



普通高等教育“十一五”国家级规划教材



Essentials of *Great Western Ideas*

Ed. by Zhengkun

西方学术精华概论

□ 主编 辜正坤



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XIFANG XUESHU JINGHUA GAILUN

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西方学术精华概论

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总 序

随着全球化进程的加速发展,文化全球化和经济全球化的深入推进,高等教育,特别是英语专业教育在新的历史转型期的文化交融层面肩负着日益重要的社会责任。因此,为了培养具有扎实的英语基本功、相关的专业知识和文化知识、较强的英语综合应用能力和创新思维的人才,为不断深入的大学英语教学改革培养和提供师资,而且立足于中国语境,用全球化的理念和视角进行教材设计,我们策划了“高等院校英语专业立体化系列教材”。

实现这一具有时代意义的战略任务需要广大英语专业教师树立执着的敬业精神,制订科学的、高水平的、切合实际的英语专业教学大纲,编写出版能充分体现大纲要求的有关课程(必修和选修)的配套教材,以及开发为课堂教学和学生自主学习服务的、与新型数字化教学仪器设备配套的教学软件系统。由高等教育出版社策划并陆续出版的“高等院校英语专业立体化系列教材”作为“普通高等教育‘十一五’国家级规划教材”,就是为实现英语专业教学改革这一历史任务服务的。

为实现以上目的和任务,本系列教材注重以下方面:

1. 注重培养学生的跨文化交际能力和文化鉴赏与批判能力。在教材设计时体现“全球视野,中国视角”的理念。这就是说,本系列教材在保持各门课程的思想性和批判性的优良传统外,既向学生提供西方文化背景知识,也引导学生鉴赏和学习我国的优秀文化传统。要让学生在多元文化的背景下,熟悉掌握中外文化的共同点和差异。在这个基础上,培养学生的鉴别和比较能力,启发和诱导学生进行创新思维。

2. 科学安排,系统设计。经过多年来对教学模式改革的探讨,我国英语专业教学已总结出良性的教学规律,一般将4年的教学过程分为两个阶段,即:基础阶段(一年级和二年级)和高年级阶段(三年级和四年级)。按照此教学规律,本系列教材分为基础阶段教材和高年级阶段教材,同时悉心设计基础阶段和高年级阶段的衔接。基础阶段教材的主要任务是传授英语基础知识,对学生进行全面的、严格的基本技能训练,培养学生实际运用语言的能力、良好的学风和正确的学习方法,为进入高年级学习打下扎实的专业基础。高年级阶段教材的主要任务是在继续打好语言基础的同时,学习英语专业知识和相关专业知识,进一步扩大知识面,增强对文化差异的敏感性,提高综合运用英语进行交际的能力。同时,根据《高等学校英语专业英语教学大纲》的课程设置,本系列教材将课程分为英语专业技能课、英语专业知识课和相关专业知识课三种类型。全面培养学生的语言能力、思维能力、终生学习能力,拓宽学生的知识面,同时帮助学生树立正确的人生观和价值观。

3. 时代性。这不仅表现在选材方面能反映当代人民的生活内容,更主要的在于对它的“立体化”要求。21世纪的教材不再拘泥于传统的纸质教材,而是能培养学生多元识读能力(multiliteracy)的基于多媒体(multimedia)的多模态(multimodality)教材。本系列教材在建设传统纸质教材的同时启动建设一个开放性、超文本化的网络系列课程,构建全国英语专业英语自主学习体系,使优秀教学资源共享,充分体现“以人为本”的教学理念。这一举措也反映了由于当前英语专业招生人数的不断扩大,英语专业的传统教学模式已不能满足当前专业教学的需要。本系列教材采用立体化配套,将各种多媒体手段运用到教学中来,这是英语专业教学发展的需要,也将为我国英语专业教学改革和发展作出重大贡献。

