Research Article

Journal of Industrial Engineering, Systems,and Manufacturing Technologies

Science-Based Dead Ends

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Submitted: 20 February 2026 **Accepted:** 03 March 2026 **Published:** 11 March 2026

Citation: *Ordin, S. (2026). Science-Based Dead Ends. J of Indu Eng Sym & Manu Tech, 2(2), 01-06.*

Abstract

Science, being at the highest level of human consciousness, is itself subject to Chaos, which it seeks to harmonize in human consciousness. And in addition to the natural influence of the unknown-new Chaos "from above," which it essentially clears away, Chaos is also brought into Science "from below"—from the ignorant philistine milieu. This is why scientific and technological progress proceeds along very crooked, circuitous paths and often leads to dead ends. And in our own Phys.-Tech., despite the fact that I myself have uncovered many errors in the Fundamentals of Thermoelectricity formulated by Abram Fedorovich Ioffe, I nevertheless believe that since his "departure" from Phys.-Tech., a worthy Scientific Leader has not been found.

Keywords: Education System, Phenomenology, Superconductivity, Thermoelectricity, Radiation, Computers, Quantum Theory, Magnetism, Fundamental Impasse.

Introduction

Preamble

The common religious saying, "God works in mysterious ways," can be transformed into an abstract mathematical statement: "If the number of possibilities approaches Infinity, then any Event is equally probable, akin to 'white noise.'" While it is well known that, when working with Real Infinities, Statistical Mechanics yields probability maxima determined by the Laws of Nature. Thus, we see that instead of "white noise," a Black Body emits radiation in the form of the Planck function. Moreover, Planck provided an example of a Unified Theory, demonstrating the meaninglessness and non-physicality (atypicality) of abstract Catastrophes. But theorists continue to cling to Catastrophes as supposed Discoveries.

In practice, following theoretical fallacies, they pile up 70-kilometer Colliders instead of tabletop devices. So, in today's business environment, I believed that Elon Masks, far removed from understanding the Laws of Nature, simply "wisely" ACCEPTING the abstract "Mystery"—the equal probability of events—almost at random, lure the masses along one of the paths of Technological development. Especially since they have to deal with "Business Soldiers," and their understanding of what they're doing is, in principle, TABOO. But their commanders also lack a deep understanding of Nature; their main focus is MONEY. So, the business regiments led by Elon Masks move along crooked and roundabout paths toward a speculatively defined Goal. But, one could say, they usually achieve not the Goal, but rather whatever new thing comes their way along the way, when deviating from the beaten path. So Elon Musk's Tesla "flew" into space on laptop batteries, but it also sparked the development of next-generation batteries, which are now ubiquitous, even in pizza delivery cars. Although many of the ideas embodied in these new batteries gathered dust on the shelves of history, unclaimed, for at least half a century.

But even in the history of science itself, even pure science, divorced from business (and in the century before last, when Roentgen spent his father's billions on it, and Louis de Broglie his count's titles, there was such a thing), and especially in the history of technology, which is closely intertwined with business, there are many examples of wanderings—when a departure from traditional scientific fields and technologies leads only to temporary progress, but then, due to the canonization of accepted technological solutions, leads away from a promising direction and leads to a dead end. On the one hand, this occurs due

to the use of "bright new" ideas without a deep understanding of traditional ones. On the other hand, this is a purely speculative push of "bright" ideas, exploiting the ignorance of the general public. On the third hand, the "bright" ideas themselves were put forward without a proper, deep UNDERSTANDING of Physics.

And Phenomenological Wanderings, both in pure Science (and even more so in "dirty" ones), become catastrophic in the absence of a Scientific Leader, and in Technology – in the absence of a General Designer with a deep UNDERSTANDING of Nature. Thus, useless monsters are born. So, without a focus on Scientific Minds, both Business and the State are like a bulldozer with tracks sliding in the mud – there is an imitation of active movement, but in reality, there is none. Hence, the subconscious feeling of stalling, comes Humanity's fear of Artificial Intelligence, which can sort through the famous cubes faster than humans. Business society itself relegates to the margins even the True Creators, who are not afraid of AI, but rather find it useful in determining the correct direction of development. Hence, business society's constant attempts to break out of technological stagnation, like an ant, through permanent wars. If previously wars were the result of religious or ideological fanaticism, now they are simply playing on this, and wars are waged simply for the sake of the main goal – Money.

