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Abstract

Previous studies of the sources of thought in Yan Fu's *Tianyan lun* have failed to give sufficient attention to Francis Bacon. The source of Yan Fu's ideal of a strong and prosperous China is, I think, none other than Bacon. This paper discusses Bacon as he appeared in Yan Fu's *Tianyan lun* and political essays written at the time of *Tianyan lun*, and Bacon's influence on Yan Fu.

Keywords: science, Bacon, Western studies, *Tianyan lun*, Yan Fu

1 Bacon in *Tianyan lun*

Tianyan lun 天演論 was the first translation that Yan Fu 嚴復 published.¹ This was a translation of the 1893 Romanes Lecture, *Evolution and Ethics*, by Thomas Henry Huxley (1826–1895), a British philosopher and naturalist, and an introduction, written in 1894, to guide readers through this somewhat abstruse lecture.² Huxley's lecture and introduction discussed the connection between Charles Darwin's theory of evolution and ethics in human society.

Yan Fu, especially in book 2 of *Tianyan lun*, shows an uncommon interest in science—including its purpose, use, method, and content—even though science was not emphasized in Huxley's original work. For example, Yan Fu, in book 2 of this work, clearly states at the outset,

In metaphysics 道, we approach the truth the closer we get to particulars 每下而愈況. Even though we reach the ultimately fine, by exhausting the nature of things we get to know their ultimate nature, and by exhausting the principles of things we come to know their ultimate principles. This

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1 Page references are to Yan Fu, *Tianyan lun* 天演论, Yan yi mingzhu zongkan 严译名著丛刊 (Beijing: Shangwuyin Shuguan, 1981). Some quotes, however, follow citations in other works.

2 *Evolution and Ethics and Other Essays*, by T. H. Huxley (1894). Here I use the 1902 reprint published by D. Appleton and Co.

requires cleverly using only what we know. How can we achieve something great by rushing to distant vistas and soaring high?³

The phrase 每下而愈況 is a loose quote of 每下愈況 in *Zhuangzi*. In an inter-linear note Yan Fu explains,

Bacon was the first to state these ideas. His words were, “The business of science 格致 is to describe all the richness that Nature 真宰 has produced. The things that Nature produces are neither noble or base. Hence, man’s taking them to be noble or base is a wide departure from the way of science. When we do this, how can we still be doing science?⁴

“Bacon” here is a reference to Francis Bacon (1561–1626). This paragraph reflects Bacon’s basic idea of science. Though Huxley did not explicitly state this, we should understand what he wrote as follows: the metaphysical 道 can manifest itself only in the physical, and the essences and principles of the metaphysical and the physical interact. As Bacon said, the object of our study is the physical. Hence, we should investigate whatever has an objective existence. In the object of our inquiries, there is no innate distinction between the metaphysical and the physical. Any artificial distinction between noble and base is already a departure from the nature of our study. If we pursue such a departure, how can we properly carry out our inquiries? The ideas that Bacon was the first to state, according to Yan Fu, came from book 2, aphorisms 119 and 120, of Bacon’s *Novum Organum*. Here are the original passages:

There will be met with also in my history and experiments many things which are trivial and commonly known; many which are mean and low. . . . But I—who am well aware that no judgment can be passed on uncommon or remarkable things, much less anything new brought to light, unless the causes of common things, and the causes of those causes, be first duly examined and found out—am of necessity compelled to admit the commonest things into my history. (Book 1, aphorism 119)⁵

And for things that are mean or even filthy, . . . such things, no less than the most splendid and costly, must be admitted into natural history. Nor is natural history polluted thereby; for the sun enters the sewer no less

3 *Tianyan lun*, book 2, discourse 1, “Neng shi” 能實 (Attaining Reality), p. 49.

4 *Tianyan lun*, book 2, discourse 1, “Neng shi,” p. 49 n. This note does not appear in Yan Fu’s edited manuscript of *Tianyan lun* dated lunar sixth month 1897.

5 Here and below, quotations of Bacon’s *Novum Organum* are from the translation by James Spedding et al.

than the palace, yet takes no pollution. (Book 1, aphorism 120)

For whatever deserves to exist deserves also to be known, for knowledge is the image of existence; and things mean and splendid exist alike. (Book 1, aphorism 120)⁶

This was the first time that Yan Fu mentioned Bacon in his translation. Later, in *Tianyan lun*, book 2, discourse 3 “Jiao yuan” 教源 (The Origin of Doctrine), Yan Fu again mentioned Bacon:

If we view matters as Bacon dictates, we can take our probes into the principles of things as providing the rationale for the way of man 人道. Those who fuss around in the realm between Heaven and man take themselves to be engaged in serious business, but are they not playing around in the void and exerting themselves to no avail?⁷

That is, investigating why the physical is as it is, is just investigating why the metaphysical is as it is. Theologians and scholastics who look down upon the physical are only dallying about in an empirically unverifiable world of illusion. Their work produces nothing of value. Huxley, in the fourth section of his lecture (pp. 63–66), discussed such early Indian philosophical matters as the relationship between the Atman (soul) and substance, between suffering and release, etc. Yan Fu translated this discussion as discourse 8 “Mingwang” 冥往 (Death) and discourse 9 “Zhen huan” 真幻 (The Real and the Illusory) in his *Tianyan lun*, and he also expanded the discussion to include mind and existence. The text of these two short discourses differ hardly at all between the manuscript and the printed work, but there are quite a few discrepancies in the translator's notes. In a note in the manuscript version, Yan Fu writes,

6 Bacon expressed similar ideas in *The Advancement of Learning*: “But the truth is, they be not the highest instances that give the securest information, as may be well expressed in the tale so common of the philosopher [Thales (624?–546? BCE), a Greek philosopher, mathematician, and astronomer] that, while he gazed upwards to the stars, fell into the water; for if he had looked down he might have seen the stars in the water, but looking aloft he could not see the water in the stars. So it cometh often to pass that mean and small things discover great, better than great can discover the small; and therefore Aristotle noteth well, “That the nature of everything is best seen in his smallest portions” (book II.i.5). “But if my judgment be of any weight, the use of History Mechanical is of all others the most radical and fundamental towards natural philosophy; such natural philosophy as shall not vanish in the fume of subtle, sublime, or delectable speculation, but such as shall be operative to the endowment and benefit of man's life” (book II.i.6).

