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On the Pythagorean Square in Nature

Or the Four World-Regions

(1798)

Franz von Baader

Translated and introduced by Carlos Zorrilla Piña*

Certain facts from Benedikt Franz Xaver Baader's life let themselves be easily set down. He was born on March 27, 1765 in Munich, at the heart of a traditional Bavarian Catholic family. Following his father's wishes, he first pursued an education in medicine and then, honoring his own preference, in natural science, including in chemistry and mineralogy. This latter pursuit would see him study for some time under Abraham Gottlob Werner, in the famous Mining Academy in Freiberg which also counted Alexander von Humboldt and, some time later, Novalis as its students. Looking to gain experience and continue refining his craft, Baader then spent some years in England and Scotland. Upon his return to his homeland, in 1797, Baader found his fair share of success as a mining intendent, quickly rising up the ranks of state service and eventually being ratified as a member of the Bavarian Academy of Sciences and promoted to a minor nobility rank in 1808. In what is furthermore a testament to his experimental keenness, he developed a novel method of glass production, the patent of which he subsequently sold to the Austrian government for what was then a relatively sizeable sum.

It would not be his experimental keenness, however, which would stake Baader's claim to fame, but much more so that of his theoretical speculation. Already during the travels of his youth, in Scotland, Baader had begun to

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read Kant and to gradually but irrevocably reorient the bulk of his intellectual efforts towards philosophy and theosophy. That reorientation would prove enduring and fruitful. Even as he was still working his way up the rungs of his practice, Baader quickly became one of the most perspicacious readers of the new philosophy that developed in the wake of Kant's critical revolution and began advancing his own nuanced position in laconic but insightful publications. Thanks to the attention these latter garnered him, he had occasion to cultivate intellectual dialogue and even friendships—though not all of them long lasting—with figures such as Friedrich Jacobi, Schelling, Johann Ritter, Joseph Görres, and Hegel, all of whom he lastingly influenced. Following the founding of the University of Munich in 1826, he was appointed honorary Professor of Philosophy and Speculative Theology. In time, Baader's ideas would even leave a mark in the social and political developments of his day, as he played a decisive, albeit discrete, role in the formation of the Holy Alliance after the final defeat of Napoleon Bonaparte, and was also one of the first voices to speak against the material and spiritual dispossession of the proletariat of the new industrial order, well over a decade before Marx appeared on the intellectual scene. Seventy-six years old and still tirelessly writing, Baader died on May 23, 1841, without a numerous band of followers, but with a few congenial disciples convinced of his speculative brilliance.

The task of summing up Franz Baader's philosophy is however not as easily dealt with as that of the events of his life. In the most general terms, one can say that his lifelong ambition was to develop a philosophy which, though thoroughly rational, resisted any form of rationalistic desire to do away with religion and revelation. Theosophically inclined, Baader considered the disclosures of reason and revelation to be intimately entwined and both only meaningful by recognizing the traces of divine life in the workings of a thoroughly dynamic nature. Beyond this, a more detailed picture would need to consider the fact that Baader boasted a particularly rich and encompassing intellectual upbringing, whose heterogeneous sources he skillfully welded together in creating a highly sophisticated and highly idiosyncratic view of existence and of the human being's place in its midst. Familiarity with classical sources such as Plato, Proclus, Augustine, and Thomas Aquinas undergirded his reception of his contemporaries' philosophical advances and was carefully informed by an attention to recent scientific developments, prominent among which were those dealing with chemistry and physiology, as pursued e.g. by Antoine Lavoisier and Albrecht von Haller. The already complex set of philosophical convictions that this yielded was articulated in light of the always commanding presence of Scripture, even if the latter was

often read through the decidedly unorthodox lens of the theosophical teachings of figures such as Paracelsus, Oetinger, and—above all—Jakob Böhme and Louis-Claude de Saint Martin. Adding to the difficulty of tracing the coming together of all of these aspects of Baader’s thought is the fact that, while his sophisticated views of existence and the human being may at base form a coherent whole, its presentation in Baader’s work decidedly does not. Readers approaching Baader’s work with any degree of systematic ambition must therefore be prepared to take upon themselves the task of making manifest the many connections which their author never managed or never chose to put on paper. Since such a systematic reconstruction lies well beyond the purview of this short introduction, we will content ourselves for now with touching on those aspects of Baader’s philosophy which are most relevant to his 1798 “On the Pythagorean Square in Nature, or the Four World-Regions,” whose translation into English is offered here for the first time.¹

Already the assertion in the work’s opening paragraph—that mass is ultimately to be thought in terms of a forceful obstruction of the expression of another’s force—should provide a hint that Baader’s natural philosophy belongs to the tradition of ontological dynamics which in the context of modern philosophy was inaugurated by Leibniz’s paradigm-changing suggestion to think of substance under the guise of force. As with Leibniz, the motivation behind this appeal to force stems from the theoretical possibilities it offers in articulating an ontology wherein the ideal domain of representation and the more manifestly physical one of bodies and their interactions can be harmoniously integrated. Of course, Baader stands firmly on the other side of Kant’s critical reworking of the project of ontological dynamics. He generally supports the latter’s bid for a self-aware metaphysics which proceeds under the banner of a rational anticipation of possible experience and harbors no naïve ambition of transcending the sphere of phenomenality. The crucial point, however, and in this he draws no small amount of inspiration from Herder, is that Baader takes issue with the overly subjectivist character of Kant’s critical philosophy (not to mention of the “completion” it underwent in Fichte’s hands) and emphatically resists the overly deflationary characterization of both nature and God sanctioned by it. In Baader’s eyes, indeed, while it is true that there can be no direct or unmediated cognition of natural and divine substance, the possibility of the transcendental subject itself remains unaccounted for, and so all cognition

¹ This English translation is based on the original 1798 German edition of Franz von Baader, “Ueber das pythagoräische Quadrat in der Natur, oder die vier Weltgegenden”, reprinted in: *Sämmtliche Werke* (Leipzig: Bethmann, 1852; hereafter SW), vol. III:248-268.

