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PHENOMENOLOGY AND PHYSICS: APPROXIMATION OF HUSSLERL'S IDEAS TO EINSTEIN'S THEORY OF GENERAL RELATIVITY

Introduction

In the ordinary activities of our daily life, we find our actions of perception confronted by material things. To them — acts of perception — we attribute to them a "real" existence ownership in such a way that we submerge them and to transfuse, in a multiple and indefinite way, within the environment of analogous realities that unite to form a single world to which I, with my own body belong. In this sense, if we assume a skeptical attitude about what is "real" in the world, we will have doing a philosophical reflection. So that, for example, the "green" quality has existence because the sensation "green" associated with an object perceived by us. Which leads us to think that it does not make sense to link the sensation as a thing in itself to things existing materials in themselves, this leads us to think that the qualities of the senses have a subjective character.

Despite this reflection, it is advisable to point out that this subjectivity does not interest the exact sciences because they seek the objectivity. From this point of view, we find in the studies of Galileo Galilei the principle underlying the constructive mathematical method of our modern physics¹; in this way, and under this principle, the colors — for example "green" — are only vibrations in a medium, repudiating the subjective character while maintaining objectivity. However, within the field of philosophy, Kant's transcendental idealism marks a paradigm shift in relation to the above. Kant argues that not only the qualities of the senses have subjective character, but that space and time, founding concepts within physics, have no absolute significance; In other words, space and time are forms of our perception . This represents a revolution around the dichotomy between the conceptions of subjectivity and objectivity within the exact sciences because, being space and time forms of our perception, it is clear that our physical theories are supported under concepts that they show a subjective character rejecting the Galileano principle. In this way, and under this perspective, only the theory of relativity it very clear that the two essences space and time, are forms of intuition in Kantian terms, and do not take place in the world built by the mathematical physics conceived by Galileo².

From this principle, the colors are not vibrations in a medium, so are simply a series of values of mathematical functions of four independent parameters. These parameters correspond to the three dimensions of the space and the time, expressed as a general principle

¹ Cf. Husserl, E., *La Crisis de las ciencias europeas y la fenomenología transcendental*, trad.esp., Iribarne, J., Prometeo, Buenos Aires 2008, pp.65-79

² Cf. Weyl, H., *Space, Time and Matter*, trad. ing. Brose, H., Dover, Oxford 1921 (1918), p. 3

this means that the real world and each one of its constituents can only be, in husserlian terms, *intentional objects of acts of conscience*³.

In other words: the immediate data I receive are the *experiences of consciousness*⁴. This allows us to assert that the feeling of an object is present in a physically real way for me with whom that feeling relates. This is what Brentano calls *intentional object*⁵; for example, if you perceive an object I see this "book" my attention is directed to it. I "have" perceived, but only when I make this perception — a free act of reflection — something I "know" about it — and not just the "book" — it precisely to a second act: Intentional objects of acts of conscience⁶.

However, the intentional object is *immanent*⁷ and what is *immanent is absolute*⁸. Is exactly what it is in the way I have it, and I can reduce this, its *essence*, by the *acts of reflection*⁹. In other words, it is a real component of my experiences; contrary to what happens with the primary act of perception, where the object is *transcendental*¹⁰, it is in an experience of conscience but not a real component of it. On the other way, transcendental objects have only phenomenical existence; they are appearances that presented in multiple ways. None of these modes of appearance can pretend to present what it is perceived-for

³ “Para Husserl, hay que distinguir siempre entre el acto (cualquier tipo de acto, pero en particular un acto de conocimiento) y el objeto al que el acto se refiere, el objeto al que el acto se dirige o que el acto mienta. Sólo hay una identificación parcial entre el acto y el objeto cuando el objeto es él mismo un acto, cuando el objeto pertenece a la misma corriente de conciencia que el acto que se refiere a él. Pero en cualquier otro caso, la distinción es radical: el objeto no es parte del acto, no se halla contenido en el acto, ni siquiera cuando se habla de objeto de conocimiento o de objeto intencional. Ni siquiera, pues, cuando se ha hecho la reducción fenomenológica, y por lo tanto cuando no tiene ya sentido, o al menos no tiene ya ningún propósito científico, hablar de un objeto fuera de la relación intencional, fuera de su relación con una conciencia posible, ni siquiera en este caso es el objeto un ingrediente de la conciencia, sino, precisamente, su objeto. Pero, por otro lado, la relación intencional tampoco debe entenderse como si la conciencia estuviera relacionándose gracias a ella con una realidad de objetos independientes, existentes en sí. “Jamás es un objeto existente en sí un objeto tal que no le afecte para nada la conciencia y su yo”, dice Husserl en Ideas I (§ 47, p. 109). Los pasajes seleccionados se encargan de poner en claro que no hay objeto posible fuera del darse de dicho objeto a la conciencia, y que todo objeto es así un objeto constituido por nexos de actos de conciencia y, más concretamente, de actos de conocimiento. Esta constitución del objeto es la función última de la intencionalidad” (Quijano, A., *Diccionario Analítico de Conceptos Husserlianos*, op.cit., p.47); Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen*, op.cit., [73-74], p. 88; Cf. Weyl, H., *Space, Time and Matter*, op. cit., p.4