7 *Tianyan lun*, book 2, discourse 3, “Jiao yuan,” p. 54. This passage does not appear in Yan Fu's manuscript for *Tianyan lun*.

In the Jiaping, Longqing, and Wanli reign periods of the Ming dynasty, or the sixteenth century in the West, the Dark Ages were already in the past and the Renaissance was in full bloom. During this period such great scientists as Bacon, Newton, Spinoza, Leibniz, and Locke appeared in considerable numbers, producing seminal theories and writing notable books, and the Frenchman Descartes advocated skepticism and following one's own mind, breaking the hold of such ingrained thinking as Catholicism and Aristotelianism.⁸

This was Yan Fu's first mention of Bacon in his June 1897 edited manuscript for *Tianyan lun*. In a translator's note in the published version, Yan Fu states that discourses 8 and 9 contain the most subtle theories on the principles of physical observation, and that beginners will find them difficult to understand on a first pass. But because they provide the keys to Western studies and these matters are important, he accepted the challenge and applied himself ever more diligently to making the author's intent clear, even though he felt himself not up to the task of getting at the author's deep meaning.

In discourse 11, "Xuepai" 學派 (Schools of Thought), Yan Fu continues to introduce sources of Western thought to China: Heraclitus (ca. 530–ca. 470 BCE) created a theory of the universe to elucidate the sources of Nature, and thereby acted as a harbinger of science of future millennia. His theories have nothing to do with daily life or with moral cultivation of the individual. Thus we can say that Heraclitus's theories were profound and broad. In contrast, Socrates (469–399 BCE) and his follower Plato (ca. 427–347 BCE) thought that the universe was too vast, and its principles too complicated, for mere mortals to reason clearly about. So they gave up studying the universe and returned to the study of morality in human society. Yan Fu criticizes Socrates for not understanding that truth cannot be divided into major truths and minor truths, that all natural phenomena entwined in causal connections reflect the truth, and that all such phenomena can be studied. There is no reason to think that principles of the natural world are difficult, and that matters concerning human society are easy. The constant natural phenomena around us operate according to mysterious principles requiring the methods of science—logic, mathematics, physics, chemistry, and probing—to understand them. One of the failings of Socrates's view is that it elevates natural phenomena tangled in a web of causal relations to the level of unattainable knowledge, treats such phenomena as outside the purview of human society, and regards moral culti-

8 "Tianyan lun shougao" 天演论手稿 (Manuscript for *Tianyan lun*), in Yan Fu, *Yan Fu ji* 严复集 (The Collected Works of Yan Fu), edited by Wang Shi 王斌 (Beijing: Zhonghua Shuju, 1986), vol. 5, p. 1455.

vation of the individual as most important. Proceeding in this fashion ostensibly seems practical and realistic, but in fact is forsaking the whole for a part and jettisoning the near at hand for the remote. Hence, Socrates contributed nothing to the theories of Heraclitus. Huxley, in his original work, did not criticize Socrates. Yan Fu added this criticism in his translation of Huxley's work. The idea for this criticism can be found in the quote from Bacon given above. Huxley only pointed out that Heraclitus's intellectual heir was neither Socrates nor Plato nor Aristotle. In an author's comment, Yan Fu elaborates: Aristotle accommodated the theories of his predecessors. Then in the sixteenth century (the middle of the Ming period), Bacon in England and Descartes in France advocated empirical and inductive science, breaking through the stagnation of the Dark Ages. Newton, Galileo, and Harvey discovered new principles, establishing new sciences that replaced the old. There was excess rejection of the past, and Aristotle's theories fell into neglect, but in the last century, according to Yan Fu, people came to reappreciate Aristotle's theories and ideas, and appropriated the best of them.⁹ Yan Fu praises Bacon for founding the modern scientific method and for "sweeping away the cobwebs of the old learning."¹⁰

What Yan Fu calls the ninth discourse of Huxley's lecture is the conclusion of the lecture and its crucial points. After reviewing the history of Indian and Greek philosophy, Huxley turns his attention to late-nineteenth-century Europe, a leap of twenty-six centuries. At that time Darwin's theory of evolution had already been in circulation for more than forty years, and the optimism of a perfect world that the theory ushered in had begun to dissipate. People began to wonder what sort of relationship there was between the evolution of species and the evolution of ethics. Huxley points out that there is no necessary connection between the two, that the evolution of species need not further the evolution of human ethics, and that humanity ought to consciously promote ethical progress in a world fashioned by humans. Huxley writes,

Finally, to my knowledge, nobody professes to doubt that, so far forth as we possess a power of bettering things, it is our paramount duty to use it and to train all our intellect and energy to this supreme service of our kind.

Hence the pressing interest of the question, to what extent modern progress in natural knowledge, and, more especially, the general

9 *Tianyan lun*, book 2, discourse 11, "Xuepai," p. 80. In the manuscript version, this note is very concise (Yan Fu, *Yan Fu quanji*, vol. 1, p. 57).

10 From "Yuanqiang xiuding gao" 原強修訂稿 (The Sources of Strength, Revised Version). More on this work below.

outcome of that progress in the doctrine of evolution, is competent to help us in the great work of helping one another?