pursued on its basis remains ungrounded, unless a symbolic cognition of both what is under and above the subject be pursued. For no amount of epistemological prudence circumvents the fact that the subject's complex constitution is owed to a natural formative process, and her ultimate subsistence and actuality to God. In a letter to Jacobi written shortly before "On the Pythagorean Square in Nature" appeared, and in whose light one may better understand the title of that work, Baader claims: "When Herr Fichte counts one, there I already count four, namely: as a You facing my I, thus too I find one above me and one under me, without being able to place either the one or the other before me, or to explain them away as stemming from my I itself.—I swear, that is, as a Pythagorean by that holy *Quaternarius*, and hope again to step into it (as my homeland)..." (SW XV:192–193) This explicit ambition to elucidate the ontological situatedness of the I is again evident in the preface to "On the Pythagorean Square in Nature", the declared general goal of which is to reinstate the fourfold of principles—or, in the topological tenor of the text, of world-regions—on the basis of which alone existence in all its variety can be properly explained, and in reference to which alone philosophy and the subject may sufficiently orient themselves.

It is within the context of that general purpose that the more specific advance which this short text seeks to make should be understood. That specific advance, as also the preface announces, is to offer an alternative to the Newtonian conception which seamlessly identified gravity with attraction and therewith to revise the two-force construction of matter which Kant had proposed on the basis of Newton's model. For despite its undeniably positive contributions, it was also clear to Baader that Kant's construction, based exclusively on the two forces of repulsion and attraction, had ultimately reduced matter to homogenous mass and therewith stripped it of any capacity for qualitative differentiation and self-complication. The itinerary of the reduction is an intricate one, but can be summed up by its two main stages. In the *Critique of Pure Reason*, Kant argued that, as the sensibly given in our cognition, matter constitutes the ultimate anchoring point for our representation, or the spatially appearing "*substantia phaenomenon*" (A277/B333). In the 1786 *Metaphysical Foundations of Natural Science*, in turn, he explicitly foreclosed the possibility that an intensive determination could pertain to this substance of the phenomenon itself, i.e. independently of how it made itself known to the human transcendental subject of cognition. Prompted by the inability of his two-force construction to reconcile the conflicting and yet equally pressing demands of thinking matter as infinitely divisible and yet capable of keeping its opposed constitutive forces from annulling one another, Kant thereby declared the project of dynamically

grounding specific differences in matter unsusceptible of a priori rational construction, submitting instead that “matter has no other magnitude than that consisting in the aggregate of manifold [parts] external to one another, and hence has no degree of moving force at a given speed that would be independent of this aggregate, and could be considered merely as intensive magnitude.” (Ak. IV: 539) Content with transcendently justifying Newtonian mechanics, Kant was undeterred by the fact that this reduction voided matter of any inner locus from whence its organization could autonomously follow, rendering the production of different existential types unintelligible in the absence of subjective intervention, and ultimately exposing the transcendental standpoint to the kind of metacritique Herder levelled at it: that it either severed itself from the rest of existence and remained unexplained, or else in explaining its origin risked the *petitio principii* of relying on the very thing it wanted to explain in the first place.

In response, Baader’s text begins precisely by undoing the aforementioned reduction of matter to purely external relations. Setting out from a consideration of the conservation of momentum as showcased by Newton’s third law of motion, he argues for an alternative—or, more exactly: for a more general—understanding of the inertial resistance that a given material existent presents to the action of any other. In his eyes, that resistance should not primordially be thought in terms of the resisting body’s quantity of homogenous mass points but as the expression of its unitary energetic value, or in his words: of its specific energy. Resisting the notion of a haphazard aggregation of a multiplicity of homogenous, mutually external parts, Baader’s suggestion crucially implies that every single existent is first and foremost determined in its being by an intensively couched unitary principle which underwrites and organizes the efficacious forces through which that existent consequently fills a space. It is this unitary organizing principle in each existent that Baader conceives as its specific gravity and which—in departing from all previous theorizations of nature—he rigorously distinguishes from the efficacious, motion-inducing force of attraction. Attraction and repulsion, Baader emphasizes, are extensive forces whose operations are immediately manifest on the level of material existents. Gravity, on the other hand, is an altogether different dynamic principle. Subsisting at an internal remove from the spatial externality of material existence, gravity first makes the latter possible insofar as it provides the unifying medium for the other two forces and, without itself directly manifesting, serves as the “common ground of their definite and persistent presence.” (SW III:258) In every existent as well as in existence as a whole, gravity thus designates a topologically and functionally distinct aspect of

existence: a ubiquitous bearing center or leverage point to the periphery that is matter per se.

In Baader's thematization of nature, gravity thus grounds matter and relieves it of the role of *substantia phaenomenon*, itself becoming the common currency whose conservation guarantees the rationality and rule-boundedness of interactions between existents. As Baader himself insists, however, gravity is not just the bearing principle; it is also the one which allows for specific formation and determinate configuration. Admittedly, Baader's arguments towards substantiating this claim are less convincingly expounded than those for accepting gravity's role as intensive natural substance. In the text under consideration, they all too suddenly pass over into the symbolic and—with the sibylline claim that “our respect towards this invisible earth-principle [...] becomes well-nigh veneration when we discover in it the source of all forms and formations” (SW III:264)—they will foreseeably do little to satisfy the reader's question of how exactly that determination from within could take place. Those interested in alleviating this lack and further pursuing the question can nonetheless do so by turning to Baader's 1797 “Contributions to Elemental Physiology,” the work from which the present one developed and whose main insights it partially refines and partially repeats in condensed form. Together, both works provide just enough light to reconstruct how exactly Baader's overhaul of gravity paves the way for a robust understanding of a matter the rational anticipation of which may respect nature's production of existential types and avoid any threat of either a stark substance dualism, or else a physicalist or idealist reduction of existence. Without pursuing the details of that reconstruction, it can nonetheless be noted that its key lies in the topological complication of phenomenal being involved in Baader's account. Indeed, as previously intimated, Baader's insistence on an intensive measure of essence entails the need to recognize “an interiority analogous to that of the stuff of our inner sense in every corporeal configuration.” (SW III:216) This objective interiority does not constitute an irruption into the noumenal, but rather the acknowledgement of both the depths demanded by a consistent and non-reductive elucidation of the phenomenal itself, as well as of nature's rationality qua “configurating artist [*Bildnerin*]”—a rationality that certainly does not render nature intelligent, but which, phenomenally understood, nonetheless respects its intelligibility as anchored “in its own original state as well as in its continued existence.” (SW III:216)

