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THE CONCEPT OF SPACE IN HEGEL: THE EARLY JENA YEARS

ABSTRACT: The last two decades of the Twentieth Century marked an ever-growing interest in philosophy of nature within the *Hegel-Forschung*. The essay outlines a renewed appraisal of the systematic form, which affords a better reckoning of the anti-mechanistic quality of Hegel's philosophy of nature. This concerns, primarily, the progressive movement from externality to internality, then from the objectivity of nature to the subjectivity of the spirit, and hence the transition from mechanism to life as the most direct expression of the idea. It is from within the framework of such a general speculative perspective that we must consider the concept of space, and engage with Hegel's 1801 work, *Dissertatio de orbitis planetarum*. The focus will then shift to how Hegel's system was first traced out in Jena between 1803-1805, before the break with Schelling, and the "phenomenological crisis of the system". The climax of this recognition may be identified in Hegel's exposition of 1804-1805 in which he validates the theory of ideality – or abstractness – of space and time as separate forms, i.e. considered *per se*. The reality of space-time becomes the *being* of time in space and the *being* of space in time, and the "real union" of the two is "the real infinity of the ether", of absolute matter, which he terms *motion*.

SOMMARIO: Gli ultimi due decenni del Ventesimo secolo hanno visto emergere un crescente interesse verso la filosofia della natura nell'ambito della *Hegel-Forschung*. Il contributo delinea un nuovo modo d'intendere la forma sistematica, che consente una migliore valutazione della qualità anti-meccanicista della filosofia della natura di Hegel. Ciò implica, innanzitutto, il progressivo movimento dall'esteriorità all'interiorità, in

seguito dall'oggettività della natura alla soggettività dello spirito, e dunque la transizione dal meccanicismo alla vita come più diretta espressione dell'idea. È nel quadro di tale generica prospettiva speculativa che occorre prendere in considerazione il concetto di spazio, e relazionarsi con l'opera di Hegel del 1801, la *Dissertatio de orbitis planetarum*. L'interesse si sposterà poi sulle modalità con cui il sistema di Hegel venne tracciato per la prima volta a Jena, tra 1803-1805, prima della rottura con Schelling e della "crisi fenomenologica del sistema". Il climax di tale riconoscimento è forse da identificare nell'esposizione di Hegel del 1804-1805, nella quale egli corrobora la teoria dell'idealità – o astrazione – dello spazio e del tempo come forme separate, ovvero considerate *per se*. La realtà dello spazio-tempo si profila come il *divenire* del tempo nello spazio e il *divenire* dello spazio nel tempo, e la "reale unione" dei due è "la reale infinità dell'etere", della materia assoluta, che egli definisce *movimento*.

KEYWORDS: Hegel; Jena Lectures; Philosophy of Nature; Space; Space-Time

1. Starting from the closing decades of the 20th century, the field of *Hegel-Forschung* has witnessed the emergence of a new approach to the philosophy of nature, in the context of a renewed appreciation of the value of the systematic form. The Hegelian system is no longer perceived – to borrow an image Croce was fond of – as a series of gates enclosing dialectic as the logic of life and history, but rather as the form expressing the very movement of the "absolute idea": as the various "Seinsbereichen" in which the same underlying structure – the logical element destined to present itself through a panoply of "figures" – unfolds in different, multifarious ways. Thus *Naturphilosophie* too testifies to the power philosophical reflection has to explore the ontic and discover the immanent logic within it, "the 'pure network' of universal thought determinations within which we are bound to include all experience and knowledge of nature".[1] The systematic and encyclopaedic form corresponds to the very idea of philosophy; it is not only of epistemological significance, but also of ontological import, since science – which is organically exposed in the system – is the science of "essence" (*Wesen*).

[1] Verra 2002, 12.

From § 10 of the *Philosophical Encyclopaedia*, which Hegel composed in Nürnberg (from 1808), in the context of his work as a *Gymnasium* teacher, it clearly emerges that "the three main parts" in which "science as a whole" may be divided – "logic", the "science of nature" and the "science of the spirit" – reflect three modes of being of the "essence", namely: "the logical element" (or "pure concept" and "abstract idea"), which is the "eternally simple essence [considered] in itself"; "nature", which is "this essence externalised" (or "the reality of the idea" in the form of "exterior being-there"); and "the spirit", which is the "return of the essence within itself from its externalisation" (or "the reality of the idea" in the form of "self-consciousness").[2] Yet already in the letter Hegel addressed to Schelling on 2 November 1800, when he was about to "venture" into "the literary uproar in Jena", he stated the need to give a well planned and systematic form to the "ideal of his youthful days".[3] In doing so, the philosopher was assimilating scientificity to systematicity, in line with a trend in the culture of his age, which looked to the ancient astronomical model of the order of the universe, as well as to the more recent biological model of living organisms. Already Kant had regarded systematicity as a defining feature of scientificity, which is to say rational enquiry:

> The systematic unity – we read in the *Critique of Pure Reason* – is what first of all forms the common cognition into science, that is, from a mere aggregate of it forms a system […]. I understand by a system the unity of diverse cognitions under an idea. This is the reason-conception of the form of a whole […]. The whole is therefore membered (*articulatio*) and not heaped together (*coacervatio*); it may increase, certainly, internally (*per intus susceptionem*), but not externally (*per appositionem*), as an animal body, whose growth adds no member, but without change of proportion, renders each of its member stronger and more fit for its end.[4]

Hegel already explicitly noted this need for systematicity and cohesiveness at the beginning of his Jena period, in his *Differenzschrift*.