In an author's comment in discourse 15, "Yan e" 演惡 (The Practice of Evil), Yan Fu severely criticizes Huxley: "Huxley's words here are very superficial and not worthy of an intellectual." "Of all seventeen discourses in this work, this is the worst." He even goes so far as to say, "Huxley here is just flattering superficial scholars. This is not a serious argument." I will leave to intellectual historians to discern differences and similarities between Yan Fu and Huxley on evolutionary theory and ethics. Here I will point out only the scientific outlook reflected in Yan Fu's translations. Huxley sought to improve our ability to better things and change Nature, and he called this task the "supreme service of our kind." Yan Fu sought to point out our natural ability to use scientific training to improve ourselves and also to benefit society as a whole. Whether it be the ability of natural science to improve people's habits of thought or the ability of abstract science to promote progress in society, the advances of science have a positive effect. Moreover, all beings must follow the laws of evolution; there are no distinctions of noble or base here. Hence scholar-scientists sooner or later realize that creation proceeds from a single source, that no science is important or unimportant, worthwhile or worthless. Humans' innate sense of right and wrong was perfected through the process of evolution, which proceeds through systematic causal laws that we can discover. The development of the universe and the evolution of society are intimately connected—a fact that we cannot fail to recognize. In this discourse Yan Fu departs from a simple translation of Huxley's original lecture. We can readily detect Bacon's influence: that the business of science is to describe Nature in all its richness, that science does not find the things of Nature either noble or base.

In *Tianyan lun*, Bacon is referred to four times: once in the interlinear notes, twice in the text, and once in the author's comments. But Huxley never directly mentioned Bacon, either in his lecture or in the prolegomena to his lecture, written later. Bacon was the father of modern British materialism and empiricism. An advocate of modern natural science and the earliest proponent of the modern scientific view, he elaborated on the purpose and nature of science, and on a sure way to promote the development of science. He opposed scholasticism and thought that in the pursuit of truth, physical science held a position on a par with that of metaphysics. Bacon advocated observing and learning from Nature. He pointed out that all knowledge comes from Nature, that apart from Nature, there is no knowledge, that in seeking the truth, we must rid ourselves of preconceptions and prejudices, that observation and experiment are the only sources of knowledge, and that

induction is the only scientific way of accurately knowing Nature. Bacon's criticism of scholasticism and traditional logical thinking cleared the way for the development of modern science. Though Huxley never mentioned Bacon by name, the ideas and views of this great thinker of two centuries prior were well known to both Huxley and his audience and required no introduction.

2 Science in Yan Fu's Three Essays on Western Learning

When did Yan Fu come in contact with Bacon, when did he read his works, and why did he mention Bacon several times in his *Tianyan lun*? To answer these questions, we have to look at Yan Fu's three essays on Western learning—"Lun shibian zhi ji" 論世變之亟 (On the Urgency of Change in the World), "Yuan qiang" 原強 (The Sources of Strength), and "Jiuwang jue lun" 救亡決論 (On the National Salvation Decision)—which were written concurrently with Yan Fu's translation *Tianyan lun*.¹¹

Yan Fu, in the aftermath of defeat in the First Sino-Japanese War, said, "I felt a blockage in my chest and wanted to throw up," and on February 28, 1895, he published his first commentary on current events, "Lun shibian zhi ji." In this commentary he took the opportunity to introduce the concept of evolution, warned his countrymen of the danger of the loss of the country and the extinction of the race, and affirmed that if China wants to be rich and powerful, it must acquire Western technology.

One month later, on March 29, Yan Fu published the first of two installments of "Yuan qiang" in the newspaper *Zhibao* 直報. In this article Yan Fu introduced Darwin's theory of evolution to Chinese readers for the first time.

And then in May 24, 1895, he began publishing "Jiuwang jue lun" in installments, again in the Tianjin paper *Zhibao*. This article focused on the pressing issue of developing people's knowledge. Yan Fu held, "Human talent and scholarship should seek to be useful, and the measure of being useful is to make the nation rich and powerful. Making the nation rich and powerful is the foundation of the sciences 格致. If the sciences have no foundation, they have no direction and are barren. It is just as the saying says: 'Boiling sand forever and ever never produces cooked rice.'"¹² Here Yan Fu emphasizes the importance of science for making the nation rich and powerful, and this was also one of Bacon's main points. But at the time, the thinking in China was this: China from ancient times already had the notion of science 格致, namely, as the fundamental beginning 始基 in the *Great Learning* 大學. Hence,

11 *Lun shibian zhi ji*, *Yuan qiang*, and *Jiuwang jue lun*, in vol. 1 of Yan Fu, *Yan Fu ji*, edited by Wang Shi, pp. 1–5, 5–15, 40–54. Quotations below are from this edition. In some cases, I give just the volume and page number.

12 *Yan Fu ji*, vol. 1, pp. 40–54.

why is it necessary to look to the West to study science 格致?¹³ Moreover, after Zhu Xi 朱熹, in *Daxue zhangju* 大學章句 (The Great Learning, Fully Annotated), explained the phrase 格物致知, here translated as “science,” later scholars have disputed its meaning, with the Lu brothers (Lu Jiushao 陸九韶, Lu Jiuling 陸九齡, and Lu Jiuyuan 陸九淵) and Wang Yangming 王陽明 asserting that merit in the conduct of affairs does not depend on science 格致. In the same essay Yan Fu responded,

The theory of the Lu brothers and Wang says that science 格致 helps not in the least in the virtuous conduct of affairs, and that restraint in the virtuous conduct of affairs does not impede science. But that is totally not possible.

