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PATTERNS OF APPROPRIATION IN THE GREEK INTELLECTUAL LIFE OF THE 18TH CENTURY

A Case Study on The Notion of Time[*]

1. INTRODUCTION

Reception or transmission studies are not, of course, something new. There have been studies discussing the diffusion of the new ideas about nature in England, Scotland, France, the Low Countries and Germany during the seventeenth and eighteenth centuries. Many problems related to the reforms by Peter the Great in Russia have also been analyzed. There have been studies on the introduction of the new scientific ideas in Latin America. So is the case for many aspects of science in the Scandinavian countries. Furthermore, there have been many studies on the question of science, technology and imperialism. There have also been accounts of the establishment of university chairs in many countries. The introduction of modern physics in a number of countries is also well documented. The reactions to the Darwinian theory have been the subject of serious scholarship. Nevertheless, studies in languages other than the local languages for the Balkans, the Ottoman Empire, the Central European countries, the Baltic countries, Portugal, but also Spain have been very few and mostly from a philological point of view. The lack of studies for any subject by itself does not, of course, constitute a legitimate reason for starting to work on it; nevertheless, recent developments in the history of science raised many interesting historical questions to warrant an analytical discussion of these issues (Gavroglu 1999, Abattouy et al. 2001).

Although a simple bipolar distinction between center and periphery is useful for broadly delineating the situation, it is incapable of capturing many salient details. There are first of all many centers and many peripheries. Moreover, and depending on the subject one is discussing, a place may be both center and periphery. A center may, over time, change into a periphery, and vice-versa. And a single country may contain both centers and peripheries, thereby making purely national distinctions problematic. Nevertheless, in the following we shall use the term center-periphery to denote the dynamics of the transmission and appropriation of the new scientific ideas from the region broadly defined by the British Isles, France, Switzerland, Germany, and the Low Countries to the rest of Europe during the eighteenth century.

A. Ashtekar et al. (eds.), Revisiting the Foundations of Relativistic Physics

2. TRANSMISSION VERSUS APPROPRIATION

The concept of the "transfer" of ideas, used extensively by those who have discussed these issues, is found to be ultimately inadequate in contextualizing the dissemination of the new sciences in the societies of the European periphery. We shall argue that "appropriation" can be a more coherent and fruitful analytic concept. Appropriation directs attention to the measures devised *within the appropriating culture* to shape the new ideas within the local traditions which form the framework of local constraints—political, ideological as well as intellectual constraints. To examine such issues requires discussing the ways in which ideas that originate in a specific cultural and historical setting are introduced into a different milieu with its own intellectual traditions as well as political and educational institutions.

A historiography based on the concept of transfer can easily degenerate into an algorithm for keeping tabs on what is and what is not "successfully" transmitted. A historiography built around the concept of appropriation is more comparable to the procedures of cultural history; acceptance or rejection, reception or opposition are intrinsically cultural processes. Such an approach also permits the newly introduced scientific ideas to be treated *not* as the sum total of discrete units of knowledge but as a network of interconnected concepts. The practical outcome of a historiography based on the notion of appropriation is to articulate the particularities of a discourse that is developed and eventually adopted within the appropriating culture.

Undoubtedly the concept of transmission of ideas is of some use to the historian of ideas. This, however, is apparent only in the case of comparative studies, when the historical inquiry focuses on the differential reception of a certain system of scientific ideas in a variety of cultural contexts. Nevertheless, even in such cases one must always recognize that ideas are not simply transferred as if they were material commodities. They are always transformed in unexpected and sometimes startling ways as they are appropriated within the multiple cultural traditions of a specific society during a particular period of its history. Indeed, a major challenge for historians who examine processes of appropriation across boundaries is precisely to transcend the merely geographical reference, and to understand the character of what one might call *the receptive modes and devises of the receiving cultures.*

Adopting the notion of appropriation directs attention to the production of a distinctive scientific and philosophical discourse through the reception of the new scientific ideas. This is a crucial point and misconceptions abound. Many historians assume that the scholars of the periphery introduce the new scientific ideas having already adopted the same constitutive principles of the new discourse as those adopted by the scholars at the center. But this is hardly the case; rather, one should adopt the view that the whole enterprise of appropriating the new ideas during the eighteenth century could only be achieved through the formation of a *new* discourse as the optimum way of overcoming the local constraints. Ideas, techniques and practices are not simply transferred; they are being appropriated in order to form a discourse adapted to local intellectual traditions, educational strategies and ideological commitments. In this sense, what is to be systematically studied are the metamorphoses the new ideas underwent through the various stages of assimilation and the kinds

of attempts by "local" scholars to incorporate them into existing traditions. For it appears that at the initial stages of the attempts to introduce new ideas, these scholars were able to choose from a host of many different alternatives for developing a proper discourse, and their works expressed different intellectual and social prerogatives.The detailed study we will later present of the way Eugenios Voulgaris appropriated the concept of time by "intervening," in a way, to the dispute between Newton and Leibniz, will clarify these considerations. Time was always a disputable notion and many contemporary historians and philosophers have attempted to trace the various transformations this notion underwent in the past few centuries. What we shall try to show here is how a scholar of the European periphery elaborated this fundamental notion of science and philosophy while the dust from the famous Newton-Leibniz debate had not yet settled down.

One of the main aspects of such an approach is to understand the dynamics and the conditions under which the creation of legitimizing space for the new ideas becomes possible. The problem is relatively simple in those cases where we are confronted with well discerned and clearly defined spaces such as universities and academies. But in many instances at the countries of the periphery one may not be able to even find such spaces. In this case one will have to understand the role of many priests who have written extensively on the subjects we are interested in and have spent all their lives teaching at schools in remote agricultural regions. Likewise one should explain the many cases of lay people who had written philosophical and scientific works and never had the opportunity to communicate them through the standard institutional settings. So where shall we direct our attention to find the legitimizing spaces? Travel itineraries, publishing programs by authors, editors or publishers, lists of subscribers at the end of books, may be some alternative indications. Disputes among scholars have also been a particularly advantageous method for understanding the dynamics of legitimizing spaces. But somehow in the more standard accounts, disputes presuppose an audience with an inclination or at least a potential interest to engage in the issues involved in the dispute. It has quite often been the case that those who are directly involved in a dispute are preoccupied almost exclusively with the audience rather than the adversary. But what about public disputes before an audience totally ignorant of the issues involved but supportive of the overall agenda of particular scholars? Can under such circumstances our studies concentrate in understanding the cognitive content of disputes? Our answer is yes, it is possible to deal with the cognitive content, but only if one stops looking at disputes as intricate scientific rituals and analyze them as *alternative cultural processes.* In this sense, understanding the creation of legitimizing spaces for the new ideas presupposes the comprehension of the nature and features of resistance to these ideas. *Resistance is usually expressed because when new ideas are introduced, they provide alternative methods and answers to questions for which peoples and cultures have already adequate answers. In other words, new ideas are not introduced to be placed in any kind of void, but they are asked to displace other, usually strongly entrenched ideas.* Therefore, understanding the creation of legitimizing spaces for the new ideas cannot be achieved independently from the understanding of the ways resistance is expressed against these ideas.

3. FRENCH ENLIGHTENMENT AND NEWTONIANISM

Let us now discuss a problem which, we feel, has undermined a large number of studies on these issues. It seems that many historical works imply a dependence on a double equation. Enlightenment equals French Enlightenment and the introduction of the new scientific ideas during the eighteenth century equals the reception of Newtonianism.