⁴ We refer to the object of the experience is to say, to the object of the sensible experience, because to know is the basis of the method of the empirical sciences. In other words, is the object of the "external" perception that Husserl identifies under "temporal object". Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen*, op.cit., p. 51

⁵ See the Investigation V in the Investigations logics, §§ 9 a 13. Cf. Husserl, E., *Investigaciones Lógicas*, trad. esp. Morente, M., Gaos, J., Alianza, Madrid 1982 (1929)

⁶ Cf. Weyl, H., *Space, Time and Matter*, op.cit., p.4

⁷ Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen*, op.cit., [33-35], p.46

⁸ Cfr. Husserl, E., *La Crisis de las ciencias europeas y la fenomenología transcendental*, op.cit., p.26

⁹ Cfr. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen*, op.cit., [23], p. 32

¹⁰ *Ibid.*, [35], p.45

example the book-as it is in itself. In any perception is involved the thesis of the reality of the object that appears in it; the latter is, in fact, a fixed and lasting element of the general thesis of the reality of the world¹¹. In synthesis, is very important understand the importance of the *data of consciousness* as a starting point in which we must situate ourselves if we are to understand the *absolute meaning*¹².

1. From subjective thinking to being objective: the Enigma of Knowledge in Husserl

What is to know? Is it possible to know? How do we know? Such questions raise the problem of knowledge, the possibility of knowing. To know is to reach what is the same *things themselves*¹³. This is the starting point of Husserl to build a gnoseologic critique that allows identifying the epistemic requirements and thereby solving the enigma of knowledge¹⁴. However, any criticism of knowledge must overcome two problems: *transcendence* and *correspondence*. The phenomenological version of correspondence is correlation between *act and object*¹⁵, and Husserl resolves the problem of *transcendence*¹⁶ through *intentionality*¹⁷, (the knowledge of internal objects instead of the external ones). Under this perspective, not every cognitive act drags the problem of transcendence because, in the direct apprehension of its own acts, the conscience does not go beyond itself showing thus the

¹¹ Cfr. Weyl, H., *Space, Time and Matter*, *op.cit.*, p.4

¹² Cfr. Blanco, J.E., “3 lecciones sobre Husserl”, en: *Revista Universidad Pontificia Bolivariana*, 1940, vol. V, nro. 16-17, Bogotá, pp.20

¹³ “Conocer el mundo, “filosóficamente”, con seriedad científica, sólo puede tener sentido y posibilidad si se ha de descubrir un método para construir el mundo y la infinitud de sus causalidades, sistemáticamente, en cierta medida de antemano, a partir del escaso haber, en cada caso, de experiencia directa y sólo para establecer relativamente, y verificar obligatoriamente esta construcción a pesar de la infinitud.” (Husserl, E., *La Crisis de las ciencias europeas y la fenomenología trascendental*, *op.cit.*, p.74) ; además para una distinción entre la fenomenología como ciencia (o conjunto de disciplinas científicas) y la fenomenología como un método véase Quijano, A., *Diccionario Analítico de Conceptos Husserlianos*, *op.cit.*, p. 47

¹⁴ Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen*, *op.cit.*, [19], p.28

¹⁵ Cf. Husserl, E., *Investigaciones Lógicas*, *op.cit.*, p.176

¹⁶ Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen*, *op.cit.*, [36], p.47

¹⁷ En la esencia de la vivencia misma entra no sólo el ser conciencia, sino también de qué lo es y en qué sentido preciso o impreciso lo es” (Husserl, E., *Ideas I*, trad.ing. Boyce, W.R., Routledge Classics, New York 2012, [36], p. 82). Al referirse a un objeto se refiere a la propiedad esencial de ciertas vivencias. Esta referencia es lo que Husserl llama intencionalidad, llamando a tales vivencias intencionales.

*absolute donation of the conscience*¹⁸, which leads us to *transcendental subjectivity*¹⁹ to which we have access by means of the *reduction*²⁰.

