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A Buddhist Critique of Scientism

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Abstract

This article introduces and translates "The Basic Problematic of Science" (*Kexue zhi genben wenti* 科學之根本問題), a short essay published in 1926 by the scientist and lay Buddhist Wang Xiaoxu 王小徐 (1875-1948). Although he did not use the term, the target of Wang's essay was scientism, an extreme form of logical positivism which claims that natural science is the sole authority for answering questions of both fact and value. This materialist position became popular in China from the late 1910s, and it posed a serious challenge to a wide variety of ontological and epistemological claims, including those made within Buddhist circles. While he did not oppose science in general, Wang believed the spread of scientism would lead to an increasingly violent and materialistic society. As a result, he critiqued the authority of its absolutist view by emphasizing the epistemic limits of the scientific method, and by rejecting its Cartesian dualism in favor of the Mahāyāna Buddhist position that "the myriad dharmas are consciousness-only" (*wanfa weishi* 萬法唯識).

Keywords:
Science, the myriad dharmas are consciousness-only, Wang Xiaoxu, materialism, epistemology

佛教的唯科學主義批判

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摘要

本文介紹並英譯〈科學之根本問題〉一文，此為身兼科學家與佛教徒的王小徐（1875-1948）於 1926 年所發表的一篇短文。「唯科學主義」是一種極端的邏輯實證主義，聲稱自然科學是回答有關事實和價值問題的唯一權威觀點。雖然王小徐沒有使用「唯科學主義」一詞，但其的確是他主要的批判對象。這種唯物論的立場在中國從 1910 年代晚期開始流行，它對包含佛學在內的多種本體論與認識論主張提出嚴重的挑戰。王小徐大體上不反對科學，但是他相信唯科學主義的散播將會導致暴力日益嚴重的唯物社會。結果，他藉由強調科學方法的認識限制來批判它絕對觀點的權威性，同時拒絕笛卡爾的二元論而認同「萬法唯識」的大乘佛教立場。

關鍵詞：
科學、萬法唯識、王小徐、唯物主義、認識論

PART I: Introductory Comments

The translation of modern science in China in the late nineteenth and early twentieth centuries had a marked impact on the way in which many Buddhists discussed their tradition.[1] This was due to a number of socio-political factors, as well as the fact that despite its growing cultural cachet, "science" remained a contested concept, and its establishment in China involved much disagreement and debate. Debates about the nature of modern science and the role it would play in China peaked in the 1920s and early 1930s. Not surprisingly, Chinese Buddhist discussions of science were at their height during the same period. The text translated here was originally published in 1926, and was very much a product of this historical milieu. Its author, Wang Xiaoxu 王小徐 (1875-1948), was both a practicing Buddhist and a prominent Western-trained scientist, who published several popular longer works on the relationship between Buddhism and science. "The Basic Problematic of Science" (*Kexue zhi genben wenti* 科學之根本問題) was the first work he wrote on this topic. Wang's target in this work was not science, but scientism, the iconoclastic and fundamentalist belief that modern natural science is the only valid way of knowing the world, and that it articulates the only valid values upon which human society should be based.[2]

One can see in "The Basic Problematic of Science" three themes that were becoming common in Buddhist critiques of scientism in the 1920s. First, like many of his contemporaries, Wang rejected the subject/object dualism promoted in scientism. Second, he pointed to flaws in the epistemological structure upon which the scientific method builds its claims to knowledge. Although he did not question the specific discoveries made by science, he argued that the scientific method is unable to answer questions about the ultimate basis for reality because it starts from faulty knowledge, including that of the relationship between subject and object. Wang argued that we should instead turn to Buddhism, and specifically to the Mahāyāna Buddhist doctrine of "the myriad dharmas are consciousness-only" (*wanfa weishi* 萬法唯識). This phrase had come to serve an important role in Chinese Buddhists' discussions of science and philosophy, and it was central to Wang's essay.

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1 Given the complex interaction between modern scientific ideas and Chinese thought, it is misleading to refer to a "transmission" of science to China. Thus, I follow David Wright in referring to the "translation" of science into China. See Wright (2000).

2 See Kwok (1965) and Sorell (1991).

The meaning of this phrase will be explained in greater detail below. The final theme that appeared in Wang's piece was a critique of the idea that the advancement of science automatically leads to increased levels of human happiness. Wang did not agree with this assumption. In fact, despite making a career as an engineer in Chinese industry and academe, he saw in modern science a number of things that concerned him.

Context

Wang's essay on science appeared in the midst of rich, and often contentious discussions about the future of China, and the role that science should play in that future. He thus did not create his essay from pure personal inspiration; rather, he was responding to a number of specific arguments that were taking place in the Chinese intellectual world at the time. These arguments developed because thinkers were answering certain fundamental questions in new ways. An ontological question: What kind of world do we live in? An epistemological question: How can we know this world? An ethical question: On what basis can we determine what it means to live rightly in this world? This set of questions was deeply interrelated for Chinese thinkers in the early twentieth century.