The first problem is the almost exclusive attention being given to the French Enlightenment. The French Enlightenment is taken as the paradigmatic expression of the Enlightenment, and all other expressions of the Enlightenment are considered as being either unfulfilled versions of the French case or cases which tended to the ideal and pure program which was expressed by the French *lumieres* and *philosophes*. The French Enlightenment has been particularly dear to the heart of a number of historians at the countries of the periphery and especially of philologists, whose studies concentrated on scholars with a social and political agenda that was a significant part of their life and work.

If one looks, however, at the German case and studies a man like Christian Wolff, his followers and other rationalists of their time, one realizes that they did not enter into a confrontation with either the political or the religious establishment, though they were definitely unwilling to accept their all-pervasive power. In fact, this contradictory attitude, this practice of not wanting to come into a conflict, yet questioning the authority of the state and ecclesiastical powers, characterised this practice and set it apart from that of the French *lumieres*. It was not an antagonistic view of the Enlightenment, but rather a complementary one. Referring to Frederick II, Venturi notes:

> But his limitation, his desire never to go beyond certain definite barriers finally elicited from the man who set himself up as the protector of philosophers, Frederick II, a statement which defined with the utmost clarity that detachment, that division of labour between men of culture and statesmen which was only to be overcome with very great difficulty later in Germany. This is precisely the limitation of the greater part of the *Aufklärung* as opposed to the lumieres. Frederick II would proceed to write that the philosophers 'instruct the world through their reasoning we through exemplary practice.' It was a division of labour which also meant putting the philosophers in their place, a definition of enlightened absolutism (Venturi 1972, 21).

The point is clear: There have been many societies where it was often the case for persons holding high offices to be consciously initiating elements which in the local context constituted Enlightenment policies. To study these cases—especially for the societies at the European periphery—though an almost exclusive reference to the French case would surely lead to deadlocks. In this respect let us make three points:

- The first point is almost trivial. Enlightenment was not a homogeneous and uniform movement. There are no more sanitized and less sanitized versions of Enlightenment. They are all equally legitimate, and it is wrong to look at the French version as the more advanced and radical if we want to see how the movement in Europe as a whole influenced the rest of the regions. Exclusive attention to the French Enlightenment when studying the reception of the new ideas at the societies of the European periphery during the eighteenth century is, we feel, a methodological choice which is historically sterile.

- The second point is that we should look at the French Enlightenment and the German Enlightenment in their complementary aspects as well as in their contradictory aspects, and emphasis should be placed on the merging and the confluence of traditions. Let us be reminded that the Balkans turned out to be particularly receptive to the practice of enlightened despotism of Germany, Poland and Russia.
- And thirdly, we should deal with the scholars of the periphery as a group of people who turned what appeared a liability into an asset. These scholars functioned within a framework formed not by any paradigmatic case they may have perceived, but by their "eclecticism" among a number of alternatives. The scholars of the periphery became rather assertive and acquired a rather creative freedom when they realized that there was much to be gained by looking at the cracks of the various manifestations of the Enlightenment, by concentrating on its unfinished business, its weaknesses, failures or even exaggerations. In other words, we should look at the scholars of the periphery not as passive agents whose only function was to distribute locally the well-packaged goods delivered to them from the centers of Europe, but rather as active subjects who received many goods with no particularly clear directions on how to dispose of them locally. The French Enlightenment as the paradigmatic case of Enlightenment, apart from being a historiographical construct much in demand in the twentieth century, is also a notion that reduces the local scholars to passive carriers of this otherwise "perfect" program.

Let us now come to Newtonianism. Almost all of the works discussing these issues take for granted that the developments in natural philosophy during the eighteenth century were simply the unfolding of the *Principia*. At best they consider the eighteenth century as the algebraization of the geometrical *Principia*. Nearly no one takes into consideration the deeply diverging opinions on the future, as it were, of mechanics. And even fewer people note that Newtonianism was in a state of flux[1] and that such a state of affairs provided a *much less constraining context* to a lot of scholars of the periphery in their attempt to formulate a new discourse. Such considerations are rather significant for us since what we would be mainly concerned with is the understanding of the attempts to appropriate the new ideas through the formation of a *new* discourse. When we talk of the influence of Newtonianism, or still, when people talk of the ways Newtonianism was introduced at the periphery, the tendency is to see how the local scholars were influenced by the *Principia*, how faithful they were to the particular work or how much influenced they were by those who tried to either "popularize" Newton's work or write simpler scholarly treatises about it. If one deals with at least the first half of the eighteenth century, this is a misguided effort. For it was the period when the notion of force was still an open question, while the precarious procedure of separation of rational mechanics from natural philosophy was still in progress.[2] To understand what came to be known as Newtonianism in the countries of the European periphery will greatly help to comprehend the multiple aspect of the Newtonian program. The formation of different local discourses, namely the procedures of appropriation, involved selections and decisions on the part of the scholars, concerning the synthesis of ongoing programs like "rational mechanics," "experimental philosophy" or "vis viva conservation physics" with local intellectual and, more specifically, theological traditions.

So, what kinds of themes are amenable in such a discussion and what kinds of questions could be raised? Here are some examples among the many themes which suggest themselves: What were the particular expressions of the new ideas in each place? What were the specific forms of resistance encountered by these new ideas? To what extent such expressions and resistances displayed national characteristics? What were the commonalities and the differences between the methods developed by scholars at the "periphery" for handling scientific issues and those of their colleagues in the center? What was the role of the new scientific ideas, texts, and popular scientific writings in forming the rhetoric concerning modernization and national identity? What scientific institutions were slowly consolidating their presence and what had been the opposition by the local scholars? What were the characteristic features of the scientific discourse formed by the local scholars? What were the particular expressions of the relation between political power and scientific culture in the societies of the "periphery"? What were the social agendas, educational policies and (in certain places) the research policies of scientists and scholars? What shifts in ideological and political allegiances were brought about as the landscape of social hierarchy changed? What consensus and tensions appeared as disciplinary boundaries were formed, especially as those were reflected in the establishment of new University chairs? What ideological undertones characterized the disputes, and what was their cognitive content? What was the significance of the disputes for the "becoming" and/or the "emergence" of the respective audiences? What was the character of the institutions and other intellectual spaces legitimizing the newly emerging community?

Before discussing the Greek case let us make a short comment on the ways we approach the individual scholar of the eighteenth century. We will follow Peter Gay in talking about the sub-worlds and mental universes of the scholars which normally reinforce each other but often are in conflict with another (Gay 1972).

The first such sub-world is the world of cultural atmosphere of the age, the environment that assigns positive or negative values to ideas passions and actions, pronouncing some exemplary, others unthinkable. This is the comprehensive world that sets the rules governing the way of living. To quote Peter Gay "Even rebels acknowledge its power…one leaps out of the magic circle of one's culture only so far."

The individual's relations with his or her culture are mediated through his or her social environment: Class, gender, ethnic and religious loyalties, regional affiliations and family ties put strong constraints on the meaning of the words used and the ideals followed, define what aspirations are legitimate and what limits are inescapable. Gay notes that the most interesting ideas "emerge from a position on the margin of defined groups. But whenever ideas stand they stand somewhere."

The interplay of cultural and social environments is not sufficient to account for the emergence of ideas. What we usually call tradition, defines a relatively autonomous network of ideas, skills and values which constitutes another constraining framework.