Crucially, once such an interiority of phenomenal existence is acknowledged, the possibility is thereby opened that a given existent's allotment of essence may be expended for the sake of a preponderance over alterity of a

kind entirely different than that of physical interactions. For just as a being that lays claim to a high disposition of essence can externalize it as objective or quantitative preponderance, *viz.* as inertial mass, it could also rather retain the majority of that ontological capital for the sake of qualitatively elevating the internal or subjective side of its being. In the latter case, no mass accretion and physical hegemony would follow; but in their place, that existent would acquire a more complex specific kind of being, directly connected with how much of an interior life it would have, or with how much self-determination would be shifted, as it were, to the ideal, representative side of its being. Importantly, since essence is formally given under the guise of zero-sum distribution of gravity, then even in cases where the disposition of essence were thus exponentiated for the sake of internal complexity a conservation law at the basis of the community of existence would nonetheless hold, and a certain equivalence with alterity would still be kept. The inward complication of essence would thereby result in a being which, having eschewed massiveness, would not only stand opposed to and elevated above everything that is massive, but would do so while remaining in identity with it. Only, this identity would not manifest in merely mechanical and kinematic terms—as a momentum-conserving reaction to extrinsic impulsion—but rather on an ideal level, i.e. by allowing what is internally complex to dispose of what is opposed to it as the material for its truth-preserving representation. As put forth in these early texts, the intimation of Baader’s philosophy is thus that the rational anticipation of nature’s formative capacity from basic, more material beings, unto higher, more spiritual ones, lies precisely in the two “operative modes [*Wirkungsweisen*]” (SW III:211) of its production and in how these unitarily ground both a self-less as well as self-endowed manifestation of essence. The question as to whether the actual dynamical process whereby these two modes of operation coalesce into a fully formed existent is sufficiently elucidated by Baader’s perfunctory treatment of the fourth principle of the Pythagorean square—which he calls “the all-animating principle” and symbolically designates as “air” (SW III:267)—can only be marked here as one still needing to be addressed. Readers of Schelling may perhaps take this as their cue to argue that, although undeniably capitalizing on Baader’s insights, it is Schelling who first articulates the formative logic of nature by explaining light’s role as the reconstructive, actualizing principle without which the succession of potencies would never be drawn out of the ground.

Finally, in the context of the invitation for the long overdue reengagement with Baader to which this translation hopes to contribute, I cannot resist the temptation of leaving off with a last, somewhat daring, thought.

Even the most distracted reader will notice that Baader's complication of the classical formula for momentum (from $p = mc$, to $p = emc$) takes steps in the direction of Einstein's famous $E=mc^2$ equation and of what, from a contemporary perspective, would be called a relativistic physical theory. In fact, Baader's formulation entails that $E^2=(p/mc)^2$; contemporary relativistic physics are built on the tenet that: $E^2=(mc^2)^2+pc^2$. The obvious differences notwithstanding, the proximities and similarities are striking. And they are, of course, not coincidental. The very title of Einstein's 1905 paper where the formula was introduced—"Does the Inertia of a Body Depend on its Energy Content?"—shows that the question which motivated his inquiry was essentially the same lying at the basis of Baader's protestations against Kant's Newtonianism. Einstein's conclusion, moreover, that "[t]he mass of a body is a measure of its energy content", reads like a paraphrase of Baader's "[t]he degree, the strength, or the magnitude of the countering or resistance determines the degree, strength, magnitude, or, if one prefers, the multiplicity of the mass..." (SW III:251) Adding to this Baader's transformation of space into "the open marketplace (the passage) of the single or whole traffic of these depths" (SW XV:165), as well as also his theorization that, based on its relative energetic preponderance, each existent will exercise on all others an "an assimilation-force (equation) of its own inner time-unity" (SW III:208), thereby curving their otherwise straight motion to a "not-straight [...] heteronomy of energy" (SW III:218), one cannot avoid the realization that the road later travelled by Einstein was one whose beginning was first explored by Baader. Of course, exaggerating or misjudging this connection would be as pernicious as failing to recognize it. At stake is not the spurious claim that there is no distance between Baader and our contemporary science; but rather that our contemporary science may still very fruitfully draw from Baader's insights in the search for the deeper meaning of the facts it uncovers. More so, in fact, considering that Baader's speculations on the gravitational depths of nature are pursued at one with the question of how every discrete existent crystallizes into its determinate form out of a prior state of fluid indeterminacy, and can do so only by virtue of its informative intake of alterity. The prospect that the resolutions of some of contemporary physics' outstanding challenges and long-protracted theoretical unifications may benefit from a reconsideration of speculative sources long thought to be outdated cannot therefore but beckon to us as a serious and promising one. This path is open and more than worthy of being pursued, though it must be tread with the utmost caution and rigor, and only on the basis of a genuine collaboration across disciplines the likes of which we are still far from putting into practice.

On the Pythagorean Square in Nature

Or the Four World-Regions

Franz von Baader

{III:249} This small text originated while reading Herr Schelling's recently published work (*On the World-Soul*), which I gratefully welcomed as the first herald of an approaching spring, i.e. as the first felicitous expression of physics' reawakening from the death-slumber of atomism. Since by now nature-philosophy has correctly comprehended the dualism of nature (its inner dichotomy), and hence already recognizes two regions (namely midday and midnight) in the world at large as well as in each individual smaller one (their polarity), so it has only one further step to take in order that, after the discovery and recognition of the two remaining world-regions (of dawn and dusk), it may fully orient itself. — An attempt at how this step may at any rate be taken over and beyond current school physics, is contained in the following small text, admittedly very incipiently and only in draft. To this end, one would above all have to regard the phenomenon of gravity from an entirely different standpoint as has hitherto been the case (since Newton), and thereupon also to free the manifestation of dualism in the all-encompassing phenomenon of heat and cold from the remnants of atomistic hypotheses, so as to secure for it its original dignity as purely dynamical phenomenon. Primarily, though, instead of looking for the source of gravity in the compressive basic force, one would have to {250} recognize in the latter the positive principle of cold again—which, one knows not why, has long been forgotten in physics. Indeed, as far as this principle of cold is concerned, I do not find any mention of it by a single one of our recent writers (who nevertheless all recognize a compressive basic force, and regard the essence of heat at the same time as the expansive force that counteracts it), with the exception of the author of the *Metaphysical Heresies* [viz. Karl Heinrich von Gleichen], of whose remaining original and interesting ideas (especially about his given view on the connection of cold with salt and light) I will make use at a later opportunity, and in the pursuit of the path of ideas here laid down.