The teaching of the Lu brothers and Wang, in essence, says that one should only directly follow one’s heart and act independently. They feel that without going outdoors they can know the world. But do the affairs of the world match what the so-called cognoscenti know, or are they far apart? This they do not ask. They feel that they can close the door and make a carriage, and when they emerge from the workshop, the axle width will match the ruts in the roads. But will the ruts in the roads match the axle width of the carriage, or will they be misaligned? This they do not investigate. They create without models, follow error and polish, yet their principles seem to have reasons, and their words seem rational.

They do not ask or investigate whether their own knowledge matches objective truth, whether their conclusions match external reality. This way of doing scholarly research leads to disaster first in their scholarship and finally in the nation at large.¹⁴

13 Translator’s note: The phrase 格物致知, abbreviated 格致, is frequently translated as “science,” and even in *The Great Learning*, it can be translated as “to investigate things to extend knowledge.” But there the focus is on cultivating the self and ordering the state. In *The Great Learning, Fully Annotated*, Zhu Xi explains that 格物 means to make affairs rational. The idea is that the virtuous ruler wants to make the affairs of the nation rational and extend his knowledge to the far corners of the empire. So that Yan Fu’s argument logically follows, I have translated 格致 as “science” throughout.

14 In “*Yangming xiansheng jiyao sanzong, xu*” 陽明先生集要三種序 (Preface to Three Important Works from the Works of Wang Yangming, winter of 1906), Yan Fu wrote, “Scholarship in our country, from late Zhou, Qin, and Han times, has generally amounted to nothing more than textual criticism. One seldom encounters learning from observation and investigation, examining near and far, as Westerners learn from Nature. For textual criticism relies on the words of the ancients. Thus if we take this as our model of study, we will amplify the harm of such study,

Reflecting on Western science, Yan Fu, again in “Jiuwang jue lun,” approvingly wrote,

The methods they follow are the opposite of those of Chinese scholars. To clarify a principle or to establish a method, they examine all manner of things or phenomena to see whether they all conform. They then establish a principle or method as a constant. What they examine is more valuable, since it is broader and more significant. Their effects must be lasting, and hence long standing. Their investigations must lead to the same result and same source, and hence are lofty and clear. As for how Westerners manage science, they cannot harbor prejudices, embellish their language, entertain the slightest opinion, or make arbitrary decisions. Moreover, they must be diligent, patient, impartial, and humble. Only thus can they reach a level of excellence and lay a solid path. To apply their science to people's lives, they create technology according to principles, make use of necessary laws, and call forth new effects, all according to Nature's design, as naturally as dirt accumulates to form the earth.

Western science has benefits for national prosperity and people's livelihood. Indeed, it forms the basis for a rich and powerful nation. Hence,

Today in the West—in such sectors as the military, agriculture, industry, and commerce, and in such organizations as the household, nation, and empire—if they neglect anything, it is never study. This is what Herbert Spencer was quoted as saying in *Quanxue pian* 勸學篇 (An Encouragement of Learning). Now and in the past, the West views clarity in the physical sciences as aiding human affairs.

Yan Fu also points out that Western science, in addition to having the practical effects mentioned above, also promotes self-cultivation. This accords with *The Great Learning*, where it says, “With knowledge attained, intentions will be sincere.” As Yan Fu writes (again in “Jiuwang jue lun”),

A gentleman of the West writes, “Learning is seeking not only to know

pursuing the fragmented and the tangential, limiting ourselves a barren enterprise, and restraining our learning. If we then examine what we have gained, some will seek it in the mind (and feel a sense of unease), and others will place it in the external world (and find it out of place). This being the case, one might think better to close one's eyes and block up one's ears and seek the truth in a little square inch, for there one may find it. This is why Bodhidharma said, ‘Nirvana has no saints,’ and this is why Zhu Xi, late in life, said that he regretted not losing his sight earlier. Thus, Wang Yangming, after he went to live among the barbarians, taught the broad-minded first” (*Yan Fu ji*, vol. 2, pp. 237–238).

the unknown, but also to do the undoable. Those who study measurement and calculation do not spend all their time viewing the progress of the heavens. Those who study chemistry do not test materials everywhere. Those who pursue botany need not cultivate. Those who pursue zoology need not herd livestock. The greatest value of these sciences is that they provide the means to marshal wisdom and exercise the mind, so that those trained in the profound do not become superficial and those trained in the truth do not slip into the absurd. Hence, when a principle is presented to us, we must immediately examine to see what is right and wrong so that no one is confused.

Thus, Western science, which Chinese scholars viewed as nothing more than evidence of the physical, is at the same level as “investigating things to extend knowledge” (science) 格物致知, in *The Great Learning*. In “Jiuwang jue lun,” Yan Fu, in a critical tone, even quotes Zhuangzi’s view on the distinction between the metaphysical and the physical:

Moreover, as far as science is concerned, when we look at things from the perspective of the truth, we find that all things are equal. There are no differences of great and small, enduring and transient, valuable and worthless, good and bad. Zhuangzi knew this, for he said, “Truth 道 is found even in feces and urine” and “We approach the truth the closer we get to particulars 每下而愈況.”¹⁵

This passage and the first paragraph of discourse 1, “Neng shi,” of book 2 of *Tianyan lun*, quoted above, echo one another. So even though Yan Fu never mentions Bacon by name here, we can clearly sense Bacon’s presence.