> These are the three collective pressures –culture, society, tradition. They press on what is the ultimate shaper, the only carrier, of ideas: the individual. This makes the fourth subworld, the self, so critically important. By "self" I mean the uneasy collaboration between genetic endowment and acquired habits, affection and neuroses, conscious pur-

> poses and unconscious wishes, skills and stratagems. Whenever a scholar is seriously engaged with his work, the latter offers substantial evidence of his encounter between his private world and those three other worlds, which he reflects in his distorting mirror, relates to his needs and urges, and reproduces in his own way (ibid., 68).

Let us now discuss a number of points related to the Greek case.[3]

4. GREEK INTELLECTUAL LIFE AFTER THE FALL OF CONSTANTINOPLE

In the present paper we shall mainly be concerned with the regions where Greek-speaking scholars appropriated the new scientific ideas during the Enlightenment. These regions were on the whole part of the Ottoman Empire until the beginning of the nineteenth century, and the Christian Orthodox Church played a dominant role there, through its highest institution, the Ecumenical Patriarchate at Constantinople. The schism between Rome and Constantinople has had a very complicated history. A number of theological and political differences precipitated a crisis in 1054 when the representative of Pope Leo IX, Cardinal Umberto, walked into Saint Sophia and left a letter excommunicating the Patriarch Mihail Kiroularios. Ostensibly the disagreement was over the question of *filioque*—that is on the insistence of the eastern Church that the holy spirit originates from both the father and the son, whereas Rome insisted that it originated only from the father. The enmity between the two Churches grew to such an extent that during the siege of Constantinople there were many people in the city wishing an Ottoman occupation over the rumored salvation by the Catholic fleet.

Immediately after the fall of Constantinople, in 1453, the Sultan Mohammed II not only allowed the Patriarchate to continue its function but also provided it with a written "privilege" that granted the Christian authorities jurisdiction over many aspects of the religious and civil life of the Orthodox populations. One of the most important consequences of this arrangement was that it allowed the Patriarchate to gain full control on the educational procedures and the respective intellectual activities of these populations. This was the situation when, in the late seventeenth century, a period of educational and economic rejuvenation of many Christian sectors of the Ottoman Empire was initiated. By referring to Christian sectors, we mean the Greeks, the Armenians, the Catholics who were mostly the descendants of the Venetians and Genoans and all kinds of small and sometimes not so small groups, especially in Constantinople. Among all these, there was a social group which would play a rather significant role intellectually, politically and educationally. These were the Fanariots, who took their name after Fanari, the neighborhood of Constantinople where the Orthodox Patriarchate was located. From the end of the seventeenth century, the Fanariots acquired an increasingly important role in the administration of the Ottoman state. At the outset of the eighteenth century representatives of the Fanariots were appointed by the Sultan governors and hospodars in Wallachia and Moldavia. The Fanariots would soon take the lead among all the other Orthodox groups dispersed in the Balkans; their political dominance would reinforce the already strong influence of the Greeks in the economic as well as cultural spheres in these regions, while at the same time as administrators and as diplomats they would adopt the line of the enlightened despotism.

This period is characterised by three interdependent developments. The first is that the increasing involvement of the Fanariots in the administrative affairs of the Ottoman Empire undermined the almost exclusive role of the clergy in mediating the relations of the Christians with the Ottoman Court. The second is the increase of the receptivity of the Fanariots for the new ideas coming from Europe. The third characteristic is related to the rise of a new social group. In addition to the Fanariots, the merchants started to assert themselves socially and played a rather significant role in the intellectual orientations of the period. The symbiotic relationship between the merchants and the quasi-administrative group of the Fanariots was not always without conflict. The point is, however, that the social and economic prominence of these two groups slowly led to the weakening of the absolute control the Church had on the schools and on their curricula.

By the early eighteenth century, Greek-speaking scholars started moving all over Europe. Italy ceased to be the almost exclusive place they would go to study. They also started travelling to the Germanic states, the Low countries, Russia, France and elsewhere. They were thus acquainted with a multitude of intellectual traditions and schools. Contrary to the previous generations of Greek-speaking scholars who pursued their careers mainly in the Italian courts, many scholars of the eighteenth century started returning home after the completion of their studies abroad. There were, basically, two reasons favouring this repatriation. The first was the growing need for teachers in the schools that were being founded as a result of the economically thriving Greek communities dispersed in various regions of the Ottoman Empire. From the early eighteenth century, the economic well-being of the Greek communities within the Ottoman Empire with the accompanying social transformations brought about a number of changes in the educational system. There was a gradual redefinition of the teachers' role. The image of the teacher-priest whose work was a religious mission gave way to another kind of scholar: although the great majority of those teachers were still priests, their educational agenda became more secular and their actual work tended to be more "professional." The scholastic teaching of the works of the Fathers of the Orthodox Church, as well as of ancient Greek literature and Aristotle gave way to a curriculum determined through negotiations with the communities which had established and catered for the schools. Teaching began to reflect the social, political and ideological priorities of these communities. These changes strengthened the relative autonomy of the scholars from the Patriarchate and reinforced their role as independent intellectuals. In many schools the curriculum was no longer determined exclusively by the Church. It was, rather, a compromise between the largely similar but at times conflicting aims of the religious hierarchy, of the social groups with significant economic activity and of the scholars themselves.

The second reason for the return of the scholars had to do with the marginalization of their intellectual enterprise with respect to the established community of natural philosophers in Europe. Almost all of the scholars who went to Europe were churchmen having the blessings of the Patriarchate. They were among the best who had mastered the amalgamation of ancient thought together with the teachings of the Church. In their travels to Europe, however, they found a Europe quite different from what the narratives and experiences of the scholars of the preceding generation had

led them to expect. By the middle of the eighteenth century they found a Europe dominated by the ideas of the Scientific Revolution, with flourishing scientific communities involved in the production of original scientific work. The institutions where the Greek-speaking scholars could indulge in the all-embracing studies of philosophy, continuing the kind of education they had already acquired, were progressively decreasing. The scholars were faced with a paralyzing dilemma: if they were to become part of the community of the natural philosophers in the places where they were studying, they would have to abandon their own intellectual traditions and probably question the doctrines of their Christian Orthodox faith. *Being ideologically unwilling and intellectually unable to proceed to such a break, they immersed themselves in the study of the new sciences with a view to returning home and assimilating them into their familiar intellectual milieu.* A characteristic consequence of this attitude was the increasing desire to teach the new sciences in a manner that harmonized with the conceptions of the ancients. No wonder that almost all the Greek scholars explicitly expressed in their books their "debt" to their ancient predecessors independently of the subject they were writing about; they almost always included a first chapter where they made sure to state that what would follow in the book is in perfect harmony with the teachings of the ancients. This conception of an uninterrupted continuity and the perfection of ancient knowledge—a conception that was gladly adopted and promoted by the Church—became one of the basic characteristics of the Greek scientific culture during the Enlightenment.

One of the difficulties in trying to analyze the newly emerging community of Greek-speaking scholars has to do with the relative lack of consensus among the scholars as to the *constitutive discourse* of the community. The study of the emergence of the scientific community in the various countries of Western Europe deals with the ways a group of people managed to reach a *consensus* as to the discourse they were to use in discussing, disputing, agreeing and communicating their results in the new field. From the first decades of the eighteenth century until well into the nineteenth century, the discourse that the Greek-speaking scholars developed was a predominantly philosophical discourse. Two reasons, among the many, which favoured the development of such a discourse are the following. Firstly, there were neither internal nor external factors to precipitate a crisis with Aristotelianism and, therefore, no need to reformulate Aristotelianism let alone initiate a break with it. Secondly, although these scholars appeared quite sympathetic to experimental philosophy, what they considered to be experiments was hardly different from verbal descriptions of experimental demonstrations. The emphasis, usually indirect but often explicit, was about the use of the new material for (re)shaping philosophical arguments. From this point of view it is quite remarkable that in almost all the books where mention of experiments is being made, the emphasis is on the confirmation of already known results, rather than on the process of measurement and the heuristic function of the experiment. In this sense, it is quite typical that, in more than one place, one finds passages stating that "rational thought is not less effective than experimental results."

