

EIR Feature

Leibniz, Cantor, and LaRouche on the human mind

by Gabriele Liebig

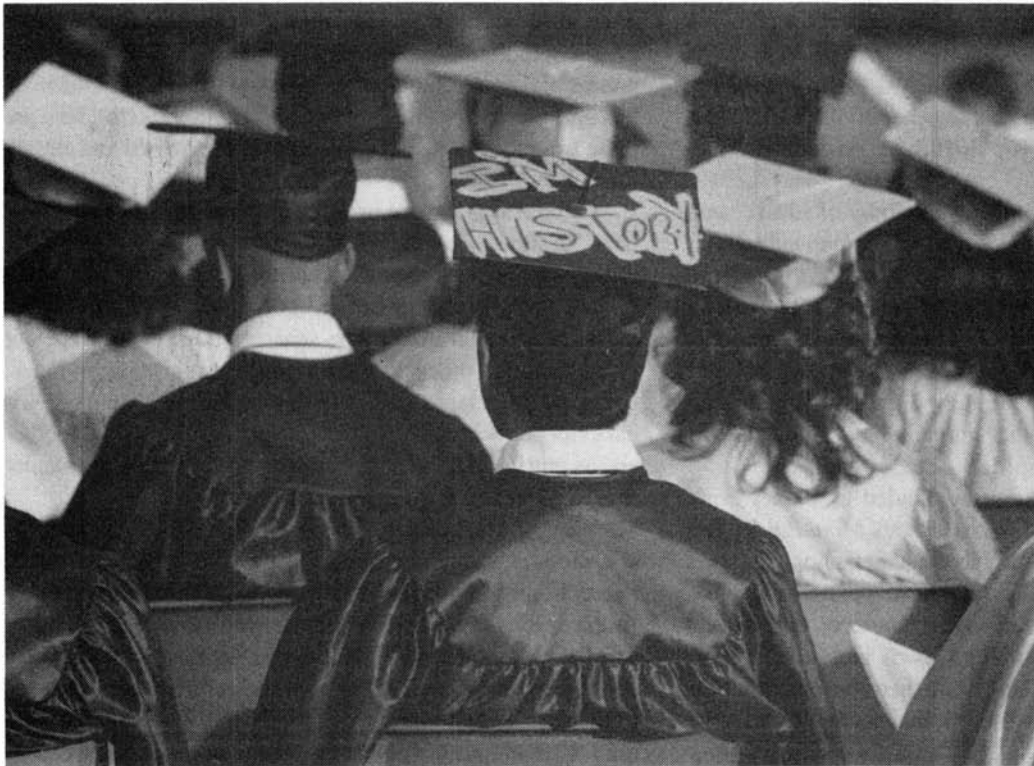
The following has been abridged from a class presented to the International Caucus of Labor Committees in Paris, France, on July 31. Mrs. Liebig is a member of the ICLC European Executive Committee and editor-in-chief of the German newsweekly Neue Solidarität.

We see around us a world day by day sinking deeper into crisis. Some time back, it was still necessary to list a lot of predicates, because people did not believe that there was a crisis. Today you can watch it on TV and read about it in the press.

Our international movement is organizing for a change in course, and has developed all the policies to get out of this crisis. But we would not have much hope of success, if we were not convinced of the power of ideas—that a certain kind of ideas can be an efficient cause for change in the political or physical world. This is the central topic of Lyndon LaRouche's latest writing, "History as Science," published in the Fall 1993 issue of *Fidélité* magazine: namely "the crucial role contributed by individual ideas and individual personalities in the shaping of history."

How can that be done, how can a devastating process of destruction be reversed, evil transformed into good? In "History as Science," LaRouche states: "It is by taking the *negation* of life, the conditions which must be changed, more or less promptly and urgently, that we are led to discover those among the implied axioms of presently prevailing opinion which must be uprooted," as a precondition to avert even worse consequences. And: "Ignorance, want, and suffering, become the goads which prompt the relatively noblest persons among us to develop the good which is technological progress, and to develop those anti-usury programs of economic development which are indispensable for conquering the evils of ignorance and want throughout our planet, and beyond."