As the influence and authority of traditional Confucian orthodoxy declined from the start of the twentieth century, Chinese intellectuals faced a major crisis of fact and value.[3] China's thinkers began to articulate new visions for their society by drawing variously on streams of traditional thought such as Confucianism and Buddhism, as well as from Western ideologies of anarchism, Marxism, and the values of the Enlightenment. Although they drew from different modes of learning, there were few absolute differences between the views of different groups of thinkers, and there was a great deal that they had in common. By the late 1910s, the positive value of modern science and a belief in uninterrupted human progress were two ideas shared by most.[4] Yet this did not mean that everyone agreed in the answers they gave to the fundamental questions outlined above.

These disagreements are perhaps best represented by the Science and Philosophy of Life (*Kexue yu renshengguan* 科學與人生觀) debates of the

3 See Chang (1987).

4 See Fung (2010, 13).

1920s. Named for a collection of essays of the same name published in 1923,[5] I would argue that this term should not be limited to the contents of that particular collection but should instead be used to refer to the wide-ranging discussion of science that took place among China's intellectuals during the 1920s. Few of the individuals who weighed in during these debates had any expertise in science, but that did not prevent them from being active participants in what Wang Hui has labeled the "community of scientific discourse"—those who used scientific terms and concepts to discuss a wide range of issues, including many issues that did not directly relate to science.[6]

These debates were not about whether modern science was valuable: all agreed on this. Rather, the debates centered on certain absolutist claims made by the proponents of scientism. Although this specific term was not used, the concept indicated by it was the key focus of the debates. As noted by David W. Y. Kwok,[7] several major themes can be identified within the debates, all of which are related to the three questions raised at the beginning of this section. First, as to the ontological question of what kind of world we live in, the supporters of scientism pushed for strict materialism: the notion that only matter and energy (insofar as it is understood to be a material phenomenon) exist, and that all other phenomena, including consciousness, are merely epiphenomena of matter. This position was related to their answer to the second question, the epistemological question of how we can know the world. For the proponents of scientism, the only valid means of discovering truth about the world was through the scientific method. For them, this was generally understood to be a process of hypothesis, quantitative observation, and reasoned conclusion. This view holds that when properly applied, the scientific method automatically leads to a correct understanding of the rules of material causality. And since all things are nothing more than matter, if we properly understand material causality, then we understand the universe.

Starting from these two basic assumptions, supporters of scientism made a number of claims. They extended their faith in the power of science to make sense of the world of inanimate objects to the subjective world of human experience. Writing during an era when the Behaviorist school of psychology was on the rise, they believed that human consciousness was ultimately governed by knowable laws of cause and effect, analogous to those described in classical Newtonian physics. From there, they claimed that just as human

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5 See Hu and Chen (1923).

6 See Wang Hui (2006).

7 See Kwok (1965, 157-60).

experience and emotion follow certain rules, aesthetics and even ethics could be reduced to definite rules discoverable via the scientific method. In this way a few basic assumptions were extended to formulate the position of scientism, in which all phenomena are part of the natural world, and occur according to definite and knowable laws. It was the hope of the supporters of scientism that science would eventually be able to not only explain chemical reactions and the anatomical function of animal organs, but also create perfect art and, most importantly, perfect societies in which everyone was happy and lived according to a scientifically-determined set of universal human ethics.

Not everyone agreed with these ideas, of course. The above-mentioned Science and Philosophy of Life debates began when Zhang Junmai 張君勱 (Carsun Chang, 1886-1969) gave a lecture at Tsinghua University questioning some aspects of this ideology. Zhang denied the mechanistic understanding of human psychology promoted by some thinkers. Instead, he placed great value on the importance of subjective experience and intuition, and looked to continental thinkers, such as Henri Bergson (1859-1941), for his inspiration. Along with Liang Qichao 梁啟超 (1873-1929), he questioned the notion that the advancement of science automatically leads to social progress. Both Zhang and Liang had recently returned from Europe, where they had seen the devastation wrought in the First World War by the weapons produced by modern science. After their return, both men publicly expressed their disillusionment with the romanticized vision of science and European culture then popular in China, and they raised concerns about the dangers posed by science when left to its own devices.[8]

It was thus on the last of the three questions posed at the start of this section—the question of ethics—where the opponents and proponents of scientism were in the greatest disagreement. The basis upon which we determine what it means to live rightly in this world was very important to the opponents of scientism. Nor was this idle sophistry: Chinese society was being turned upside-down by social and political change, and China's thinkers were searching for the values upon which a Chinese future could be built. Given all of this, it was only natural that some Buddhists would weigh in on the question of scientism using ideas drawn from their own tradition. Wang Xiaoxu was one of the Buddhists to do this, and he was uniquely qualified to do so.