Throughout “Jiuwang jue lun,” Bacon’s ideas and assertions seems to peer through between the lines even though he is never explicitly mentioned. At the end of “Jiuwang jue lun,” Yan Fu stated that his essay “strongly advocates Western science and does not touch on anything else,” as if he had more to say. On October 19, 1896, a year and seven months after the publication of “Yuan qiang” and a year and five months after the publication of “Jiuwang jue lun,” Liang Qichao 梁啟超 send Yan Fu a letter praising his essay “Yuan qiang” and asked if he could reprint it in the newspaper *Shiwubao* 時務報. Yan Fu replied,

In mid-spring 1894, during the instability in the east of the country, I felt a blockage in my chest and wanted to throw up. Then my essays “Yuan qiang” and “Jiuwang jue lun” were published in *Zhibao*, and the depressing situation ceased to bother me so much. But the “Yuan qiang”

15 The quote from Zhuangzi appears in *Zhuangzi* 莊子, “Zhi bei you” 知北遊.

series of essays is not yet finished. For at the time, having nothing to do, I offered my opinions, based on the *Novum Organum*, so that we may get to the bottom of things, discover how to enrich and strengthen the country, and get people started along this path. . . . But my abilities did not measure up to my aspirations, and I was distracted by personal matters, with the result that I did not complete the project. When I look at this old essay now, I really feel that it does not amount to much, but then you find it incisive, think it colorfully written, and praise it excessively, much to my embarrassment. . . . “Yuan qiang” is as I have described it above, but if I revised it, something better might come of it. Would it be okay for me to submit it for your approval some ten days hence?¹⁶

Yan Fu acknowledged that the “Yuan qiang” series was incomplete, that he wanted to base it “on the *Novum Organum* 格致新理, so that we may get to the bottom of things and discover how to enrich and strengthen the country,” but because of personal matters and other duties, he could not realize this plan. Yan Fu agreed that he would quickly revise the series and give the manuscript to Liang Qichao to publish in *Shiwubao*. Harking back to Bacon’s *Novum Organum* (1620), he charts the development of Western science from its sources and expresses hope for a connection between science and the development of a rich and powerful nation.¹⁷ It is here, in an

16 “Letter to Liang Qichao,” in *Yan Fu ji*, vol. 3, pp. 513–515.

17 The Bacon scholar Yu Lichang has written, “From what Yan Fu wrote above, we can even infer that he personally read Bacon’s *Advancement of Learning* and *Novum Organum*” (*Peigen ji qi zhexue*, p. 446). According to this letter, Yan Fu definitely read *Novum Organum* around 1895. In fact, he read many of Bacon’s works. For example, in the prologue 卮言 to *Yingwen Hangu* 英文漢詁 (English Grammar Explained in Chinese, 1904), Yan Fu writes, “Neither Spinoza, in *On the Improvement of the Understanding*, nor Hugo Grotius, in *On the Law of War and Peace*, nor Newton, in *Mathematical Principles of Natural Philosophy*, nor Bacon, in *Novum Organum* 穷理新机, forsook the traditions of the past” (*Yan Fu ji*, vol. 1, p. 155). In Yan Fu’s translation of John Stuart Mill, *A System of Logic* 穆勒名學, we see that Bacon, in his *Novum Organum* 致知新器, divided human illusions into four idols of the mind that dupe people into belief (*Yan Fu ji*, vol. 1, p. 241). From Guo Songtao’s diary, we can infer that Yan Fu already encountered and read Bacon during his studies in Britain. On May 30, 1878, when Guo Songtao visited the Greenwich Royal Naval College where Yan Fu and other Chinese foreign students were studying, Yan Fu guided him around, telling him the history and circumstances of the naval college. In his description for that day, Guo Songtao recorded in detail the physics and chemistry that Yan Fu explained to him, and also wrote, “The ordinary and practical sciences are most rational. They deeply seek for causes and know their unlimited usefulness. Their subtlety cannot be fathomed, and their ordering of the facts is known to all” (*Guo Songtao riji* 郭嵩焘日记 [Diary of Guo Songtao], p. 589). [Reference OK? See <http://www.fep.com.cn/index.php?m=content&c=index&>

untranslated portion of this “Yuan qiang” revision, that he first mentioned Bacon’s name.¹⁸ Below, let us take a look at the revisions of the third installment, “Western Science,” in this revision of “Yuan qiang.”

The original and revised versions of “Yuan qiang” are basically the same, with the latter exhibiting a few rhetorical changes for emphasis. The revised version focuses on how to raise people’s knowledge, resources, and morals. Yan Fu points out, “The West, during these past two centuries, has engaged

a=show&catid=32&id=1467, which gives 《郭嵩焘日记》第3卷, 湖南人民出版社1982年, 第518页 as the source for this quote.] These statements perfectly agree with Bacon’s assertions. About Yan Fu’s explanations, Guo Songtao states, “I greatly appreciate his statements” and “Every day I write down the information I get from him.” Yan Fu, I believe, reread Bacon around the spring of 1895. Yan Fu wrote, “For at the time, having nothing to do, I offered my opinions, based on the *Novum Organum*.” “At the time” refers to the time of writing of the third installment, “Western Science,” of “Yuan qiang” (from spring 1895 to May of that year). In the manuscript revision of July 4, 1897, of *Tianyan lun*, “Bacon” appears twice, and in the published version, one occurrence is deleted and another two instances are added, for a total of four occurrences.