[2] Hegel 1970a, 10.
[3] Hegel 1952, 59-60.
[4] Kant 1983, 695-96 (Kant 1838, 624-625).

Here he argues that because the relation of the limited to the absolute is manifold "philosophizing must aim to posit this manifold as internally connected, and there necessarily arises the need to produce *a totality of knowledge, a system of science*".[5] The system is established neither through an analytical method, nor through a synthetical one; rather, it is founded on the "development of reason itself"; it is a "self-production of reason", in which "the Absolute shaps itself into an objective totality, which is a whole in itself held fast and complete, […] an organisation of propositions and intuitions".[6]

Reflection remains the "tool" of philosophy, as the faculty of limitation and determination from which the wealth and multiplicity of knowledge and reality spring; yet, as *speculation*, reflection transcends itself, enters "in relation with the Absolute" and turns into "reason", destroying itself, its own work, its own rigid determinations and limitations. In such a way, thought becomes the thought of life: from the "night of mere reflection" there emerges "the noon of life".[7] According to this perspective, in his *Differenzschrift* Hegel draws a comparison between Fichte's system and that of Schelling.

The principle behind Fichte's system is certainly "the authentic principle of speculation" – "pure thinking of itself, pure selfconsciousness, Ego=Ego. I am". Yet this principle is not expressed or fully revealed in the system, where "the Subject-Object reveals itself a subjective Subject-Object" that is always confronted with the non-mediated, non-unified "objective Subject-Object"[8]: "the essence of the Ego and its positing do not coincide: *the Ego does not become objective to itself* (*sich*)".[9] Unification, therefore, is only conceived in practical terms, as the object of a need, of a "practical postulate", an infinite "having to

[5] Hegel 1970b, 46.
[6] *Ibid.*
[7] *Ibid.*, 35.
[8] *Ibid.*, 11-12.
[9] *Ibid.*, 56.

be". This reveals the limits of Fichte's thought, where "the result of the system does not lead back to its starting point".[10]

By contrast, "the principle of identity is the absolute principle of the *whole* system of Schelling. Philosophy and system coincide: identity is not lost in the parts, and much less in the result".[11] The "philosophy of nature" and "transcendental philosophy" are the two "sciences of the Absolute". In them, "in the necessary forms of its existence one and the same Absolute is set forth", the Subject-Object as both objective Subject-Object (nature) and subjective Subject-Object (intelligence or the spirit).[12] The "point of indifference" towards which the philosophy of nature and the philosophy of the spirit tend in their construction of the Absolute as both objective and subjective totality, as nature and spirit, is the intuition of the Absolute as that "original identity"[13] which – through its eternal self-manifestation – becomes other than itself and is known in its being-other.

2. Through these preliminary considerations on "contemporary philosophising" and his comparison between the systems of Fichte and Schelling, Hegel developed his first outline of a system. This included an introduction to the system based on the movement leading from the point of view of the intellect and of reflection to that of speculation. Driven by the "need of philosophy", which tends to overcome division, the logic of the intellect overcomes its own rigid determinations and fixed oppositions by relating the limited and finite to the Absolute. This paves the way for the construction of a "system of science", which alone is capable of ensuring the knowledge and exposition of the Absolute. For the being of the Absolute is to be found in its manifestation, which is to say in its multiple expressions and the forms of knowledge pertaining to them: "the Absolute must posit itself […] within

[10] *Ibid.*, 68.
[11] *Ibid.*, 94.
[12] *Ibid.*, 101.
[13] *Ibid.*, 112. See Marcuse 1975, 55-57. On the connection between the concept of "original identity" and that of "life", see 46-48.

manifestation, i.e. not destroy it, but establish it as an identity". [14] After a first introductory part (logic), the system is divided into a "theoretical part", or "philosophy of nature", and a "practical part", or "philosophy of intelligence" or of the "spirit". It then ends by reverting to its beginning, with the "polarity" of the intuition of the Absolute, which "is found objectively (art and religion)" or "takes shape" (speculation). Both sciences, that of nature and that of the spirit, expose the Absolute: the former as objective Subject-Object, the latter as subjective Subject-Object. For each of these two forms of manifestation of the Absolute, they trace the development "from the lower powers to […] the totality". Drawing upon a Spinozan principle, Hegel therefore establishes a correspondence between the two sciences, as between spirit and nature: "the order and connection of ideas (i.e. of the subjective) is the same as the order and connection of things (i.e. of the objective)".[15]

As concerns *Naturphilosophie* in particular, what we have here is a dialectic knowledge of nature that grasps its profound dynamism through a thought that rejects the rigidity and fixity of intellectual concepts, along with all quantitative approaches to natural phenomena, and instead grasps its fluidity: nature thus shows itself through its hidden rationality by manifesting itself as life. This entails a transcending of the empirical and experimental method of the science of nature[16] and the setting of the latter against the backdrop of a philosophy founded on the "intellectual intuition"[17] of the close identity and unity between *mens* (the spirit) and nature, reason and reality, where the distinction between the

[14] Hegel 1970b., 48.

[15] *Ibid.*, 106.

[16] The distancing of Hegel's philosophy of nature from the method of modern science – as it had taken shape starting from Galileo Galilei – is founded upon the very conception of philosophy as speculation and hence – as Nicolao Merker has aptly noted in *Le origini della logica hegeliana (Hegel a Jena)* – upon the "idealistic way of conceiving the objectivity or reality of nature as an (objectified) alienation of the Idea and hence the (empirical) unity of the material as a direct emanation of the (speculative) unity of the Idea" (Merker 1961, 132-133).

