

## THE ORIGIN OF EUROPE AND THE *ESPRIT DE GÉOMÉTRIE* (EUROPE: ORIGIN, PHILOSOPHY, GEOMETRY AND PROCLUS.)

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ABSTRACT: In searching for the origin of Europe and the cultural region/continent that we call “Europe”, at first glance we have to consider at least a double view: on the one hand the geographical understanding which indicates a region or a continent; on the other a certain form of identity and culture described and defined as European. Rodolphe Gasché taking hint from Husserl’s passage ‘Europe is not to be construed simply as a geographical and political entity’ states that a rigorous engagement with what we understand by “Europe” requires that we acknowledge it as involving ‘something else as well’.

With regard to the many bequests of Europe, founded in ancient Greece, in this essay I will attempt to elucidate some essential features of its cultural identity such as *science* and *philosophy*, and reflect upon several specific aspects: on the origin of Europe, on its roots and heritage, on the concept of culture, and especially on the foundation of sciences (Geometry), which contains a large part of European spirit and civilization. In particular I will address some European historical moments referring to Husserl, Heidegger, the concept of *Thaumazein*... In the second part of the essay, I shift to Ancient Greece to access the value of the *Esprit de géométrie* as defined in *Proclus* on the *Commentary on the First Book of Euclid’s*.

KEYWORDS: *Europe; Philosophy; Science; Thaumazein; Esprit de géométrie; Proclus*

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In his book *Europe, or the infinite task-A Study of a Philosophical Concept*, Gasché begins with a close reading of Edmund Husserl's célèbre *Crisis of European Sciences and Transcendental Phenomenology* (1936). It is well known that in the opening of his Vienna lecture, Husserl claims that Europe stands for the project of reshaping humankind in the light of a ‘genuine’ humanity- a humanity that is much more

than membership in a particular ethnicity. Husserl's project aims to recreate the same "breakthrough that takes place in early Greece by the *irruption* into consciousness of the very concept of humanity as a concept transcending all particular humanities".<sup>1</sup> According to Husserl this irruption gave rise to science and stimulated a kind of susceptibility to live in a world insofar as it seemed new. For Husserl, the European project is founded completely upon the idea of thinking and acting in view of what is universal.

This idea of philosophy "is not merely one of tasks (*Aufgaben*, literally, assignments) depending on a programmatic and normative knowledge that merely needs to be applied but of infinite tasks -a concept that Husserl probably borrowed from the neo-Kantian Hermann Cohen, who has systematically highlighted the importance of the concept of "task" in Kant-and concerns tasks that devolve from ideas, that because infinite, constitute universal tasks".<sup>2</sup> Indeed, Husserl's reference to the stand point from which the idea of philosophy makes itself known implies that philosophy does not impose itself as a self-evident, culturally specific product. Rather, from the outset it justifies itself in term that call on everyone, regardless of usual, customary way of thinking. What makes this idea so odd is that it answers itself and does so with a view toward principles and rules that can be followed and reconstructed by everyone as long as on condition that particular modes of thinking are bracketed. The self presentation from the standpoint of universal humankind shows this idea to be one of humankind itself. Indeed, the breakthrough that takes place in early Greece is the irruption into consciousness of the very concept of humanity itself as a concept transcending all particular humanities".<sup>3</sup>

Further along in his reading, Gasché remembers that according to Husserl, although the European spirit is born in ancient Greece, it manifested itself again in the Renaissance as something "which is at once a reestablishment (*Nachstiftung*) and a modification of the Greek primal establishment"(C71).<sup>4</sup> For Husserl, this re-establishment was not just an irruption but a rebirth, and involved a critical examination of tradition. Galileo, the Renaissance scientist *par excellence*, transmitted ancient Greek heritage in such a way that he "did not feel the need to go into the manner in which the accomplishment of idealization originally arose (i.e., how it grew on the underlying basis of the pre-geometrical, sensitive world and its practical arts) or to occupy himself with questions about the origins

of apodictic, mathematical self-evidence”<sup>5</sup> Moreover, Ancient mathematics and Euclidian geometry, he observes, knew only finite tasks: ‘pure mathematics and geometry had their origin in this method for securing intersubjective truth, and it is this origin that provided them with their true meaning. “This is the premise on the basis of which Husserl argues that by taking the achievements of these disciplines for granted, Galileo had become oblivious to geometry’s and mathematics’ origin in the life-world that alone makes them meaningful for humankind”<sup>6</sup>