4. 可教性。在编写过程中,反复强调教材的可教性。在选材上,讲究趣味性,让学生喜欢学。在内容安排上,力争让学生在较少的课时内学到该学的内容,从而体现当代先进的模块化教学思想。在习题设计上,做到有针对性、形式丰富,便于教师和学生课内课外操作。充分体现教学过程以学生为中心的教学理念,通过教师与学生互动、学生之间互动的教学活动,把语言、文学、文化、翻译等方面的教学内容转化成为学生能掌握的技能和知识,着力培养学生分析问题和解决问题的能力,传授基本研究方法,增强学生的研究意识和问题意识,同时提高学生的学术素养,提升学生综合素质。

5. 适用性。本系列教材集中全国著名大学的一批专家编写,凝聚了他们多年教学经验的精华,体现了我国英语专业教学的最新理念和先进水平。入选系列教材的初稿均在不同重点高校教学中使用过至少三轮,深受学生喜爱,能够真正反映当前英语专业教学改革的思路和教学的实际情况。

综上所述,本系列教材反映了当代新的教学理念。为此,编委会也做出了大量努力。一方面,编写工作中强调协同性:在编写策划层面,出版社与编委会之间、编委会与编写者之间反复协商,制订计划,讨论样张;在使用者层面,充分考虑师生之间以及学生之间的互动和协作。另一方面,教材致力于构建良好的英语学习平台,为学生自主性学习、独立思考和创新思维创造条件,同时向作为教学各个环节的咨询者、组织者、监督者的教师提供指导。

多年以来英语专业教材,特别是专业高年级教材的出版比较零散,一直缺乏相对配套完整的系列教材。我们深信本系列教材的出版对于推动英语专业的教学改革和建设,对于进一步提高英语专业人才的培养质量将起到积极的作用。同时,我们衷心希望听取广大师生的意见和建议,使本系列教材的出版日臻完善。

“高等学校英语专业立体化系列教材”编委会

2007年10月

Preface

By Gu Zhengkun

I have been indulging in philosophy ever since I was a child of about 10 years old. I am always galvanized into life whenever a philosophical problem occurs to my mind, seizing my imagination. *The Book of Change* (《易经》), *The Book of Tao and De* (《道德经》), *The Medical Classic of the Yellow Emperor* (《黄帝内经》), or even lots of religious classics such as *The Shurangama Sutra* (《楞严经》), *The Vijnaptimatratasiddhi Sastra* (《成唯识论》), *The Yogācārabhūmi-śāstra* (《瑜伽师地论》) and the *Bible* always lay around my bedside cupboard and pillows for more than fifty years, giving me thrilling pleasure that, though sometimes making me insomniac, has indeed enriched my innermost experiences of subtle speculations about the cosmos, life, despair and hope. Those books are, however, not really philosophy in the strict sense of the English word as understood by many of my contemporaries. I would say that it is the works of thinkers like Heraclitus, Socrates, Plato, Aristotle, Hegel, Descartes, Kant, or Wittgenstein that better match the word “philosophy” in the modern Western sense and that truthfully have opened my eyes to another door into the unfathomable mysteries puzzling and pestering human minds for thousands of years. In saying so, I do not imply that orthodox Western philosophy is superior to other sorts of speculative thought. No. In saying so I just mean that the structures of great human thought actually interweave with each other in a wonderful Yin-Yang pattern of complementarity, ushering us in a world where we are able to sense and appreciate the inexpressible grandeur and perfection of some cosmic spirit. One who disregards the legacy of Eastern ideas is destined to lack enough profundity in thinking, while one who does not make use of the legacy of Western ideas is equally doomed to lack enough precision in thinking. The Eastern and the Western systems of ideas are just like the two wheels of a chariot or the two wings of a bird, which complement and foreground each other to make a consummate whole.