8 See Kwok (1965, 136-41).

Wang Xiaoxu and this Text

Wang Xiaoxu[9] was a devout Buddhist and one of China's first great modern scientists.[10] He grew up in a traditional Jiangnan 江南 gentry family in Suzhou 蘇州, but his was a generation in transition. During the first part of his life he received a classical Confucian education, but in his teens he enrolled at the *Tongwen guan* 同文館 in Beijing, a school founded expressly for the purpose of teaching foreign languages and modern subjects including science and international law.[11] There the precocious Wang excelled at mathematics, and he even wrote a mathematical treatise in 1891 at the age of sixteen.[12] Wang graduated in 1895 and over the next decade became an associate of some of the most important intellectuals of his generation, including his friend Cai Yuanpei 蔡元培 (1868-1940), and the geologist, linguist, and key contributor to the Science and Philosophy of Life debates, Wu Zhihui 吳稚暉 (1865-1953).[13]

In 1909, Wang's life took an important turn when he was sent to work and study in England for three years. While working at the Siemens Brothers factory in Stafford, Wang invented an automatic electrical switch for which he was awarded a patent.[14] In 1911, Wang became one of the first Chinese scientists to publish in a Western academic journal when his article "The Differentiation of Quaternion Functions" appeared in the *Proceedings of the Royal Irish Academy*.[15] With the end of imperial rule in China in 1912, Wang brought his expertise in engineering back to his native land. For a decade and a half Wang worked to establish modern industry in China, working in chemical manufacturing, steel production, and the manufacture of engines, among other areas. In 1928, Cai Yuanpei asked Wang to be a founding member of the Research Institute of Engineering (*Gongcheng yanjiusuo* 工程研究所) at the newly founded Academia Sinica (*Zhongyang yanjiuyuan* 中央

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9 Xiaoxu was Wang's style name (*hao* 號). He also commonly went by his name (*ming* 名), Jitong 季同.

10 What follows is a summary of a longer article on Wang Xiaoxu's life and works: see Hammerstrom ([2011] 2012).

11 See Xu (1991, 63-4).

12 See Guo (2005, 331).

13 Ibid.

14 See Yu (1999, 193-4).

15 See Wang Ki-Tung (1911).

研究院) in Shanghai.[16] From 1930 to 1934, Wang edited the Institute's journal, the *Memoir of the National Research Institute of Engineering* (*Zhongyang yanjiuyuan gongcheng yanjiusuo jikan* 中央研究院工程研究所集刊), and wrote most of the articles that appeared in it. He did all of this despite the fact that he retired from the Academia Sinica in 1933.[17]

In addition to publishing articles on engineering, Wang also began writing about the relationship between Buddhism and science. Spurred on by the debates then taking place among his peers, Wang put his extensive knowledge of science to the service of his Buddhist faith. "The Basic Problematic of Science" was the first piece he wrote on the topic. He wrote several other essays, including the 1929 "A Scientific Explanation of the Buddha-dharma" (*Fofa zhi kexue de shuoming* 佛法之科學的說明).[18] In 1932, he published a collection of his essays and letters on the topic of science and Buddhism titled *A Comparative Study of the Buddha-dharma and Science* (*Fofa yu kexue zhi bijiao yanjiu* 佛法與科學之比較研究). For this collection he solicited prefaces from his friends Hu Shih 胡適 (1891-1962), one of the most important Chinese intellectuals of the twentieth century, and Cai Yuanpei. Hu did not agree with Wang's support of Buddhism, which he felt was unscientific, and the dueling prefaces in Wang's book stirred up a great deal of discussion in the Buddhist community. *A Comparative Study of the Buddha-dharma and Science* was immensely successful and went through five printings within five years. In 1942, Wang published *Brief Essentials of the Buddha-dharma* (*Fofa shengyao* 佛法省要). This work repeated many of Wang's ideas about science and Buddhism, but also included substantial criticism of the dialectical materialism of Marx.

A Comparative Study of the Buddha-dharma and Science was the more important of Wang's two major writings. In it Wang laid out his major ideas, and his debate with Hu Shih attracted the attention of the wider community. This collection remains in print today,[19] and is an important source document for understanding the development of the modernization of Chinese Buddhism. For full English translations of Wang's and Hu's prefaces, as well as the essay "A Scientific Explanation of the Buddha-dharma," which served as the

16 See Shi (1994, 16).

17 See Yang (2007, 417).

18 See Wang Xiaoxu ([1929] 2006). Translated in full in Lancashire (1981, 110-30).

19 It can also be found online on several sites. See, for example, "Fofa yu kexue zhi bijiao" 佛法与科学之比较 at http://bookgb.bfnn.org/books2/1275.htm. Accessed 12/27/2013.

centerpiece of the collection, the reader is encouraged to see Douglas Lancashire's *Chinese Essays on Religion and Faith*.

Lancashire does not translate all of the material in *A Comparative Study of the Buddha-dharma and Science*, and one of the pieces not translated is the one presented here, "The Basic Problematic of Science." This essay was first published in 1926 in the *Journal of the World Buddhist Householder Grove* (*Shijie Fojiao jushilin linkan* 世界佛教居士林林刊).[20] The following year it was reprinted in *Sound of the Sea-Tide* (*Haichao yin* 海潮音), the most important Chinese Buddhist periodical of the century, as well as in *Eastern Culture* (*Dongfang wenhua* 東方文化), another Buddhist periodical.[21] In 1932, the same year that it was published as part of Wang's *A Comparative Study of the Buddha-dharma and Science*, this essay also appeared in a collection published by Nie Yuntai 聶雲台 (1880-1953), another Buddhist layman.[22] It may have appeared in other collections or in reprints that I have not yet seen, but in the eleven years between its publication in 1926 and 1937, "The Problematic of Science" was printed at least seven times.[23]

Wang's Argument

In the essay translated here, Wang's primary goal was not to undermine science, but to refute scientism. He argued that modern science has its limits: there are limits to the knowledge it can produce, and there are certainly limits in its ability to establish ethics for society. He made use of a number of concepts and terms drawn from modern science, but Wang's position was rooted deeply in Buddhist attitudes towards the reliability of the human mind, and the inherent interdependence of one's self and the world one finds oneself in.

