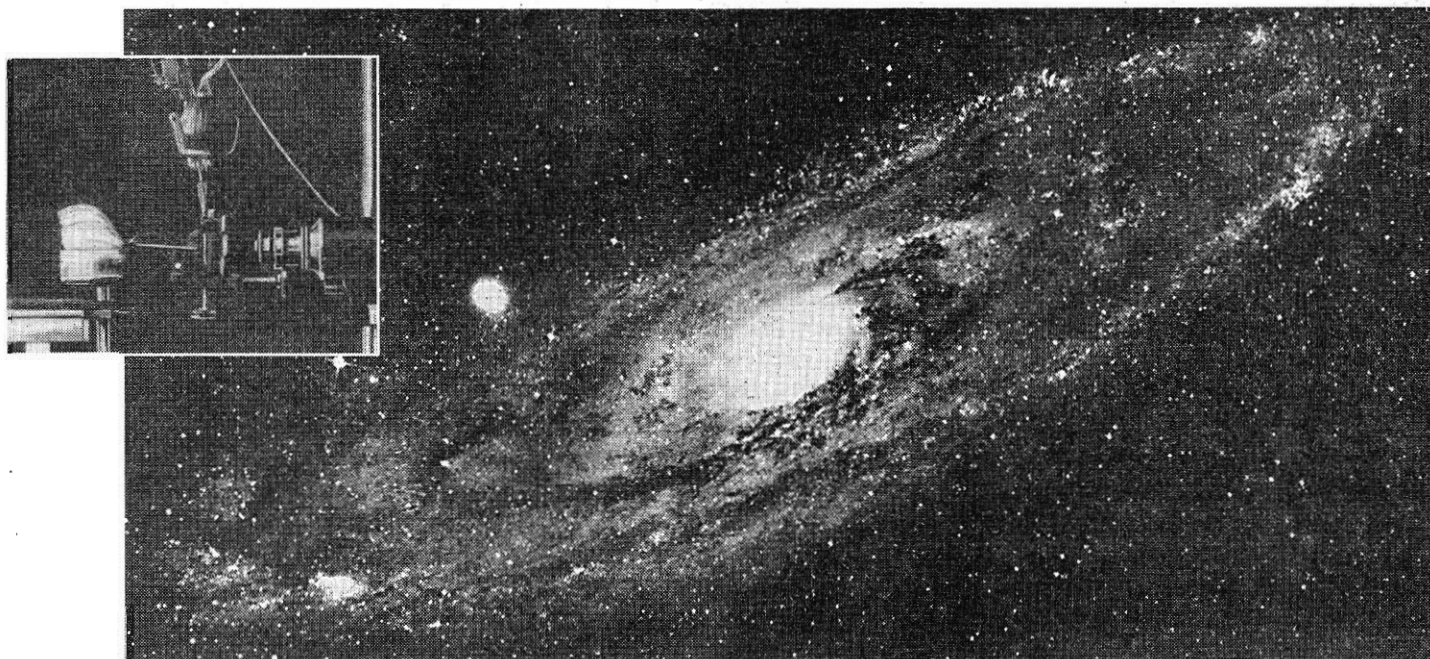


THE RECIPROCITY OF EXTREMES

The Astrophysics of Gurwitsch Radiation

by Lyndon H. LaRouche, Jr.



NASA
Inset: A.G. Gurwitsch, *Das Problem der Zellteilung* (The Problem of Cell Division), 1926

"If a principle of action corresponding to Gurwitsch Radiation exists in this universe, what does that principle thus prove about the nature of the universe itself?" Here, the Andromeda galaxy. Inset is Gurwitsch's onion experiment, which demonstrated that mitogenetic radiation from one onion root increased the cell divisions in a second onion root.