It is this awareness that inspired me to offer the course “A Comparative Study of Chinese and Western Cultures”, by which I wished to share my academic experiences with Chinese students in general, especially the students at Peking University. Although I always adopted Western cultures and Western ideas as the frame of reference in the course, my emphasis was on Chinese culture. In order that Western culture, above all, Western ideas could be equally emphasized, I offered another optional course “Essentials of Great Western Ideas” for undergraduates of the whole university since 2003. This is the basis of the present textbook *Essentials of Great Western Ideas*. But the book aims not only at Peking University students but also at students throughout China. There are at least three important purposes

for the book which I'd like to mention here. Firstly, it is intended to expose students to the essentials of Western academic thought, especially Western philosophy, within the shortest possible time. Secondly, as we all know, the major portion of Western philosophy and humanities is written in the Indo-European languages. When the ideas and concepts are transmitted within the same language family, the linguistically-engendered distortion of meaning would be much less compared with when they are translated into Chinese. We know Chinese students' knowledge of Western philosophy and general humanities is always built upon related Chinese translations and Chinese courses. This obstacle to the understanding of the philosophical ideas and concepts from the West also causes corresponding misunderstandings and misinterpretations, because ideas and concepts usually get distorted, more or less, upon translation. As English belongs to the Indo-European language family, if the knowledge of philosophy can be directly imparted and received in English, the obstacles and distortions will be substantially reduced. So it is imperative to start such a course in a language of this family, say, in English, for our Chinese students. Thirdly, the textbook is also planned to help graduate or undergraduate students throughout the country to improve their ability to take courses in English.

The course "Essentials of Great Western Ideas" was delivered in English. It later on became a core course at Peking University for all sorts of students either in science or in liberal arts and was delivered almost every semester until the first half of the academic year 2012, developing through 15 semesters. Besides Western philosophy, the substance of the course also touches upon the knowledge of other disciplines, such as Darwin's theory of evolution, Freud's psychology and selected highlights from the natural sciences such as Newton's and Einstein's theories, the big-bang theory, the quantum theory, and the like.

Due to the over-rigid compartmentalization of disciplines, contemporary students are commonly locked into their own specialized areas, ignoring other fields. This may be a defect of the modern educational system which institutionalizes a belief that if one tries to master everything, he will certainly end up with a working knowledge of nothing. Yes, the belief sounds reasonable but it should not mean that speciality-oriented students should completely ignore all the other disciplines. Indeed, trying to acquire knowledge in all fields is foolish and absolutely impossible, but it is not a reason for us to refuse widening our range of knowledge. There are, after all, certain disciplines which consist of highly general knowledge and which should never be ignored. Philosophy belongs in the category. If a science is a discipline, philosophy is the discipline of disciplines. In other words, philosophical knowledge in a broad sense is crucially important, and it should enter into the list of compulsory course for students both in liberal arts and sciences. The range of knowledge for modern people is so over-expanded that nobody is in a position to exhaust all fields throughout his life; thus a generalized or abstract system of knowledge constructed to help

human beings get a command of the essentials or the general outlines of men's intellectual achievements within the shortest possible period of time serves an important purpose. At present, I suppose, philosophy and similar studies form just such a discipline. Philosophy is surely not omnipotent, but it indeed stands at the top of man's systems of knowledge. If philosophy is defined as an outlook upon the world and life, then all civilizations in the world have their particular philosophies because there can be no civilization that has no view of life as well as the world. Hence we have Eastern philosophy and Western philosophy. But the present book mainly aims at an introduction to Western philosophy or great Western ideas.

Great ideas or philosophies are not purely dogmatic theories. Often they function as clever answers to questions about concrete phenomena. Thus politics, ethics, economics, law, literature, linguistics, etc. can be all interpreted in terms of philosophy and thus I have started yet another course, "Essentials of Great Western Ideas with Regard to Literary Studies", for graduate students of the School of Foreign Languages since the second half of 2012. This new course is, to a large extent, the embodiment of my attempt at philosophical applications to literary researches, or an applied example of the present book *Essentials of Great Western Ideas*. It is mainly meant for introducing Western philosophy, but much of Chinese philosophy is referred to for comparison, or to put it another way, one of my intended purposes is to demonstrate the wonderful application of philosophy through examples to the field of comparative literature or comparative culture.