One of the primary arguments of this essay was that scientific knowledge is limited by its uncritical dependence on the human mind. Wang began by likening the scientific method with the practice of Euclidean geometry. Just as one builds on certain basic initial assumptions, or postulates, to arrive at more complex geometric truths, science carries out experiments based on

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20 See Wang Xiaoxu ([1926] 2008). This journal was the organ of the prominent Shanghai lay Buddhist association. It began publication in 1923. See Jessup (2010, 14-15).

21 See Wang Xiaoxu ([1927a] 2006) and Wang Xiaoxu ([1927b] 2006).

22 See Nie (1932, 52-6).

23 See the table at the end of this article for a complete list.

preliminary assumptions about the universe to deduce more complex truths about reality. Wang said that science could never reach absolute truths about the universe since its preliminary assumptions are flawed. In other words, the problem for science is that the truths it discovers are ultimately based on untested assumptions about reality. Wang said that these flawed assumptions are ones derived from our common sense (*changshi* 常識)[24] or innate knowledge (*liangzhi* 良知)[25] about the world. We do not learn these ideas through study or practice; instead, they are truths about the world that we learn through everyday experience, and we take them for granted. Wang felt we should not take these ideas for granted because we cannot trust our own experiences. He adopted the Buddhist position that what we know about the world through the use of our mind is most often mistaken. He described the activity of the mind as "mental habits" (*xinxi* 心習), defiled mental activity that is produced by karma and that is delusional in nature. Scientists cannot hope to arrive at an accurate explanation of the truths of the universe as long

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24 I have translated *changshi* here as "common sense" or "commonsense knowledge." This refers to the knowledge that one is born with, or learns growing up without need for schooling. Despite some evidence of this term's usage in Chinese before the modern period, Wang uses the term according to the meaning it was given in modern Japan, where it had been adopted to translate the Western concept of common sense (Liu 1995, 286). Geoffrey Lloyd has suggested to me that Wang may have been using *changshi* as a double entendre, by referring to both people's common knowledge and to the "common opinions" (Greek: *koinai ennoia*) that form the basic initial postulates of Euclidean geometry.

25 This term is ultimately derived from the *Mencius*, 7A.15: 孟子曰：「人之所不學而能者，其良能也；所不慮而知者，其良知也。孩提之童，無不知愛其親者；及其長也，無不知敬其兄也。親親，仁也；敬長，義也。無他，達之天下也。」Legge translates this passage as follows: "Mencius said, 'The ability possessed by men without having been acquired by learning is intuitive ability, and the knowledge possessed by them without the exercise of thought is their intuitive knowledge. Children carried in the arms all know to love their parents, and when they are grown a little, they all know to love their elder brothers. Filial affection for parents is the working of benevolence. Respect for elders is the working of righteousness. There is no other reason for those feelings—they belong to all under heaven' (Legge [1895] 2011, 465)." By the time Wang wrote his piece in the mid 1920s, another term, *zhijue* 直覺, was in common use to translate "intuition." This had been introduced by Liang Shuming 梁漱溟 (1895-1988) as a translation for "intuition" as the term was used in Bergson's thought (Meynard 2014, 217). Because Chinese thinkers were aware of the term "intuition," and because it was the subject of some discussion, I have chosen to translate *liangzhi* here as "innate knowledge."

as their initial postulates are based on such deluded thinking. Wang was not content to let the logic of his argument stand by itself; he gave examples of the kinds of assumptions that come from our flawed innate knowledge about the world. These examples include some of the most famous moments from the history of anti-science: that the world is flat, and that the sun revolves around the world.[26] Wang argued that although these things seemed obviously true to the common sense of people of earlier generations, we now know that they are not true. For Wang, these examples illustrate the problems inherent in an over-reliance on common sense.