Prelude to Working at the Academy

The education system, in principle, trains specialists for an Ideal World. But then the "smart kids" end up in a far from ideal world, where the literate and inquisitive are preferred over the obedient and compliant. Furthermore, the "smart kids"' idealization of their acquired knowledge often prevents them from immediately recognizing the historical errors that have crept into it. All in all, the scientific community deteriorates, favoring applied science, which provides immediate benefits (MONEY), rather than fundamental science.

I first graduated from the optional school created by the mathematics professors of the Pontryagin School, and then from the Electronics Department of the Leningrad (St. Petersburg) Polytechnic Institute, renowned since pre-revolutionary times. Our special graduating class initially trained researchers for work at the Academy of Sciences under a non-session system. Our pre-graduation internship began in our third year. My first supervisor, a young researcher named Sasha Weiss, and I sawed apart an infrared spectrometer at the right place, inserted a helium cryostat, and re-aligned the resulting new optical circuit and calibrated it. But Sasha was drafted into the army for two years, and the illiterate graduate student assigned to me could only bring me samples from the Phys-Technology Department for optical measurements at helium temperatures.

So, when I measured a bunch of spectra for my diploma, I ran into a problem: I had thousands of formulas in my head, but I couldn't figure out which one to use to process a specific spectrum. So I approached my official supervisor, Professor Yuli Ivanovich Ukhanov, who taught us the course "Semiconductor Optics," with this question. And this man, not particularly well-versed in theories, but having systematized ALL of Semiconductor Optics (at that time) in his book of the same name, instantly read all of my spectra like a pianist reads musical notation. And this lesson: How General Vision allows one to correctly use Theories, I not only learned but also used, including to correct canonized Models (including those in Ukhanov's book) and to construct new Theories. And in my inventive work, from the perspective of General Vision, I have repeatedly become convinced that many devices and instruments are created "crookedly" – in violation of Fundamental Principles, both previously known and those I discovered.

Thus, I was able to describe the origin of Magnetism, which entered (implicitly, through Electrodynamics) into the Theory of Relativity, but the description of whose nature, until now, has been based on the Power of Tao, introduced by the Chinese 3,000 years ago. But all my discoveries and inventions at the Academy of Sciences, one might say, struggled through a degraded scientific environment, where the rules of life had become not Science, not the search for Truth, but philistine values. So in Science, just as in Medicine, for example, a niche is needed for adjuncts, with subsequent promotion to research fellows. A dissertation shouldn't determine the fulfillment of this position; rather, it should provide the opportunity to produce a full-fledged dissertation, not just another piece of paper for the archives.

Scientific and Technical Misconceptions

Superconductivity. Ceramics instead of Metals

Mathias, using his empirical rules, without any Bardeen-Cooper-Schrieffer theories, obtained metallic alloys with a superconducting transition temperature of almost 30 K. But theorists suggested that higher superconducting temperatures could be achieved in one-dimensional metal filaments with dielectric plates. My first work at the Academy of Sciences was aimed at producing such monoatomic metallic filaments by Professor V.N. Bogomolov by pressing a liquid metallic alloy into mordenite crystals with dehydrated channels 6 angstroms in diameter. I filled these angstrom-sized pores with metal – I recorded a characteristic jump in the conductivity of mordenite samples with increasing pressure back in 1975. BUT! I did not detect any high-temperature superconductivity [1]. Over time, the work of other researchers who attempted to achieve high-temperature superconductivity by indenting and/or intercalating metals as threads or layers in layered crystals also faded. Much has already been written and said about how much these methods were "improved" by the "Sticky Tape" that flooded the world with fake "Graphene," leading nanotechnology down the wrong path [2, 3]. And the thinnest graphite layers were grown, as noted in my earlier work, in a matrix—highly ordered rhombohedral boron nitride.

High-temperature superconductivity was later discovered in poorly conducting ceramics, originally intended for the manufacture of high-resistance resistors, and discovered by a disobedient employee (for which he was fired, and his new employers received the Nobel Prize). After the Nobel Prize, many researchers focused their efforts on improving these ceramics. But ceramics are inherently heterogeneous, and it's no surprise that reliable, reproducible high-temperature superconductivity at temperatures above nitrogen has yet to be achieved in ceramics.

Now, however, with the analysis of the Magnetic Field (Fig. 1), it has become clear that the idea of increasing the supertransition temperature must be realized not in one-dimensional filaments,

where charge vortices are strictly forbidden, but in nanostructures in which regular vortex chains can exist.