5. CONTEMPLATING TIME: THE NOTION OF TIME IN THE WORK OF EUGENIOS VOULGARIS

5.1 Eugenios Voulgaris and the intellectual life of his time

Eugenios Voulgaris (1716-1806) was probably the most "representative" figure of what G.P. Henderson called "the revival of Greek thought." For twenty years (1742-1762) he was a renowned professor of philosophy in the most important Greek schools of the southern Balkans and a protagonist in the attempts of the Ecumenical Patriarchate and the Fanariots to reform the higher education of the period. Although his biographical details do not form part of the present study, it is important to keep in mind that after his educational career in the Greek-speaking regions of the Balkans he continued his intellectual activities for some years in Leipzig, where he also became personally acquainted with several members of Saxony's philosophical community. Subsequently he set himself under the patronage of Catherine the Great, became a courtier in Saint Petersburg and culminated his career as Archbishop of Slavensk and Cherson—a new diocesan seat created by the Russian Orthodox Patriarchate especially for him.

Voulgaris was a typical man of letters. His contributions were in the fields of theology (like most of his contemporary scholars, he was an ordained clergyman), metaphysics, literature, political philosophy and the "sciences." Especially the latter occupied a central position in his interests throughout his life. He was the first to introduce into the Greek education the philosophy of Descartes (1596-1650), Leibniz (1646-1716), Newton (1642-1727), and Wolff (1679-1754). He was also well acquainted with the works of natural philosophers like Samuel Clarke (1675-1729), Jacob van 'sGravesande (1688-1742), Petrus van Musschenbroek (1692-1761), and Madame du Châtelet (1706-1749) and he incorporated many elements from their textbooks in his teachings and writings. And he translated into Greek many treatises like Voltaire's *Essai historique et critique sur les dissensions des églises de Pologne* (though accompanied by a commentary that questioned the central thesis of the original work), 'sGravesande's *Introductio ad philosophiam,* Antonio Genovesi's, *Elementa metaphysicae mathematicum in morem adornata* and John Locke's *Essay.* In this respect, Voulgaris was an "enlightened" person and this is, *grosso modo*, the way current Greek historiography perceives him: He was the first to import the ideas of the new natural philosophy in the Greek intellectual life; and because of this he encountered the hostility of many contemporary scholars, who were suspicious about the new intellectual trends; and this was one of the main reasons why he failed to fulfill most of his pursuits. What interests us here, however, is *the specific way he became involved with natural philosophy.* What were his intellectual motives and constraints while doing so? What aspects of his cultural and social environment did they reflect? And how they affected not simply his ability to perceive "correctly" the new scientific ideas but the very discourse he *produced* in order to account for nature in consonance with his contemporaneous natural philosophy? Such questions are important in the sense that they may help us not only throw light on the way Eugenios Voulgaris practiced science but also to bring forth one of the many ways of *doing science* in eighteenth-century Europe.

Eugenios Voulgaris was one of the first—if not the first—who became consciously involved with the enterprise of synchronization of the Greek intellectual life with the attainments of European thought. In this capacity he found himself in the midst of multiple diverging traditions. Being, on the one hand, an agent of "modernization" he felt obliged, on the other, to secure the specific intellectual identity of his audience. As a result, the theological particularities of Eastern Christendom and the neoaristotelian tradition maintained a central position in his philosophical endeavors. It is important to stress, however, that the function of this dipole in the Orthodox East was fairly different from the function of the dipole Catholicism-Aristotelianism in the Latin West. The fact that *neoaristotelianism* was perceived as an anti-Catholic trend within the general context of Aristotelianism[4] made it quite attractive for the Orthodox Christians; but there were also other historical circumstances which determined the character of the co-existence of these two traditions. This is not, of course, the place to discuss analytically these circumstances, but it must be stressed that the doctrinal integration of Aristotelianism with Christian faith, which was peculiar to the philosophical synthesis of Thomas Aquinas, never occurred in the Greek intellectual life of the early modern period. Orthodoxy managed to coexist for almost two centuries with a hard core materialist interpretation of the Aristotelian philosophy without being fused with it and, strangely enough, without raising a major dispute against it. At the same time, it was this political "moratorium" along with the profundity of the philosophical teachings of Theophilos Korydaleas (c. 1566-1646), the man who founded Greek neoaristotelianism in the early seventeenth century, that ascribed the latter a legitimate status, and allowed it to dominate in Greek-speaking education throughout the whole period.

The most important trait of Korydalean philosophy was the emphasis it placed upon Aristotle's natural philosophy.[5] Voulgaris emerged from a culture which not only accounted consistently for the whole range of the known natural phenomena, but also had put this concern into the center of its investigations. Voulgaris could not ignore neither overcome easily this cultural state: Korydalean neoaristotelianism provided the conceptual *armamentarium* for the understanding of the natural world, and framed the conceptual context within which the respective knowledge ought to be placed. The structure of Greek intellectual life did not encourage the emergence of major philosophical disputes on such issues like those that shaped the philosophical and scientific controversies in the Western societies of the seventeenth and eighteenth centuries. As a result, Voulgaris represented a philosophy which seemed not to display important inconsistencies and which did not find itself against the problem of reinterpreting natural world, as was the case with other European philosophical and religious traditions.

But Voulgaris was also a learned man of his age who was well aware of the changes that took place in the European intellectual landscape. In this respect, he understood that no version of the Aristotelian philosophy could keep up with these changes. But, although he considered Aristotelianism a problematic philosophical interpretation of nature, which needed to be integrated with the attainments of new philosophy, he did not feel that it was a tradition that ought to be eliminated from the intellectual horizon. Thus, even if the result of such a reconsideration was to lead to a

radically new philosophy of nature, Voulgaris' adherence to Korydalean neoaristotelianism was so strong that he could not refrain from incorporating its fundamental principles in the new philosophical synthesis he produced.

Orthodoxy comprised the other cornerstone of his intellectual edifice. Voulgaris was one of the most eminent Greek theologians of the eighteenth century and the author of a great number of relevant treatises. What is important here, however, is not the relationship between his religious and philosophical considerations *per se*, but his very attempt to revive the link between Orthodox Christian religion and philosophy. After more than one and a half centuries of "political" coexistence of Orthodoxy with neoaristotelian philosophy, he is the first who aimed consciously at producing a more tight epistemological fusion between the two. The mid-eighteenth century was a period during which Christian Orthodoxy occupied a significant position in the discussions concerning the character and the future of the newly emerging society. Voulgaris participated actively in these discussions and supported the prospect of a Great Orthodox Empire under Russian domination. Under these circumstances the incorporation of religious elements in his philosophical endeavors becomes a decisive task. And, strangely enough, this is also an important reason why Voulgaris honored to such an extent "Newtonian" philosophy. Although most historians tend to perceive his preference towards Newton as a self-explanatory result of the epistemological superiority of new physics, an equally strong reason for this preference seems to be the fact that Newton and the natural theology of his age brought anew in the foreground the notions of divine intervention and of miracle. And this approach enabled Voulgaris and other contemporary Greek-speaking scholars to develop a religiously oriented natural philosophy keeping distances from both disturbing extremes, namely the potential atheism of Korydalean neoaristotelianism on the one hand, and the fusion of Aristotelian natural philosophy with Catholicism on the other.