The readers of the book are expected to benefit significantly by applying its principles to any discipline, especially to the academic areas or issues in which they are genuinely interested. Chinese readers may benefit especially because the design of the book is planned in consideration of their particular receptivity and cultural background.

The writing of this book has taken many years. The general framework of it is based on my lecture notes of the course, but in writing the book, the contributors have made many extensions and modifications, and some new materials have also been added to meet the needs of potential readers.

The writing panel for the book is composed of 13 contributors. Except for 4 doctoral candidates, all the others hold PhD degrees in English. All of them are professors or associate professors with tenure at different universities. Alphabetically, they are Han Zhihua (Chapter 5), Jiang Li (Chapter 15 and 24), Li Hui (Chapter 17 and 19), Liu Hao (Chapter 3 and 4), Ma Shikui (Chapter 6), Niu Yunping (Chapter 12), Peng Fasheng (Chapter 2, 9 and 13), Peng Ping (Chapter 16 and 20), Shao Xueping (Chapter 7, 8, 14 and 18), Sun Jicheng (Chapter 1 and 21), Xu Yang (Chapter 10 and 11), Yu Suling (Chapter 22 and 23), and Zhang Zheng (Chapter 25 and 26). They have sacrificed much of their spare time for this work. Their commitment is really appreciated and I want to express my sincere thanks to all

of them on behalf of their readers. Mr. Zhang Kai, editor of Higher Education Press (HEP), has offered much advice on the revision and modification of this book. The leaders of HEP have always encouraged the publication of the book. It is their supervision and constant help that has made the present book possible. Mr. Joseph Christian, the English expert, has read through the whole book, correcting many errors or inappropriate expressions, indeed gracing the whole book. Last but not least, my good friend Prof. John G. Blair, Co-President of International Association for Comparative Study of China and the West, has kindly polished my preface to the book. Hereby, I'd like to extend my heartfelt gratitude to all of them on behalf of the whole writing panel.

March 2013

Institute of World Literature,
Peking University, Beijing

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Chapter One

Zeno of Elea and His Paradoxes

1 His Life and Work

Zeno of Elea, the great Greek philosopher, lived in Elea on the Italian coast in the 5th century B.C. Because his writings did not survive to modern times, our knowledge of Zeno of Elea comes from Plato's dialogue *Parmenides*, Aristotle's *Physics*, and Simplicius' *Commentary on Aristotle's Physics*. He is credited with creating several famous paradoxes, but by far the best known is the Paradox of Achilles and the Tortoise. Zeno's paradoxes have inspired many writers and thinkers through the ages, notably Lewis Carroll and Douglas Hofstadter, who also wrote dialogues involving Achilles and the Tortoise. They believed that the universe was singular, eternal and unchanging; "the all is one". Zeno was a philosopher and a logician, not a mathematician, but his famous paradoxes confused and confounded mathematicians for thousands of years. The most famous of these is usually referred to as "Zeno's Paradox" or "The Dichotomy", also termed as "The Paradoxes of Motion".

2 Zeno's Paradoxes I and II: Achilles and the Tortoise VS Dichotomy

A paradox is defined in *Webster's Dictionary* as "a statement that seems to contradict common sense and yet is perhaps true". The word is derived from the Greek language and is comprised of "para", meaning "contrary to", and "doxa", meaning "opinion".

As his Paradox of Dichotomy goes: "There is no motion, because that which is moved must arrive at the middle before it arrives at the end, and so on forever". While the original goes something like this: Achilles was the great Greek hero of Homer's *The Iliad*. Achilles was very good at running. When Hector, another Greek hero, was defeated and tried to escape, Achilles caught up with him and finally killed him.