In my experience with relevant circles, both in oral exchanges and written works, the most frequent, and often most devastating flaw in the mental life shown among today's ostensibly best-educated science professionals, is a stubborn refusal to accept what ought to be the most obvious, and persisting challenges to their customary assumptions. Typical of the type of such problem met from among professionals of various specialties, is an axiomatic problem from the domain of one of the most significant, if relatively lesser known branches of science. I refer to a matter from the domain of biology. I focus upon what should be perceived as the most obvious of the implications of the most elementary experi-

mental definition of Gurwitsch Radiation. For my purposes here, I simplify the argument to be made, by defining the issue immediately at hand more narrowly: "the Riemannian implications of Gurwitsch Radiation."

The setting within which the discussion is situated, is the same topic which has dominated my philosophical and related concerns for six decades. It was, notably, the basis for my attacks against Professor Norbert Wiener's hoax, so-called "information theory," five decades ago; it has been the centerpiece of all my own original discoveries and their development and application, since that time. During the recent two decades, it has become, for readers of my published

work, the most frequently recurring theme of my published work. Thus, no science professional presently familiar with my life's work, will fail to recognize the theme.

Although I had been occupied by related topics from the work of Vernadsky, Rashevsky, and others since the middle to late 1940s, the work of Gurwitsch was first brought to my attention, about a decade and a half ago, by my associate Jonathan Tennenbaum. The latter contact startled me; Gurwitsch's discovery agreed with the related work of Vernadsky in the most remarkable degree. The reports on Gurwitsch's work by Professor Fritz Popp, were our initial point of reference. As a result, in light of the im-

portant bearing that work has on the entire domain of optical biophysics, researches into the area of Gurwitsch's discoveries became an integral feature of my own work and the work of the Fusion Energy Foundation (FEF) on the Strategic Defense Initiative (SDI) during the middle of the 1980s. Since the U.S. Department of Justice's fraudulent bankrupting of FEF's *Fusion* magazine, in 1987, continued interest in Gurwitsch's important contributions to biology has been revived by *Fusion* quarterly (Germany and France), and *21st Century Science & Technology*. The point of reference for the present treatment of the latter topic, is a report on that subject appearing, as a series, in Vol. 11, Nos. 2 and 3 of *21st Century Science and Technology* quarterly, in which a report by a Gurwitsch associate, Michael Lipkind, is featured [Summer and Fall 1998].

Gurwitsch Radiation is an area of crucial experimental issues, which poses, implicitly, some of the most fundamental questions of epistemology for science as a whole. Not only does Gurwitsch's and related argument and evidence imply such questions; it is impossible to resolve the crucial-experimental issues except by designs of experiments which address that epistemological issue most directly.

On those and related accounts, the theme within which the discussion of Gurwitsch Radiation is properly situated, is the following. Since Plato, the most elementary mathematical conception of all scientific thought, has been, as Luca Pacioli, Leonardo da Vinci, and Johannes Kepler emphasized this principle, the challenge of recognizing both the distinction in axiomatic principles of ordering, between living and non-living processes, and the still-deeper implications of the existence of such a distinction within a universe which must be coherent throughout. The very concept of Gurwitsch Radiation poses precisely this topic as typical, axiomatically, of the leading issue of all known problems of mathematical physics.

To sum up the relevant setting in which my own comment on Gurwitsch Radiation is situated, restate the situating argument in the following terms.

Humanity's present knowledge of the universe recognizes three axiomatically distinct qualities of ordering of processes. We recognize the ostensibly "entropic"

ordering usually associated with non-living processes. Secondly, we recognize the "anti-entropic" ordering of living processes. Finally, we recognize that the archeological-historical record of willfully ordered increases of the potential relative population-density of cultures, places the quality of "anti-entropy" of human cognitive processes apart from, and beyond the quality of ordering of all other living processes. As Plato argued, and as Johannes Kepler was the first to give generality to a fourth point respecting these orderings; as this is demonstrated by the fact that the lawful ordering of the Solar System as a whole is also anti-entropic principles, the ordering of the universe as a whole, is underlain by an anti-entropic principle.