Voulgaris' dialogue with his contemporaneous natural philosophy, therefore, was mediated, to a great measure, by the particularities of his own intellectual and cultural milieux. He did not simply "transfer" nor "translate" nor "canalize" the scientific attainments of the Enlightenment into the Greek intellectual life; he attempted to *produce* a new philosophical synthesis, which reflected his intellectual and social pursuits. Besides, what exactly Voulgaris could have "transferred" or "translated" or "canalized"? "Science"; yes, but *what* "science"? "Natural philosophy"; yes, but *what* "natural philosophy"? "Newtonianism"; yes, but *what* "Newtonianism"? As we have already mentioned above, what we nowadays tend to perceive as an integrated and homogeneous pattern of scientific activity had not yet been implemented in the mid-eighteenth century. There was an extremely wide spectre of philosophical interpretations and research directions concerning the understanding of natural phenomena. Even Newton's own works seemed to indicate diverging directions and to accommodate different patterns of natural investigation. Thus, the further elaboration of mathematical principles of motion developed in the *Principia*, offered a sound foundation for rational mechanics (which, must be noted, was a branch of *mathematics*), while, at the same time, his experiments in *Opticks* and his concern about the theoretical foundation of experimental induction contributed to the "advancement" of experimental philosophy. On the other hand, Newton displayed a strong interest in exploring the nature of matter

and force, and his respective metaphysical contemplations were incorporated in a long series of contemporary philosophical discourses, frequently juxtaposed with the ideas of his major philosophical opponent, Gottfried Wilhelm Leibniz. In this sense, Voulgaris' philosophical enterprise took place within an intellectual space defined by a multiplicity of philosophical approaches, which had their roots chiefly in Newton's works (or referred to them), but which also differed considerably from one another, reflecting the specific intellectual origins and pursuits of their agents.

It seems that Voulgaris was well acquainted with the respective literature. He was at home with a broad range of works, which represented the various aspects of "Newtonian" philosophy. And, most importantly, he seemed to understand that, above all, the eighteenth century was a period of *trial* of the various philosophical discourses about nature. It was a period, during which a great number of open problems came into consideration and formed the object of fervent discussions throughout the centers of European philosophy. Many of these problems were related to those principles of natural philosophy which comprised its constitutive elements—as became evident from the debates among the representatives of the Cartesian, Leibnizian and Newtonian traditions. At the same time, many fundamental concepts of natural philosophy —like those of *matter, vis inertiae, force* and *attraction*—seemed to bear multiple and not necessarily well-defined contents. In fact, the codified way we perceive nowadays Newtonian physics is a result of the developments that took place during the nineteenth century. In the eighteenth century, however, the interpretation that was eventually to prevail had not become yet clear, and the resolution of the various pending problems was going to determine to a great extent the outcome of this procedure.

As a matter of fact, in order to fulfill reliably his philosophical undertaking Voulgaris was obliged to take sides in the various open disputes concerning either the metaphysical foundations of natural philosophy or the physiognomy and the patterns of natural investigation. *In other words, he had to function as a genuine natural philosopher and not as a mere intermediary between different cultural milieux.* In this respect, he would not be preoccupied with the "transfer" of a definite set of scientific theories and practices, but with the articulation of his own philosophical discourse where the philosophical and scientific attainments of Enlightenment would be fused with the intellectual traditions and the social pursuits of his own cultural milieu.

5.2 Debating Time

Time was one of the central issues of the "Leibniz-Clarke correspondence." This dispute took place between 1715 and 1716 and, as is well known, was in fact a dispute between Newton and Leibniz about a number of metaphysical considerations about the foundations of natural philosophy (Cohen and Koyré 1962). Voulgaris was well aware of the dispute between the two philosophers. As is evident from the footnotes and the cross-references that occur in his philosophical works, he had studied thoroughly the correspondence between Leibniz and Clarke, which was published by Clarke in 1717. Indeed, in many cases he referred to the specific edition in order to draw information about Newton's and Leibniz's views on various subjects of natural philosophy. The death of Leibniz put an end to the debate, but the issues it raised

maintained their significance for many European philosophers for more than forty years afterwards. What was at stake as far as *time was concerned?*

In the first "Scholium" of *Principia,* with which the introductory "Definitions" of the first book conclude, Newton clarifies the meaning of some terms, which are in common use, but their empirical context differs from the notion he is going to ascribe them. These terms are *time, space* and *motion.* He writes about time: "Absolute, true, and mathematical time, in and of itself and of its own nature, without reference to anything external, flows uniformly and by another name is called duration. Relative, apparent, and common time is any sensible and external measure (precise or imprecise) of duration by means of motion; such a measure —for example, an hour, a day, a month, a year—is commonly used instead of true time" (Cohen and Whitman 1999, 408).

The *sensible* time, therefore, is always relative. In astronomy, however, Newton remarks, astronomers are obliged to correct the apparent durations by reducing them to an absolute measure of time so that they can calculate the celestial motions more precisely ("on the basis of a truer time"). This measure represents the equable flow of the absolute time and is defined on the basis of a uniform motion. But no such motion really exists, since all real motions are either accelerated or retarded (ibid., 409). As a matter of fact, the need for a measure of absolute time arises from the practice of astronomers and experimentalists who seek accurate quantitative results, *but* it cannot be fulfilled on the basis of the real motions of the sensible world these groups study. In fact, the quest for the definition of such a measure is an implication of the *metaphysical* assumption that the duration of the things *does not* depend on the things themselves and the transformations they undergo. And, in this sense, it comprises one of the most fundamental presuppositions of a crucial transition: Without the "absolute, true and *mathematical"* time, the study of motion would never be able to overcome the fragmentary character of geometry and enter the world of algebraic relations.[6]

According to Newton's conception, therefore, time is an infinitely extended substance independent of matter and its manifestations. Time would continue existing even if matter ceased to exist. On the other hand, matter exists only within time and all natural phenomena have an absolute temporal duration. Newton's epistemology is permeated by a fundamental distinction between *apparent* nature, which is being perceived through the senses, and *true* nature, which can be perceived only through abstraction and the proper mathematical processes. Absolute time forms part of the latter. And this is the reason why Newton draws the attention of his readers to "certain preconceptions" which may lead to the confusion of mathematical time, space and motion with the sensible ones. And that is why there is a kind of an (implicitly evaluative) asymmetry in the expressions he uses: "absolute, true and mathematical" for the former, "relative, apparent, and common" for the latter.[7]

The dispute between Newton and Leibniz had its roots in the ideas of the two philosophers about the relation of matter with space and time. According to Newton a material particle considered from the point of view of mathematical physics occupies, by definition, a certain position in space and time. It is possible, then, for identical material particles to be distinguished only on the grounds of their differential positioning in space and time. But this is exactly the point where Newton's ideas clashed with the two fundamental principles of Leibniz's philosophy: The principle of suffi-

cient reason and the principle of the identity of indiscernibles.