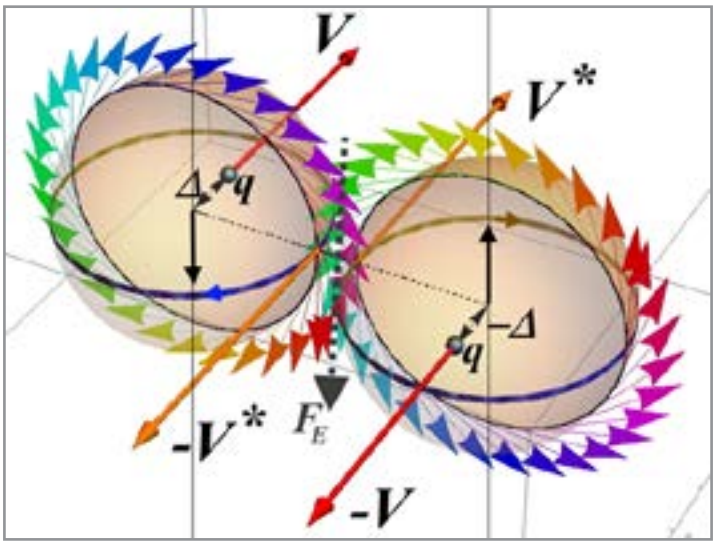

Figure 1: Genesis of a Magnetic Field (the total Oersted Force) due to the Coulomb Field Relativism between counter-moving charges (from unfinished work).

Thus, the development of "dirty" superconductors is currently underway, while nanotechnology, in principle, already allows for the creation of regular superconducting metal-dielectric nanostructures. Instead of creating such structures, however, the fashionable but abstract modification of pure metals using topology is being pursued.

Diffuse Thermoelectricity. Semiconductors Instead of Metals

Traditionally, the Seebeck and Peltier effects were also studied on metals. In constructing the first thermoelectric generators, Röntgen's student, Abram Fedorovich Ioffe, who was the first to measure the charge of an electron, the first to appreciate the significance of Onsager's Principle of Kinetic Coefficient Symmetry, and who, at Lenin's behest, founded our Institute, used metal thermocouples (Fig. 2).

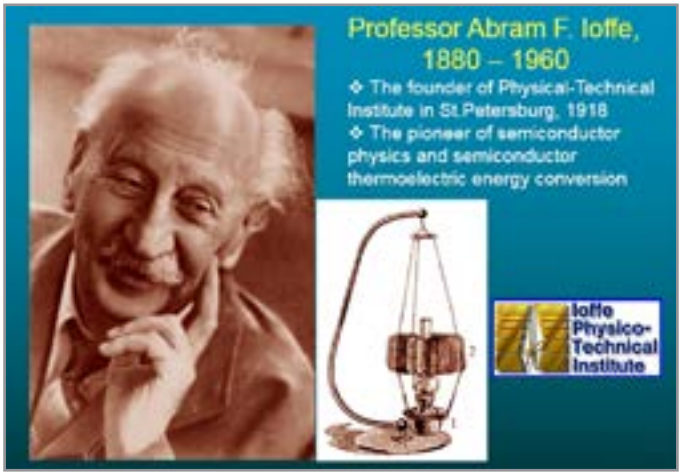

Figure 2: Abram Fedorovich Ioffe with his first thermoelectric generator using a kerosene lamp (lighting) and metal thermocouples.

However, the metallic thermocouple materials had a Seebeck coefficient, as Ioffe estimated, almost an order of magnitude lower than the optimum for achieving maximum efficiency. So Ioffe reoriented thermoelectricity toward semiconductors with a Seebeck coefficient close to the optimum. Ioffe introduced the thermoelectric figure of merit (ZT), which became the determining factor for selecting semiconductors for thermoelectricity.

However, ZT is only applicable to dirty semiconductors, for which the theoretical efficiency increase is limited to approximately 16%. In practice, many thermoelectric devices have efficiencies no higher than 5%. Moreover, such "efficient" semiconductors have poor structural properties. When I first encountered thermoelectricity, I made a simple thermal detector from metal thermocouples, and for its calibration, I asked a laboratory developing film thermoelectric detectors for a control standard. However, my detector, a star-shaped array of metal thermocouples, turned out to be more sensitive than the standard made of optimal semiconductors.