Wang pointed to the limits of scientistic epistemology in order to make room for Buddhism as a legitimate form of knowing. In particular, Wang rejected the Cartesian dualism of scientism in favor of the Mahāyāna Buddhist position that "the myriad dharmas are consciousness-only." Wang was neither the first, nor the most influential, writer of his day to use this phrase as a summary of Buddhist views on ontology and epistemology. From the 1910s onward, it became increasingly common for Buddhists to use this phrase when discussing modern Western philosophy and science.[27] Lexically similar to such neologisms as *weiwu* 唯物 (materialism) and *weixin* 唯心 (idealism), Buddhists used the term *weishi* 唯識 (consciousness-only) to stake out a unique position for Buddhism within modern philosophical discourse. Though *weishi* is another name for the school of Buddhist thought more commonly known as Yogācāra, it seems that many of the Chinese Buddhists who used this term in the early twentieth century were not referring to that school specifically, but rather to one of its central propositions.[28] This is not to say that some Buddhists did not make extensive use of Yogācāra thought in their discussions of science: they certainly did, especially in their discussions of modern psychology.[29] Rather, Wang's usage follows that of many others who wished to assert*, pace* scientistic materialism, a vision of the universe which

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26 The so-called Trial of Galileo, in which Galileo Galilei was challenged by the Catholic Church for his support of heliocentric Copernican astronomy, serves as an important piece of evidence for those who claim an inherent conflict between religion and science. This notion of conflict was initially popularized by several late-nineteenth century works in English (Barbour 1990, 24). This simplistic understanding of the nature of Galileo's conflict with the Church, and of the historical relationship between religion and science in the West have been challenged by historians (Brooke 1991, 8-10, 77-80).

27 See Hammerstrom (2010) and He (2013).

28 See Hammerstrom (2010, 87-8).

29 See Hammerstrom (2014).

accepted a deep causal relationship between consciousness and material phenomena.

Wang did not view his critique of scientism as merely a philosophical issue. As noted above, Chinese discussions of science were deeply connected with questions about ethics and social structures; Wang concludes his piece by raising the same concerns. Like most Buddhists, Wang was deeply suspicious of materialism as a basis for ethics, and he made his doubts clear. He alluded to the dangers of the "survival of the fittest" ethic of Spencerian social evolutionism. This idea had become popular in China from the start of the twentieth century, but it never sat well with China's Buddhists. While some responded by embracing the alternate vision of social order present in Kropotkin's anarchist socialism,[30] others, such as Wang, focused on warning against the advent of the self-serving society to which both evolutionism and materialism would inevitably lead. For Wang, the ultimate danger of scientism was not its mistaken views about the universe, but a corrupting social ethic that would cause great suffering to the peoples of China and the world.

In the pages that follow, I have avoided a strictly literal translation in favor of one that flows and follows the English idiom a little more closely. I have still tried to preserve the flavor and primary argumentation of this essay. Wang's logic is not always clear, nor are his arguments always the most convincing, but as a translator I felt it best to let his work speak for itself as much as possible without trying to correct or supplement his ideas. It is my hope that this translation might be of some use to those who do not read Chinese, but who are interested in the relationship of Chinese Buddhism and modern science and philosophy.

PART II: Translation of the Text[31]

The inferences laid out in Euclid's *Elements*[32] are precise, and later generations have taken him to be the founding father of the scientific method.

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30 See Ritzinger (2013).

31 This translation was made from the version of "The Basic Problematic of Science" that appears in Wang Xiaoxu (1932, 30-32). All paragraph breaks are mine. I wish to extend my thanks to the participants of the text-reading seminar at the Needham Research Institute, University of Cambridge, for the helpful comments they offered on this translation when I presented it in October 2009.

32 This work was first translated into Chinese under the title *Jihe yuanben* 幾何原本 in 1607 (Engelfriet 1998).

But many scholars in those generations have not been entirely pleased with his twelfth axiom.[33] And like a great building built on sand, this axiom could not avoid being shaken at its foundation. Lobatchevsky [*sic*] and others eventually abandoned this axiom and created a separate non-Euclidean geometry.[34]

Although "life has its limits, knowledge is limitless."[35] The various fields of human learning take common knowledge (*changshi* 常識) as their foundation. Now, the so-called scientific method relies on the rules of logic, and uses propositions to seek new conclusions. The conclusions at which it arrives become new theories and new inventions. As for the first propositions that are initially relied upon, they are either derived from common sense,[36] or they are conclusions arrived at by others before. And those previously-arrived-at-conclusions must themselves be arrived at by depending on still other propositions. Thus, there can be no doubt that the earliest, original propositions in this chain of deduction must be derived from common sense. But what is common sense, ultimately? If we examine for a moment the question of science, we find that its method consists of nothing more than depending upon commonsense knowledge as a basic proposition in order to seek conclusions which are, in turn, taken to be explanations for what we know with our common sense. This method cannot look into the origins of our common sense. Commonsense knowledge about time, space, quantity, and mass are the basic propositions of natural science, which are no different from the axioms in the *Elements*. And none of these axioms makes people more dissatisfied than the twelfth axiom. Although natural science has already developed to an incredible degree today, we should recognize that its foundation rests upon common sense assumptions that have not yet been adequately explained.

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33 Also known as the fifth postulate, this states that all straight, non-intersecting lines are parallel.

34 During the nineteenth century, three European mathematicians argued that Euclid's fifth postulate should be discarded because it could not be proven. This changed much of what was known about geometry and even the nature of the physical world. The efforts of these men, and the effect they had on Western mathematics are detailed in Bardi (2008).

35 吾生也有涯，而知也無涯。This is a quote of the first line of Chapter 3 of *Zhuangzi* 莊子. Watson translates it as, "Your life has a limit but knowledge has none" (Watson [1964] 1996, 46).