We see an illustration of that in Bischofferode, Germany, where the hunger strike of 40 potash miners has focused the attention of the television-minded



About to receive a diploma, a high school graduate proclaims that he is "history." These students' link to the whole of human history is one thing the oligarchy wants to eradicate. Inset: G.W. Leibniz (1646-1716), a universal thinker who fought both the British empiricism of Locke and the French rationalism of Descartes.

population and the politicians on the intolerable consequences of the policy of deindustrialization of east Germany, where one-third of all jobs have been wiped out and 80% of all industrial jobs! Unionists and businessmen, and even some Christian Democratic and Social Democratic parliamentarians have finally been prompted—in part for opportunistic reasons—to attack this ruinous kind of privatization and “shock therapy.” The problem is that they tend to ask for Keynesian-financed job creation, which means more government debt. This is no solution, because public debts already amount to DM 27,000 per German citizen, and the debt service eats 25% of the budget. Nevertheless, there is a chance for people to grasp, that between the Scylla of shock-therapy and the Charybdis of Keynesian deficit-spending there is a real solution: infrastructure development in the Productive Triangle, financed by long-term, low-interest National Bank credits. This is the *idea* we put into the incipient mass strike ferment.

Platonic ideas

Other ideas, too, tend to become stronger, once you see the results of denying them. Thus, amid deep and growing injustice the longing and striving for *justice* is swelling into a powerful social force, which eventually will sweep away those responsible for the denial of justice. Likewise, the idea of *freedom* shines brighter in the prison cell than in the all-too-liberal outside world.

The importance and actual meaning of the idea of *equality*

of men also becomes clear, if you are confronted with ethnic conflicts and racist ideologies seeking the identity of peoples in trivial or even only alleged differences. What does it mean: All men are created equal? It means, they are all created in the image of God, endowed with the potential of creative reason. Unfortunately, the dynamic of such conflicts, once injustices occur and blood flows, tends to increase popular hatred of the “different” enemy. But no matter what chauvinistic demagogues say, most human beings want to be human beings, and not single-minded racists.

Those ideas just mentioned—justice, freedom, and equality of men—belong to the special class of ideas called Platonic Ideas, which, as one of their characteristics, cannot be equated to any object. To understand that better, let us look at several different classes of ideas:

The lowest category is the *sense impressions*. John Locke and the empiricists describe the mind as a *tabula rasa*, like an untouched plate of wax, upon which one by one the things of the sensory world impress themselves. The signs they leave in the mind are the *nomen* or names of things (nominalism), which we can remember, connect with each other, etc. It is quite obvious that this is a description of the way certain animals think, like Pavlov's dog, which waters at the mouth if it sees a sausage. We can also call them *animal ideas*.

Second, there are *human ideas* of objects, new objects to be produced. The most developed of those are discoveries, like the wheel or Thomas Edison's light bulb. In a combined

form those ideas form, for example, the concrete projects of a certain economic program.

Third come the *Platonic ideas* such as justice, freedom, equality of men, without objects attached to them. You can attempt to define them, and you should, but no definition will be complete or sufficient.

On a still higher level in the “hierarchy of ideas,” you have what is called the *personality* of the human individual, or its *soul* or *spirit*. This is the whole edifice of Platonic ideas in the mind, including the totality of emotions that belong to them. LaRouche has pointed out that the mathematician Bernhard Riemann has called this *Geistesmasse*, while Leibniz called it “monad” or soul. Leibniz also distinguished between the “living soul” that animals have, too, and the specifically human soul or spirit.

Leibniz’s monads have been ridiculed as if they were obscure, windowless things. In reality his *Monadology* is a beautiful, far-sighted and highly truthful metaphor to express the otherwise inexpressible lawful ordering of multi-leveled, multiply-connected, always changing universe. The lowest are the monads or simple substances of inorganic matter, next the substances of organic life, then the animal souls and then the spirit of man. The original monad of all—the sufficient reason for the whole multiply-connected universe—the Necessary Being is God. Each monad reflects the macrocosm as a whole, although to different degrees.

“But the spirits are also images of divinity itself—or the very Author of nature. They are capable of knowing the system of the universe, and of imitating it to some extent through constructive samples, each spirit being like a minute divinity within its own sphere” (Section 83).

The “knowing” signifies *imago Dei*, the image of God, while the “imitating” signifies *capax Dei*, capacity for God.