By correlating increases in society's potential relative population-density with the impact upon productivity of scientific, technological, and Classical-cultural forms of progress, I have made two points bearing upon the fundamental questions of physical science. First, that those forms of cognition which correspond to crucially-experimentally validated discoveries of physical principle, are expressed as the transmission of increased anti-entropy from the cognitive processes of the individual human mind, to man's increased power over the universe, as such increase of power is expressed in per-capita and per-square-kilometer terms. Secondly, as the relevant work of both Plato and Kepler imply, the ostensibly geometrical characteristics of the process correspond to continuing, successive such increases of power, and *therefore* coincide with the fundamental, lawful characteristics of the universe as a whole. This, by implication, situates the process of development of higher living species within a Riemannian form of multiply-connected manifold.

From this standpoint, we must begin our epistemological investigation into the matter of Gurwitsch Radiation, by acknowledging four distinct ordering principles in nature. First, the apparently entropic characteristics commonly attributed to so-called "non-living" processes. Second, the contrasting, characteristically anti-entropic ordering of living processes. Third, another anti-entropic characteristic, unique to human cognition, by means of which mankind is enabled to increase the power of its species within, and over the

universe at large. Fourth, the anti-entropic ordering principle, as Plato and Kepler argue some of the relevant evidence, which subsumes the potential of man's cognitive powers to increase our species' power over the universe. To restate the latter point: the ordering principle which corresponds to the successful expression of man's anti-entropic development of his cognitive potentials.

If we situate the discussion of the evidence bearing upon Gurwitsch Radiation, two general conclusions, of relatively axiomatic authority, must govern our reading of that evidence. First, that the evidence of typically crucial phenomena of Gurwitsch Radiation compels us to direct the investigation of living processes' distinguishing characteristics, on the assumption that these are governed by the notion of a Keplerian form of interaction between living and non-living processes. Second, that the global ordering of development within and among living species, as underlain by the implications of such Gurwitsch-Radiation effects, must be coherent with the notion of a Riemannian form of multiply-connected manifold. Thirdly, that both of these engage no less than the four distinct types of characteristic ordering which I have listed above.

In the practical experience of today's putatively educated strata, the sundry ironies of the proposition which I have thus just restated, are expressed in two interconnected ways.

The more immediate obstacle thrown up as objection against Gurwitsch's experimental principle, reflects the fact that we are living presently in a global culture whose most educated professional strata are miseducated, predominantly, and thoroughly polluted by reductionist ideologies. These ideologies are, in the first instance, the intellectual and moral degeneracy taught by the writings of Aristotle; in the second case, we have the more radically degenerate, more popular of today's reductionist cults, of empiricism and its radical-positivist offshoots. Relative to the issues implicit in the central fact of Gurwitsch Radiation, the leading obstacle to a rational view of Gurwitsch Radiation, among mathematicians and science professionals today, is the popularity of the common, empiricist dogma of Isaac Newton, Leonhard Euler, Augustin Cauchy, et al., that the physical universe



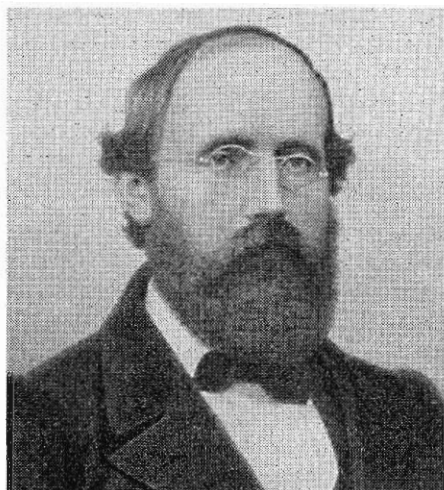
Nicholas of Cusa (1401-1464)



Illustration by Jan van der Heyden,
Courtesy of New York Public Library Prints Division
Johannes Kepler (1571-1630)



New York Public Library Picture Collection
Carl Friedrich Gauss (1777-1855)



Library of Congress
Bernhard Riemann (1826-1866)

"The issues posed by a Riemannian reading of Gurwitsch Radiation, prompt us to focus upon the crucial distinction between the notion of an anti-entropic ordering . . . and the higher standpoint which emerged, beginning with Cusa's De docta ignorantia, with the emergence of the process leading into the development of modern hypergeometric methods, by, successively, Kepler, Leibniz, Gauss, and Riemann."

must be regarded as linear in the infinitesimally small. That latter assumption precludes any serious consideration of the nature of the fundamental principle upon which the mathematical "possibility" for the existence of life depends.