36 As mentioned above in note 23, I translate *changshi* here as "common sense" or "commonsense knowledge."

Thus, science of today can be referred to as Euclidean science. If we can abandon this commonsense knowledge, then we can develop a separate non-Euclidean science. What is non-Euclidean science? It is Buddhism, which was established three thousand years ago by Prince Siddārtha, scion of the clan of the Indian King Suddhodhana. Euclidean geometry is based on the common sense assumption that the gap between a parallel line in the same plane as another straight line will never change, no matter how far it is extended. Non-Euclidean geometry, on the other hand, is based on recognizing those cases in which these parallel lines will gradually draw closer or farther away from one another. In the same way, natural science today is based on common sense assumptions about the independence of matter and self (i.e. object and subject), while Buddhism is based on the idea that "the myriad dharmas are consciousness-only" (*wanfa weishi* 萬法唯識). "Myriad dharmas" here include all psychological, physiological, and physical phenomena; the commonsense knowledge discussed above; and all types of scientific questions established based on those common assumptions. "Consciousness-only" says that these things are all only the functioning of the mind. The substance of mind is originally empty and quiescent, but consciousness gives rise to delusion. Because of delusion, one produces karma, which produces retribution. Beings of similar karma (*tongye* 同業) generate shared retribution (*zongbao* 總報). Beings of different karma (*yiye* 異業) generate retributions specific to them (*biebao* 別報).[37] All of the questions of science, which are based on common sense assumptions, are no more than the shared retribution generated according to the similar karma we have generated in our lives.[38]

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37 Digital keyword searches seem to indicate that these terms were not often used together in Chinese Buddhist scripture. Wang likely drew this language from the *Zongjing lu* 宗鏡錄, where all of these terms are used in the context of an extensive argument in favor of the premise of consciousness-only. There, the terms are used as Wang uses them here, to explain that sentient beings see the same phenomena because of shared karma, not because of the reality of some external world that they all perceive (*Zongjing lu* 宗鏡錄 CBETA, T 2016, 48: 772b-773a).

38 The expression *tongye* appears in several different contexts in the Chinese Buddhist canon. Here, Wang used the concept of *tongye* to explain why, even though the world each of us experiences is a product of consciousness only, the worlds we experience are similar. To put this differently, if all worldly phenomena exist according only to the deluded consciousness of sentient beings, how is it that we are able to discover natural laws (gravity, for example) that seem to apply equally to all of these worlds? Without some other rationale to account for this similarity, it is easier for the materialists to argue that the reason for this similarity is that the world exists as a material phenomenon independent

This karmic retribution has no real substance, it is only of the substance of mind (*xinti* 心體). Thus it is said, "the myriad dharmas are consciousness-only." I say then that the natural science of today is Euclidean science, and that Buddhism is non-Euclidean science.

Someone could ask: Although common sense cannot be proven by logic, it is an innate knowledge (*liangzhi* 良知) possessed by human beings, which is entirely sincere and not deluded. This non-Euclidean science you have described, which runs counter to common sense, is just some kind of sophistry, and it is of no benefit or use to anyone. If Buddhism is a non-Euclidean discipline, how could it be worth studying?

To this I reply: At first glance, humans' mental habits (*xinxi* 心習)[39] only *seem* to be innate knowledge, but those who consider it carefully and understand how things really are do not point to innate knowledge to support their claims. The earth is flat: this is false innate knowledge. The earth occupies a fixed location in space: this is false innate knowledge. Matter falls in straight lines: this is false innate knowledge. If you say that that which goes against common sense is not worth investigating, how can science take as believable the theory of the mutual attraction of objects proven by physics and astronomy, or the orbit of the earth around the sun? Moreover, the conservation of matter and the conservation of energy have today become irrefutable principles of science. The mutual independence of time and three-dimensional space is a firmly entrenched mental habit, but Einstein relied on astronomical observations and advanced mathematics to prove that time and space are mutually related, and from this he created a four-dimensional geometry. When mass is introduced into space, the four-dimensional geometry of that space changes from a Euclidean one to a non-Euclidean one, proving the mutual attraction of objects. This is not the only thing that runs counter to common sense: There are imaginary numbers in algebra, which our minds do not have the power to envision. When ideas such as these are introduced they are touted by the scientists of the world, they are not disdained as unworthy of investigation just because they run counter to common sense. Why is it that

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of our consciousness. Wang attempted to undermine this argument by offering up *tongye* as the reason why we all experience the world as a similar cluster of phenomena.

39 Although this is not, as far as I have been able to determine, a common technical term, Wang seems to have been referring here to defiled habits (*xiqi* 習氣) related to the mind (*xin* 心), which are delusional.

only the idea that "the myriad dharmas are consciousness-only" is doubted on the grounds that it runs counter to common sense?

Someone could ask: The contradictions between common sense and the ideas of the mutual attraction of objects, the orbiting of the sun by the earth, and Einstein's Theory of Relativity have all been settled through the accumulation of precisely-measured experiment and calculation. They accord with the newest theories of science, and as a result, these theories have changed our common sense. Now you wish to replace common sense assumptions about the relationship of matter and self with the position that "the myriad dharmas are consciousness-only." Do you have any support for this position?

