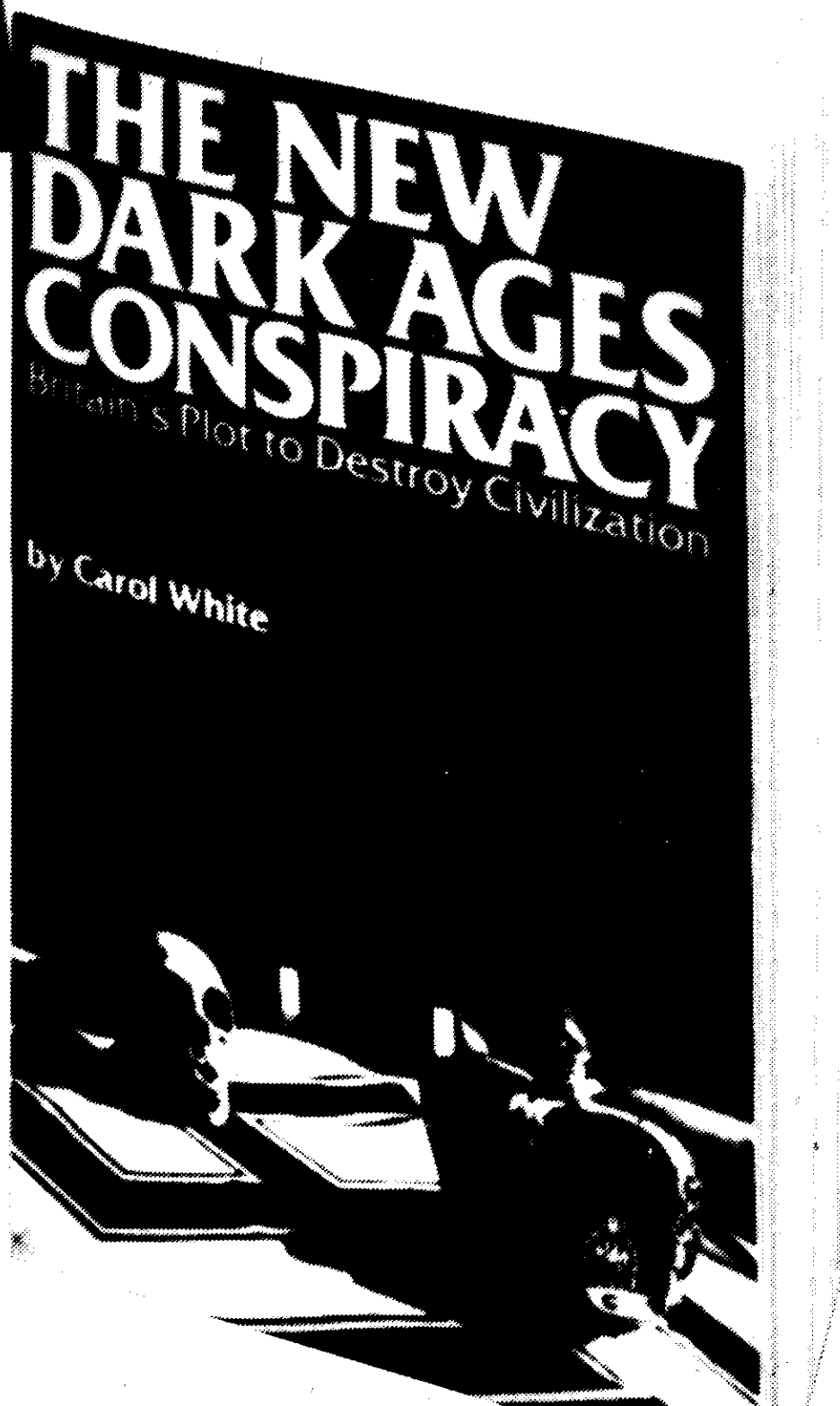
Continued on page 85

In Our Own Words

Through an editorial oversight, a note identifying the translation of Plato's *Timaeus* cited in Helga Zepp LaRouche's "The Secret Knowledge of Friedrich Schiller" was omitted from our June issue. The translation quoted was that of a task force led by Uwe Parpart and Criton Zoakos, which was published in the February 1980 issue of *The Campaigner*. Copies of this translation are available from Campaigner Publications for $2.00 plus $1.00 postage and handling.