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To summarize, “the new sciences come into being by modeling themselves after ancient geometry are disconnected from the pre-scientific life in the given world.” Gasché continues his comment on Husserl this way: “Even though as a thinking being, ‘the man of everyday life... has the *katalon* (*i. e.*) the notion of the general, or universal, in everyday life’, he achieves only relative truths”<sup>7</sup> And he suggests that “the idea of a universal science that erupts for the first time in Greece, and that constitutes the idea of Europe”<sup>8</sup>

Years ago, reflecting on the same narrative, Klaus Held in a dense essay wrote: “The consideration of the European origin of science and democracy among the Greeks will additionally have recourse above all to the thought of Heraclitus. For, so far as may be determined from the fragmentary character of what has been handed down to us from that period, Heraclitus was the first thinker who reflected upon the earliest scientific activity and, at the same time, who first contemplated communal life in the Greek *polis*, where democracy was developing in his day”<sup>8</sup> Of these features of European civilization spoke also M. Heidegger in the Conference *Was ist das- Die Philosophie?* “If they (science and democracy) are able to leave a mark of the civilization of the entire world it is because they issue from the core of the European historical process, which is to say, the philosophic process”<sup>9</sup> The civilization of the whole planet, the sciences of the whole planet have this mark. Again, recalling Heidegger’s planetary thinking: “If they are able to give their own imprint today, if that specifies the history of the European man on the whole planet, this happens because they draw origin from the most internal process European history, that is to say, from the philosophic one”<sup>10</sup>

The word φιλοσοφία, philosophy, in such a way comes to coincide with the birth of our history, and that of the present epoch. “The Greek adjective φιλοσοφοζ, philosopher, attached to man, very probably coined by Heraclitus, means him who loves *sophon*, him who can speak as the *logos* speaks. The relation between *philein* and *logos* is αρμονια; but harmony is not something of static and fixed; it is not a synthesis; it is tension toward the *logos*, tension for knowledge, establishing a new relation with “the world”.<sup>11</sup> As Klaus Held observes: “Using the concept of “world” in this contest, we make, usually without remarking upon it, a simple assumption. We understand by this the totality of that to which human comportment can be related and we assume that this “totality” can be viewed as a whole.”<sup>12</sup>

Here it is useful, anyway, to make a well-timed distinction between harmony and what in English we call attunement (German Stimmung). The first is the experience of moods, which stir or shake us deeply and has a lasting effect on our whole lives, the second is the superficial attunement, the rapidly fluctuating good and bad mood of everyday life. The first experience arises from out of the fundament or ground (*Grund*) of human existence and constitutes simultaneously the ground or reason (*Grund*) for the discovery, by individuals or communities, of the possibilities from which human existence receives its measure. In this case the right and critical meaning of *logos* is not “gathering,” as Heidegger suggests, it can be better signified by the expression “laying-open of a relation”.

At the beginning of the Greek tradition of philosophical and scientific thinking, Plato and Aristotle observed that thinking has arisen from *thaumazein* (wonder); they explained that *thaumazein* is something such as *pathos*, “suffering”. The happy occurrence of wonder is concurrent with the darkness of nothing and presents itself as a shadowy abyss. *Thaumazein* initially makes one speechless; yet, it doesn’t wish to abide in speechlessness, but demands that things, showed in the newly appearing world, are brought forth in language and knowledge. Klaus Held concludes his previous reflection: “*Through the Greek philosophy and science the pathos of thaumazein became, for the first and only time in the history of humankind, first and foremost the cultural founding force for the European culture and civilization*”<sup>13</sup>.