Under this consideration, the critique of Husserl's knowledge raises the correlation between *experience of knowledge, meaning and object*²¹, as the source of the most difficult problems in the possibility of knowing. This correlation leads to Husserl a reformulation of the doubt Cartesian — *Cogito ergo sum*— giving account of the process of the intellectual essence of the self for the generation of the self and for its resurgence in the consciousness as object, in other words: *Cogito to the Esse*²². In this way, with the *pure cogitation*²³ Husserl puts in maximum abstraction the being to achieve to put in the maximum abstraction of the knowledge, the *pure essence*. It is in this *essence, eidós*, where it made object of thought the pure cogitation and is here where the act of pure cogitation is to reach the *epojé*²⁴. Then, from the above we can say that from the *Cogito to the esse*, it shows the way for an explanation of the self and a foundation of knowledge, giving account of the eidetic science as metaphysical doctrine.

Despite such argumentations, Husserl does not describe how such a process is given, staying (with Descartes) in the *cogito*, in the pure self. However, it is necessary recognize to Husserl that determine in the pure self of the conscience a richness of intentionality.

¹⁸ “Todo sentido concebible, todo ser concebible, dígase inmanente o trascendente, cae en el ámbito de la subjetividad trascendental... Ella es el universo del sentido posible; un fuera de ella es pues precisamente sinsentido” (Husserl, E., *Las conferencias de París. Introducción de la fenomenología trascendental*, trad. esp. Ziri6n, A., Colecci6n Cuadernos UNAM, Nro. 48, Ciudad de M6xico 1988, Lecci6n III, pp. 43-44)

¹⁹ “Por lo que toca al segundo tomo de la nueva edici6n ha sido refundida radicalmente la vacilante introducci6n, tan poco justa con el sentido y el m6todo esenciales de las investigaciones realmente llevadas a cabo. Yo mismo sentí su deficiencia inmediatamente despu6s de la aparici6n y pronto encontré ocasi6n de rectificar el nombre que entonces daba a la fenomenología (psicología descriptiva), designaci6n harto favorable al error. Algunos principios capitales encuentran ya en aquel lugar una caracterizaci6n rigurosa en pocas palabras. La descripci6n psicol6gica, realizada en la experiencia interna, aparece equiparada a la descripci6n de los procesos externos de la naturaleza, realizada en la experiencia externa, mientras que por otra parte es colocada en oposici6n a la descripci6n fenomenológica, en la cual permanecen completamente excluidas todas las interpretaciones trascendentes de los datos permanentes, incluso aquellas que hacen de ellos «actividades y estados psíquicos» de un yo real. [...] La plena claridad reflexiva que he obtenido sobre la esencia de la fenomenología en estos a6os y los siguientes, y que me ha conducido paulatinamente a la teorí a sistemática de las «reducciones fenomenológicas» ha sido utilizada tanto en la refundici6n de la introducci6n como en el texto de todas las investigaciones siguientes; y en este respecto la obra entera ha ascendido a un grado de claridad esencialmente más alto” (Husserl, E., *Investigaciones Lógicas, op.cit.*, p.28)

²⁰ Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen, op.cit.*, [44], p. 55

²¹ *Ibíd.*, [19], p. 28

²² Cf. Blanco, J.E., “3 lecciones sobre Husserl”, en: *Revista Universidad Pontificia Bolivariana*, 1940, vol. V, nro. 16-17, Bogotá, pp.20

²³ Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen, op.cit.*, [49-50], pp. 61-62

²⁴ Cf. Husserl, E., *La Crisis de las ciencias europeas y la fenomenología trascendental, op.cit.*, p.25; Cf. Blanco, J.E., “3 lecciones sobre Husserl”, en: *Revista Universidad Pontificia Bolivariana*, 1940, vol. V, nro. 16-17, Bogotá, pp.20

This way, the *cogito* in Husserl comes to represent infinitely more than the *cogito* of Descartes, giving the starting point to understand that the existence in general presupposes that rich world of intensionalities that is the pure conscience, the subjectivity transcendental.

In other words: intensionalities arise in thought rather than experience, and with them – intentionality-the gross content of existence is subject to it. It is true that Husserl, like Descartes, does not describe how this gross content emerges as an object of consciousness; we must recognize the philosophical reflection on the enlightenment of subjective thinking when it is objective.

2. Influence of phenomenology in relativistic theory

Assuming the starting point of Husserl obtained the development of the exercise, method and systematic testing of phenomenology²⁵ in the application of special sciences such as physics and cosmology under the framework of general relativity. This starting point is in the *essence as pure intentionality of consciousness*²⁶. Since the intentional essence in a consciousness is, the one that makes all individual subjectivity is to objective that is to make of its content an object of existence. In other words: this conception offers by means of introspective exercises, to pass from the intuition of the existence, conscious of the intentional, to the reality of the existence.