The principle of sufficient reason is the cornerstone of Leibnizian metaphysics. According to it there must be always a specific and well-defined reason for whichever action in the universe; nothing occurs by itself or, better, nothing occurs without a reason; and this holds even for God.[8] The Newtonian perception of time clashed with this principle, since in a continuous and uniform flow of time there cannot be found a reasonable cause for the location of an event in a certain position instead of anywhere else in this flow. The principle of the identity of indiscernibles, on the other hand, states the impossibility of the simultaneous existence of two different entities which are absolutely identical; if so, they should be a unique entity. The identical material particles of Newtonian atomism which are distinguished only by their differential positioning in space and time are apparently in conflict with this principle. But there is, also, an even more profound conflict between the two approaches: The very same points of mathematical space and time, deprived from any quality that might distinguish them from each other, could not but be reduced to a unique point; in other words, Leibnizian philosophy contests the possibility itself for absolute space and time to be substantiated. According to Leibniz, therefore, time and space are only relative: Space is the order of coexistent phenomena and time is the order of successive phenomena. Or, at least, this was the way his contemporaries perceived his ideas about time and space. Today we know that his views on the subject were not reduced to this statement. Ernst Cassirer in his systematic discussion of 1943 suggests that space and time for Leibniz were not only a result of the sensible relations between things but they also comprised the totality of the relations among the terms of *every possible* experience. Leibniz himself remarks:

> Space and time together are the order of possibilities of the entire universe, such that they order not only that which actually is, but also that which could be put in its place, just as numbers are indifferent to that which is numbered.
>
> It is as I said that time and space mark the possible apart from the supposition of existence. Time and space are of the nature of eternal truths which obtain equally in the possible and the existent.[9]

This view seems to contradict the idea of relativity of space and time which Leibniz admits in other places. What he claims here is that space and time belong to the realm of *eternal truths*, while elsewhere he insists that they are only apparent impressions derived from the sensory perceptions. The fact, however, is that the point he tries to make during his controversy with Clarke, as well as elsewhere in his works, is that space and time are *ideal* conditions through which every possible world can be substantiated. This means that the *knowledge of space and time* is distinguished from the *knowledge of their empirical terms.* Although the *notions* of space and time are always a result of the relations between the various bodies and events which are being perceived through our senses, space and time themselves are not sensible. The concepts of spatial order and temporal succession do not derive directly from sensory perception, since they presuppose the processing of this perception by means of reason. As a result, the knowledge of space and time does not consist of the attributes of the apparent world we perceive through our senses, but originates from the eternal

truths, the validity of which is founded on the law of contradiction. Thus, Leibniz agreed with Newton as far as the *ideal* notion of space and time was concerned but disagreed with him on the grounding of these notions in the real world.

Voulgaris had not studied the original works of Leibniz; he got acquainted with them through the textbooks of Christian Wolff and, especially, of Madame du Châtelet. The latter conceives Newtonian time in the way most European philosophers read Newton's "Scholium" on space, time and motion:

> Ansi, on se le figure comme un Etre composé de parties continues, successives, qui coule uniformément, *qui subsiste indépendamment des choses qui éxistent dans le Tems,* qui a étédans un flux continuel de toute éternit, & qui continuera de même (Madame du Châtelet 1742, 119 [our emphasis]).

Talking about the Leibnizian view on the subject which she herself chose to adopt she says:

> Le Tems n' est donc réellement autre chose que l' ordre des Etres successifs; & on s' en forme l' idée, entant qu' on ne considère que l' ordre de leur succession. Ansi, *il n' y a point de Tems sans des Etres successifs* rangés dans un suite continue; & il y a du Tems aussi-tôt qu'il existe de *tels Etres* (ibid. 1742, 124 [our emphasis]).[10]

Along the same lines, but speaking as an opponent of Leibniz's view, Voulgaris observes in his *Metaphysics*:

> Wolff's followers do not seem to me to have been dealing successfully with the problem of time's nature. For they consider time to be the order of successive events that occur in a continuous manner (*Metaphysics*, part II, "namely *Cosmology*," 130).

5.3 The multiple aspects of temporality

Voulgaris' views on time are elaborated in two of his major works. The first is the *Elements of Metaphysics, written by Deacon Eugenios Voulgaris ... containing his teachings before his past students,* namely the philosophical lectures he delivered between 1742 and 1762. The work was published in 1805 thanks to the patronage of the Zosimas family, a family who sponsored the edition of a great number of Voulgaris' works that remained unpublished until the last years of his life. The other work took its title from pseudo-Plutarch's *Placita Philosophorum* (= Philosopher's Favorites) but it is, in fact, a work on the natural philosophy of his times. It was also published thanks to Zosimas' funding in order to be delivered to the Greek schools of the period. It came out in 1805 as well, but it was printed in Vienna while *Metaphysics* was printed in Venice. It is estimated that *Placita* must have been written between 1763 and 1771, while Voulgaris was living in Leipzig. This book does not contain his past teachings but it is a programmatic work on various subjects of natural philosophy.

The chapter "About time and space, as well as about Vacuum" of *Placita* is introduced with a bold claim: "Time is not a real being, neither is it a substance of the temporal beings that can be divided"[11] (*Placita*, 73). This claim brought apparently in the foreground the central issue of the controversy between Leibniz and Newton about time: What is the *nature* of time? Voulgaris' most complete answer did not occur in the *Placita* but in his *Elements of Metaphysics.* There, he devotes to the sub-

ject an extended section of the second chapter of book two, which is entitled *Cosmology.*[12] The section is entitled "About Continuance as well as about Time" and predisposes the reader for a significant ambivalence even in the definitions themselves: Voulgaris is going to deal not with one, but with two concepts, "time" and "continuance."[13] The fundamental one is the latter. "Continuance is the continuous extension of a being's existence"[14] (*Cosmology,* 109). But continuance has a double meaning as well. Insofar as it represents the duration of a being's existence *per se* it is called "irrelative,"[15] while when it is being measured on the basis of the events that take place in other beings it is called "relative." Voulgaris evokes Newton's "Scholium," although without making an explicit reference to it: "And the irrelative [continuance] is also called true and mathematical" and resembles the equable motion of a point that describes an infinite straight line; the "relative," on the other hand, is also called "apparent" and is being affected by the changes in the rate of the external events, "being, thus, particularly irregular" (*Cosmology,* 110). Though one can easily recognize Newton's presence in this passage, it is still extremely difficult to recognize Newtonian time. What is the relation between "continuance" and "time"?

As is the case with many other concepts of traditional Metaphysics, this relation seems to be an *hierarchical* one: Continuance has three ontologically distinguished states, according to Voulgaris: The superior state is "eternity," namely the duration that has neither a beginning nor an end and is peculiar only to God. Second comes "perpetuity," which is connected to the existence of *pure forms.*[16] Since these forms are created entities, they cannot be considered as eternal beings; although their existence never comes to an end, it certainly has as starting point the act of Creation. That is why this kind of continuance, which is open at the one end, is called "perpetuity" and —contrary to the common beliefs—it is not identical to "eternity." "Time" lies on the lowest level of temporal hierarchy; it is a duration closed at both ends, since it always has a starting point and an end, and corresponds to the duration of the natural bodies that belong to the world of creation and corruption (*Cosmology,* 110).