Zeno's Paradox of Achilles and the Tortoise is an allegory illustrating the paradox of the dichotomy.

The Tortoise challenged Achilles to a race, claiming that he would win as long as Achilles gave him a small head start. Achilles laughed at this, for of course he was a mighty warrior and swift of foot, whereas the Tortoise was heavy and slow.

"How big a head start do you need?" he asked the Tortoise with a smile.

"10 meters," the latter replied.

Achilles laughed louder than ever. "You will surely lose, my friend, in that case," he told the Tortoise.

"On the contrary," said the Tortoise, "I will win, and I can prove it to you by a simple argument."

"Go on then," Achilles replied, with less confidence than he felt before. He knew he was the superior athlete, but he also knew the Tortoise was very bright and very wise. So the Tortoise said, "Suppose you give me a 10-meter head start, would you say that you could cover that 10 meters between us very quickly?"

"Very quickly," Achilles answered firmly.

"And in that time, how far should I have gone, do you think?"

"Perhaps a meter — no more," said Achilles after a moment's thought.

"Very well," replied the Tortoise, "so now there is a meter between us. And you would catch up that distance very quickly?"

"Very quickly indeed!"

"And yet, in that time," the Tortoise said, "I shall have gone a little way farther, so that now you must catch that distance up, yes?"

"Ye-es," said Achilles slowly.

"And while you are doing so, I shall have gone a little way farther, so that you must then catch up the new distance," the Tortoise continued smoothly.

Achilles said nothing.

"And so you see, in each moment you must be catching up the distance between us, and yet I — at the same time — will be adding a new distance, however small, for you to catch up again."

"Indeed, it must be so," said Achilles wearily.

"And so you can never catch up," the Tortoise concluded sympathetically.

"You are right, as always," said Achilles sadly and conceded the race.

So, who wins? The Tortoise.¹

What this actually does is to make all motion impossible, for before Achilles can cover half the distance he must cover half of half of the distance, and before Achilles can do that he must cover half of half of half of the distance, and so on, so that in reality Achilles can never move any distance at all, because doing so involves moving an infinite number of small intermediate distances first.

1 [MLA] Smith, B. Sidney. "Zeno's Paradox of the Tortoise and Achilles." *Platonic Realms Interactive Mathematics Encyclopedia*. Platonic Realms, 24 Mar 2013. Web. 24 Mar 2013. <<http://platonicrealms.com>>

Paradox Resolution

Since motion obviously *is* possible, the question arises, what is wrong with Zeno? What is the “flaw in the logic”? If you are giving the matter your full attention, it should begin to make you squirm a bit, for on its face the logic of the situation seems unassailable. The Tortoise should win the race! Yet we know better.

Now, let us pause to notice something remarkable. Suppose we take Zeno’s Paradox at face value for the moment, and agree with him that before I can walk a mile I must first walk a half-mile. And before I can walk the remaining half-mile I must first cover half of it, that is, a quarter-mile, and then an eighth-mile, and then a sixteenth-mile, and then a thirty-secondth-mile, and so on. Well, suppose I could cover all these “infinite” number of small distances, how far should I have walked? One mile!

$$1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \dots$$

In other words, at first this may seem impossible: adding up an infinite number of positive distances should give an infinite distance for the sum. But it doesn’t — in this case it gives a finite sum; indeed, all these distances add up to one!

A little reflection will reveal that this isn’t so strange after all: if I can divide up a finite distance into an infinite number of small distances, then adding all those distances together should just give me back the finite distance I started with. An infinite sum such as the one above is known in mathematics as an infinite series, and when such a sum adds up to a finite number we say that the series is *summable*. And poor old Achilles would have won his race.