- 18 Bacon’s name appears in *Tianyan lun*, book 2, discourse 1, “Neng shi.” There is a temporal connection between the two essays, I believe. The first person to introduce Bacon to Chinese readers was Wang Tao 王韜, who in *Weng you yutan* 甕牖餘談 (Ramblings from the Window of an Old Man) stated, “In 1620 Bacon wrote *Novum Organum* 格物窮理新法. Prior to this, no one discussed these matters. Bacon’s writing sought to reach the truth, and to do so, one must investigate things in conformity to reason, and not make up reasons to conform to things.” Wang Tao’s knowledge must have come from James Legge. At about the same time, Guo Songtao, the first Chinese minister to Britain, mentioned Bacon in his diary: “The British endeavor to study reality, a tradition that began with Bacon 畢爾庚” (*Lundun yu Bali riji* 伦敦与巴黎日记 [London and Paris Diaries] [Changsha: Yuelu Shushe, 1984], vol. 10, p. 275). “The British began to take empirical studies seriously starting with Bacon 比耕. . . . Bacon studied the Latin and Greek classics, but after a while came to find them barren and bereft of practical use. He then took up material theories of learning called the new science. . . . In 1645 a group of scientists met to pursue Bacon’s new science, and they founded a society called the Society for the New Science” (vol. 13, pp. 384–385). “The English have Bacon 倍根, who wrote books on astrology” (vol. 14, p. 405). Guo Songtao’s knowledge of the history of Western science came from Chinese foreign students in Britain, including Yan Fu. The first person to translate Bacon’s works into Chinese was the British Protestant missionary William Muirhead, who concisely translated a portion of *Novum Organum* under the title of *Gezhi xinfa* 格致新法 (The New Scientific Method). Muirhead’s partial translation was first published in installments in *Gezhi huibian* 格致匯編, nos. 3–10 (1877) and later reprinted in *Wanguo gongbao* 萬國公報. A relatively accessible edition of this translation can be found in *Wanguo gongbao wenxuan* 万国公报文选, edited by Li Tiangang 李天纲 (Shanghai: Zhong-Xi Shuju, 2012), pp. 409–420. On Bacon’s reception in late Qing China and his influence on Yan Fu, in addition to Yu Lichang’s work, one can also refer to the Fudan University master’s thesis “Yan Fu dui Peigen zhishixue sixiang de chanfa,” by Li Yu. Thanks to Prof. Sun Qing of Fudan University for showing me Li Yu’s thesis.

in measurement, calculation, and scientific pursuits on an unprecedented scale and at heretofore unseen levels of precision. Machines produced with science appear nearly everywhere in people's lives. Moreover, the telegraph, steamship, and railroad can unite the whole world, and yet only one or two people are needed to operate them." "The West's accomplishments to date are due to its rapid changes over the last two centuries in the long run and over the last fifty years over the short term." All this is because the West follows the laws of survival of the fittest and natural selection and greatly encourages the development of people's knowledge, resources, and morals. Yan Fu writes,

The thriving state of scientific studies over the past two centuries must be attributed to Bacon's first sweeping away the cobwebs of the old learning. Scholars propose new theories, and technicians then thoroughly apply these theories to create new technology. This model for progress has been very successful. Hence we say that people's knowledge is the source of a rich and powerful nation. Now I will put this essay aside for a few months and not publish it.

Since both the West and China (in the *Great Learning*) take science as the beginning of scholarship, Yan Fu asks, Why has there developed such a huge difference in people's knowledge in the two countries? Some people think that the reason for this is that "knowledge in China is anchored on vacuities, whereas knowledge in the West is based on reality." But Yan Fu points out that this is not the crux of the matter, for the West also has vacuous scholarship.¹⁹ "The difference between China and the West lies not in the difference between the vacuous and the real," for up to the Ming dynasty, Chinese science was comparable with Western science.

[But] more recently, their philology prioritizes science and neglects literature, emphasizes correct usage and depreciates embellishment. Moreover, they teach the young to observe and take what they observe to heart, to value what they acquire on their own and avoid relying on others, to be given to doubt and be wary of believing tradition. In their numerical sciences they teach the young to apply reason, and in their mechanical and chemical sciences they instruct the young to observe. And yet science is nothing more than a tool.

That is, mass education in the West encourages personal observation, application, and thought. One should not be bound by the theories of the ancients.

19 For example, the abstract sciences in Yan Fu's "Xixue menjing gongyong" 西學門徑功用 (Means and Applications of Western Knowledge) and *Qunxue yiyen* 群學肄言 (The Study of Sociology). Details to follow in another paper.

Moreover, the focus of learning in the various sciences is different. Logic and mathematics require thought; physics and chemistry demand observation. And yet all of these sciences serve only as tools (for the organization of knowledge). Yan Fu continues,

Hence, Huxley writes, “Reading is a second-hand way of acquiring knowledge. I regard only the world as my book, and only the things of the world as my text. This is true learning.” This is the crux of Western education. But what about China? Zhu Xi explained “to investigate things to extend knowledge (science)” 格物致知 as meaning learning all the principles of things 即物窮理, which is true. But reading books to acquire knowledge is depending on externals, much as the crane depends on the wind to soar high.

The passage beginning “Hence, Huxley writes” is not in the first draft of “Yuan qiang.” Yan Fu borrowed Huxley’s words to introduce Bacon’s idea that only knowledge gleaned from Nature is true knowledge. In the Chinese tradition, it is unproblematic for Zhu Xi to explain “to investigate things to extend knowledge (science)” as meaning learning all the principles of things, but to say that learning the principles of things is acquiring knowledge from books (including those written by Zhu Xi) is not what is meant. Knowledge acquired from books neither requires nor allows testing. Hence, Yan Fu writes, such knowledge “is depending on externals, much as the crane depends on the wind to soar high.” It is just not the same as principles gleaned from things.²⁰

20 Thanks to Prof. Azuma Jūji of Kansai University, a specialist on Zhu Xi, for his instruction. On another front, Li Yu thinks, “The model followed in Chinese classical studies is none other than reading books to acquire knowledge. Though Chinese classical studies also “investigates things to extend knowledge,” investigating things in Chinese classical studies and seeking the truth in science are two radically different approaches to scholarly research. The former takes the Confucian classics as its point of departure, establishes norms and emends texts, and thereby attains knowledge” (“Yan Fu dui Peigen zhishixue sixiang de chanfa”). In “Jinshi wenming chuzu er dajia zhi xueshuo” 近世文明初祖二大家之學說 (The Theories of Two Founders of Modern Civilization), Liang Qichao noted the following: “In his explication of the *Great Learning*, Zhu Xi said that scholars must familiarize themselves with the things of the world, for one can further what one already knows of things and reach new heights of knowledge; that after much effort, one will suddenly achieve a breakthrough, arrive at a grasp of the surface and interior, the fine points and rough spots, of the things of this world, and by fully exercising one’s mind, achieve perfect clarity. Zhu Xi’s argument, in clarity and completeness, yields naught to Bacon. But though Zhu Xi can expound roughly on his notion of principle 理, Bacon can elaborate in detail on his method. Bacon not only elaborated on his method; he put it into practice. While Zhu Xi made a serious effort at expounding his theory, it nonetheless was vacuous mental talk based on nothing and