These mental exercises of introspection, and under the method of Husserl, Herman Weyl in his work: *space, time and matter*²⁷ expose the metaphysical foundation in the theory of general relativity, through by the *intentional experience of the acts*. Weyl expose the formal positions that conduce to the being: experience the effort and the resistance and experience of activity and passivity. These experiences lead from the essentially intentional to any perception of the existence²⁸. Under the perspective of philosophical thinking, properly metaphysical, of phenomenology we can go on to consider two cardinal notions of relativity: time and space, being central concepts for our knowledge of the world. The one that we go to consider such conceptions from the phenomenological perspective does not exclude that it complies with the metric and physical requirements that the theory's demand. We will start with time.

Time is the primitive form of the flow of consciousness. It is a fact, which the contents of consciousness not presented as beings (conceptions, numbers, etc. ...) but as a *present*, that fills the form of the *time present* with a variable content.²⁹ Under on the Kantian ideas we can clarify the above through the supremacy of time with respect to space. Because while the space organized externally, time organizes both externally and internally. In this way, the time becomes formal condition of all the phenomena in both internal and external sense. Under this perspective, the content of our mind (ideas, thoughts, etc.) is under a temporal relationship that fixes the order of perception of physical events.

²⁵ Cf. Husserl, E., *Die Idee der Phänomenologie, Fünf Vorlesungen*, op.cit., [23], p. 33

²⁶ Cf. Weyl, H., *Space, Time and Matter*, op.cit., p.4

²⁷ Ibídem

²⁸ Ibíd., pp. 4-6

²⁹ Ibíd., p. 5

Now before we continue with such studies about time it becomes indispensable, for our purposes, to address space. The space is the form of the external material reality³⁰. All the characteristics of the material things, are presented in the *acts of external perception*, and endowed with the separation of space extension, but only when we build a real world connected with all our experiences the spatial extension, becomes part of the same space that includes all realizing space as the shape of the outside world. In other words: every material thing can, equally occupy a position in the space different from its time present. This gives us immediately the property of the homogeneity of the space³¹. Space and time as foundational conceptions for science or *pure intuitions a priori* ordering the phenomena external and internal — transcendental idealism — can only be, in phenomenological terms, *intentional objects of acts of conscience*. In fact, the worlds of consciousness and transcendental reality cannot be very different from one another. If it were, the state of things would be: a) a consciousness that advances under an infinite or eternal present, but without space, this is a-spacial and b) a spatially-timelessly enlarged reality that has a variable appearance. This is not what happens. We do not perceive either of the two worlds separated from each other. Exists in us, as antecedent of any perception, the experience of effort-resistance, of active-passive and although the conscience, without giving up its inmanet, becomes a piece of reality, it must extend its network in the form of time on the reality.³² Is impossible to perceive a-spacial or timeless world. The worlds of consciousness and transcendental reality (transcendence) is a coupled.

How this coupling given? Well, if we consider time, one might wonder about the possibility that many of the temporal characteristics we attribute to the world are not the product of our subjective projections motivated by our experiences. This leads us to think that the subjective structures are not independent of us, which leads us to assert that the causal link between many events is subjective, that is, its physical form. Now physics demonstrates that cosmic time and physical form cannot be dissociated from each other³³; so if cosmic time and physical form add space as pure intuition, motivated by the argument that we do not perceive the worlds of transcendence and consciousness separately, this leads us to the metric continuum (*spacetime*) postulated by the Theory of general relativity. In this way, shown that the relation between space and time offered by the theory of relativity brings with it a deeper insight into the harmony of action in the world. In other words, from the point of departure and with the method of phenomenology, space and time as intentional objects of the acts of conscience become real components of the experience — *cogito to esse* — space and time coupled in *spacetime* which is the means — *continuum space* — postulated by the theory of general relativity.³⁴

³⁰ *Ibíd.*, pp. 5-6; Cf. Dorato, M. Allori, V., Laudisa, F., Zanghi, N., *La natura delle cose. Introduzione ai fondamento e alla filosofia della fisica*, op.cit., pp.18-22

³¹ Cf. Weyl, H., *Space, Time and Matter*, op.cit., p. 6

³² *Ibíd.*, pp. 6-7

³³ *Ibídem*

³⁴ *Ibídem*

3. Conclusion

In summary, we can say that the forms induced of time and space, as intentional objects of the acts of conscience to become immanent become real components of the experience of the conscience showing as consequence the cosmic time and the notion of space in pure form established the notion of metric continuum. That leads to the concept of Riemann's time by giving the link of time and space. This consideration exhibited by Weyl shows a metaphysical foundation granted under the ideas of Husserl.

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