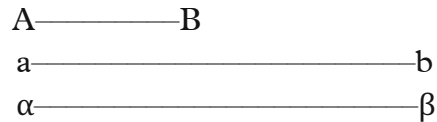
{251}

There are two classes; but in these two classes,
union cannot take place without rupture. Are there
not two forces in opposition: one to stop union, one
to promote it? Are there not additionally the
principle which gives and the principle which
receives?

One can easily give a more general meaning to the common expression ($MC = mc$) found in mechanics to designate the momentum or magnitude of motion (the strength of what moves or the mass of what is movable) so as to apply to the momentum of any (finite) action whatsoever, if one but considers that: insofar as every action is a reciprocal or counteraction, one can understand by mass or M that which resists the expression of force of any forceful thing, and which therefore can itself only be the counteracting of a likewise forceful thing—as is also meaningfully expressed by the word: object. — The degree, the strength, or magnitude of the objection or resistance determines the degree, the strength, the magnitude, or—if you will—the multiplicity of the mass (of the load or of the weight, etc.). If one now takes all working causes as of the same magnitude in terms of energy, as is in fact the case in the above formula, then MC expresses the twofold mode of an increase (intensification) and weakening of momentum in general. For if $M = m$, or if the working causes are the same in number, or the same amount of parts of a working cause are in play, then the degree of their exertion or disposition (temperature)—which as always is assumed to be variable, and which {252} is here designated by C , or by the velocity of the action¹—will give a difference of momentum. And if on the contrary this degree of disposition or exertion is equal, then only M or the quantum, the magnitude or amount of working causes, can be the decisive factor. Now admittedly (according to the proposition of phoronomy) “the momentum of a working [cause] from greater specific energy is equal to the momentum of many joint working [causes] of a weaker specific energy”, and from this it indeed follows that the mathematician can to that extent abstract from the specific differences of the working causes; but it by no means follows that he

¹ In the case of forces which are variable in their action, the expression $C = s/t$ [*celeritas est spatii per tempus divisi* = speed equals distance over time] gives the degree of the action, or the tension in which the agent finds itself. Thus, e.g., a higher degree of expansive or compressive force (a higher degree of heat or cold) fills the same space faster or decreases the same filling of space in like measure faster—which is in part proven by Lavoisier’s experiments on this issue.

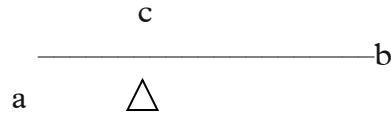
can impose his hypothesis or assumption (of the specific sameness of energy of natural forces) as a proposition on natural science. — In order to sufficiently convince oneself of this, one only needs to make the above phoronomical proposition intuitable by means of an example.



A moving point A,² whose action has a determinate energy, externalizes it with a velocity or {253} degree of its exertion = AB. One can then conceive it as divisible in its substance (in the two points a and α) of which each possesses only half of that energy, and which therefore will need a double velocity or exertion (ab = 2AB) in order to bring about the same momentum as A. In the same way, if one conversely thinks of a union of two points a and α, a deceleration or relaxation of their action (a decrease in their velocity) must occur if the newly created unity A is to perform only the same which each of the individual points a and α could perform separately and by itself, but with double the effort or exertion of its force. The specific energies (strengths) therefore behave inversely to the degrees of exertion (the velocities) in cases of equal momentum; and if we designate the specific energies with E, e, then instead of the above formula we arrive at: MEC = mec, where namely M indicates the multiplicity of working causes, E their specific energy, and C the degree of their exertion, tension, or velocity. Since in the phoronomy (as mere mathematics) of Professor Kant's [*Metaphysical Foundations of*] *Natural Science*, there is no mention of the concept of specific energy, I here had to first and foremost justify the general use, of which I am immediately in need of as much by a consideration of the action of motion as well as by that of expansion and condensation. Incidentally, by a consideration of the above formula one arrives at the insight of the permanence or persistence of the total momentum—or of the absolute of each of the working causes of nature—throughout all its variations which result in the constant

² Instead of the actual motion (as successive change of place or however else one wants to define it), one can also choose as an example of every action in general that of extension, or the opposite one of condensation; for I presuppose that one correctly notices the difference of these actions, and does not want to reduce all actions in nature, with the atomist, to that of motion in the narrower sense above. The scholastics already distinguished between *motu lationis* and *motu alterationis*. Our outer sense can of course not be affected by anything but motion in the first sense; but our inner sense (which is the sense for relative quality, strictly understood) is not affected mechanically like the former, but only dynamically. More on this in the sequel.

change of the specific momenta and express themselves precisely in that change—i.e. throughout all separation (isolation) and unification of its action.³