The drug plague is only part of the story...





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Continued from page 83

reality. Such arguments may consist either in a reference to observation and experiment through which the statement could be verified, or in a correct reasoning made up of a system of judgments."

Thus only the words "Law of Sufficient Reason" remain of the influence of Leibniz, down to his successor Euler, to remind the Russian student of his Platonic heritage.

The Soviet treatment of the "ideal point" or point at infinity, which is central to the epistemological elaboration of Riemannian geometry (a subject which the Soviets otherwise apply with noteworthy success in plasma physics) is equally painful. For Riemann, the point at infinity is precisely the point where the higher hypothesis intervenes into physics so that the transformation from one geometry to its successor can occur and be understood. The point at infinity is the point occuring at the extremity of a process, where pragmatic reality is disturbed by a singular forcing event.

How is this crucial and complex idea presented to Soviet students? Writes N.M. Beskin in *Dividing a Segment in a Given Ratio*: "The reader naturally feels the need to consider this point just as any other. Where is it? However, this point is not a point like any other—it is an *ideal point*. It can also be made palpable but not in the same way as an *ordinary point*; we shall now attempt to overcome the natural resistance of our organism to the introduction of new concepts, which are incompatible with our habitual desire of perceptibility.

"The ideal point is the one which parallel lines have in common. Two parallel lines have the same *direction*. Thus the introduction of ideal points is not a radical revolution but only a modest renaming: from now on the term 'direction of a straight line' will be replaced by a new one—'ideal point.' "

For Riemann, the existence of the point at infinity creates the reality of the "palpable" points subsumed by it; for Beskin, it is an embarrassment, a non-existent. As Lyndon LaRouche has pointed out, although the Soviets apply Neoplatonic method to science, they are epistemologically hamstrung by their continued clinging to British materialism in the form of Marxism.

It was this weakness which opened the Soviet Union, like our own country, to a calculated operation by Bertrand Russell to falsify and distort the epistemological content of Leibniz and Riemann's work. Russell's first published books were in fact devoted to precisely this project.

Adopting the Soviet educational model will not rescue the nation. We must leap ahead of the Soviets by combining Platonic epistemology with method, as was done at the Ecole Polytechnique, and by so doing we will startle the world that once again America shining forth as a beacon for progress. Only with LaRouche in the White House can the odious comparisons of the Wirszup report be righted. What's more, only with the implementation of LaRouche's war-avoidance strategy for global industrial development, when the military implications of Wirszup's findings recede into the background, will it be not the threat of war, but the threat to our posterity, which will create the mobilized commitment for the nation's moral and educational reform.

About the Authors

Peter Wyer, author of the introduction to Felix-Eberhard von Cübe's "Who Was Heinrich Schenker?" is a founding member and leading organizer of the Musicians for LaRouche, a group of professional musicians supporting the presidential campaign of Democrat Lyndon H. LaRouche, and is also a Music Director of the Humanist Academy. He majored in piano at the Manhattan School of Music and at Oberlin College, and studied composition at the Aspen summer music festival with Darius Milhaud. He also took a degree in Biology at Columbia University and received his degree in Medicine at the University of Pennsylvania. A frequent contributer to *The Campaigner*, he is the author of "A Draft Proposal for a Heinrich Schenker Foundation of Music," which appeared in *The Campaigner* in August 1978.