For unknown reasons, the essay “Yuan qiang,” after revision, was never republished in *Shiwubao*. Yan Fu agreed “to submit it for your approval some ten days hence.” That means that the revision should have been completed within 1896. In the revised version of “Yuan qiang,” “Bacon” is rendered 柏庚, as in *Tianyan lun*, whereas it appears as 培根 in “Xixue menjing gongyong” (September 1898) and later publications. Hence, it would seem that Yan Fu revised “Yuan qiang” when he was translating *Tianyan lun*, no later than the latter half of 1896.²¹ At about the same time, Yan Fu first defined the terms 內導 (induction) and 外導 (deduction) in his preface to *Hexuli zhigong tianyan lun* 赫胥黎治功天演論 (Huxley's *Evolution and Ethics*, 1896):²²

In Western logic 名學, the means for discovering the reasons for things and deriving knowledge are the methods of induction 內導 and deduction 外導. Induction consists of investigating a portion and inferring the whole, discovering a bit and generalizing over all. Deduction consists of using principles to reach a conclusion about many things, or hypothesizing a parameter and reasoning backwards via *modus tollens*.²³

totally unverified. This is why the new science arose in Europe and not in China” (*Yinbingshi wenji zhi shisan*, p. 4). At the beginning of this essay, Liang Qichao wrote, “My friend Yan Fu of Houguan District often said, ‘Martin Luther, Bacon, and Descartes are the sages of the modern age. But people of later ages are weak in their thinking and regard sages as those whose names have been passed down by the ancients. Hence, I dare not revere them by name.’ I really admire this statement. For the one who opened up new territory in the centuries-old field of religion is in fact Martin Luther, and the ones who opened up new territory in the centuries-old field of science are in fact Bacon and Descartes. In view of the fact that religion has already entered its period of decline and that science has just entered its period of ascendancy, like the morning sun rising in the sky, we can see that the influence of Bacon and Descartes on the world has yet fully to bear fruit” (*Yinbingshi wenji zhi shisan*, p. 1). This passage appears to refer to Liang Qichao's interactions with Yan Fu prior to fleeing to Japan in October 1898.

- 21 The revised version of “Yuan qiang” was published only in 1901 in *Houguan Yuan-shi zongkan* 侯官嚴氏叢刊 (The Works of Yan Fu of Houguan), edited by Xiong Yuan'e 熊元鏗.
- 22 In the Shenshijizhai 慎始基齋 edition of *Tianyan lun* dated October 15, 1896, 內籀 is used for “induction” and 外籀 is used for “deduction.”
- 23 *Yan Fu ji*, vol. 5, p. 1411. In the edition of *Tianyan lun* published by Shenshijizhai in June 1898 and later editions, this passage reads, “When we look at Western logic, we find the methods of induction 內籀 and deduction 外籀 used in science. Induction consists of investigating a portion and inferring the whole, grasping a bit and gathering all together. Deduction consists of using principles to reach a conclusion about many things, or hypothesizing a parameter and reasoning backwards by *modus tollens*” (*Yan Fu quanji*, vol. 1, p. 76).

3 Brief Conclusion

In the previous section, I sorted out Yan Fu's views of science as reflected in "Lun shibian zhi ji" (On the Urgency of Change in the World), "Yuan qiang" (The Sources of Strength), "Jiuwang jue lun" (On the National Salvation Decision), and the revised version of "Yuan qiang." In 1895 Yan Fu began translating Huxley's *Evolution and Ethics* (*Tianyan lun* in Chinese). In spring of the same year, he broke his silence to publish newspaper articles commending Charles Darwin's theory of evolution and Herbert Spencer's sociology, arguing that the source of a rich and powerful nation is people's knowledge, resources, and morals, and advocating that the most important task was developing people's knowledge. In the course of translating Huxley's *Evolution and Ethics*, Yan Fu seems to have realized the need to trace the development of Western religion and science, and at this time Bacon's works reentered his purview. Liang Qichao's request in the fall of 1896 to reprint "Yuan qiang" gave Yan Fu an opportunity to introduce Bacon to Chinese readers. All of this first made an appearance in his revision of "Yuan qiang." Yan Fu translated Huxley's *Evolution and Ethics*, Adam Smith's *Wealth of Nations* (*Yuan fu* 原富), and Herbert Spencer's *Study of Sociology* (*Qunxue yiyen* 群學肄言) while simultaneously writing his political essays of this period. These translations and writings no doubt mutually influenced and mutually supplemented one another. In reading and understanding Yan Fu's *Tianyan lun*, it is quite necessary to keep this perspective in mind.