[17] Schelling 2006, 106.

two stems from the original duplication of the original whole, which is to say the Absolute.[18]

Hegel explicitly refers to intuition, without which it is impossible to overcome division and the endless loop in which reflection – the knowledge of the intellect – gets caught, in one of the fragments of the *Nachlass* for the lecture series he held in 1801-02 on the *Introductio in Philosophiam* ["*Die Idee des absoluten Wesen*" (1a-2b)]. Here, in a polemical engagement with critical philosophy, he identifies "a firm and clear intuition" of the idea of the Absolute, to be set forth in the system of philosophy, as "the primary condition for philosophising" and its starting point. The articulation of the latter must correspond to the very movement of the "absolute essence", which "defines in the idea, so to speak, the image of itself, and is itself realized in nature [and] takes itself up as spirit, reverting to itself and acquiring self-knowledge". [19]

According to the system plan presented in *Die Idee des absoluten Wesens*, logic and metaphysics, which is to say the "science of the idea in itself" (i.e. not yet as "universe") is to be followed by "the science of the reality of the idea", which in turn will differentiate itself into the philosophy of nature and that of the spirit. The philosophy of nature will lend expression to "the real body of the idea" (the "universe") as the "system of the heavens" and the system of the "earth". Within the latter, the reality of the idea presents itself as "life" in an "organic" form, the "concept" of which includes the "ideal moments" of both the "mechanical" and the "chemical" element, and finds expression "in the mineral system of the earth, the plant one and the animal one". Taking the form of animal life, however, the idea of the organic "will break away from nature", from being-other, from externality, and "posits itself as

[18] Merker remarks: "According to Hegel the non-rigidity or dialectical quality of thought is only assured when this thought is the thought of a Whole (Idea) that divides itself into reason and nature, and hence a thought which has awareness of this division and clings to it as a contradiction within the very context of the Idea" (Merker 1961, 134 and n. 126). In doing so, Hegel does not take account of the non-rigid and dialectic quality modern science acquires through the relation between hypotheses and their experimental testing.

[19] Hegel 1998a, 264, 262.

spirit". It is significant that in the context of the physics of the heavenly bodies, the solar system, which Hegel describes as "the most sublime and purest expression of reason", is regarded as "a living being" (*Lebewesen*, or *animal* in the Latin text).[20] A clear allusion is being made here to the philosophy of nature expounded in Plato's *Timaeus*. Hegel proves to be familiar with this dialogue and quotes it at the end of his *Dissertatio*, in relation to "Pythagorean numbers".[21] In particular, one is reminded here of that passage from the *Timaeus* reproduced by Hegel in his *Lectures on the History of Philosophy*, in which Plato states that:

> the creator, reflecting on the things which are by nature visible, found that no unintelligent creature taken as a whole was fairer than the intelligent taken as a whole; and that intelligence could not be present in anything which was devoid of soul. For which reason, when he was framing the universe, he put intelligence in soul, and soul in body, that he might be the creator of a work which was by nature fairest and best. Wherefore, using the language of probability, we may say that the world became a living creature truly endowed with soul and intelligence by the providence of God.[22]

Equally detectable is an implicit reference to Aristotle's concept of nature, which Hegel – as argued in his *Lectures on the History of Philosophy* – considers superior to the one dominant in modern thought, precisely because it "understood nature as *life*, as unity which has its end within itself and unity with itself".[23] While thinkers, and especially modern thinkers, usually place nature within the category of necessity, Aristotle focuses his attention on "immanent finality", regarding "necessity" as an "external condition". "Nature – Hegel states when discussing Aristotle – means precisely that a thing will become what was already within it from the beginning: it is this immanent universality and finality that are accomplished".[24]

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[20] Hegel 1998b, 237. See also Illetterati 1995, 105.

[21] Hegel 1979, 174

[22] *Tim.* 30b-c; cf. 30d; Hegel 1979, 230-231.

[23] Hegel 1979, 174.

[24] *Ibid.*, 176. Here Hegel quotes *Phys.* B, 8, 199b: "But the person who asserts this entirely does away with 'nature' and what exists 'by nature'. For those things are natural which, by a continuous movement originated from an internal principle, arrive at some

The principle of the vitality and dynamism of nature also underlies the idea of the system of heavenly bodies illustrated in the *Dissertatio*. The opposition between the "utmost density" of bodies and the "utmost rarefaction" of ether – and hence the "separation of bodies" – is overcome through the "primitive identity of nature", ensuring the cohesion of the system and the mutual independence of heavenly bodies in the space they cover by rotating on their orbit: "nature – Hegel writes – does not want the system of heavenly bodies to coagulate into a single mass, nor that it fall into that sad state of *natura naturata*, there to share the fate of bodies, but that it be a living expression of reason and its likeness".[25]

This is enough to give an idea of the anti-mechanistic quality of Hegel's philosophy of nature and of what was destined to become the guiding thread in his treatment of the subject, as already foreshadowed in his *Science of Logic*, namely the progressive movement from externality to internality, the progressive rising from the objectivity of nature to the subjectivity of the spirit, and hence the progressive passage from mechanism to life as the most direct manifestation of the idea.

> Nature – Hegel writes in the annotation to § 193 of the *Encyclopaedia* (1817) – is divine *in itself*, in the idea, but in the specific mode by which it is nature it is suspended. As it is, the being of nature does not correspond to its concept […] The highest level to which nature drives its existence is *life*, but as only a natural idea this is at the mercy of the unreason of externality.

In § 195 Hegel further stresses the idea that nature in itself is "a living whole", in the sense that it constitutes the movement by which the idea posits itself

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completion: the same completion is not reached from every principle; nor any chance completion, but always the tendency in each is towards the same end, if there is no impediment."