Voulgaris feels obliged to distinguish the thing *per se* from its conceptual representation. Notwithstanding the differentiation of continuance, he remarks, the ability of human beings to perceive temporal relations is limited. In fact, the only way we perceive a temporal relation is by comparing the duration of a being with a sequence of events that take place in our intellect. For, as Locke observed, *but also Aristotle much earlier than him had realized,*[17] if we are unable to take notice of the changes that occur in our mind, it is impossible to perceive time. This is so because we attach what precedes to what follows and we miss what happened in the meantime.[18] Hence, if we concentrate on a unique thing in such a manner as to follow its changes without taking notice of any external events, we will get the impression of a continuous present and, thus, we will miss the time that elapsed. Fortunately, this is impossible because our mind tends to be distracted by the multiple events that take place in the world of natural beings and to order them according to their temporal succession. As a result, human beings have at every moment a perception of time. But what does this manner of fashioning the notion of temporality mean for our ability to perceive "continuance"? Since human beings can only take notice of the changes that occur in the world of creation and corruption, the only dimension of continuance they actually

perceive is "time"; and insofar as they take notice of the time elapsed only through the comparison of different events, the only "time" they can really perceive is *relative* time. The two other aspects of continuance are intelligible but not perceptible. Hence, the fact that the human beings perceive the various aspects of continuance in the same way—that is, as "time"—reflects the limitation of human intellect. Continuance, however, as a general concept for temporality is actually divided into three different levels, each of which corresponds to a different group of beings. What is the reason for this "idiosyncratic" manipulation?

After a general introduction to the subject, Voulgaris turns to a series of theorems that refer to the various features of continuance. The first theorem is of a particular philosophical significance: "Continuance cannot be distinguished from the continuate."[18] Voulgaris proves the proposition in three different ways, all of which are based on the presumption that the dissociation of *existence* from its duration either renders the former unintelligible or leads to logical absurdities. But the purpose and the meaning of the theorem are better explained in the ensuing "Corollary" and "Scholium." The corollary is the positive rephrasing of the theorem: Consequently, neither "eternity" is distinguished from eternal God nor "perpetuity" from "perpetual natures" nor "time" from natural bodies; on the contrary, "eternity" is *identical* with God,[19] perpetuity is *identical* with those natures that remain immutable since the moment of their creation, and time is *identical* with natural bodies that are in a process of continuous change, governed by the necessity of creation and corruption. As a matter of fact, "most wisely Aristotle proved that time is nothing *per se*." The only way we have to distinguish the various aspects of continuance from the respective beings is through the help of reason. Voulgaris here reproduces a description that is found in many textbooks of natural philosophy of his time: As we distinguish number from the objects it counts and dimension from extended bodies, so we can also distinguish continuance from the beings whose duration it represents: That is, by *abstraction*. But virtually, continuance is not a self-existent being and, most importantly, its various aspects do not exist *prior to* the respective beings (*Cosmology*, 113-114).

So, this is the answer Voulgaris gives to the problem of time: *Continuance is an existential condition of the beings.* And this is the reason why he introduces the section on time of *Placita* with the programmatic declaration that "time is not a real being, neither is it a substance of the temporal beings that can be divided"; and that is why, in what follows he repeats that "most wisely Aristotle proved that time is nothing real";[21] and that is also why Voulgaris stresses that "time is the continuance and duration of existents, namely the progress, and the advancement, and the prolongation of their existence"[22] (*Placita*, 73). Voulgaris makes a philosophical as well as a theological point: Aristotle teaches us that time is an existential condition of the beings and thus it cannot subsist independently of, prior to, or after the end of them. On the other hand, the nature of God differs from the nature of humans and the nature of the eternal beings from the nature of God. Consequently, the times that represent the durations of these beings should be qualitatively different. "Time" as an existential condition of natural beings cannot account for the existence of eternal God; the same holds for "perpetuity," as well. "Eternity" and "perpetuity," on the other hand, due to their immesurability,[23] are inadequate for the estimation of the duration of nat-

ural bodies, which observe the necessity of creation and corruption. Thus Voulgaris' view on temporality is articulated as an alternative answer to the problem of time when compared to Newton's and Leibniz's conceptions. Time is neither a *self-existent entity*, which flows *independently* from the presence and the transformations of matter (Newton) nor an *apparent notion* that ensues from the comparison of the changes that take place in the natural world (Leibniz). Time —or, more precisely, "continuance"— represents an existential condition for the various beings both of the natural as well as of the transcendental world.

There is, however, a difficulty: Voulgaris displays undoubtedly a special preference for Newton's philosophy; he is, indeed, the first who introduced Newtonian ideas in the Greek intellectual life. Thus in two points, one in *Cosmology* and one in *Placita*, he reproduces faithfully the distinction made by Newton between absolute and relative time. In *Cosmology*, as we have already mentioned, he writes that "continuance" is divided into "irrelative" and "relative." "And the irrelative one is also called true and mathematical" and resembles to the continuous and uniform motion of a point that describes an infinite straight line. The "relative" one, on the other hand, is also called "apparent" and since it follows the rate of external events, its flow is irregular (*Cosmology*, 110). Along the same line in *Placita* he remarks that "absolute time, which is also called true and mathematical" is an endless uniform flow, without accelerations, retardations or interruptions which helps us "apprehend the endurance itself of existence." And "relative" time is the measurable duration of a change, which can be perceived through our senses as a result of the comparison with other changes (*Placita*, 74). Thus the difficulty we have is the following: How can one relate the "*true* continuance" and the "*true* time" which occur in the above statements with Voulgaris' programmatic declaration that "time is nothing real"? How can these views be reconciled? What does it mean that Voulgaris seems to adopt the "true time" of *Principia*, while at the same time he praises Aristotle because he proved that time is not real?

The answer lies in the distinction Voulgaris makes between the terms "true" and "real." For Newton the two terms are identical, insofar as time is ontologically self-existent and independent from matter. The "absolute, true and mathematical" time of *Principia* does not *correspond* to a natural entity, *it is* a natural entity. For Voulgaris this presumption is not valid. "Continuance" is being substantiated, only to the extent that material or immaterial entities exist, as a condition that represents the duration of their existence; as a result, "continuance" cannot not be real *per se*. But, it *can* be "true": If it becomes intelligible only in respect to the being whose duration it counts, it is "true" in the sense that it informs us about the real conditions of the existence of a being. On the contrary, when it is measured on the basis of the changes that take place in other beings it is only "apparent," because it does not inform us about what actually occurs to the being itself. This semantic manipulation makes it possible for Voulgaris to accommodate Newton and Aristotle under the same theoretical synthesis; or, to be more precise, to eliminate the potential contradiction between the two approaches and to construct a philosophical context within which the Aristotelian view on time becomes compatible with the "absolute, true and mathematical" time of *Principia*. *Reality* and *truth* are two distinguished states upon which the co-existence of the two different approaches is firmly founded.

6. CONCLUSIONS

Undoubtedly Voulgaris' elaboration of scientific ideas formed part of a *legitimate* cognitive enterprise. The fact that this enterprise was not able to be fully integrated within the broader stream of the emerging scientific thought was, of course, a result of the particular historical and cultural circumstances under which it was shaped.

The introduction of the new scientific ideas by the Greek scholars of the eighteenth century was a process almost exclusively directed to their appropriation for educational purposes. The apparent aim was to modernize the school curricula, but this did not mean a neutral attitude as to the possible ideological uses of these new ideas–especially the need to establish contact with the ancient heritage and to conform with the doctrines of Orthdoxy. As a result, the assimilation of the scientific ideas involved the production of a new discourse which reflected the *network of local constraints and priorities.* As we tried to show, the process of appropriation refers to the ways devised to overcome cultural resistance and make the new ideas compatible with the local intellectual traditions. As a matter of fact, understanding *the character* of this resistance becomes of paramount importance. And in the case of Greek intellectual life the issue of resistance cannot be discussed independently of the issue of breaking with ancient tradition. The specific ideological and political contingencies of Christian societies under Ottoman rule during the Enlightenment, together with the dominance of the Greek scholars in the Balkans, called for an emphasis not on the break with the ancient modes of thought, but rather on *establishing* the continuity with them. The Greek scholars tended to see the development of modern sciences as a triumph of the programmatic declarations of the ancient Greek thought, with its emphasis on the supremacy of mathematics and rationality, rather than a break with it and the legitimization of a new way of dealing with nature. On the other hand, the absence of a national state and of the relevant intellectual institutions did not allow the Greek society to form those conditions which would favour the exploitation and the respective social assessment of the sciences. Lacking such a corroborative framework, ideological and, in fact, philosophical considerations became the dominant preoccupation of the scholars and comprised the context within which the appropriation of the contemporary natural philosophy took place.