The second obstacle is the failure of even many of those otherwise opposed to reductionist ideologies, to recognize the relevance of a crucial connection between the founding of modern experimental physical science by Nicholas of Cusa, and that original discovery by Johannes Kepler which sets Kepler's elementary view of modular functions above and beyond all other, earlier fol-

lowers of Plato's study of the Golden Section. Expressing this issue in the form of a question: If a principle of action corresponding to Gurwitsch Radiation exists in this universe, what does that principle thus prove about the nature of the universe itself?

The first obstacle is only generally noted, as it must be, to put the sillier, commonplace objections to my argument to one side. The issues posed by a Riemannian reading of Gurwitsch Radiation, prompt us to focus upon the crucial distinction between the notion of an anti-entropic ordering, as pervading, for example, Plato's *Timaeus*, and the

higher standpoint which emerged, beginning Cusa's *De docta ignorantia*, with the emergence of the process leading into the development of modern hypergeometric methods, by, successively, Kepler, Leibniz, Gauss, and Riemann, most notably. Cusa's discovery that the generation of circular action was of a higher cardinality than Archimedes had assumed, marks the point of conceptualization, which separates the higher mathematical-physical standpoint of modern hypergeometry, as distinguished qualitatively from the level of such followers of Plato as Archimedes. It is among the implications of that latter distinction that the axiomatic implications of Gurwitsch Radiation is lodged.

A Discussion of Cusa's Point

To begin the relevant discussion, take as a point of reference, the conventional standpoint of scientific opinion today, the heuristic view expressed in action by the cooks working in science's kitchens, that the "universe began" in some relatively simpler form, out of which successively higher forms of existence were generated. Some of those "cooks," a minority, go further. The latter insist, that a global directedness of such successive development of higher forms, is implicitly adducible even in considering the most rudimentary of those forms conceivable. This latter is the standpoint impressed upon us by Johannes Kepler's and Carl Gauss's approach to astrophysics, the standpoint implicit in the general notion of the Gauss-Riemann form of a multiply-connected manifold.

That "evolutionary" view of the universe flows directly from the methods of modern experimental-physical progress. The point of reference should be identified as follows.

We have two points of reference. On the one side, looking outward toward the presently known boundaries of astrophysics, we must situate ourselves, as observers at a point on the surface of the Earth, with respect to all those motions within the universe, within which the Earth, and our moving position, as observers, on it, are situated. On the other side, we must situate the action with which we are dealing in respect to all of those motions which intersect it, from the most distant smallness of microphysics. What most of the "cooks"

of science have failed to do, is to recognize what should be acknowledged as an unavoidable implication of the interaction among the mutually distinct, interacting, cohabiting types of ordering (processes). Whether many among the "cooks" acknowledge that fact, or not, until now, in each and all of these observations, we must take into account the role of multiple-connectedness among ostensibly not-living, living, and cognitive processes, and, also, we must situate the multiply-connected relationship among those four qualities of processes ("non-living," living, cognitive, universal) within the including, defining framework of the universe as a whole.

Cusa's discovery, that circular action represented a higher cardinality than the Classical Greeks, including Archimedes, had located within the bounds of irrational-number orderings, broke the mathematical barriers standing in the way of the subsequent emergence of hypergeometry. Kepler's response to the impact of his predecessors Cusa, Pacioli, and Leonardo da Vinci, carried us to the beginning of a general notion of physical hypergeometries, as shown most clearly by the implications of the elliptical orbit of Mars. The progress from Cusa's proof of the higher ("transcendental") cardinality of circular action, led, thus, to the standpoint established by Kepler's approach to the problems of a multiply-connected manifold. Kepler's work took the notion of the transcendental and still higher-order cardinalities, out of the formal-mathematical domain of the Golden Section, into the higher domain of physics. It was Kepler who, with his grasp of the implications of Mars's elliptic orbit, contributed the crucial first step into that higher domain of investigation. In that sense, it was Kepler who made possible the defining of the physical, as distinct from merely formal-mathematical, meaning of the source of the distinction between non-living and living processes.