To this I reply: Anatomy has proven that when people see an object, it is nothing more than chemical changes taking place in the retina, and that hearing is nothing more than the quivering of the cilia in the ear. Thus, my sight and hearing are nothing more than movements in my retinal and ear cells. If I exist independently of objects, how am I able to see and hear them? Not only that, I have never observed my own retina and cilia, let alone the traces left upon them by the objects I encounter. This being the case, what is the basis for the opinion that matter and self exist independently of one another? The Buddha and Bodhisattvas of the higher stages, those who have attained non-discriminating wisdom, have proven for themselves that "the myriad dharmas are consciousness-only." You yourself have not practiced meditation, yet you say that you do not believe what the Buddha said. How is this different from someone who has not studied or mastered natural science, carried out any scientific experiments, or done any scientific calculations, who still rejects the mutual attraction of objects, the orbiting of the earth around the sun, the conservation of mass, the conservation of energy, and Einstein's Theory of Relativity, all without investigating them? Do you think this kind of person really understands these theories?

Someone could ask: In that case, have you yourself attained this non-discriminating wisdom and thus proven the truth of consciousness-only?

To this I reply: Although I have sadly not been able to verify the premise of "consciousness-only" for myself, I have read the teachings contained in the twelve sections of the *Tripiṭaka*, and because the rationale given there is sufficient, I have faith that they are reasonable words. You have faith in science, but have you yourself done experiments for each scientific problem, and have you carried out calculations to prove them? Doesn't the majority of

people rely on records made by earlier people, listen to their explanations, and consider their rationales enough to be believed?

Someone could ask: Your words are mere sophistry. "Studying for the purpose of application" is valuable; and although science has really flourished only in the last one to two hundred years, the degree to which it has advanced human happiness is obviously real and can be verified. On the other hand, there is no way to really measure the benefit that the Buddha's words have provided for sentient beings. Aren't his followers just idealists?

To this I reply: Are suffering and joy not measured solely according to the happiness they bring to the human heart, or do we take the quality and quantity of material things as their measure? If you say that human beings live only in the world, and that we do not need to ask about the feelings in their hearts, then wanton desire for goods should be our only natural duty. I am afraid that no one would be willing to accept this kind of talk. There is no doubt that the measure of suffering and joy is the happiness they bring to the human heart. This is why you cannot surpass the happiness that comes from a having just a bamboo ladle and some common scrolls, and why it is difficult to describe the suffering that comes from owning mansions and cars. The materialistic culture of the world today teaches people to be wayward, and to give free rein to their desires. The world's resources have their limits, but human desire is inexhaustible. When there is disparity between the resources held by different groups, disastrous conflict and slaughter will become increasingly fierce between them. Such calamities are already occurring. Are the effects of advancing happiness really like this? I humbly wish that my wiser colleagues will carry out quiet and diligent investigations of these basic problems; that they will not vainly adhere to the incomplete words of scientists, nor hide themselves away.

PART III: Original Text[40]

科學之根本問題

歐克里得著幾何原本（Euclid's "Elements"）推論精確，為後世以科學方法治學之始祖；顧其公論十二（Axiom 12）不為後世多數學者所滿意。猶如偉大建築物營於流沙之上，未免根本動搖。故羅巴怯夫斯基

40 As stated in note 30, this version of the text is taken from Wang Xiaoxu (1932, 30-32). All paragraph breaks are mine.

（Lobatchewsky [*sic*]）等得撇去此公論，別演為非歐克里得幾何（Non-Euclidean geometry）。

雖然，生也有涯，而知也無涯。吾人學問固莫不以常識為基礎。蓋所謂科學方法者，無非依邏輯（Logic）規律，據提案以求斷案耳。所得之斷案，為新學說，為新發明。所據之提案，非為常識即為他人先得之斷案。然先得之斷案，仍必據他提案以得之。故其最初之基本提案，終必為常識無疑。至於常識究屬何物？雖有時亦得藉科學以回溯一步，而其方法仍不外據他常識為提案，以求此常識之斷案，以為此常識之說明。其不能窺常識之源可知。故關於時（Time）空（Space）量（Quantity）質（Mass）等常識，其為自然科學之基本提案，實與幾何原本之公論無殊。且其不能使人滿意，未必愈於幾何原本之公論十二。故今日之自然科學，雖發達已至可驚之程度；當知其基礎，仍築在此未有滿意說明之諸常識之上。

更端以言之，則今日之科學，可稱為歐克里得式之科學。而撇去此諸常識，亦仍可別演為非歐克里得式之科學也，非歐克里得式之科學為何？三千年前印度淨飯王家悉達多太子所立之佛教是也。夫歐克里得幾何，基於一直線上同平面之諸垂線，無論如何引長，其距難恆不變之常識。而非歐克里得幾何，則基於認此諸垂線為或漸湊近或漸遠離之條件。今自然科學基於物我對待之常識。而佛教則立萬法唯識。萬法者，一切心理生理物理現象，上文所謂常識，與立於此常識基礎上之種種科學問題，皆是。唯識者，言其唯是心理作用也。然心體本來空寂，生識乃由於迷。因迷造業，因業感報。同業感總報，異業感別報。種種科學問題，與其所基之常識，皆不過吾人夙生同業所感之總報而已。而即此業報亦無實體，唯是心識。故曰萬法唯識。故曰：今日之自然科學，為歐克里得式之科學，而佛教為非歐克里得式之科學也。