{254} To begin, we want to consider the interaction of moving causes in the simplest case, the lever. Since one arm of the lever is not movable without the other one being simultaneously moved in the opposite direction, then the moving in a counteracts the moving in b as the mass of the load, and likewise the moving in b counteracts the moving in a. But the lever is in fact movable only from its point of motion or support c; and consequently b, in that it has to move (lift) a, can act only from c, just as a does in that it strives to move b. In c, therefore, both b acts on a and a on b; and since the end of the lever b has to traverse twice as much space in the same time as a, the moving part in a must of course perform twice as much as the moving part in b.⁴ Now admittedly here a specific difference in the energies of the moving causes does not seem to come into consideration, whether one represents dead bodies (weights) or living bodies (animate) as acting on both ends of the lever. For since the bodies are not subject to any change in the specific energy of their own motions (of gravity), (in that this very persistence constitutes what is substantial in them, qua phenomena), then of course any external cause which manifests itself in them as inducing motion cannot strengthen the momentum of this their action of motion otherwise than by more highly determining the degree of its exertion, which inner higher determination is outwardly manifested by means of being moved faster. But from this it does not yet follow (according to the previous considerations) that every material point's own action of motion (if you will) is of equal magnitude in its energy {255} to that of every other even at the same speed. Rather, the experience of specific gravities leads us just as much to the recognition of a similar

³ As a consequence of the above, I further provisionally remark here that with the unification by mutual total dissolution or interpenetration of two fillings of space, one already concedes that mass (as a quantum) can in no way be constructed as a multiplicity outside of, i.e. next to, one another. Incidentally, the concept of a dissolution (*solutio continui*) in general is still indeterminate because one does not here recognize the negative of true connection as (systematic) unification.

⁴ This view of the lever also seems to me the simplest and most natural. One can easily give it the necessary generality for every system of opposite moving forces, if one but considers that in a system of forces every single one acts on all the others only from the common center of motion or action.

specific difference of what is substantial in the fillings of space (namely, of what moves and what is moved), as the recently discovered specific temperatures proved to us a difference in the energies of their expansive forces. Now since, in my opinion, only the misjudgment of the connection of the gravity of all bodies of the same system with that of their inertia (as opposability or resistance against any other than their own movement) made the above truth inaccessible,⁵ then by a correct application of the concept of positive and negative forces, I want to try to determine the true point of view from which every matter's own motion must be regarded [together] with its relative immobility, or the resistance against any foreign one.

An actual motion (as an action, and hence including the striving) in a given direction is a negative one (a negation, hence a positive counter-striving by that same moving thing or thing striving to move) in any other direction.— By this, incidentally, I do not want to be understood in such a way that one imagines the conflict as Herr Prof. Kant constructs it in the *Natural Science*, in that it is not here a question of e.g. a reciprocal motion present before impact (which motion is merely ideal), but only of the motion (as action which merely expresses itself as striving) present at the moment(um) of and continually generated during the conflict, whether that which inhibits motion is a matter, or whatever other motion inducing thing it may be. This resistance, qua reaction which is generated at the moment(um) of interaction or community, must naturally be greater (stronger) the greater the disturbing influence itself is, i.e. {256} the faster the body moves in any other direction than in its own direction, and the more it is to be set away from the latter in any other direction, i.e. the more opposite the directions are. With other words: bodies therefore only show inertia, they therefore only resist as mass everything which moves them, because they are heavy; and hence the momentum of their specific inertia lets itself be a priori regarded as fully equal to that of their specific gravity, because namely we are only designating one and the same thing with both terms. — That thing, or the substance of each matter (as individual and for itself movable filling of space) is thus one and the same thing as the momentum with which it vindicates its own original motion (as heavy). It must consequently be seen as an expression of force with which every single matter vindicates the relative rest (unity of a certain motion or position) with regard to the system (of which that matter is a member) and so partially also the independence of that system. — If,

⁵ Thus, not seldom e.g. does one find matter regarded as merely inert, and not furthermore as heavy. One therefore considers in such a case something spatially movable and moving (for both are inseparable) without any actual definite motion; i.e., one professes a true absurdity.

however, one now considers the entire mass of the system (of our planet qua individual) as a unity whose action is each time only separated or individualized into as many partial actions as there are individually and unitarily movable (hence relatively immovable among themselves) fillings of space in it (whose number will therefore also each time be a definite and finite one),— then one neither needs to assume a really completed division or separation of this one material substance into infinitely many,⁶ nor otherwise and in general, to represent to oneself in a mechanical or transfusionist way the concept of a {257} substance qua constancy (holding or persistence) of the momentum of that unity with regard to the perceptible intensification of energy in individual points of its virtual presence and the decrease thereof in others (i.e. the abundance of absolute gravity throughout all change in the specific ones). The meaning of the word substance as self-standing, self-bearing, or self-positing bearer (in opposition to the non-self-standingly posited, positioned, or borne) already prepares us not to regard the force or invisible omnipotence which radiates and spreads from the center (mass-point) of our planet as an effect of sorts of the mere aggregation of a countless amount of non-self-standing particular causes. For this aggregation would be so little in a position to create an active center common to all, as would all the individually scattered and then gathered peripheral points to create the mid-point which creates, positions, and bears them.⁷ We should much rather regard gravity as the immediate expression of the individuum which dwells in all singular or for-itself-movable bodies, individualizes each of them, and uninterruptedly posits, bears, and systematically orders them all (as a priori

⁶ Admittedly Herr. Prof. Kant gives a proof of this actually completed division of matter into infinity (in the *Metaphysical Foundations of Natural Science*) from the continuity of the expansion of a single material substance. — But the efficacy of the expansive forces of one and the same matter is not there constructed dynamically, as the nature of the issue actually requires, but mechanically: as an effort of several matters to move away from one another, which manner of conception (exactly as the atomist wants) would as such deny all true decrease and increase of expansion with constant continuity and would explain it away as mere appearance. It would perhaps be better to postulate a complete division of the material substance in the liquid; only here, too, this inner drive towards endless disunification is as such only present *in potentia*, and is always suspended by a hastening, cohesive force; so that here, too, each time only one actual matter, i.e. a finite filling of space, moves and strives to move at once and with each other.