Aristotle was the first to introduce the term *theôria*, “theory,” for this kind of knowing. The “theoretical” man, in that original Greek sense, is always striving

for knowledge; he does not only investigate that which may be useful for him within the limited field of vision of a particular life-world. He is interested simply in beings insofar as they *are*. The theoretical man considers, as Aristotle says, the being *as* being, not simply as it belongs to one of the many life-world horizons. The human bios-theoreticos has touched the limit of the ontology of subjectivity, this is because philosophy has been led to this limit' to extend beyond the limit every non discursive experience of *thaumazein*, to transform what can be only a fleeting moment. Aristotle remarks, on the way, that the Ionians had *scholé*, that is "leisure"; they had time free from life's necessities, and began to philosophize. Only with the leisure, made possible by economic prosperity, the inhabitants of Ionia could open up the world in a manner so new and radical. These living conditions and such prosperity have occurred here and there, but in other countries and cultures without giving rise to philosophy or science.

The wonder, with the awe that distinguishes it, motivated science and stimulated a kind of susceptibility to the light of the world insofar as it seemed new. The sensation of birth, of coming-to-be of the human being equally applied to all citizens, made clear that the only life-world on this earth may be lived in common with all human beings. *In this lies always a hope for path breaking new beginnings, within which the first birth, as it were, repeats itself.* If one could clear the way for something new, this was possible only because one saw the world "in a new light". The hierarchic life-system of the old Greek polis, its pyramidal structure was modified.

In a very lucid passage of *Mythe et pensée chez les Grecs. Etudes de psychologie historique* J. P. Vernant writes: "All "common things" must be object for free debate, for public discussion in the plain light of agora, directed by different subjects, among those who take part of political collectivity".<sup>14</sup> Vernant would tell us that the Greek polis begot a turning shift from the mythical vision of the world and society to the scientific one. At dawn of culture and civilization a new conception of the world flourished, defined by science and by the image that the polis gave of itself by means of its political dictionary (See the Cleisthenes' polis modeled by the geometric rationality; see also the influence of geometry in Platonic *Republic*).

In reference to 'irruption' and 'natality', in the last century Hannah Arendt

eloquently wrote that the possibility for humans to live together democratically now depends upon the fact that the spirit of birth or re-birth, the spirit of ‘natality’, or another beginning remain alive. This concept of modest awe led Greeks to found the essence of democracy expressly on human rights.

### THE ESPRIT ‘DE GÉOMÉTRIE’

Let us consider, in a short historical survey, the Greek legacy of science and mathematics.

At the distance of more than two millennia we still accept the existence of science as nearly self-evident, so that in order to better understand it, we still need to return to origin and try to discover why, in a particular moment of history, the Greeks felt themselves to be in harmony with the *cosmos* at the centre of the universe.

According to many scholars the Greek miracle of mathematics and the birth of philosophy occurred simultaneously. The epistemologist M. Serres writes: “Now, to reply to the problem of the Greek beginning of geometry compels one, exactly, to ask how it is passed from one language to another, from one language considered natural and from its alphabetical connotation to the natural rigorous language and from its alphabetical connotation to the rigorous and systematic language for numbers, measures, axioms and rigorous reasoning, written and annotated in equations and figures”.<sup>15</sup> The language of the esprit of geometry was born by means of pure figures and demonstrations. But, who was the first *geometer*? Surely a *philosopher* able to transfer his thinking from the practical, the finite, the particular, and the surrounding world to a special vision and theoretic knowledge of the known and unknown, of spaces and times inside the horizon of one open infinite. On the historical revolutions, continuity and discontinuity, pre-historical path and progressive expansion of mathematics I refer again to M. Serres who compellingly defines “the quantitative purification of its concepts, the always strengthened power of its methods, the movement in ahead towards a mathematical conceived as horizon allows to think a shape evolutionary connected, but articulated from stages, stages or crisis, total reorganizations of a knowledge transmitted without losses, therefore incessantly accumulated”.<sup>16</sup> This idea recalls the archaic geometry of the ancient Greeks, the concrete empirical

science that began in Miletus with a kind of investigation called *historiê*. The Milesians were, indeed, the first philosophers and geometers to use the demonstration as proof in order to promote greater rigor in sciences.

During the Hellenistic age, science and philosophy separated: Athens remained the centre of philosophical research, and Alexandria became the centre of scientific studies and discoveries, but the speculative spirit of the first Greeks continued and the sciences improved substantially. It is in this epoch that Euclid came to the fore, having received his mathematical training in Athens, and he may himself have been a Platonist. Proclus says that Euclid was of the school of Plato and in close touch with that philosophy. One thing is certain; Euclid taught and founded a school at Alexandria.