This is one way to express the truth that ideas have material power.

The human mind: tabula rasa or innate ideas?

Leibniz has written a whole book, *New Essays on Human Understanding*, a devastating critique in dialogue form of John Locke’s mistaken view of the human mind. It was written in French and appeared only in 1765, some 50 years after Leibniz died.

First, Leibniz demolishes the Aristotelean-Lockean conception of the human mind as a *tabula rasa* or empty slate. An empty slate as “image of God” is rather strange indeed (because Locke would not deny that man is in the image of God). Leibniz explains, that the human mind or “soul” rather includes from the beginning “innate ideas.” But these ideas are not to be misunderstood as prejudices, they are not even specific, fixed, pre-formulated ideas, but rather the inborn human potential for knowledge, including the deepest and most difficult sciences. He uses the image of a piece of marble, which is to become a beautiful sculpture. In the case of the human soul, the marble is not indifferent, but it has certain

internal structures which make it easier to discover the shape of the sculpture. Nevertheless it takes a lot of effort and concentration to discover the shape and to transform the marble into the sculpture. In other words, the innate ideas are there from the onset, but they must be discovered and clearly formulated.

Leibniz says that he uses the expression “innate” or “inborn” to signify that these ideas don’t come from the outside, through the senses, but they can only be found inside the human soul, by the sovereign, concentrated activity of the individual human mind. The senses are important, but not primary in that process. They give the opportunity to think, they lend the images to fill the “bare concepts.” And empirical evidence serves to cross-check the validity of an hypothesis, as one checks the correctness of an arithmetical calculation by calculating it a second time backwards.

While Locke denies any other mental activity than the conscious one, Leibniz introduces the “pre-conscious” mind. Perceptions don’t occur noun by noun, as isolated objects or facts consciously perceived. Perception mostly occurs in the form of very many small, unnoticeable perceptions—*les perceptions insensibles*. The pre-conscious mind always active, even when consciousness sleeps. People know much more than what they could instantly formulate, and often people act according to certain principles, without being consciously aware of them.

“The mind operates at every moment according to the principles upon which it is based, but it is not so easily able to unscramble them and represent them to itself distinctly and separately, because this requires paying great attention to its own activity, and most people are little accustomed to meditating on such matters” (*New Essays on Human Understanding*).

In this way the famous “intuition,” which is made responsible for so many discoveries, becomes intelligible and loses its magical sound: It just means a mental breakthrough, when suddenly the light of reason brings a momentary clarity to the inside of the mind, which soon sinks again into relative darkness. Anyone can observe this in himself while conceptualizing a difficult article or presentation: Ideas are sometimes slippery things, in one moment you think you have them, but then they slip back into the pre-conscious sphere of the mind, and it needs some concentration to fish them out again. This is no magic, but an ultimately intelligible process, and it can and must be trained.

Three levels of thinking

Early in his development, LaRouche distinguished three levels of thinking:

1) Empirical thinking, the level of sense perception. Leibniz writes about it in the *Monadology*:

“Memory provides a kind of *connectedness* to souls which resembles reason but must be distinguished from it. For we see that animals which have a perception of something

that strikes them and of which they have previously had a similar perception expect, from the representation in their memory, that which has been conjoined in that previous perception, and are thus led to sensations similar to those they have had before. For example, when one shows a stick to dogs, they recall the pain that it has caused them and whine and run off. . . .

“Men function like beasts insofar as the connections among their perceptions come about only on the basis of memory, resembling empirical physicians who have mere practice without theory. We are all mere empirics in three-quarters of our actions” (Sections 26, 28).

2) Logical or deductive thinking. What you think or say, must not include contradictions. If it is contradictory it is regarded as untrue. This should not be despised as from a counter-culture point of view, arguing for example against learning arithmetic or algebra in school. But one should not regard it as the only possible way of rational thinking.

3) Creative thinking, which is not irrational but rather a higher form of rational thinking.

All three levels are included features of the human mind. Creative thinking supersedes but doesn't exclude logical thinking; deductive thinking is a priori in respect to sense perception, but doesn't exclude it.