[25] Hegel (1998b), 251: "illud corporum coelestium systema non in unam massam coagulari, neque in tristem naturae naturatae statum et corporum sortem decidere sed rationis vivam expressionem suique immaginem esse voluit natura". Cf. Negri 1984, XLVIII-XLIX. For a comment on the *Dissertatio* see Neuser 1986 and Negri 1984.

> as that which it is *in itself*; or, what is the same thing, it goes *into itself* out of that immediacy and externality which is *death*, in order to exist as a *living being*; yet further, it suspends this determinacy of the idea, in which it is only life, and becomes spirit, which is its truth.[26]

It is within the framework of this general speculative perspective that we must broach the issue of the concept of space, by starting from an engagement with the 1801 *Dissertatio de orbitis planetarum* and then focusing on Hegel's first outlines his system, drawn at Jena, before the break with Schelling and the "phenomenological crisis of the system".

3. Nowadays, Hegel's interest in the study of nature is usually traced back to his Bern period, when he was serving as a tutor for the von Steiger family: their country house in Tschugg boasted a library stacked with geometry and physics books pertaining to Newtonianism and Cartesian rationalism.[27] On the other hand, with regard to the *Habilitationschrift de orbitis planetarum*, Rosenkranz informs us that Hegel "had already long come up with the topic: a research on the conformity to the laws on the mutual distances among planets"; he adds: "even before then, in his papers we find extracts from the mechanical and astronomical writings of Kant, Kepler and Newton, among others".[28] In his *Dissertatio*, as already observed by Rosenkranz, Hegel acknowledges astronomy's debt towards Newton, precisely "on account of what it borrows from mathematics"; yet, at the same time, he argues that "it is necessary […] to distinguish between mathematical relations and the physical expression he [i.e. Newton] gave them".[29] One must not confuse the quantities that are the focus of mathematics, or the lines employed in geometry, with the forces or causes that are the object of physics. For instance – Hegel observes – "it is clear that the geometrical need for a tangent line in no way implies the need for a tangential physical force ".[30]

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[26] Hegel 1817, § 193 Anm., 127-128, § 195, 130; cf. Hegel 1970c, § 248 Anm., 27-28. See too Verra 2002, 21.

[27] See Ferrini 1996, 82.

[28] Rosenkranz 1988, 151

[29] Hegel 1998b, 246.

[30] *Ibid.*, 240.

Hegel is no less critical of the possibility of demonstrating the forces of attraction or repulsion, or the centripetal force and the centrifugal, on the basis of the empiricist philosophy dominant in British culture which Newton and the Newtonians referred to. For this would mean attempting to define the whole starting from its parts, whereas the "genuine method" of geometry starts from the whole in order to deduce its parts:

> it does not seek to construct the circle or any other curve from lines intersecting at a right angle or any other way; on the contrary, it takes as given the circle or any curve under consideration and from it establishes the resulting relations of the rest of the line.[31]

What empiricist philosophy fails to grasp is the principle of genuine philosophy, which – by drawing upon the conception of the Absolute as "identity of identity and non-identity" expounded in *Differenz*[32] – Hegel enunciates in a later passage of the *Dissertatio*: "the principle of identity that posits difference within itself ".[33] This principle cannot be attained by "mechanical science, since it remains alien to the life of nature", which is to say to nature as the objectification of the idea, as the hidden spirit that contains within itself a movement leading back to the idea as self-conscious spirit. As Hegel was to argue in the *Science of Logic*, with the empiricism and experimentalism of Newton and "the heirs of Bacon" as his polemical target, it is certainly

> a great service to ascertain the empirical numbers of nature, e.g., the distances of the planets from one another; but it is an infinitely greater service when the empirical quanta are made to disappear and they are raised into a universal form of determinations of quantity,

so as to turn them into "moments of a law or of measure." Here Hegel acknowledged Galileo and Kepler's great merit with regard to the fall of

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[31] *Ibid.*, 241-242.

[32] Hegel 1970b, 96: "Das Absolute selbst aber ist darum die Identität der Identität und der Nichtidentität; Entgegensetzen und Einssein ist zugleich in ihm."

[33] Hegel 1998b, 247. On the criticism of Newton in the *Dissertatio,* see Marchetto 2008, 48-49.

bodies and the motion of heavenly bodies respectively. The two scientists' merit lies in the fact that they proved capable – unlike Newton, that is – of demonstrating "the laws they [had] discovered" by showing "the whole compass of the particulars of observation to correspond to them".[34] And yet, philosophy requires even more, namely that the quantitative determinations entailed by the various laws be deduced from the concepts or qualities of the terms which are set in mutual relation, in this case the concepts of space and time.

Within the framework of mechanical science, matter is conceived as "inert matter", one of the properties of which is gravity, and matter in all of its variety is explained through external causes. Hence Newton's wish to introduce the idea of centrifugal force in order interpret the orbits of planets within the solar system, and his attempt to trace everything back to God. Indeed, in his *Principia* Newton argues: "This most beautiful system of the sun, planets, and comets, could only proceed from the counsel and dominion of an intelligent and powerful Being. [...]. This Being governs all things, not as the soul of the world, but as Lord over all; and on account of his dominion he is wont to be called Lord God".[35] Now, Hegel observes that if this is the case, if everything may be traced back to God, then we should bear in mind that "God's action is not external or mechanical, nor is it arbitrary or random".[36] The various forces, therefore, are to be conceived of as immanent in nature, and we are to acknowledge the latter's rationality and inner laws.