The paradox can be also expressed in a slightly different way. For example, let’s suppose that Achilles runs 10 times as fast as the Tortoise and that the Tortoise has a 10 meter head start at the beginning of the race. Zeno argued that in such a situation, it would take Achilles an infinite amount of time to catch the Tortoise. His argument went as follows: By the time Achilles runs the 10 meters to the point where the Tortoise began, the Tortoise will have traveled one meter and will therefore still be one meter ahead of Achilles. Then, by the time Achilles covers a distance of one meter, the Tortoise will have traveled 1/10th of a meter and is still ahead of Achilles. After Achilles travels one tenth of a meter, the Tortoise will have traveled 1/100th of a meter. Each time Achilles reaches the previous position of the Tortoise, the Tortoise has reached another position ahead of Achilles. As long as it takes Achilles some amount of time to traverse the distance between the point where he is and the point where the Tortoise is, the Tortoise will have time to move slightly beyond that point. No matter how long

the race goes on, Achilles will have to move through every point where the Tortoise has been before he can pass him. Each time Achilles reaches such a point, the Tortoise is at another point. Therefore, Achilles will have to pass through an infinite number of points in order to catch up with the Tortoise. If it takes him some time to pass through each one of these points, it will take him forever to catch up. Can you find the faulty logic in the above argument?

The faulty logic in Zeno's argument is the assumption that the sum of an infinite number of numbers is always infinite. While this seems intuitively logical, it is in fact wrong. For example, the infinite sum $1 + 1/2 + 1/4 + 1/8 + 1/16 + 1/32 + \dots$ is equal to two. This type of series is known as a geometric series. A geometric series is a series that begins with one and then each successive term is found by multiplying the previous term by some fixed amount, say x . For the above series, x is equal to $1/2$. Infinite geometric series are known to converge (sum to a finite number) when the multiplicative factor x is less than one. Both the distance that Achilles travels and the time that elapses before he reaches the Tortoise can be expressed as an infinite geometric series with x less than one. So, Achilles traverses an infinite number of "distance intervals" before catching the Tortoise, but because the "distance intervals" are decreasing geometrically, the total distance that he traverses before catching the Tortoise is not infinite. Similarly, it takes an infinite number of time intervals for Achilles to catch the Tortoise, but the sum of these time intervals is a finite amount of time.

The assumption here is that the physical world consists of infinitely divisible space. In other words, we assume that it is possible to divide a running track into infinitely small pieces. If we accept this assumption, then we do run into a seeming contradiction: motion is impossible.

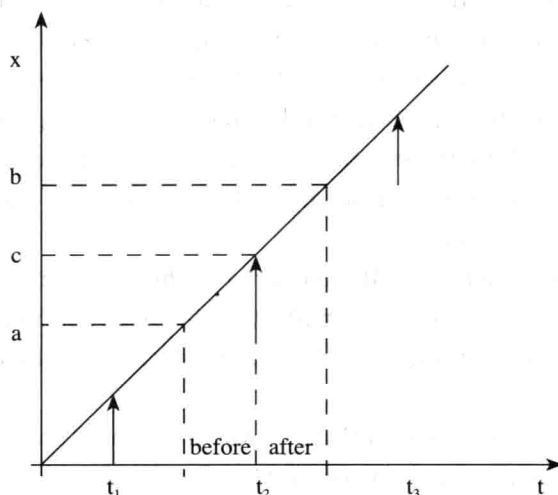
Western scholars usually view Zeno's argument not as a paradox, but as a proof that the physical world is not infinitely divisible. We begin with the assumption that a running track is infinitely divisible. This leads us to the logical conclusion that motion is impossible. But motion is clearly possible! So we may only conclude that the assumption is false, and that the track may not be divided into infinitely small pieces.

Accordingly, Aristotle stated his solution: "A finite time is also infinitely divisible and that will be sufficient for someone to move an infinitely divisible distance". He later decided that the response was not adequate, and claimed instead that the infinite number of halves was only a potential, rather than an actual, infinity.