⁷ In making use of the sphere and its center point as a symbol, one usually thinks of the latter only as the mathematical point, whereas one should conceive by the actual center of the periphery the generating inner one in contrast to the externally appearing many (individuals). To this then it is owed that so many fancy to have to be at least as small as a mathematical point in order to be simple or not extended, as the author of the *Metaphysical Heresies* very naively expresses.

principle).⁸—An individuum which precisely therefore {258} does not itself appear (as matter) because it gives all of those bodies permanence, content, and truth; is that in which they all have their ground, manifesting in each of them (qua so many particular peripheries) as center; and is that which with a determinate momentum holds them fast, bears, posits, and therewith, so to speak, substantializes them. The degree of actuality of each matter is the degree of its efficacy as moving itself or resisting motion in space, and the absolute indestructibility of matter is by no means due to it itself (for every matter is mortal and temporal by its nature), but only to its inner principle, whose independence from matter is incidentally as certain as the dependence of the latter on it. — It is easy to see from this true view of the phenomenon of gravity that its source and thus also the source of matter's own motion is neither to be sought in its compressive basic force, nor in the latter's unification with the expansive one acting against it, insofar as one would explain this unification of both forces from them themselves, but rather in a third one which is itself precisely the cause, what unifies those forces, and the common ground of their definite and persistent presence itself. — Before I now elaborate on this concept, I find it necessary to recall something of both the other already recognized forces of nature.

One understands by the temperature of a matter the momentum of its expansive force (or that of its extension, considered as action) in relation with that of another matter. Individual {259} matters enter with one another into community of their temperatures (they share these with each other), if they come into noticeable community with the spheres of action of their expansive or compressive forces; and they set themselves in equilibrium in terms of the former when they reciprocally balance out the momenta of their expansive forces among themselves (through relaxation and tension of their action). — If we thus consult our latest physical writings on this topic, we find that the unmediated and purely dynamic influence of matters on each other which takes place during the distribution of temperature is still generally misunderstood. For the hypothesis of a separate warmth or warmth-generating matter is nothing more than a mechanical-atomistic manner of conception, which is

⁸ In passing, I remark here that in this way alone one may hope to obtain information about the existence and subsistence of our planet as the individual *par excellence* compared to all individuals produced by it. On the contrary—as Herr G[eheimer] R[at] Jacobi remarks—with the usual machinistic conceptions of the origin of our mother earth from a general basic mush, form is taken to arise in a truly miraculous manner *per generationem aequivocam* out of pure uniform (chaos), unity from below upward out of endless rupture, life from death. — *Totum (Unum) parte prius* etc. — These gentlemen seem not yet to be as far advanced as those savages who could indeed count up to 2 or 3, because they have not even begun to count, since one must in any case start with the unit.

only still retained because one has not noticed that in this case an interaction of single, moving, pressing, etc. matters does not explain anything at all; and that one must simply recognize here that an unmediated interaction of forces of matter, radiating and penetrating at certain distances from the latter without all mediation of a reciprocal impenetrability of something spatially moving, occurs as such. — Since, however, one has only recently begun to speak of a dynamic influence in contrast to the mechanical one,⁹ the reten-

⁹ Since this double influence must be deduced from the double affectability of each particular (individual) in general, namely from the outside and from the inside, I find it necessary to devote a somewhat lengthy note to its consideration here. Imagine, for example, a body A, which for the time being you endow with the ability to sense and move; and now let another body B as such enter into community with it, i.e., as moving or as expressing its individual space-filling presence against the first. Now, since the place of influence or interaction is always only in the boundary of mutual repulsion (of movement) or in their mutual impenetrability, i.e. outside of both, so the former [A] will relate this sensation of B to the latter qua something acting outside of itself. But let B or whatever other thing is taken as agent not act by mechanical contact on A, but rather in it as e.g. by warming. Then A (as a spatial presence or as an individually movable thing) will be penetrated by the action B. Thus apprehended in itself, in its substance (as a spatial I), the body A will, since the place of the influence falls within its own I, admittedly recognize the presence of an agent as before; but it will not recognize it in the same sense as outside of itself, like the first time. Only, it also cannot recognize it as something that is in itself, except insofar as it perceives itself in turn comprehended in it. In this respect, the objective presence (being) of this agent for A is just as true as it is incomprehensible. For since we give the latter only a capacity for motion, and here no movable, graspable reacting thing offers itself, the influencing thing cannot fall within the sphere of what is actually cognizable or intuitable for it; for the eye sees only in front of itself and from there on out, where hand and foot work. — I break off this consideration here, in order to provisionally anticipate some conclusions from it: 1) All quality of matter is one and the same with its interior (as also Herr Schelling already asserted) and in all changes of quality, it is not bodies or individual matters, but higher principles that are effective, to which therefore belong all dynamic phenomena, the chemical, the life processes etc. 2) We must distinguish in every bodily essence (insofar as the meeting point of receptivity and spontaneity is within it itself, and does not fall outside of it e.g. in the mass point of the earth) a double sense: the actually external or mechanical one, which accompanies the feeling of the mutual impenetrability of e.g. our body as moving or movable against any other moving etc., and which only persists with an actual expression of one's own capacity for motion (more passive or more active). This sense or this feeling is the actual sense of the body. On the other hand, we sense all dynamic influences and interactions of our own matter with a foreign one, where no motion or striving thereto takes place (in seeing, hearing, smelling, tasting, feeling warmth etc.), even though motion accompanies them, by means of the dynamic inner sense. And if in this case we relate the actually acting to a movable outside (body), then this relation happens just as generally, as in particular the whole life process is related to the living body (as proceeding in it), but not as attributed to it (as cause; see Schelling). This sense for forces in general (if you will), in contrast to the sense for bodies, is of course still until now as good as unknown, because one still tries to explain it away as a mere modification of the latter (as though one for finer matters or bodies). To this end, the well-known emanation and vibration hypotheses were invented, which are neither individually admissible nor in their combination, because they both set out only from a mechanical principle. — 3) Individuals of the same class must of course, as members of the same system, perceive each other reciprocally as impenetrable, thus in their