All of the axiomatic issues respecting interactions between living and non-living processes are situated, in an elementary way, within that framework of epistemological reference which is implicitly provided by, chiefly, the further development of the notion of multiply-connected manifolds, by, chiefly, Leibniz, Gauss, and Riemann.

A Synopsis of the Point

Let us assign a special implication for Curwitsch's use of the notion of a biological *field*.

For our first approximation, here, let us employ the term, *field*, in its included sense, as a term of distinction employed to present the conception, that the distinctions among the orderings of living and non-living processes, the interactions of such orderings, and the interactions of all with the implicitly Keplerian ordering of the universe as a whole, represent orderings which each designate a distinct *field*. Let us go further, to include all four of those general types we have listed above, among the interacting *fields*.

As in the case of Cusa's proof, that circular action is elementarily transcendental, rather than simply algebraic, the distinctions in ordering which separate one type of *field* from another, are congruent with the differences among such types to be recognized in terms of what Leibniz defined as the characteristically non-constant (non-linear) curvature of processes in their infinitesimally small intervals of action. *From the standpoint of elementary epistemology, these "non-linear" differences must necessarily correspond to what modern convention would oblige us to describe as relatively "very strong forces," acting with global effects, upon the infinitesimally small.*

These "forces," which are expressed with global effects, must be located experimentally among the smallnesses of the microphysical scale. These are epistemological conclusions, not reflections of speculative guesswork. These "forces" are subtended as the interactions between *fields*, as we have, for the moment, assigned a special meaning to the term *field*. We have, thus, the "strong forces" which reflect the stresses of interaction between ostensible living and non-living processes, or the impact on both of the universal, or "Keplerian" *field*.

This notion of "strong forces" has two principal implications for our discussion. First, when one of the *fields*, as we have assigned special usage to that term here, "imposes its will," as expressed by its distinctive ordering principle, on another, there is a "bending" action exerted by the one field on the intersected field. It is as if the geometry

of the universe represented by the latter were altered to conform, as subordinated, to the geometry of the universe represented by the former. Second, the notion of such "imposition of will" brings us to Leibniz's overlapping notions of *analysis situs* and *monadology*, as this was explored fruitfully by Lazare Carnot and other associates of Gaspard Monge.

To wit: from the standpoint of the thus-perplexed mathematical formalist, what is the form of action expressed by the relationship of multi-connectedness, as that relationship is integral to the Gauss-Riemann notions of a multiply-connected manifold, as the astrophysical manifold? This defines a set of questions which may be posed in mathematical terms of the complex domain, but the answers are to be found in the domain of crucial-experimental physics. To wit: the undiscovered portions of the reach of the multiple-connectedness of the universe as a whole, both in the astrophysical large and microphysical small, are acting efficiently upon the subject-matter of our inquiry into a lesser domain of multiple-connectedness. Thus, from this vantagepoint, by definition of the case: The "non-linear" discrepancy yet to be measured, is reflected for measurement into the ever more extreme, yet to be discovered remotenesses of the infinitesimally small.

With certain qualifications, each distinct living species and associated, subsumed type, must also be considered a *field* in such a multiply-connected domain. The crucial qualification, is the interdependency pervading the living biosphere in any present state. The existence of the representative of the individual species must necessarily (epistemologically speaking) depend upon not merely the superimposition of one such field upon another, but a reciprocal kind of interdependency.

That completes the statement of the general point I wish to introduce at this time.

Lyndon H. LaRouche, Jr., is a member of the scientific advisory board of 21st Century. This statement was written in August 1998. LaRouche's remarks on Curwitsch's method, written in March 1987, appear on page 54 of this issue.