On the first and second level of empirical and deductive thought rests the philosophy of a mechanical explanation of nature founded by René Descartes. In order to make the laws of nature simple and accessible to everyone, he wanted to reduce all observable processes to mechanical, algebraic functions, while he continued to believe in hypothesis. However his mechanical hypotheses were often quite absurd, especially in regard to the human body. He believed that the physical connection of soul and body was seated in the *epiphyse*—pineal gland—or that embryos would develop into females if a little piece of excrement prevented the embryo from growing male genitals.

Descartes founded a whole “new philosophy,” but the great new discoveries were made by others such as Christiaan Huygens, his youthful friend, who soon superseded the Cartesian method. These discoveries—about light radiation, a pendulum clock which “always” shows the correct time, etc.—were based on so-called non-algebraic curves. The simplest is the cycloid, which is constructed by rolling a circle on a line or another circle. They clearly exist in nature, but can't be simply expressed by an algebraic function. Hence the Cartesians rejected them as “unscientific.” Those non-algebraic curves or functions, including the Golden Section, represent a higher mathematics than algebra, but not the highest.

LaRouche points out in “History as Science” that there is a third and still higher level of mathematics represented by the transfinite numbers of Georg Cantor, also called “alephs.” As this is a major stumbling block for many in LaRouche's books, I want to explain it a bit.

Cantor's alephs

We go back here to Cantor's *Grundlagen einer allgemeinen Mannigfaltigkeitslehre* (1883) and his *Beiträge zur Begründung der transfiniten Mengenlehre*.

He first explains the simple notion of *cardinality* (cardinal number) or *power of finite sets* or *series*. Example: You have a set of three objects. Its cardinal number is 3.

Of course, there exists an infinite number of sets with other cardinalities. You can order the totality of all cardinal numbers of finite sets of whole objects into the *infinite series* 1, 2, 3, 4, . . . n .

Now, Aristotle and his followers always claimed, that all infinite series are equally big. If you add 1 to the last number of an infinite series, it is still infinite. Galileo at least tried to check if this was true and asked himself, whether the square numbers in their totality were not a smaller infinity than all whole numbers, but he found that this was not true, because each square number belongs to one whole number:

$$1, 2, 3, 4, \dots n$$

$$1^2, 2^2, 3^2, 4^2, \dots n^2$$

However, Georg Cantor not only hypothesized, but proved, that there are several distinguishable infinities of different *power*. While the square numbers and even the fractions form an infinite series of the same power as the series of whole numbers 1, 2, 3, . . . n , decimal fractions (with non-periodic numbers after the decimal) form an infinite series with a higher power than the whole number series.

If there are infinite series of different power, they must also have a different cardinality or *ordering type*. These ordering types or cardinalities of infinite series are the famous *transfinite numbers* or *alephs*.

The smallest transfinite number or aleph zero (\aleph_0) is the ordering type of the series 1, 2, 3, 4, . . . n . The ordering type represents the unifying concept of the whole series, uniting the *many* numbers into *one*. This unifying concept is at the same time the *generating principle* of the series. In the case of (\aleph_0) it is “plus one.”

Cantor explains that the human mind creates numbers by two *generating principles*, a lower one and a higher one. The lower one is simple counting, like adding one. The higher one is finding the generating principle of a series, which was applied in finding the first transfinite number \aleph_0 .

Using again the first generation principle of adding we can now generate the series $\aleph_0, \aleph_0+1, \aleph_0+2, \aleph_0+3, \dots \aleph_0+m$. Imagine \aleph_0 is a crucial discovery and the series represents the successive consequences of the discovery. If \aleph_0 is the discovery of the wheel, then \aleph_0+1 could be the idea of the cart, representing infinitely many different carts, drawn by different sorts of muscle power. Then \aleph_0+2 could be the idea of the steam-engine driven railway, \aleph_0+3 perhaps the idea of the automobile, etc. Unlike the series of the order \aleph_0 , which was an infinite series of *finite* series or their cardinal

numbers, this series is an infinite series of *infinite* series. Therefore it has a higher *power* and is ordered by the next higher transfinite number \aleph_1 .

Likewise, \aleph_2 would be an infinite series of infinite series of infinite series. And so forth.