Tianyan lun was published in the lunar fourth month of 1898 and soon stirred up a tremendous reaction throughout China. The Hundred Days' Reform movement began soon thereafter, and the reformists seeking to strengthen China took up the banner of evolution. In the lunar ninth month Yan Fu lectured at the Tongyi College, a lecture that appeared in all the newspapers under the title "Xixue menjing gongyong" (Means and Applications of Western Knowledge).²⁴ In this lecture of a little over two thousand characters, "Bacon" appeared twice:

The English scholar Francis Bacon says, "In the world, material objects are not great; only man is great. In man, it is not his body that is great; it is his mind that is great." Hence, in the affairs of the living, training the mind and accumulating knowledge is most important. Those with trained minds and accumulated knowledge are scholars; those lacking such are commoners and barbarians. (P. 93)

In Bacon's *Advancement of Learning* and *Novum Organum* there is nothing resembling this quote. However, in book 1, section 115, of the *Novum*

²⁴ *Yan Fu ji*, vol. 1, pp.92-95.

Organum, Bacon does have this to say about the purpose of book 1: “Whereas in this first book of aphorisms I proposed to prepare men’s minds as well for understanding as for receiving what is to follow, now that I have purged and swept and leveled the floor of the mind, it remains that I place the mind in a good position and as it were in a favorable aspect toward what I have to lay before it.” Also in book 1, Bacon specifically analyzed four idols that hinder a scientific perspective, in order to prepare for his discussion in book 2 of the method of scientific research, and in particular, the method of induction.²⁵ One might equate Yan Fu’s phrase “training the mind and accumulating knowledge” here with the notion of cultivating moral character 修身 in the *Great Learning*, but in the context of the evolution from barbarian society to civilized society, it is obvious that he means developing people’s knowledge as part of the program of making the nation rich and powerful.²⁶ Bacon as well, in the *Novum Organum*, emphasized that understanding and using knowledge demarcates barbarians from civilized people.

In the second section of his lecture “Xixue menjing gongyong,” Yan Fu takes up his main topic of interest, the means and applications of Western knowledge. He says that there are three levels of obtaining knowledge or truth. The first is textual research 考訂, which is also called observation 觀察 or following 演驗. The reason for the latter two appellations is that “learning all the principles of things sometimes involves superhuman processes (such as the procession of the sun and stars and the change of customs over the ages) or human-driven processes (such as Daoist alchemy and planting and husbandry).” The former can only be observed, and following the latter is quite apt. The next level is linking up disparate bits of knowledge 貫通 or

25 In his translation of John Stuart Mill’s *System of Logic* (Mulei mingxue 穆勒名學), Yan Fu pointed out, “This is why Bacon developed his theory of the four idols and placed idols of the tribe first. (In book 1 of his *Novum Organum*, Bacon divided human illusions into four idols that people revere: idols of the tribe, idols of the cave, idols of the marketplace, and idols of the theater)” (p. 241).

26 Yan Fu continues, “The mind operates in two modes, one emotional, the other rational. The expression of emotion is exemplified by poetry and song, a paradigmatic instance being the Chinese poem “Li Sao” 離騷 (The Sadness of Separation). The rational is found in texts covering philosophy and discussing principles. The rational can be further divided into texts that record events and texts that discuss principles.” Yu Lichang writes that this distinction between “texts that record events and texts that discuss principles” is “Yan Fu’s new analysis of Bacon’s system of knowledge and division of the sciences” (*Peigen ji qi zhaxue*, p. 450). I myself think that in the division of the sciences, Yan Fu prefers to follow Spencer rather than Bacon. Moreover, I see this statement of Yan Fu’s rather as an expression of exasperation at the difference in style that he encountered as he transitioned from translating *Tianyan lun* to translating *Yuan Fu*. (See Shen Guowei, “Cong *Tianyan lun* dao *Yuan fu*.”)

forming a unified body of knowledge 會通. This involves “viewing similarities and differences as part of the same system” and “seeking the reason why things are thus.” Efforts at this level produce “basic methods and common cases.” Yan Fu notes that in the past, in both China and the West, knowledge came from these two levels, and only these two levels. Hence, “the basic methods and common cases often contained many errors.” “Then recently scientists in the West began improving their knowledge at a third level: experimentation.” And “the more thorough the experimentation, the more knowledge approached reality.” For Yan Fu, “experimentation” 試驗 meant trying something out to see if it proved effective, which is somewhat different from its present meaning. Since both China and the West had the former two levels of producing knowledge, how could the West pull ahead and produce so much more knowledge? Here is Yan Fu’s answer:

When we do science as best as possible, the most important thing to know is how to read Nature’s text, a text without words. Bacon writes, “All events and all things are appropriate for scholars to study. Hence, nothing is too great or small, too valuable or worthless, too clean or dirty. If scholars know how to discover their principles, all those principles can form the truth.” Here what seems like a pile of rubble is the best path to the truth. Huxley writes, “Those who understand the nature of things and the mind read from the book of Nature. Those who seek knowledge from accounts in books acquire second-hand book knowledge.” Those who read books and acquire second-hand knowledge not only depend on others’ conceptions, but also place themselves in the position of later generations. People understand things differently and often err. If I believe their errors, I too err. This is what scientists fear most. Because political ethicists do not exercise their own minds and blindly accept what the ancients say, they often create havoc and realize it only later. This has happened countless times in the past.²⁷

“The difference between Chinese and Western scholarship lies here,” Yan Fu writes. Bacon held that natural developments are the source of human knowledge. All natural phenomena—be it something low and base or something noble and sumptuous—have the same claim to our attention, observation, and study. It is this point that Yan Fu wished to make by translating Huxley, in both *Tianyan lun* and the revised version of *Yuan qiang*.

Yan Fu wrote, in two separate works, “Bacon said, ‘Knowledge itself is power.’”²⁸ Yan Fu was the earliest scholar to realize, at such a profound

27 *Yan Fu ji*, vol. 1, p. 93.

28 Yan Fu, *Yuan fu*, p. 220, and *Mingxue qianshuo* 名學淺說 (William Jevons, *Primer of*

level, the importance of knowledge in the form of Western science, and Bacon was the source of his desire to make the nation rich and powerful.

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