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NOTES

* John Stachel has not only been a very astute observer of what is happening in the uneasy and, perhaps, dangerous times we are living. John is in fact the kind of intellectual Karl Marx must have had in mind when he wrote the 11th thesis on Feuerbach: The point is not (only?) to understand the world but to change it. Though such changes implied by the 11th thesis have proven to be excruciatingly difficult, it is an optimistic sign to know that there are still people like John, with such a committed agenda to what has been envisioned more than 150 years ago.

1. See, indicatively, (Iltis 1977, Schaffer 1980 [esp. sections II. "Natural philosophy as Newtonian matter-theory" and III. "Natural philosophy as the negation of science"], Guerrini 1985, Force 1987, Casini 1988 [esp. sections 2. "The early critics" and 3. "Toland and Berkeley"], Thijssen 1992).
2. On these issues see the articles "Newtonianisme ou Philosophie Newtonienne", "Philosophie Experimentale" and "Mechanique" in *Encyclopédie ou dictonnaire raisonné des sciences, des arts et des métiers.* All of them were written by d'Alembert.
3. An analytical discussion of a number of cases can be found in (Dialetis et al. 1999).
4. There are very few studies on neoaristotelianism. C.B. Schmitt's works reprinted in the collections (Schmitt 1983 and 1984) offer a good overview of the subject. See especially the paper titled "Cesare Cremonini: un aristotelico al tempo di Galilei," contained in (Schmitt 1984, part XI), originally published in 1980.
5. On Theophilos Korydaleas' life and philosophy see (Tsourkas 1967).
6. On this subject see (Klein 1985).
7. Newton's views on space and time have been extensively discussed among historians and philosophers of science. This is not the place to review the respective bibliography, since, from the historical point of view, what we are interested in is the way Newton's contemporary philosophers perceived his ideas on space and time. See, however, J.E. McGuire's elaboration on the subject in (McGuire 1978). According to McGuire, Newton believes that space and time are general conditions of being which attach to a thing's existence. As we shall see below, this interpretation displays significant similarity to the way Eugenios Voulgaris handles the notion of time. For a further elaboration as well as for a criticism of McGuire's thesis see (McGuire 1990 and Carriero 1990), respectively.
8. A closer examination of Leibniz's philosophy, however, indicates that three different notions of this principle appear in his works. The first is almost identical with the principle of causality and states the dependence of every effect from the respective causes. This is the notion, which also Clarke ascribes to the principle of sufficient reason and that is why sometimes he claims that the only reason for an event is the will of God. The second option is contradictory to the previous one. According to it, the principle of sufficient reason functions as a motive. In this respect, even God should have a motive for his actions. The third option is connected to Leibniz's idea that God's actions aim always at the best possible world. Leibniz embraces this option when he argues against the existence of vacuum: God could not have allowed vacuum since the more matter there is in the universe, the more perfect it is (Alexander 1956, xxii-xxiii).
9. Cited by W.P. Carvin in (Carvin 1972), whence the ensuing argument.
10. We note the expressions which summarize the difference between the Newtonian and the Leibnizian perception of time according to Madame du Châtelet: The former states that time exists "independently of the things that exist in time" while the latter that time consists of "successive beings." In what follows we shall see how Voulgaris elaborates *between* the two.
11. *Οὐδέν ἐστι πραγματιῶδες ὂν ὁ χρόνος, οὐδὲ οὐσία τις τῶν ἐν χρόνῳ διηρημένη.*
12. Like in many other contemporary treatises of Metaphysics, the two other books are *Ontology* (the first) and *Psychology* (the third).
13. The (ancient) Greek word used here by Voulgaris is "*Διαμονή*". Its original meaning is "continuance" or "persistence." See (Liddell and Scott). Voulgaris was always very sensitive about the use of terms; thus in this case he was very careful not to confuse the meaning of the word with other terms signifying "duration," "continuity," or "permanence." Unfortunately, in vernacular English such a clear distinction is difficult to keep, at least for the case of continuance-continuity.
14. *Διαμονή ἐστὶν ἡ κατὰ τὸ συνεχὲς παράτασις τῆς τοῦ ὄντος ὑπάρξεως.*

15. The Greek word (*ἄσχετος*) also means "irrelevant."
16. *Τὰ ἀμιγῆ ὕλης εἴδη.* Although Voulgaris unreservedly adopts Newtonian atomism, he is quite reluctant to expel the Aristotelian dipole of matter and form from his philosophy. A few pages below he gives an even more eloquent evidence of his belief, referring to the "immaterial, perpetual forms" that would keep existing even though the material world had ceased to exist (*Cosmology,* 122).
17. As mentioned above, Voulgaris does not feel obliged to juxtapose Aristotelian tradition to the philosophy of his time. In fact, like most Greek-speaking scholars of the eighteenth century, he tends to understand the attainments of his contemporary philosophy as mature fruits of the ancient intellectual heritage. Hence in the introduction of *Placita* he declares that he is going to pay special attention to the origins of the various theories, so as not to underrate the contribution of the "real finders." (*Placita,* *2 [without page-numbering]). Along the same line here, he is careful to avert any misconception: The "real finder" of the theory about the perception of time was Aristotle and not Locke. And, most importantly, he doesn't seem to see any inconsistency in this ascertainment.
18. Although he just mentioned Locke (whose Essay, it must be noted, he himself had translated into Greek, probably in the late 1740s), Voulgaris prefers to quote Aristotle from the fourth book of *Physics*: (*Συνάπτομεν γὰρ τὸ πρότερον νῦν, τῷ ὑστέρῳ νῦν καὶ ἓν ποιοῦμεν ἐξαιροῦντες, διὰ τὴν ἀναισθησίαν τὸ μεταξύ*).
19. *Οὐδὲν ἐστὶ ἡ διαμονὴ πράγματι διακεκρινόμενον τοῦ διαμένοντος.*
20. We shall not discuss here Newton's idea, that God, by existing always and everywhere, constitutes [absolute] duration and space (which occurs in the "General Scholium"), neither his perception of absolute space as God's *sensorium* (which appears in *Opticks* and in *Leibniz-Clarke correspondence*). Although, at first glance, Voulgaris' perception of time displays some similarity to these views, his "entity-oriented" definition of the various aspects of "continuance" points to a quite different direction than Newton's contemplations do.
21. *Αριστα ὁ Ἀριστοτέλης* [...] *μηδὲν εἶναι πραγματῶδες τὸν χρόνον δείκνυσι.*
22. *Χρόνος γάρ ἐστιν ἡ τῶν ὑφεστώτων διαμονὴ καὶ διάρκεια, εἰ τοῦν πρόοδος τῆς τούτων ὑπάρξεως, καὶ προαγωγὴ, καὶ προέκτανσις.*
23. According to theorem XXX, "Neither eternity, nor perpetuity are measurable" (*Cosmology,* 124).

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