According to genuine philosophy, matter is always one and the same, just as gravity; it is an original whole which in its real differentiation divides itself into two poles, forming a "line of cohesion" between them, and in its ideal differentiation divides itself into the "factors" or "powers" of space and time. As has already been mentioned, this conjunction of unity and duality in the understanding of

[34] Hegel 1969, 407.

[35] Newton 1846, 504. Newton assumes space and time to be absolute, unchangeable, eternal, infinite and independent of all material objects.

[36] Hegel 1998b, 247.

totality, of the whole, clearly echoes Schelling's thought, [37]and further reinforces the Hegelian conception of the whole as an identity which encloses differences within itself. Subsumed within the unity of a single term that is either gravity or matter – "gravity constitutes matter such that matter is objective gravity" – an absolute mutual identity emerges between space and time which cannot vary, which can neither grow nor diminish. By contrast, the relationship between time and space is marked by differences or quantitative relations insofar as they are regarded as the forms or factors (or "powers", to use Schelling's expression) in which gravity exists ("gravity must be said to be always one and the same, and existing in the form of two factors: space and time"). In such a way, time and space find themselves in a quantitative relation whereby "one increases when the other decreases".[38] For this very reason, Hegel praises the talent of Kepler, who never attributed "any increase or decrease to the force of gravity", but merely "posited a relation between the two factors that can genuinely increase or diminish".[39] In this passage, Hegel also draws a distinction between space as such, as an extension devoid of motion, which is to say as "space at rest", and space "generated by motion in time". In the former sense, space appears to be an objective, abstract dimension, just as space and matter are connected to an abstract notion of the objective through the definition of matter as "filled space", pure formless matter devoid of any principle of motion. Actually, a principle of motion does emerge, namely in the very act by which matter fills space, since matter entails a capacity to resist all other matter pressing to occupy its place. Yet, Hegel observes, the notion of resistance "is a purely negative and empty notion": for once space is filled, there is no longer any principle of change – the latter must be

[37] Schelling argued that "neither from duality alone nor from unity alone can one understand how things are born - one can only understand it from the necessary union of one thing in the other in their mutual Bond" (Schelling 1809, XXVI).

[38] Hegel 1998b, 245-246. "Gravitas una eademque dicenda est, quae in forma duorum factorum, spatii et temporis, sive etiam spatii, ut ita dicam, quiescentis et spatii motu in tempore geniti existit: omnis autem quantitativa differentia et ratio ad hos factores pertinet, quorum altero diminuto alter augetur".

[39] *Ibid.*

sought for elsewhere. In order to switch from a purely ideal and mathematical notion of matter as objectivity to the notion of matter as reality, as physical matter, it is necessary to introduce the form of subjectivity, which Hegel terms *mens*. This is a principle of negation of inert matter which, when applied to space, to space at rest, as pure extension, defines itself as the point. As Hegel himself suggests soon afterwards, in relation to space the principle of subjectivity or *mens* may actually be seen as the other factor or power of matter, which is to say time, whose action upon space engenders the point.[40]

Starting from their original identity, which is matter, objective gravity, space and time distinguish themselves as separate factors or powers, only to always reassert their mutual identity in the end. This is the origin of change and motion: in physical terms, of the contraction and expansion of matter. One might refer here to Schelling's conception of the relation between space and time. In space we first find the dispersal of the Bond – of the Absolute – in multiplicity, in the exteriority of things one outside of the other; in time we instead find the contraction of multiplicity into the unity and identity of an instant, which negates the dispersion and multiplicity of space and engenders change and the motion re-establishing the unity and identity of the Absolute.[41] Hegel also believes that it is the power of time, *mens*, which creates motion from the stillness of the point, its absolute exteriority; *mens*, time, which is self-production, engenders the line by entering into relation with space, with the point, yet still in a subjective and ideal form. In order to find expression, it must once again posit itself in space, in extension; together, the line and extension form the plane: "The line, therefore, – Hegel writes – is the *mens* producing itself, yet in its subjective and self-enclosed form: it then acquires its perfect and natural

[40] Cf. *ibid*., 249. The relation between time and space is presented from a different angle by Aristotle. In a passage from Book IV of *Physics,* the philosopher points to "a correspondence" between the continuous and discrete structure of time and that of the point: "Time, then, also is both made continuous by the 'now' and divided at it", and likewise "the point also both connects and terminates the length — it is the beginning of one and the end of another."(*Phys.* Δ, 11, 220a).

[41] Cf. Schelling 1809, XXVII-XXVIII.

form by passing into the opposite, which is to say space, and constituting the plane".[42]

4. As we have seen, in *Differenz* nature is presented as the objective Subject-Object. Precisely for this reason, in nature we also find the moment or aspect of subjectivity. What this means, in the language of the *Dissertatio*, is that matter is not just extension but also thought, *mens*, i.e. it is not simply space but also time. From this point of view, in accordance with the place of nature within the system, space at rest, as mere extension, expresses the most extreme side of nature as exteriority, as the idea's becoming other than itself, or more generally as objectivity and the opposite pole compared to the spirit. Time, by contrast, as the negation of space at rest, of mere extension, prior to reverting in turn to the spatiality of the point-instant, emerges as the power or factor of matter that reveals its subjective aspect – as the factor and power of motion and change.