Additional large thermal losses in the standard arose because the main heat flow moved not along the semiconductor branch, but across it onto the substrate, which reduced the detector's sensitivity by an order of magnitude. To avoid these losses, I ex-

ploited the transverse thermoelectric effect in anisotropic media. However, "dirty" heavily doped semiconductors are essentially amorphous isotropic media, in which the transverse thermoelectric effect is virtually zero. Whereas semimetals with the required carrier concentration based on the Ioffe parameter can be obtained in highly ordered states. The use of quasicrystals of higher manganese silicide made it possible to create thermal detectors based on the transverse effect with the highest sensitivity for diffuse thermoelectricity (Fig. 3).

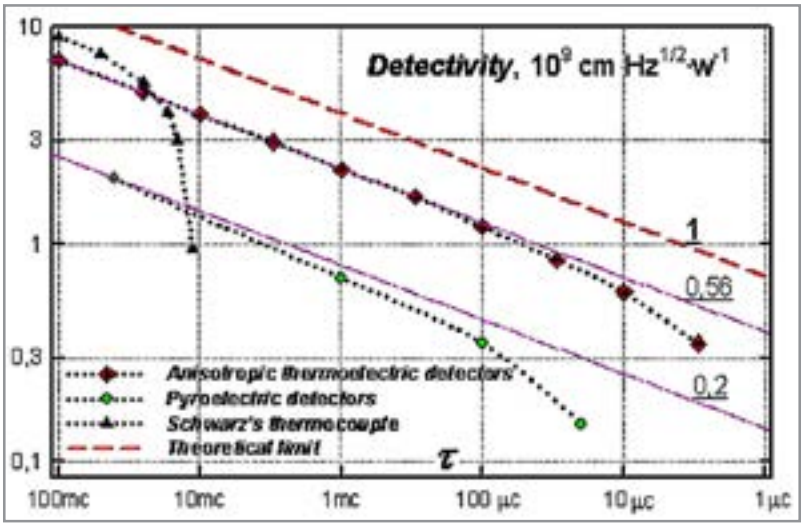

Figure 3: Detectivity of different thermal detectors versus their response time [4].

Now that I've figured out how to properly use semiconductors to convert thermal energy with an efficiency no worse than that of photodetectors, it's also clear that diffuse thermoelectrics, believing that they had achieved maximum thermoelectric power in chromel and copel metal alloys, have been relegated to metrology applications. However, the significant variation in thermoelectric power of wires made from these alloys (they require calibration for measurements) clearly indicates that the alloys obtained for metrology are still far from achieving the maximum Seebeck coefficient. And without producing "proper" thermoelectrics from metal alloys, work on increasing their Seebeck coefficients has ceased. Meanwhile, metal alloys with the maximum parameters for diffuse energy conversion, due to their ductility and heat resistance, could have taken a leading position in a specific industry niche. But Ioffe's scientific authority was so high that his closest student, my first supervisor at the Academy of Sciences, Professor Lazar Solomonovich Stilbans, was once elected President of the International Thermoelectric Congress, which effectively reoriented thermoelectricity exclusively toward "dirty" semiconductors. And the Theory of Thermoelectricity, which became the defining theory in industry, fixed it for decades exclusively on dirty semiconductors [5].

Ballistic Thermoelectricity. Dirty Semiconductors Instead of Pure Ones

But Professor Stilbans (my first and last supervisor at the Academy of Sciences) himself felt dissatisfied with the Theory of Thermoelectricity and tasked me with understanding contact thermoelectric phenomena. The first thing that became clear was that the watchmaker Peltier, when measuring the Peltier heat he had discovered at contacts, mistook it for a contact characteristic, although in reality he was measuring the integral over the entire sample (heat flow) of the volumetric characteristic. Peltier heat was thus incorporated into the Theory of Thermoelectricity as a contact characteristic [6, 7].

This minor logical clarification in the Foundations of Thermoelectricity effectively lifted the ban on the use of thermoelectric effects that had long been discovered but classified as "anomalous" and, thus, on the use of pure semiconductors [8-10]. Moreover, as has been shown, taking into account the Local Thermo-Electronic Effects I discovered not only allows for a radical increase in the theoretical efficiency limit of thermal energy conversion, but also requires a transformation of all electronics [11, 12].