Claude Albert, author of "The Ecole Polytechnique," currently heads the Metz local of the European Labor Party (*Parti Ouvrier Europeen*). For many years she was on the French desk of the New York-based news service NSIPS before becoming Managing Editor of the French-language *Nouvelle Solidarité* in Western Europe. From the vantage point of her location in the city of Metz, Claude Albert has been able to locate much original material on the history of Republican education in France.

A biographical note on Felix-Eberhard von Cübe, author of "Who is Heinrich Schenker?" appears on page 15.

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☐ **The Power of Reason: A Kind of an Autobiography,** by Lyndon H. LaRouche, Jr. ($2.95)

☐ **How to Defeat Liberalism and William F. Buckley,** by Lyndon H. LaRouche, Jr. ($3.95)

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LETTERS

Continued from page 3

letter, which we will forward to her. In the meantime, the editor of the translated excerpts of the *Commedia*, Nora Hamerman, notes that you have selected what is perhaps the most disputed single passage in all of Dante's epic, the famous phrase *"tra Feltro e Feltro."* This phrase, which describes the birthplace of the mysterious savior whom Virgil predicts will uplift Italy after the political debacle of the Black Guelph victory in 1302, has been argued over since shortly after Dante's own death in 1321. The three most common interpretations read Dante's meaning as (1) "between Feltre and Montefeltro"—two Italian cities, resulting in a geographical location that could be the birthplace of Dante's great patron the Ghibelline leader Can Grande della Scala; (2) "between felt and felt"—an entire book has been written on this interpretation, which identifies the word *feltro* as a common type of cloth produced in the major woolen industry in Dante's time, and discusses the possible symbolism; (3) between two celestial constellations, which would suggest a *time* rather than a *place* designation.

Your concept that "Feltro e Feltro" are simply one place, and that to travel between them means circling the globe, is new. Was Dante thinking of America? It is worth noting that in another famous canto of *Inferno*, the Ulysses story, Dante recounts that the Homeric hero sailed past the Gates of Hercules (Gibraltar)—in other words, toward America.

We have not been able to locate the Minchon English translation of Dante's *Commedia*, and would appreciate any information *Campaigner* readers could provide that would enable us to obtain it.

Babylon and Jerusalem

To the Editor:

Paul Arnest makes a common mistake in his misunderstanding of what Jews mean when they say that they are God's "chosen people." What Jews mean is that the Jews chose the One God and agreed to live by his commandments, the mitzvot. It is not God that went eenie, meenie and picked the Jews.

Many nations knew of Yahweh, Ha-shem as He is called in Israel, and he did indeed exist in polytheistic pantheons. but it was the Jews that rejected all the other "Gods" and chose the One.

Stuart Reckson
Yeshiva Rish HaTorah
Old City Jerusalem
Israel

The author replies:

Mr. Reckson has not grasped the point of my 1977 article, "From Babylon to Jerusalem" (*The Campaigner*, Vol. 10, No. 4). Substantial portions of the Old Testament were products of the cult factories of Mesopotamia, which also churned out the "Greek" cult of Apollo, the official cults of Persia, and the Hellenistic Isis/Osiris cult. The Babylonian cult of Yahweh functioned as an intelligence "asset" maintained to be played or discarded at will to control and pacify Judea even while Babylonian and Persian bankers plundered it.

To support this thesis, I demonstrated that the cult of Yahweh was nurtured in Babylonian exile even while Nebuchadnezzar's armies devastated Judea. The "Second Temple" was established as a money-laundering institution for Persian intelligence and Babylonian banks. Later, Yahwist "zealots," preaching an anti-science, back-to-the-land ideology aided the cult of Isis and its Roman stooges in conquering the eastern Mediterranean, and in the end sacrificed themselves in the vast destabilization which installed Isis-worshipper Vespasian as Roman emperor.

Were I writing my article now, I would draw out explicitly the parallel between the Yahwist zealots of Antiquity and today's ugly, Anglo-American intelligence-ridden Gush Emunim and similar Zionist cult groups, who are leading their nation and the world to disaster and war as surely as the traitorous prophet Jeremiah did in Antiquity.