Euclid's principal work, as known, is the mathematical and geometric treatise *Elements* composed originally in thirteen books, written in Egypt near 300 BC. Euclidean geometry, as well as the ancient Greek version of number theory, the oldest extant axiomatic deductive treatment of geometry, and proven instrumental in the development of logic and modern science. On this basis, a large number of propositions are proved with a high degree of deductive rigour including a collection of *definitions*, *postulates (axioms)*, *propositions (theorems)*, and *proofs*. The *Elements* were one of the very first books to go to press, second only to the Bible in number of published editions. Although many of the results in *Elements* originated with earlier mathematicians, one of Euclid's accomplishments was to present them in a single, logically coherent framework. For centuries, when the medieval *quadrivium* was included in the curriculum of all university students, the knowledge of at least part of Euclid's *Elements* was required all students.

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During the 17<sup>th</sup> century- in my view a very fundamental century in European history for the development of the sciences, I wonder what were mathematicians' attitude towards the *Elements* especially given the recovery and the publication of the Greek texts in the *editio princeps* on September 1533 at Basel. Firstly, there was an increasingly detached interest in the Greek text, both in its philological and epistemological merits, which was followed by an interest in creating the Latin versions. A generation later, in 1572 F. Commandino writes the first Latin edition

in Pisa, and translates it into Italian in Urbino 1575; earlier by P. C. Clavius prints Books I-XV in Rome; many others are printed in other European languages.

European mathematicians of this period were engaged in revisiting and restating the work of Euclide in canonical forms, but they also tried publishing it at a popular level. A pressing academic requirement in 17<sup>th</sup> century was to restore the *Elements*, as witnessed by the publication of *Euclides restitutus* 1658 by G. Borrelli in Latin, the *V Book of the Elements* by Galileo, published in 1674 by V. Viviani in Italiano, the *Euclide restituito* 1680 and 1686 by V. Giordano in Italiano, the *Nouveaux elements de geometries* 1667 by F. Arnauld in France, *Euclidis elementorum books XV breviter demonstrati* the 1655 by I. Barrow and *Geometric Euclidis elementa novo order ac methodo to fere demonstrata* 1678 by N. Mercator in Latin, just to mention a few. There were no scarcity of adaptations such as reduced editions for the requirements of the general readers. Currently the most printed and remarkable were the first four books, those of plane geometry.

By means an aside, I wish to stress here the historic and fundamental influence of Proclus. According to many scholars the Prologue of the *Commentary on the First Book of Euclid's Elements* by<sup>17</sup> Proclus is a treatise of philosophy of mathematic, a theoretical and methodological guide of the geometer. It tells us what geometry is. The *Commentary* has two parts: a) Prologue that has much to say about Platonic, Peripatetic, and allegedly Pythagorean philosophy, and gives a general history of Greek mathematicians. b) The rest of the *Commentary* is an item by item the discussion of Book I of the *Elements*. It is almost certainly a written version of lectures which he presented to students and associates in Athens in the mid-fifth century. In this present essay, I offer only a few selections from Proclus' work.

With his experience of diadochos, since the beginning in the Prologue (Part One) Proclus writes: 'Mathematical being necessary belongs neither among the first nor among the last simple of the kinds of being, but occupies the middle ground between the partless realities-simple, incomposite, and indivisible-and divisible things characterized by every variety of composition and differentiation. The unchangeable, stable, and incontrovertible character of the propositions about it shows that it is superior to the kinds of things that move about in matter. But the discursiveness of mathematical procedure, its dealing with its subjects as



extended, and its setting up of different prior principles for different objects-these give to mathematical being a rank below that indivisible nature that is completely grounded in itself'.<sup>18</sup>

Further along in the text, Proclus states that Plato assigned different types of knowing to the highest, the intermediated, and the lowest grades of reality. 'To indivisible realities he assigned intellect, which discerns what is intelligible with simplicity and immediacy and by its freedom from matter, its purity, and its uniform mode of coming in contact with being is superior to all other forms of knowledge. To divisible things in the lowest level of nature, that is, to all objects of sense-perception, he assigned opinion, which lays hold of truth obscuringly, whereas to intermediates, such as the forms studied by mathematics, which fall short of indivisible but are superior to divisible nature, he assigned understanding. Though second in rank to intellect and the highest knowledge, understanding is more perfect, more exact, and purer than opinion'.<sup>19</sup>