Thus, fixating the Theory of Thermoelectricity on a simplified Ioffe Efficiency Theory and, as a consequence, on impure semiconductors, has eliminated the very possibility of taking into account and accurately and correctly utilizing the properties of semiconductors in both energy conversion and electronics.

Infrared Radiation Sources. Ceramics Instead of Single Crystals

Infrared spectral research faces the challenge of broadband thermal radiation sources. According to Planck's function, infrared radiation drops sharply in the long-wavelength range, and its intensity increases only slightly as the temperature of a heated object increases. Meanwhile, short-wavelength radiation increases dramatically, passing through any material filters and creating uncontrolled background radiation, which limits both the spectral range and sensitivity of spectrophotometers. Thus, in the long-wave Fourier spectrometer given to me for testing, a high-pressure mercury lamp with a plasma temperature of 6000 C was used as an IR source. But my analysis showed that the main flow of IR radiation came not from the plasma, but from the quartz bulb of the lamp at 700 C. And by simply heating the quartz crystal with a 100-watt heater, I obtained both IR levels and, most importantly, not a single quantum of visible background light [13, 14]. And there is nothing unusual in this, since Kirchhoff's Law states: "Crystals in the transparent region do not emit. And by improving the shielding, I reduced the power consumption to 15 watts.

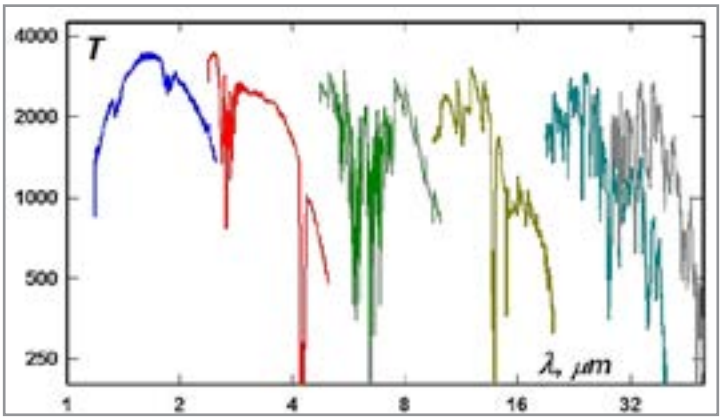

Figure 4: Atmospheric transmission spectra (in relative units) measured with a 15-watt quartz IR source.

So, to increase the sensitivity of IR instruments over a wide range of measured wavelengths, high-temperature ceramics are used, and when their radiation was deemed insufficient, mercury lamps were also used. However, both ceramics and, especially, mercury lamps spent most of their power not on producing IR radiation, but on generating stray visible light. Meanwhile, according to Kirchhoff's Law, powerful and pure IR radiation can be obtained from crystals such as quartz and sapphire that are transparent to visible light and thus selectively emit. And the apotheosis of the senseless use of enormous power to produce IR radiation was the use of bremsstrahlung in the Large Hadron Collider.

Computers. Using Multi-Core Technology inqstead of Increasing Core Frequency

Ever since the first computers, it's been clear that their performance (overall speed) is limited by the significant heat generated by transistors. Since performance grows logarithmically with the number of elements, heat dissipation limits the actual clock frequency of processors to a few hundred MHz. Reducing thermal loss in transistors through the Local Thermo-Electronic Effects described above would seem to be in demand by processor manufacturers. However, my personal negotiations and brief collaboration with INTEL revealed that manufacturers are wary of fundamental technological changes and have preferred to create multiple, spaced-apart cores to avoid processor core burnout as transistor density increases. Indeed, when parallelizing equivalent tasks, we achieve performance gains, but when parallelizing unequal tasks, the main drag on the computer is determined primarily by the most complex task. This is why work is underway to create supercomputers based on fundamentally different technologies. And various kinds of speculation, such as "quantum," are being supported by entrepreneurs, while the application of real Local Thermo-Electronic Effects proves more difficult for them to understand than the use of qubits on "entangled" electrons. This fear of Reality is simply hidden behind mysticism—behind technologies that are fundamentally different from, and even contradict, the Law of Conservation of Energy. In reality, however, the money is being invested in a beautifully designed computer-based Perpetum Mobile.