Much of the concept is already included in Leibniz's *Monadology*, where he distinguishes between the realm of mechanics (\aleph_0) and the realm of life and nature (\aleph_1):

"Thus each organic body of a living being is a kind of divine machine or natural automaton which infinitely sur-

If we want to change the course of history and bring about a new renaissance, we have to be able to fight for the paradigm of a new Renaissance: the transfiniteness of the human mind.

passes all artificial automata. For a machine made by human artifice is not a machine in each of its parts. For example, the tooth of a brass wheel has parts or pieces which to us are no longer artificial things, and no longer have something recognizably machine-like about them, reflecting the use for which the wheel is intended. But the machines of nature, namely living organisms, are still machines even in their smallest parts, *ad infinitum*. It is this that constitutes the difference between nature and artifice, that is, between divine artifice and ours" (Section 64).

Cantor has started from here with his hypothesis about an infinite system of ordered manifolds (series) of ever higher power. He was convinced that the human mind is capable of making always totally new discoveries which generate new infinite series of infinite series of consequences.

LaRouche uses the "pedagogical series" of successively reached levels of potential relative population density, each determined by specific technologies, which he calls A, B, C, You could call them as well $\aleph_0, \aleph_1, \aleph_2, \dots$. Most interesting in this series is the "comma," what is in between A and B, B and C, etc. This discontinuity or singularity \overline{AB} or \overline{BC} , etc. corresponds in reality to the generation, transmission, and assimilation for broad practice of new crucial discoveries of the individual sovereign human mind.

I want to conclude this section with a quote from Cantor's *Grundlagen*:

"Quite often the finitude of the human *understanding* is adduced as a reason why only finite numbers are thinkable. . . . By 'finitude of the understanding' is tacitly meant that the capacity of the understanding in respect of the formation of numbers is limited to finite numbers. If it should turn out,

however, that the understanding in a certain sense is also able to definite infinite, i.e., *transfinite* (*überendliche*) numbers and distinguish them from one another, then either the words 'finite understanding' must be given an extended meaning, after which that inference can then no longer be drawn from them; or else the human understanding must also be granted the predicate 'infinite' in certain respects, which, in my considered opinion, is the only correct thing to do. The words 'finite understanding' which one hears on so many occasions are, as I believe, in no way on the mark. As limited as human nature may in fact be, *much* of the infinite nonetheless adheres to it, and I even think that if it were not in many respects infinite itself, the strong confidence and certainty regarding the existence (*des Seins*) of the absolute, about which we are all in agreement, could not be explained. And in particular, it is my view that human understanding has an unlimited, inherent capacity for the step-wise formation of whole number-classes which stand in a definite relationship to the infinite modes and whose *powers* are of ascending strength."

This is another way to express how ideas can change the world. No mathematical function, neither algebraic nor non-algebraic can represent this change. You can just metaphorically express it in the form of the aleph series $\aleph_0, \aleph_1, \aleph_2, \dots$. This is the "world line" of universal history. Ordering ideas (historical, physical, musical) in this way, is science and the precondition for new discoveries. The aleph-series is something like the self-developing measuring rod of the laws of the universe. It is the "innate ideas" Leibniz talks about. It is the essence of science and culture, and of being human. It is the paradigm for a new Renaissance. And therefore it should be obvious that it must be the central subject of education.

Education or 'spiritual child molestation'?

If we want to change the course of history and bring about a new renaissance, we have to be able to fight for the paradigm of a new Renaissance: the *transfiniteness* of the human mind. And we have to create a conscious movement against the countervailing oligarchical paradigm preaching *finiteness* of the human mind, as U.N. General Secretary Boutros Boutros-Ghali formulated it in his speech in Rio de Janeiro last year.

This battle is being fought primarily on the field of education. The behaviorist- and Frankfurt School-inspired school reforms in all member countries of the Organization for Economic Cooperation and Development have had this purpose: to wipe out the paradigm of humanist education (which at least implicitly works in favor of the transfinite development of the mind). In order to make the oligarchical paradigm of human finiteness prevail, they have to cut out the idea of man and human reason as the *image of God* (which is common to Judaism, Christianity, and Islam as well as Confucianism). Second, they must cut out the primacy of the *education of the mind*, regarding this as less relevant than other aspects

like physical strength, sexuality, anti-authoritarianism, etc. Third, they must abolish *history* and *ancient languages*, in order to sever the individual's link with mankind.