tion of the above misunderstanding in the {260} doctrine of heat is less disconcerting to me than the denial of a proper principle of cold, which one nevertheless admits under the term of a condensative basic force, thus only under another expression. {261} If, that is, (as is generally done at present) one considers the actual expansion which takes place in the [thermal] steady state as an effect of the equilibrium of both basic forces, then one proceeds at least very inconsistently if one speaks of the action of the one (of heat) without mentioning the other which is inseparably connected with and opposed to it (cold). Indeed, a body cannot warm a second one (by communication) without just as much getting itself cold before it, and cannot cool it without just as much getting warm before it. Consequently, the interplay of the expansive and compressive forces of two matters which set themselves in thermal equilibrium must be conceived in such a way that the higher tensed expansive force of the warmer matter A is counteracted by the higher tensed compressive force of the colder B as mass, load, or weight; or that the expansive and compressive forces of both matters, in this way united, act against each other. — Concerning this interaction or the communication of temperature, the above formula $MEC = mec$ or (since M does not come into consideration here) $EC = ec$ gives the law of equilibrium. It can be seen from this, that the degree increase (C) behaves inversely to the specific energy, and that one should not speak of any specific heat capacity¹⁰ {262} without speaking of the cold capacity standing in inverse relation to it. For the positive element can only become or be specifically more energetic (more excitable, more irritable) in the same ratio in which the negative has become less excitable, and vice versa. For example, in the mixture of colder mercury with warmer water, the easier heatability of the former and the lower stability of its cold principle are just as evident as, conversely, in the mixture of colder mercury, the greater stability (inertia) of the cold principle of water with the lower excitability of its heat principle. — Incidentally, I have considered here the conflict of nature's reagents only in the communication of temperature, and must save the consideration of the phenomenon of the flame or of

interaction as outside each other; whereas an individual of a lower class is in the above sense not impenetrable to an individual of a higher one, but rather penetrable, which leads to the already noted perceptibility of a higher individual as within the lower one, and again of the lower one in the higher one. Likewise, the interaction of these essences (in impulse, for example) must turn out to be quite different from the above between two of the same class. 4) Since the sphere of the properly intuitable is narrower and smaller than the sphere of what can be felt, so the priority of the latter follows from this. — Finally, this remark provides a commentary to that well-known sentence: *Deus est sphaera, cujus Centrum ubique, circumferentia nusquam* [God is a sphere whose center is everywhere and whose circumference is nowhere].¹⁰ The term 'capacity' owes its origin to the transfusionist system, and therefore cannot properly be retained.

burning, as belonging to a higher order, for another occasion—its consideration, meanwhile, could until now not give satisfying results precisely because one did not recognize the negative to light (qua positive).

In ancient writers, one finds these two basic forces, whose never settled strife and duel make the life of visible nature itself,¹¹ and {263} to whose recognition now also our nature-philosophy has risen, designated under the names: fire and water. But they associate a third principle (the earth) to them, whose existence is actually already tacitly conceded with that of those two. Thus, for example, Herr Eschenmayer has already very beautifully compared these two forces of nature with those of a lever, in that they, like the two counteracting forces of the latter, are only able to express themselves in the state of their separation or distribution (as, e.g., especially their appearance in electricity and magnetism shows). And in his masterpiece (on the origin of the general organism), Herr Schelling distinguishes even more clearly the grasping, fixating principle from the two grasped elements. It is therefore time to also recognize this third principle in nature as that which engenders the bearing and supporting point in the lever of nature, and thereby grounds and constitutes the latter. — This bearing or supporting point meets us namely at every point of space filled by matter (as weight)¹² and we apprehend only in and through it those two forces, which it unifies (holds together) by separately holding them apart, and separates in order to unify them, thus as it were compels them against their will to operate together on one point

¹¹ The author of the *Metaphysical Heresies* significantly calls them half-forces. — As a supplement to the use of the word spirit made by the same author, I note the following here. The concept of a spirit in contrast to the body (as only its negative) is that of the undivided, unpartitioned, i.e. unextended unity, in contrast to the divided, separated, extended one. — In this sense, Hemsterhuis makes use of the somewhat adventurous sounding and yet true expression of calling the body a coagulated spirit, and the corporeal universe a coagulated God. Since every action is immediately preceded by a synthesis of the elements or forces, the essence that is extended within itself necessarily experiences a suspension, and it must first overcome the resistance that opposes the totality or congruence of all its individual forces. This *solutio continui* must therefore be accompanied by pain, and is actually for us the suffering of time. — For example, the human being finds will and deed disunited within himself, and this disunity or sundering in his essence constitutes precisely his dissatisfaction with the world.

¹² The first principle commences the action, the second limits or moderates it, and the third realizes or carries it out. Number, measure, and weight according to the ancients.

and to bring forth the appearance of matter.¹³ We therefore have the uninterrupted energy of this third principle, as bearer (substance) of the remaining two, to thank for the consistency and permanence of matter. {264} But our respect towards this invisible earth-principle (our common mother Rhea or Vesta) becomes well-nigh veneration, when we discover in it the source of all forms and formations. — For the determinate form (the discrete body-formation or individual) comes about (as already Herr Schelling showed) only through the determinate way of the being-bound of those two elements. — By means of a determinate binding of the two quarreling elements of nature, that principle thus creates the phenomenon of a persistent (resting) individual filling-of-space; just as the constant and determinate mode of release of those two reagents maintains a certain, individual process (life) in and on this body, which, as it were, emerges as a funerary monument out of that life, and dams and sets banks to the latter's stream. — Since, by the way, these three principles give a threefold equilibrium as well as a threefold disturbance (conflict) of the former, then the particular existence of the three kingdoms of nature presents itself to us as a commentary and evidence of their presence. Thus, for example, in the animal the fire principle, in the plant the water principle, and in the mineral the earth principle is the dominant, characteristic one; and in a similar way, the threefold chemical character or quality of matter (as combustible, salty, and earthy) is explained. —

One and the same principle is therefore the forming and supporting (positing) one—and since above I already derived the gravity and substantiality of bodies from it (our earth-individual), so I only need to draw here the conclusion which follows from this derivation, and to explain the inner and hitherto still unexplained difference of the solid from the liquid, of the formed individual from the unformed stuff. The relative immobility of rigid matter is indeed nothing more and nothing less than the unity (coherence) of its gravity, i.e. the unity of its own motion or the unity of its substance. — That this latter {265} came about (in the free original formation of the body) by articulation or individualization of what is substantial, in that here each part relates efficaciously to the whole, and the whole to each part, can be instructed by appearances themselves, to which also then belongs the simultaneity of the generation of stuff and form in every original true formation or generation of a body, which thus can only be