或曰：常識雖非可以邏輯證明，然為人類之良知，至誠無妄。彼違反常識之非歐克里得幾何，不過等於游戲問題，無裨實用。佛教既為非歐克里得式之學問，則亦安足研究乎？

曰：人類心習，驟視之似良知，細考之而知其不然者不勝摟指。大地平衍，似良知也。地體靜定，星日運行，似良知也。物質依平行線墜落，似良知也。若謂違反常識者不足研究，然則力學天文學證明物質相吸，及地球繞日，科學家何以信為的論乎？又如物質永存（Conservation of matter），能量永存（Conservation of energy）皆與常識違反者。而今則

已成為科學上顛撲不破之原則矣。至於時間與三乘之空間（Three-dimensional space）互為獨立，此吾人極堅固之心習也。而愛因斯坦（Einstein）據天文學之記錄，及高深之數學，證明時間與空間相涉，成一四乘之幾何。又以物質散布其間，更使此四乘幾何，由歐克里得的變而為非歐克里得的，為物質相吸之說明。非但違反常識；抑且有類於代數學中之幻量（Imaginary quantity），迥非吾人心力之所能想像矣。然自其說出後，舉世科學家方交口頌之，未嘗以其違反常識而鄙為不足研究也。何獨於此萬法唯識之論，乃以違反常識疑之乎？

或曰：物質相吸，地球繞日，乃至愛因斯坦之相對論，皆積精密之實驗與計算，以證明普通見解之矛盾，與夫科學新說之密合，而後乃以學說易常識。今欲以萬法唯識之論代物我對待之常識，有何理由乎？

曰：解剖學證明人之見物，不過眼底網膜（Retina）起化學變化，其聞聲不過耳內毛細胞（Hair cell）之震顫。然則我之見性聞性，未越網膜毛細胞一步。縱有與我對待之物，我何嘗能見聞之？不特此也，我固未嘗自見我之網膜毛細胞，何況其與我對待之物所印之遺跡。更何況於能印此遺跡之物。然則物我對待之見解，果有何種根據乎？至於萬法唯識，固佛與地上菩薩得無分別智者之所親證。子自未修觀行，而不信佛說，此何異於不學無術之徒自未習自然科學，行科學實驗，演科學計算，乃斥物質相吸地球繞日物質永存能力永存及愛因斯坦相對論等為無稽。子其認為知言乎？

或曰：然則子已得無分別智，證唯識實性否？

曰：不佞雖未親證唯識，然閱三藏十二分教，理由充足，信其決非妄語耳。子信科學，豈曾於科學中種種問題一一自行實驗，自行推算證明乎？抑大多數仍據前人記錄，聞前人說明，認為理由充足而信之耶？

或曰：子之言辯矣。雖然，學以致用為貴，科學才發達一二百年耳，而其增進人類之愉樂便利，固有實事可徵也。反觀佛說，利樂有情，未有實證。無乃徒屬理想乎？

曰：所謂苦樂者，以人心之欣厭為準則乎？抑僅以物質之精神粗豐儉為準則耶？若謂人生在世，不必問心中之感想如何，而當以黷貨為唯一之天職。是說也，恐無人肯承認之。然則苦樂固當以人心之欣厭為准則無疑也。故簞瓢陋巷，有不勝其樂為焉。而大樓汽車，有難言其苦者焉。且今世物質文明教人以任性縱欲。然世間之物力有限，吾人之所欲無窮。分配

勢不能均，而競爭殺戮之禍乃愈烈。今其成績已可覩矣。增進愉樂之效，固如是乎？竊願學問界之先進，對此根本問題一潛心研究，毋徒墨守此不澈底之科學家言，而故步自封也。

Printings of "The Basic Problematic of Science," 1926-1937	
Year	Publication Location
1926	*Journal of the World Buddhist Householder Grove* (*Shijie Fojiao jushilin linkan* 世界佛教居士林林刊) 14
1927	*Sound of the Sea-Tide* (*Haichao yin* 海潮音) 4-5
1927	*Eastern Culture* (*Dongfang wenhua* 東方文化) 3
1932	*A Comparative Study of the Buddha-dharma and Science* (*Fofa yu kexue zhi bijiao yanjiu* 佛法與科學之比較研究). Shanghai: Kaiming Shudian.
1932	*A Comparative Study of the Buddha-dharma and Science* (*Fofa yu kexue zhi bijiao yanjiu* 佛法與科學之比較研究). Suzhou: Honghua she.
1932	Nie Yuntai 聶雲台, *Essays on Studying Buddhism* (*Xuefo pian* 學佛篇).
1937	*A Comparative Study of the Buddha-dharma and Science* (*Fofa yu kexue zhi bijiao yanjiu* 佛法與科學之比較研究). Shanghai: Foxue shuju.

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