As Hegel argued a few years later, in a note to fragment 1 of his *Naturphilosophie* from 1803-04, "nature is in space; the whole of past history remains present; the spirit is in time: it has destroyed the past, its process of formation".[43]

The notice for this lecture course announced the exposition of a "philosophiae speculativae systema, complectens a) logicam et metaphysicam sive Idealismum transcendentalem, b) philosophiam naturae, c) philosophiam mentis".[44]

In Hegel's *Nachlass* a sizeable group of fragments has been preserved from the manuscripts for this course, on the philosophy of nature and the philosophy of the spirit. I am here referring to fragments 3 and 4. In fragment 3, Hegel describes the earth as embodying the opposition between matter as an inert mass and motion, which constitutes "the first simple potency of the earth, which is to say

[42] Hegel 1998b, 249.

[43] Hegel 1975, 5.

[44] On the notices for Hegel's lectures at Jena, see Kimmerle 1967, 53-56. On the philosophy of nature at Jena, see Neuser 2004.

mechanism".[45] In fragment 4 he adds that mechanism "immediately arises with what has brought about the passage from the heavenly system to the terrestrial system, i.e. with the reduction of motion through rest, and the falling of the two terms (motion and rest) one outside of the other". Actually, in separating, these continue "*to relate to one another*, since their separation derives from their original being one", for one term passes into the other as its opposite and this means that "they – motion and rest – are simply in relation to one another" . This original "being one" of motion and rest, however, is at first an "*empty, invisible* being one": it is the earth as "*this wholly indeterminate being one*" . Mechanism is precisely the mode of being of nature (the earth) in which the unity of motion and rest comes about, "the establishment of what *constitutes the unity of inert mass and motion.*"[46] We here find a reference to space and time. Motion extends to inert mass, engendering real matter, whose "ideal moments are time and space" – whereas its "real, independent moments are bodies"[47]. Space emerges here as the positive unity of mass, i.e. of inert matter, which nonetheless has within itself the memory – so to speak – of its own original unity with motion. This lends matter an inner animation in the form of the negative unity of the "absolute point": "mass – Hegel writes – is absolute unity equal to itself, in which negative unity subsists, the *absolute point* "[48]. The insertion of the "absolute point", identified in the *Dissertatio* as the application of time to space, generates a multiplicity of points and limits, meaning that the mass, space/matter, divides itself into countless indivisible parts, or atoms. An infinite quantity (*Menge*) of quanta (*Quanti*) thereby emerges, which is to say of parts stemming from the negation of the universal mass. Each of them, as itself mass, contains its own centre (*Mittelpunkt*) within itself.[49] While mutually distinct, quanta are all essentially the same: "one is a quantum as much another". In their self-equality and non-differentiation, they are

[45] Hegel 1975, 11.
[46] *Ibid.*, 19-20 (fragm. 4).
[47] *Ibid.*, 11-12 (fragm. 3).
[48] *Ibid.,* 12 (fragm. 3).
[49] *Ibid.*, 24-25(fragm. 4).

inert, yet this inertia affects their very mutual independence and distinction; as the removal of their independence, it takes the form of gravity, which presents itself as the fall of a body with a rectilinear motion that finds its beginning and end, its starting point and point of arrival, in its opposite, namely rest.

5. The notice for Hegel's lectures for the winter semester of 1804/05 reflects a significant change in the development of his system, which is no longer generally described as "philosophiae speculativae systema", but rather as "tota philosophiae scientia", articulated into "philosophia speculativa (logica et metaphysica), naturae et mentis." This lecture plan was again adopted in the summer semester of 1805, when Hegel also announced he was just about to publish a book presenting his system (although the same announcement had already been made in the 1802 and 1803 notices). Manuscript 9 of Hegel's *Nachlass*, on *Logik, Metaphysik und Naturphilosophie*, may indeed be associated with these two courses from the 1804/05 winter semester and 1805 summer semester, as part of the philosopher's second plan for the presentation of his system.[50] At the end of the section devoted to metaphysics, the spirit is said to recognise itself in the idea of absolute existence; for this very reason, however, it does not yet recognise itself as absolute spirit. It has become such for us, in itself, but not yet for itself. The absolute spirit must manifest its idea, it must manifest itself as absolute spirit, possessing self-awareness. The first moment in this realisation of the absolute spirit is nature, which is the absolute spirit itself grasping itself as objectivity. According to Hegel, this first self-positing of the absolute spirit is "*nature*, the simple absolute spirit referring itself to itself; it is *ether*, absolute *matter* […], living nature".[51]

Hence the philosophy of nature distinguishes itself from the common way of envisaging nature, for it presents the latter as consisting

[50] This manuscript may be found in Bd. 7 of the critical edition of the Hegel's *Gesammelte Werke* published by the Reinisch-Westfälische Akademie der Wissenschaften and the Deutsche Forschungsgemeinschaft.

[51] Hegel 1971, 177-178.

"of wholes and parts in different quantities, and in a causal relation, as well as a quantity of 'these' [single, determined things]".[52] This way in which reality appears and presents itself is an abstract and purely ideal one, stemming from reflection and the intellect. The true appearance and reality of nature, by contrast, is its appearance as spirit, the reality of the spirit. This appearance of nature, this reality of the spirit, is internal to nature itself, it is part of its very essence, and not something added to it by the knower from the outside: "its essence is within itself, its reality is that of being a *living* nature, a self-reflecting infinity, of knowing, and its matter, which is to say its absolute self-equality, is life".[53] What comes to the fore here, in the introductory pages of *Naturphilosophie*, is the characterisation of nature as life, as "hidden spirit", as the other for the spirit whose process consists in becoming other than itself, as the other of the other, i.e. the acquisition of self-awareness on the part of the spirit: nature in its totality is "the becoming of the existence of the spirit as Ego".[54]