And in chapter II, we read:

As the forms of knowing differ from one another, so also are their objects different in nature.... Mathematical objects, and in general all the objects of the understanding, have an intermediated position. They go beyond the objects of intellect in being divisible, but they surpass sensible thing in being devoid of matter... To find the principles of mathematical being as a whole, we must ascend to those all-pervading principles that generate everything from themselves: namely, the Limit and the Unlimited. Consequently more ahead 'Mathematics are the offspring of the Limit and the Unlimited, but not the primary principles alone, nor of the hidden intelligible causes, but also of secondary principles that proceed from them and, in cooperation with one another, suffice to generate the intermediate orders of things and the variety that they display'.<sup>20</sup>

Following his earlier discourse, in chapter VII Proclus suggests: 'But from the being of mathematical concepts let us go back to that unitary science which we showed to be prior to the several mathematical sciences. Let us consider its function, its power, and the scope of its activities.

We must lay it down that the function of general mathematics is, as we said earlier, dianoetic thinking. It is not the kind of thought that characterizes intellect, steadfastly based on itself, perfect and self-sufficient, ever converging upon itself. Nor is it such as goes with opinion and perception, for these forms of knowing fix

their attention on external things and with concern themselves with objects whose causes they do not possess. By contrast mathematics, though beginning with reminders from the outside world, ends with the ideas that it has within; it is awakened to activity by lower realities, but its destination is the higher being of forms. Its activity is not motionless, like that of the intellect, but because its motion is not change of place or quality, as is that of the senses, but a life-giving activity, it unfolds and traverses the immaterial cosmos of ideas, now moving from first principles to conclusion, now proceeding in the opposite direction, now advancing from what it already knows to what it seeks to know, and again referring its results back to the principles that are prior in knowledge. Moreover, it is not, like *Nous* above inquiry because filled from itself, nor it is satisfied, like perception, with matters other than itself; rather it advances through inquiry to discovery and moves from imperfection to perfection".<sup>21</sup>

Returning to my initial reference to what I term the 'Greek miracle of geometry' I cannot help remembering Kant's famous words written in 18<sup>th</sup> century in his Preface to *Kritik der reinen Vernunft* (1787 2<sup>nd</sup>). In the following passage, Kant seems to believe in a sort of discovery (irruption?) of the kind that gave rise to science: "A new light broke upon the first person who demonstrated the isosceles triangle (whether he was called "Thales" or had some other name). For he found that what he had to do was not to trace what he saw in this figure, or even trace its mere concept, and read off, as it were, from the properties of the figure; but rather that he had to produce the latter from what he himself thought into the object and presented (through construction) according to *apriori* concepts and that in order to know something securely a priori he had to ascribe to the thing nothing except what followed necessarily from what he himself had put into it in accordance with its concept".<sup>22</sup>

Jumping ahead to the twentieth century, following the First World War, among philosophers and literati who took part in a wide-ranging forum on the identity of Europe were included figures such as M. Heidegger, E. Husserl, Ortega y Gasset, Nikolaj Berdjajev-, and P. Valery. In particular, Valery treated the 'European cultural identity' as a serious subject, and in his role as poet and writer, presents an imaginary European Hamlet who leans from a terrace that overlooks the whole of Europe and its million of ghosts: "But he is an intellectual

Hamlet who reflects on the life and on the death of the truth. His ghosts are the objects of our controversies; his regrets are the titles of our glory. He is oppressed by the weight of his discoveries, of his knowledge, and is incapable of any action. He reflects on the boredom of a past that needs to be re-discovered, at the folly of continual innovation. He is thorn between two crevasses, since two are the dangers confronting the world: order and disorder".<sup>23</sup> After descending from the terrace, the European Hamlet picks up a skull and recognizes it on account of trace of the development of European history: here is the skull of Leonardo da Vinci, and then that of Leibniz, who, between the seventeenth and the eighteenth century, sought a universal European peace; and that of Kant who was also looking for "perpetual peace" apparently at the antipodes of Heraclitus, the founder of European philosophy. From Kant's skull issues those of Hegel, of Marx "Kant qui genuit Hegel, qui genuit Marx, qui genuit... " And so on. And if the European intellectual were to abandon all the skulls of the past and throw them in a ditch, would he still be himself? What would the European intellectual become? It is time to say goodbye to ghosts since there is no longer any need for them? Surely Valery would have added the names of Pythagoras, Euclid and Archimedes, Galileo, Descartes and Leibniz, as mathematician, Newton etc... to the list, given that within the same essay he doesn't forget geometry.