¹³ Thus the poet (who so often reveals himself as the prophet of philosophical truths) says: "...like nature certain forces in distaste — compellingly conjoins and contending bodies creates." [Goethe, *Auf Miedings Tod*]

directly comprehensible from the liquid.¹⁴ — In so far as the liquid proves itself apt for the formation or birth (the crystallizing outcrop) of solid bodies, it can be regarded as the general seed of the latter, since in it the earth or formative principle is still undeveloped or undifferentiated as in the germ. — Coherence in the liquid itself is nonetheless obviously only that of expansion (of expansive forces) and not that of substance (of the movable and moving), as can be shown from several observations and experiments,¹⁵ and as the everywhere separating and individually expressing force of gravity shows us already at the first sight. The ideal of the liquid, however, as boundless segregation or disunification of the substance would give (as already noted above) everywhere a 0 of the latter, or no noticeable spatial presence of it at all. — That impotence and inner lack of consistency nonetheless must have been the original state of matter (insofar as all bodies originated from the liquid, from *l'eau mère*) and therefore gives a {266} significant symbol of the non-unity or confusion¹⁶ which preceded the foundation of this world. —

Having now convinced ourselves of the presence of three principles, beginnings, or elements of matter which everywhere and in every point of it are to be found already together, we have indeed the complete elements for the construction of matter.¹⁷ But considered more closely, we see that if left to themselves, these three elements would nonetheless eternally begin nothing, and their being together (as inert) would only be able to produce a relative equilibrium, and to constitute the 1⁰ as the basis, so to speak, and the substance of all potencies or expressions of force. Left to itself, the great lever of nature would remain in eternal rest, i.e. in the 0 of its action and actuality,

¹⁴ As is well known, we owe to Herr [Carl Wilhelm] Nose the introduction of this principle as a basis for the critique of geology. But its application goes incomparably further.

¹⁵ The spherical form, e.g., which the liquid showcases in smaller portions, is obviously an effect of elasticity (which strives for the greatest possible self-contact under the smallest possible external one). — To this also belongs the decrease of fluidity with increase of the separation etc. etc. and several phenomena related to tension etc. in cases of tearing of the liquid.

¹⁶ From this, however, the concept of dissolution (*solutio continui*) can be deduced, as well as the different ratio (or efficacy) in which the earth principle finds itself in relation to both other elements in the liquid, as opposed to that in the rigid or solid. —

¹⁷ In Herr Schelling's *Ideas for Nature-Philosophy*, there is a consideration of the necessary coexistence of three acting causes in order that a self-standing result, persistent interaction, be given. In his proof that galvanism accompanies the life process, Herr Wilhelm Ritter comes across one and the same idea, — which is at home in higher philosophy, in that it is a priori demonstrable that a self-standing thing which circulates within itself is only possible through the interaction of three counterpoints (as so many individual inner members). —

if something external to it, penetrating it, did not put it into play from within and maintained it thus by the alternating conferred predominance of one action of its forces over the others.¹⁸ With this exhalation from above, life and movement course into the statue of dead Prometheus, and the pulse of nature (the interplay {267} of its dualism) beats. — Everything which exists and works, lives only from the inhalation, the breathing, of this all-animating principle—air!

And so we would have found the fourth principle of nature, its fourth or actually its first world region, the dawn; or at least we would have shown the possibility of this finding, and in it an opposition (in every small world just as the one at large), which is by no means, as our recent philosophy believes, to be mixed up with the dualism of its two reacting forces which withstand one another in struggle. — In so far as to orient oneself means nothing else than to find and keep in sight everywhere this point of the dawn (of absolute spontaneity), then philosophy first has to look for the original schema of this *quaternarius* which, as is well known, Pythagoras presented to his students as the key to nature, and by which they swore;— Or (if I otherwise wanted to part ways with this philosophy) I would express myself with a very viciously defamed author as follows: look to explain the subsistence of the One in the Three through the subsistence of the Three in the One.

Where namely the “in” means being under something as in the power of another, so to speak; insofar as in the first case the conflicting three do not serve the unity, stepping under it and submitting and surrendering their will over to it, but rather each of the three strives to bring itself up to the place of this unity and to bring the latter down; whereas in the latter case (where three subsist in one) precisely the opposite takes place.

Some years after this text was published, Professor [Adam Michael] Birkholz in the *Universal Catechism*, published in 1803, and an unnamed person in the *Essay on the Nature of Things*, published in 1804, made known a construction of the *quaternarius* from and through the *ternarius*, which stems from [Andreas] Rüdiger, and which I recommend to the reader as pursuing the topic under discussion here much further. This construction {268} consists mainly therein, that if one e.g. calls the compressive (involutive) force a, the

¹⁸ This relation of the three principles to the fourth which animates them is almost universally misunderstood by placing all four of them next to each other as one order, and thus distorting them all. In the well-known symbol (\triangle) this relation is correctly indicated.

evolving force b, and the one unifying both (the bond in Schelling's language) c, one obtains through the evolution of this *ternarius* a circuit with four counterpoints, in that e.g. the acme of a and b (of winter, night; and summer, noon) must be interspersed by two other acme's of c, in one of which c leads the b that has gone down in a upward (spring, morning), in the other of which the same c leads b back to a (autumn, evening). — Just as important, and illuminating, is the proposition noted here: that three numbers can be rearranged only five times [viz. six total permutations], in relation to which the author of the *Essay on the Nature of Things* has already registered some conclusions. — For knowledgeable readers, whose number should be rather small here, I further remark only the following: 1) That *ternarius*, which as the radius, so to say, of the esoteric unity evolves here into the *quaternarius* as its periphery, already has that unity as a mover within itself, and so, as a still latent quaternary, the designation \triangle fits it. 2) In the extra- and supra-temporal system, those two times of day or seasons, in which the bond (the spirit) is predominant, of necessity eternally coalesce; dawn, ascending and dusk, descending; spring, morning and autumn, evening. Blossom and fruit meet here incessantly; and neither a nor b are individually able to rise to dominance.