Quantum Theory. Using the Imaginaries of the Schrödinger Equation Instead of Planck Resonances (Planck photons and Einstein phonons)

Planck UNDERSTOOD a simple thing: a particle is equivalent to a resonant electromagnetic wave—a photon, and Einstein added that it is also equivalent to an acoustic wave—a phonon. But the "smart guys," having picked up, but not fully UNDERSTOOD, Planck's idea, began competing in the mathematization of this idea. Using a primitive model to find its description-solution to the equation, they employed an abstract mathematical technique—traversing a singularity on the real axis along the complex plane. BUT! Without defining the imaginary, the resulting complex solutions were "interpreted" (in The Hague).

And entire theories of states were constructed, which described these "imaginary solutions." Thus was born modern Quantum Mechanics, which "forgot" about Planck and the quantum, and, by formally rewriting the Classical Oscillator equation without properly analyzing the original equation, invented a "New Quantum World" imposed on the entire world. The apotheosis, one might say, was a report by Nobel laureate Bob Laughlin, who said: "When a new graduate student comes in, I draw him the Schrödinger equation and say: Solve it under such-and-such boundary conditions, and you'll get a PhD." In short, as shown in my book, modern "Quantum Theory" has departed from the ideas of Planck-Einstein Quantization itself, and, as a result, all sorts of speculations have become the biggest hoaxes in both Science and Technology [15].

Magnetism. The use of a loose definition of the Magnetic Field in Maxwell's equations, extended into the Theory of Relativity—the use of abstract relativity instead of the interaction of the Field of a moving Object with a Field stationary relative to the Observer

Magnetism and Relativism are inseparable. In this regard, the corrections to Einstein's Theory of Relativity based on extended Lorentz transformations are nothing more than corrections, since they fail to take into account the main thing—the expansion of the Law of Conservation of Momentum and Energy due to the angular momentum associated with Magnetism. In general, Einstein's construction extended the dubious mathematization of Descartes' "gimlets," leaving the explanation of their nature at the level of the ancient Chinese Taoist Force. These conclusions are made on the basis of my almost completed detailed Characterization of the Magnetic Field (from which Fig. 1 was borrowed), but a rigorous Mathematization based on the extended Laws of Conservation of Momentum and Energy is still to come.

Conclusion

A Dead End in Fundamental Science. Scientometrics Instead of a Scientific Mind

Friedrich Engels' "Dialectics of Nature" manifests itself in the Highest Degree of Nature's Harmony—human Consciousness. And even more so, in Science itself, which is on the Front Line of the Struggle between Harmony and Chaos. Ilya Prigogine, as noted earlier, simply concretized the Boundary Processes as the emergence of Harmony in the Streams of Chaos. And although Grisha Perelman was able to describe the fundamental characteristics of these Streams, his encounters with the realities of the scientific environment drove his consciousness into deep schizophrenia. And this was no accident, as modern Science, not being in an intensive stage of development, has effectively degenerated into a mere production of Information, and the fundamental characteristic of Scientificity—Creativity—has been relegated to the margins of Science itself. As we know, magnificent flowers cannot grow in poor soil without fertilizer. But a bag of fertilizer is no substitute for the flower itself. Thus, during the intensive development of Science, it necessarily transformed into a bureaucratic organization, the control and management of which required the introduction of Scientometrics.

Scientometrics is necessary to monitor and stimulate the scientific activity of most researchers, who, however, engage in science largely as a formality, and whose life priorities are ordinary, everyday priorities. But they do not determine the future of science; they merely serve as a backdrop for those researchers who require no incentives, since they are engaged in Science by Calling. However, the absolutization of Scientometrics (supplemented by the currently fashionable digitalization) leads to the fact that the direction of Scientific development is determined not by Scientific Heads, but by scores for the number of routine, individual scientific papers. Meanwhile, the names of the creators—the Great Scientists of yesteryear—are used only in the titles of scientific organizations, while modern creators—potentially Great Scientists—are not only unclaimed but even hinder the functioning of bureaucratic organizations. Meanwhile, corporate ethics hinders truly scientifically grounded, fundamentally new phenomenological work, making an exception only for a cadre of "recognized" theorists—schizophrenics. Thus, schizophrenic delusions become the property of a broad pseudo-scientific community, which then exploits them for their own "creativity." And so, the circle is complete—the knowledge production industry based on scientifically grounded, but well-known, Principles will soon be replaced by Artificial Intelligence, while the creators of new, scientifically grounded Principles will be eradicated, including by supporting a schizophrenic facade. And this is a serious illness of modern Science, which no Scientometrics can cure and which cannot be overcome without Scientific Minds.

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