I would again like to emphasize, as I wrote in 1977, that the Jews in Antiquity participated in the city-building effort alongside the Phoenicians and the Ionian and Dorian Greeks. This Jewish humanist tradition culminated in Philo of Alexandria, who laid the basis for modern Judaism and Christianity—working together with St. Peter—in opposition to the Isis cult rule of Rome. It is this rich tradition which is castigated and suppressed by the pro-Babylonian prophets of the Old Testament.

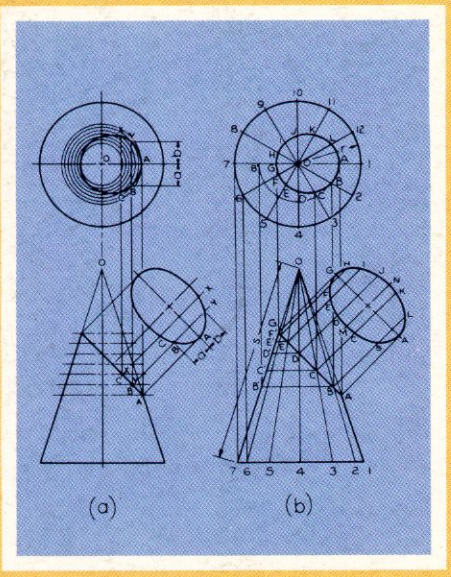
—Paul Arnest

Schiller

To the Editor:

I would like to call the readers' attention to the source for my article on "Schiller in America" which accompanied Helga Zepp LaRouche's "The Secret Knowledge of Friedrich Schiller" (*The Campaigner*, June 1980). Most of my information came from an article also entitled "Schiller in America" by Ellwood Comly Parry, published in the University of Pennsylvania's "American Germania Press" series, Philadelphia, 1905.

James Cleary
New York City



THE ECOLE POLYTECHNIQUE & THE SCIENCE OF REPUBLICAN EDUCATION

"It is better to have republicans without a republic than to have a republic without republicans." So advised the great French mathematician Gaspard Monge who, with scientist and statesman Lazare Carnot and a small group of collaborators, created the model for republican education. The Ecole produced many statesmen, but its most enduring contribution was its successful method of combining the most advanced concepts in physics and geometry with revolutionary engineering applications in construction, industry, and military science.

These achievements were made possible because of the Ecole's commitment to republican nation-building, which included its native France following the disastrous Jacobin terrorist phase of the Revolution, as well as the young United States. American republicans determined to reclaim our country from the Jacobin-modeled environmentalists will find the Ecole's educational method a blueprint for restoring America's moral, scientific and cultural excellence.

THE POLITICS OF MODERN MUSIC

Early in this century, the German musicologist Heinrich Schenker battled for the classical music tradition inherited from Bach and Beethoven against the ear-splitting and mind-destroying cacophony of Schoenberg and Stravinsky. Schenker not only debunked the pretensions of these violators of the laws of music, but also pinpointed their promoters: the very same British intelligence circles that have foisted the counterculture's rock, disco, and drugs on the youth of today. Although Schenker and his collaborators were defeated in their own day, in "Who Was Heinrich Schenker?—The Germany The Nazis Tried to Destroy," the battle for the Beethoven tradition is begun anew—this time, with the advanced epistemological tools needed to defeat these brainwashers once and for all.

Composer Stravinsky with LSD pusher Aldous Huxley in Hollywood.

SOVIETS 34 / U.S. 1

That is the ratio of Soviet to American high school students with one year of calculus or more, according to a recent study which concludes that American students are "incomparably far behind" their Soviet counterparts in science and math education. These disturbing findings are a stark rebuttal to the "deschooling" educational theorists who have turned American schools into "touchy-feely" playgrounds for drugs and promiscuity over the last decades. This new "education gap" must become the focus for a nationwide campaign to establish an American educational mobilization.