Valery closes with a statement that is not scientific, but which defines the 'European man' as one with three essential characteristic: "As far as I am concerned any people who have been influenced throughout history by Greece, Rome and Christianity are Europeans". Further along in the text he ebulliently praises mathematics and geometry, stating: Greek geometry has been that incorruptible model, and not only model, proposed for every type of knowledge that aims at the state of perfection: an incomparable model of the more typical qualities of the European reasoning. I never think of classic art without necessarily taking as an example that monument to reason that is Greek geometry. The construction of such a monument has demanded rare and more naturally incomparable gifts. The men who have constructed it were solid and sagacious workers, deep thinkers, but also talented artists with the fineness and the exquisite sense of the perfection...<sup>24</sup>

In his synthesis of the philosophical and scientific value of mathematics, we

can agree with Serres that: “Mathematics is therefore: so objective that it is the only one that is truly collective; so collective that it is the only one that is truly objective; so useless that it is the only one that is truly useful; so outer that it is the only one that is truly inner; so inner that it is the only one that is truly outer; so in the being that is outstanding at the knowledge; so in being that it excels in knowledge; so abstract that it is the only one that is truly concrete, so concrete that it has been believed, sometimes, that its space was the shape of the external sense”.<sup>25</sup>

Today, among the contemporary philosophers, Alain Badiou claims that ‘Mathematics has been ever since Greek origins, a *condition* for philosophy ... Mathematics is recognized as having a certain capacity for thinking ‘first principle’, or for the knowledge of being and of truth,<sup>26</sup> and nevertheless entirely separate from the questions, or questioning, proper to philosophy. In the *Divided line* of Plato, in the Republic, the fact that mathematics in the educational programme for the guardians corresponds to *dianoia* shows that mathematics plays a preliminary role. But, again, according to Badiou, there is something fundamental pinpointed in Glaucon’s speech (Rep.VI) when he observes that mathematics is *metaxu*, i. e. an in between, midway between *doxa* and *episteme*, opinion and intellect. In the same passage of the Republic the *mathema* is situated at the side of *dianoia*.

“Plato constructs his Parable of the Line to identify this total area as the *noetos topos*—the area of the intelligible, or as the *noeton genos*, the genus of the intelligible. . . He dramatizes this antithesis as one between the visible and intelligible worlds . . . The mind must be taught to enter a new syntactical condition, that of the mathematical equation, in preference to the syntax of the story”.<sup>27</sup>

The mathematicians (the geometers) proceed according to the intelligible, and the body of the symbols they use, the written language they use, are the more perspicuous vehicle for logical relations. So states Badiou: ‘Up to and including Kant, mathematics and philosophy were so entwined that Kant (following Descartes, Leibniz, Spinoza and many others) still saw in the mythical names of Thales a congenial origin of mathematics and of knowing in general.’<sup>28</sup>

It seems impossible to deny that from a new spirit of world-openness, the spirit of re-birth, which appeared on the stage of human history with the Greek “discovery of the world”, European culture and sciences achieved its peculiar

form of “identity” through the epochal stages of its history. I would like, in closing, to assume that genuine historical return is the decisive beginning for an authentic futurity, to deepen the issue of the origin of Europe, its mythologized and plural roots and heritage, the myriad of frameworks for ‘culture’ and the foundations of sciences, especially Geometry, which portray a large part of European spirit and civilization.

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#### ENDNOTES:

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- 5) Ib.p. 49
- 6) Ib.p. 55
- 7) Ib.p. 87
- 8) Klaus Held, “The Origin of Europe with the Greek Discovery of the World”, *Epoché*, Volume 7, Issue 1 (Fall 2002) ISSN 1085-1968. p. 82
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