3 Zeno's Paradox III: The Flying Arrow Is at Rest

The paradox, the flying arrow is at rest, calls into question our geometric

understanding of motion. The problem arises because we view both space and time as composed of indivisible points, and because motion is the change of position over time. Zeno thus asks us to consider an arrow, supposedly in flight, and its motion at any smallest instant of time. We take such instants to be points, and hence without parts according to Euclid's definitions. It follows that no motion can occur during an instant, for if it did, something like what's shown in the following figure would hold.



The Arrow Paradox: the arrow moves in the x direction as time goes on, but if it moves during t_2 then t_2 has “before” and “after” parts and is not an instant.

The trajectory of the arrow as it moves forward (in the x -direction) is plotted against instants of time t_1 , t_2 , and so on. If the arrow moves during any instant, say t_2 , from point a to point b through point c , then that instant has parts: the part before c is reached, and the part after. But instants are points and have no parts, and thus motion during any instant is impossible. Put succinctly, there is no time during a point-like instant.

Now time, in Euclid's view, is composed of instants just as the line is composed of points. But if the arrow doesn't move during any instant, and time contains nothing but instants, how can it move at all? It appears to have no time to do so.

In other words, Zeno's reasoning can be summed up as the following:

1. When the arrow is in a place just of its own size, it's at rest.
2. At every moment of its flight, the arrow is in a place just of its own size.
3. Therefore, at every moment of its flight, the arrow is at rest.

Aristotle points out that the paradox falsely assumes that time is composed of “nows” (i.e., indivisible instants or moments). Zeno's argument that an (apparently)

moving arrow is really at rest throughout its flight seems easy to evade if one insists that space is continuous (and hence infinitely divisible). But an atomist who insists on theoretically indivisible atoms seems bound to deny that space is infinitely divisible. And Zeno's Arrow Paradox poses an especially troubling problem for such an atomist.

How will the arrow (or any object, in fact) move through an atomic space? Since the space cannot be divided, the tip of the arrow must advance from one end of the space to the other without ever having occupied any of the intervening space. At one moment, t_1 , it's in one place, p_1 ; at some later moment, t_2 , it's in another place, p_2 . But if you pick any time t_i that falls between t_1 and t_2 , the arrow is either still at p_1 or already at p_2 . It never moves from p_1 to p_2 , because the space from p_1 to p_2 is atomic and therefore cannot be divided. Although we cannot, of course, be certain that Zeno intended his Arrow Paradox specifically against the atomists, it constitutes a formidable objection to an "atomic" conception of space.

Nevertheless, physicists are still enamored of the idea that space and time come in discrete "quanta" which cannot meaningfully be further subdivided, even conceptually. If you want proof, check out this *New York Times* article of December 7, 1999.

Scholarly opinion on Zeno's influence was dominated during the first half of the 20th century by a theory put forward in 1885 by the distinguished French historian Paul Tannery, which was incorporated in one form or another into most of the leading histories of Greek mathematics, science, and philosophy of the next sixty or seventy years. Tannery's interpretation included the following theses: (1) Zeno's arguments were not directed against the common-sense belief in plurality and motion. (2) They were aimed against a very special philosophical doctrine which, Tannery claimed, was held at this time by the Pythagoreans — that all objects are made up of elements which were expected to combine somehow the properties of the arithmetical unit, the geometrical point, and the physical atom. Moreover, (3) these Pythagoreans thought that time and motion were similarly discontinuous. (4) Zeno's arguments understood as onslaughts against (2) or (3) or both, were seen to be "clear, forceful, irrefutable — even those in which nothing but simple paralogisms had been commonly seen".¹ (5) "Zeno's success was complete."² "The theses he had attacked never reappeared after him."³ (6) The result was salutary for Greek mathematics, ensuring for it "rigorously precise ... notion

1 Tannery, Paul. *Pour l'Histoire de la science hellène*. Paris, Gauthier-Villars, 1877. p251.

2 Ibid., p251.

3 Ibid., p260.