The spiritual substance first finds objective expression as ether or absolute, infinite and indeterminate matter. In its absolute restlessness, this ether, or absolute matter, is like the spirit, which is equal to itself in its being other than itself: it is the capacity to take up any form – absolute plasticity and elasticity.[55] As Giordano Bruno argued, "ether […] knows no specific quality, but receives all those lent to it by nearby bodies."[56] According to Henry More - as Koyré writes - ether is

> a substance incorporeal, but without Sense and Animadversion, pervading the whole Matter of the Universe, and exercising a plastic power therein, according to the sundry predispositions and occasions of the parts it works upon, raising such Phenomena in the world, by directing the parts of the matter and their motion as cannot be resolved into mere mechanical powers.[57]

[52] *Ibid.,* 180.
[53] *Ibid.*, 180-181.
[54] *Ibid.*, 186.
[55] *Ibid.*, 188.
[56] Bruno 1972a, 529.
[57] Koyré 1970, 104-105.

Ether, as the highest part of the sky, as light expanding in an absolute way, is absolutely infinite. Its moments are only "ideal moments, which in their mutual opposition refer to one another"; they "are absolutely restless in this relation" and remove one another in their separateness. These moments of the ether, "which immediately discloses itself as genuinely infinite", are space and time. This "infiniteness is motion"; or rather: "as totality, it is a system of spheres and motions [heavenly bodies]"[58]. One is reminded here of Bruno's definition: "there is one sky, an immense ethereal region, where these magnificent lights keep their proper distances in order to participate in eternal life".[59] Space and time, then, present themselves as ideal moments of the ether, which is to say of nature as directly posited by the spirit as its first manifestation. These are ideal moments because the reality of the ether is both its self-equality, its sameness to itself, and its infiniteness, its infinite motion. Its self-equality and being at rest represent the moment of space, considered separately; yet insofar as this manifests itself, insofar as it objectively fulfils its being in itself, it represents the opposite of self-equality and being at rest: it is the moment of infinity and motion (from the equal to its opposite, the unequal and different) – hence, time. Just as infinite as space, time, as an ideal moment, in becoming other than itself spills into its opposite, into self-equality and rest, thus becoming space. Ether, as the whole, possesses this motion within itself, so that from space it becomes time and from time space, since the whole is the unity of the self-equal and the different[60] – the ontological or speculative principle on which the whole Hegelian system is founded. Here too it is worth bearing in mind the influence of Schelling and of his crucial idea that the relation between space and time in nature is based on the mutual negation of the separate identity of each. On the other hand, in the fact that according to Hegel ether immediately posits itself as space we find the same idea of a close interrelation between ether and space affirmed

[58] Hegel 1971,192.
[59] Bruno 1972b, 34.
[60] Hegel 1971, 193.

by Bruno and Kepler, according to whom all space is filled with ether. Even Newton believed that ether fills space, at least within the solar system.[61] Yet this notion is here turned on its head, so to speak, since according to Hegel it is ether, as the totality of all moments, that constitutes the reality of space and time: "the reality of space and time […], as separate terms, is the expression of the totality of moments"; the "essence" of each of these remains their mutual "relation".[62] It is also worth recalling here what Hegel states when illustrating Plotinus' thought, namely that "space is the pure abstract continuity of the activity of light – not being active as such, however, but rather the form of its being uninterrupted";[63] for indeed space, as Hegel stresses once again, is the ideal – i.e. abstract and formal – moment of the absolute self-equality of the ether.[64]

6. Space as absolute space, by its very concept, is self-equality which has difference, the infinite, outside itself, and hence also the negative, limit, outside itself. Within absolute space, this limit, this counterpart to the infinite, or time, is the point: "Just as time moves outside itself and becomes space, so space must move into itself and remove itself through the point".[65]

The point introduces a limitation within the indeterminate continuity of space. This, however, does not make absolute space determined space, but rather introduces "the concept of a general dimension within it".[66] Yet, because of this indeterminate limitation, in the very act of positing itself in space, this dimension is likewise "removed" – not eliminated, but simultaneously negated and preserved. This means that "a second dimension in general" is placed "as a [determined] limiting which relates to the indeterminate limiting of space". This new dimension presents itself as "the first being- limited of

[61] Koyré 1970, 132-133.
[62] Hegel 1971, 193.
[63] Hegel 1979, 452.
[64] Hegel 1971, 192.
[65] *Ibid*., 197.
[66] *Ibid.,* 198.

space, as *surface*", which is "the relation between two dimensions"[67], "the union of the negative and space".[68] This means that the surface is the being-other or opposite of space, placed in relation to space itself, which therefore appears to be divided, yet not negated, but on the contrary reconfirmed in its indifference and universality:

> It, the surface, is indeed the limiting of space, yet it is not the free limit itself, like a negative, but rather the union of the negative and space, the synthesis of both. In other words, it is the opposite of space placed in relation to space itself, as the negation of space, so that this is only divided – there are two spaces, but in such a way that space is indifferent in this negation and remains equal to itself, and its negation is nothing at all.[69]

Within space, as self-equality, each form of determinateness becomes indifferent, and hence the negation of the being-other of space turns out to be a formal negation which remains internal to space. This negation of surface is the line, which is "the dimension of direction"; as "real dimension" it becomes "the expression of the dimension of space in general".[70] In its treatment of the dimensions of space, the text from 1804-05 alludes to a distinction that was more broadly formulated in the 1805-06 lecture course and taken up later on as well. This is the distinction, best illustrated in the presentation of the philosophy of nature provided in the *Enzyklopädie* of 1827-1830, between on the one hand a domain of the "distinctions" of space that has to do with its "indifference" and self-equality and which directly assumes dimensions according to their current meaning as height (or depth), length and width; and on the other a domain of distinctions that is essentially determined and qualitative, and stems from the concept itself. Within the former domain, dimensions are assumed according the current, common meaning they also possess in geometry, as height (or depth), width and