Lastly, they must waste as much as they can of the pupils' *time* with subjects as learning specific activities, totally specialized facts, or, worse, courses of manipulative content as in all behaviorist or "outcome-based" education programs. All bad, discredited education schemes or "reforms" share those traits.

On wasting children's time nobody is more outspoken than French Enlightenment ideologue Jean-Jacques Rousseau, who writes in *Emile*: "May I dare now to outline the highest, most important and most useful rule of all education? It is not to gain time, but to lose time! . . . If you succeed to do nothing, and to prevent others from doing anything, if you could lead your pupil healthy and strong into his 12th year without his being able to distinguish his right from his left hand, then the eyes of his understanding would be open for reason from the first lesson on."

Rousseau rejected not only learning old languages and history, but reading books in general. Remember: The existence of written language enables human beings, and only them, to be connected with other human minds in past, present, and the future. But Rousseau states: "No book except the book of the world, no lesson except through facts! A child that only reads, doesn't think, it just reads." The same argument is used now by the "multiculturalists" in the United States, who are against teaching what "dead white European males" had to say.

Adolf Hitler had his own rantings against the idea of "equality of men," which he calls in *Mein Kampf* a despicable Jewish idea. In unspeakably brutish language, he opined that the most important outcome of all education should be "raising strong and healthy bodies. Only second comes the education of mental capabilities." The Frankfurt School's "anti-authoritarian education" project favors sexuality as the best-suited feature to compete with the mind in relevance. Most revealing in this respect is the book by A.S. Neill on *Summerhill: A Radical Approach to Child Rearing*, from which I cite two passages:

"Some time ago, I had a small boy who deluged me with questions. . . . I knew he was evading the big question that he wanted to have answered.

"One day, he came to my room and asked a string of questions. I made no reply, and went on reading my book. After a dozen questions, I looked up casually and said, 'What was that you asked? Where do babies come from?'

"He got up, reddening. 'I don't want to know where babies come from,' he said, as he went out, slamming the door.

"Ten minutes later he came back. 'Where did you get your typewriter from? What's playing at the movie theater this week? How old are you? (Pause.) Well, damn it all, where *do* babies come from?'

"I gave him the correct answer. He never came back to ask me any more questions."

Most revealing than is this quote from an interview at the end of the same book:

"*Question: What should a teacher do when a boy plays with his pencil when she is trying to teach a lesson?*

"Pencil equals penis. The boy has been forbidden to play with his penis. Cure: Get the parents to take off the masturbation prohibition."

This is why we charge people like Neill with "spiritual child molestation."

Developing the mind

The fundamental paradox in education is this: Either the mind is a *tabula rasa*, and you have to put everything in, fact by fact, through education; or nature has made the human mind such, that no organized education is necessary, because the child would learn by himself what he needs, and should not be urged or influenced by authorities. Leibniz solved that paradox by his conception of "innate ideas" which are there as a potential, but nevertheless take some effort and concentration to discover.

It seems to support the anti-educators, that especially in the first three years of life, the child almost automatically unfolds his or her "innate" capabilities of eating, moving, talking, and thinking. He is "absorbing" the world around it, needing just a normal, loving surrounding for development. Then the conscious faculties of the mind awake, and they need "spiritual food." The child asks thousands of questions and still learns without much effort, but no longer automatically. The effort will be the smaller, the more the child is used to concentrate on something for an extended period. Usually it is necessary to give the effort to learn a little push. It would be criminal to be indifferent about whether a child wants to go to school in the morning. Adults have to give that push to themselves, in order to make their mind work, to concentrate on an intellectual problem for the appropriate period of time without getting distracted.

Three cases should be distinguished: In the first case you just have to formulate an idea, that you had already consciously thought before. It is right under the surface, you just have to concentrate, fish it out and put it on a piece of paper. No reason to be blocked.

In the second case you have to formulate a new idea, that you have not yet consciously thought. This means, the "innate idea" has still to be discovered by your mind, or as Riemann would say, the *Geistesmasse* has yet to be built. You just have to work on it until you have it.

The third case concerns the discovery of an idea, that not only you but *nobody else* has ever thought of. As it is in principle not so much different from case two, it helps a lot to study how great discoveries have come about in the past, using original texts where possible. That is what youngsters should be doing in school.