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[67] *Ibid.,* 199.
[68] *Ibid.*, 200.
[69] *Ibid.*
[70] *Ibid.,* 201.

length.[71] Within the second domain, a first dimension is provided by the "negation of space itself" as pure exteriority, and this negation is the point. A second dimension is given by the "line", "the spatial existence of the point". A third dimension, constituted by the negation of the negation, is provided by the surface, "which on the one hand is a determination compared to the line and the point", but on the other represents "the re-establishment of the spatial totality".[72] In his analysis of dimensions, in the text from 1805-06 Hegel refers both to the dimensions stemming from the concept itself – point, line, surface – and to those which in space only express "different directions": height, width and length. The latter correspond to internal determinations: front and rear, right and left, above and below[73]. In the text from 1804-05 Hegel draws attention to the fact that while the dimensions of space are the moments of the realisation of space, they might also be other than three ("the determination of number – Hegel writes – immediately comes about as an extrinsic determination, which has the form of contingency")[74]. Absolute space, moreover, tends to remove its own dimensions, to negate its own determinations, as surface and line; to negate its own limitations and rule out the multiplicity of determined spaces: in such a way it contracts into the point – "it is the point". As absolute space, space is a positive totality; as point, it is a negative totality. These two modes of totality, however, fall one outside of the

[71] The three-dimensionality of space is envisaged by Aristotle as a feature that place has in common with bodies, although place itself cannot be conceived as a body (*Phys.* Δ, 1, 209a). According to Aristotle, place is "the innermost motionless boundary of what contains" (*Phys.* Δ, 4, 212 a) or indeed "the limit […] in the limited" (*Phys.* Δ, 4, 212 b).

[72] Hegel 1970c, §§ 255, 256, 44-45. Taking his cue from Hegel, Dieter Wandschneider has developed his own philosophy of nature in relation to contemporary natural sciences. In particular, he has delineated an "interpretation of the three-dimensionality of space within the horizon of a theory of principles". With regard to Hegel's treatment of space, Wandschneider has emphasised that "Hegelian deduction […] interprets space as a concept within the elemen t of exteriority and traces the principle of three-dimensionality back to the affinity between the moments of this concept: singularity, particularity, and universality" (Wandschneider 1984, 226-227).

[73] Cf. Hegel 1976, 7-10.

[74] Hegel 1971, 201.

other, and hence must be placed in mutual relation through an intermediary, namely: the surface and line, which unite the absolute singularity of the point and the empty universality of absolute space. Yet, precisely because positive totality and negative totality, universality and singularity, self-equality and infinity are terms that fall one outside the other, space, in realising itself as self-equality, spills into its opposite, into the "simple infiniteness of time". The latter, in turn, when realising itself, had passed into its opposite, the self-equality of space. "Space – Hegel concludes – in its real realisation has passed into its opposite, into time, just as time has passed into space".[75] This text from 1804-05 confirms the theory of the ideality – or abstractness – of space and time considered in themselves, as separate, and of the reality of space-time as the *being* of time in space and the *being* of space in time. To be more precise: "time exists only insofar as it becomes space, and space only insofar as it becomes time, and vice versa, the one only insofar as it reverts to the other ".[76] The "real union" of the two is "the real infinity of the ether", of absolute matter, which is *motion*.[77]

7. As has been mentioned, Hegel's treatment of the concept of space in his course for the winter semester of 1805-06 coincided with a moment of crisis for his system. This was the first and only time in which Hegel made no provisions for lessons on logic and metaphysics: the only aspects of the "whole science of philosophy" he addressed were those pertaining to the philosophy of nature and the philosophy of the spirit, which he brought together under the title of *philosophia realis* (*Realphilosophie*). Hegel's presentation of the philosophy of nature and the philosophy of the spirit independently from any exposition of his system, his unwillingness to expound on logic and metaphysics, and finally the fact that he introduced a seminar on the history of philosophy may all be connected to the so-called "phenomenological crisis of the

[75] *Ibid.*, 203.
[76] *Ibid.*
[77] *Ibid.* Cf. *ibid.,* 204.

system"[78]. This was a stage of development of Hegel's thought in which, in conjunction with his attempt to distance himself from Schelling and to emphasise the "scientificity" of his own philosophy, the problem of "philosophical propaedeutics" emerged in all of its broadness and depth: the need for a science of the experience of knowledge capable of justifying and providing the foundations for the horizon of "absolute knowledge" within which Hegel sought to expound his system. These changes also influenced Hegel's philosophy of nature, first of all by leading to a greater stress upon the exteriority of nature, as first and most prominently attested by the exteriority of space: "The first or immediate determination of nature – Hegel writes in § 197 of his 1817 *Encyclopädie* – is the abstract universality of its being outside itself – its unmediated indifference, space." In the annotation to this paragraph, after recalling that according to Kant "space, like time, is a form of sensory intuition", Hegel stresses the correctness of Kant's determination of space as "a pure form, which is to say an *abstraction* – more precisely, that of immediate exteriority".[79]

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[78] This expression is used by Karl Rosenkranz to indicate the restless development of Hegel's thought, which by increasingly moving away from Schelling's philosophy of identity, came to establish the concept of self-awareness as the foundation of philosophy, ultimately leading to the *Phenomenology of the Spirit*. See Rosenkranz 1988, 201 ff.

[79] Hegel 1817, § 197 Anm., 131.

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