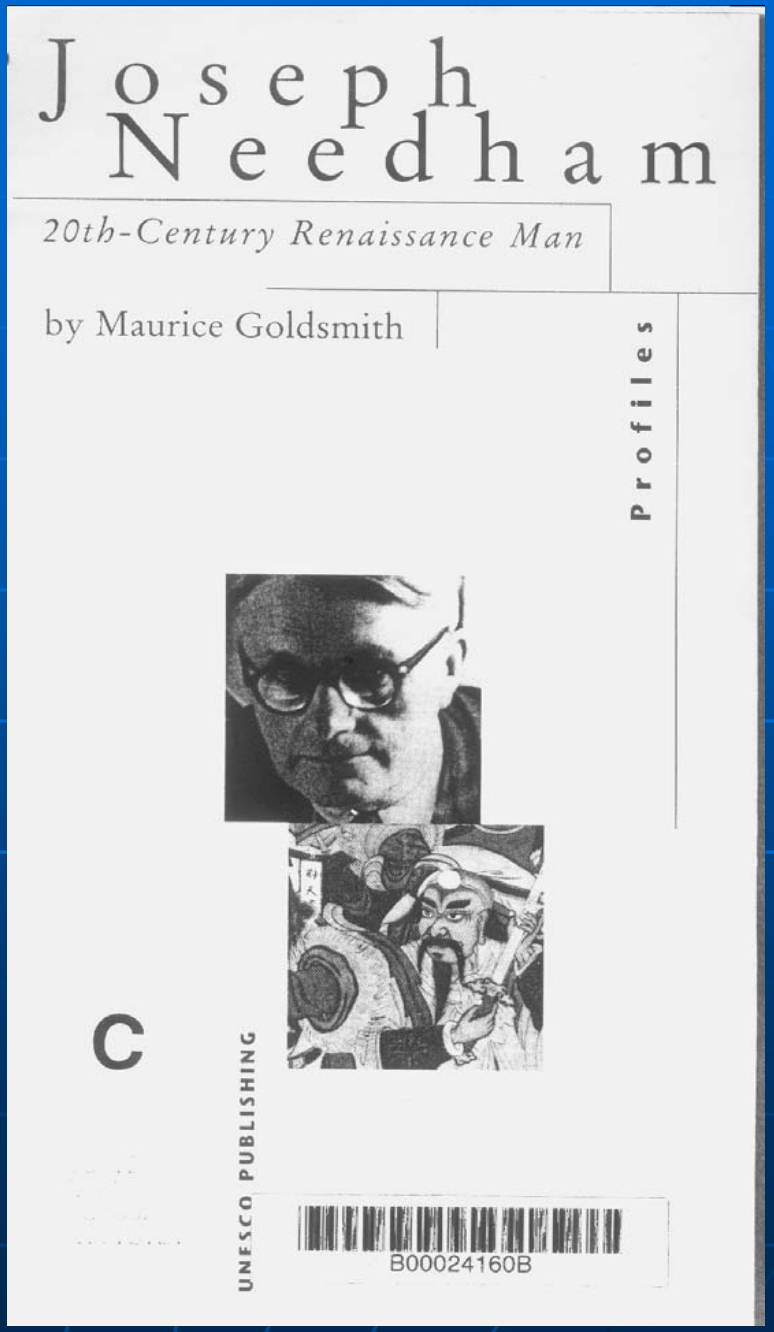
The Significance of the "Needham Question" in the Contemporary World

李约瑟问题的当代意义

Liu Dun
刘钝

“Thinking Globally.” Joseph Needham, Director of Natural Science Division at UNESCO, 1947

Courtesy of the NRI Library



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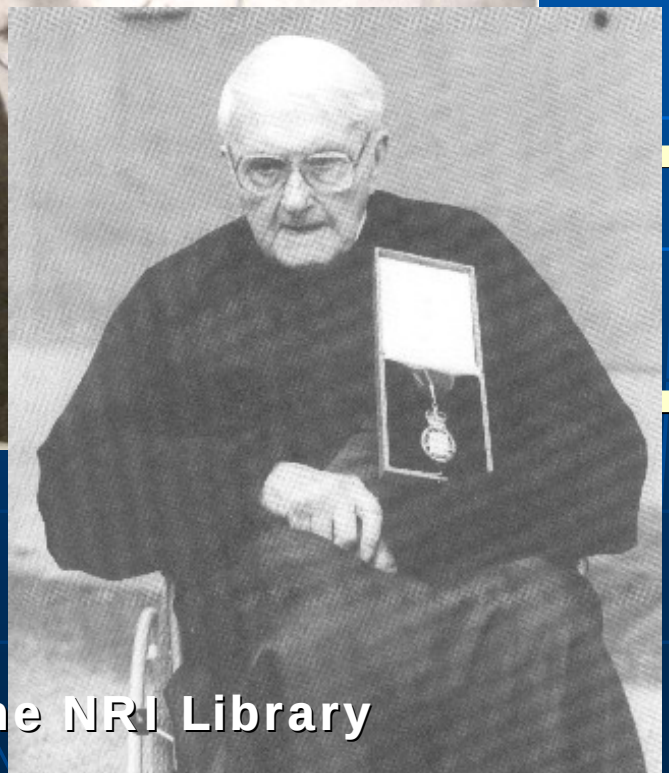
Joseph Needham and His Grand Question ※



The life of Joseph Needham was really three
李约瑟的三个身份

- Needham the biochemist 生物化学家
- Needham the historian of Chinese science 中国科技史家
- Needham the humanities scholar 人文学者

Courtesy of the NRI Library

Joseph Needham and His Grand Question

- **The origins of his world view are multifold**
- 影响李约瑟世界观的五个方面

- biological evolution 生物演化论
- Neo-humanism with a conviction in social progress through science 秉持科学进步论的新人文主义
- Marx's historical materialism 马克思主义唯物史观
- Christian socialism 基督教社会主义
- ancient Chinese philosophy—in particular, Taoist ideology 中国古代哲学特别是道家思想

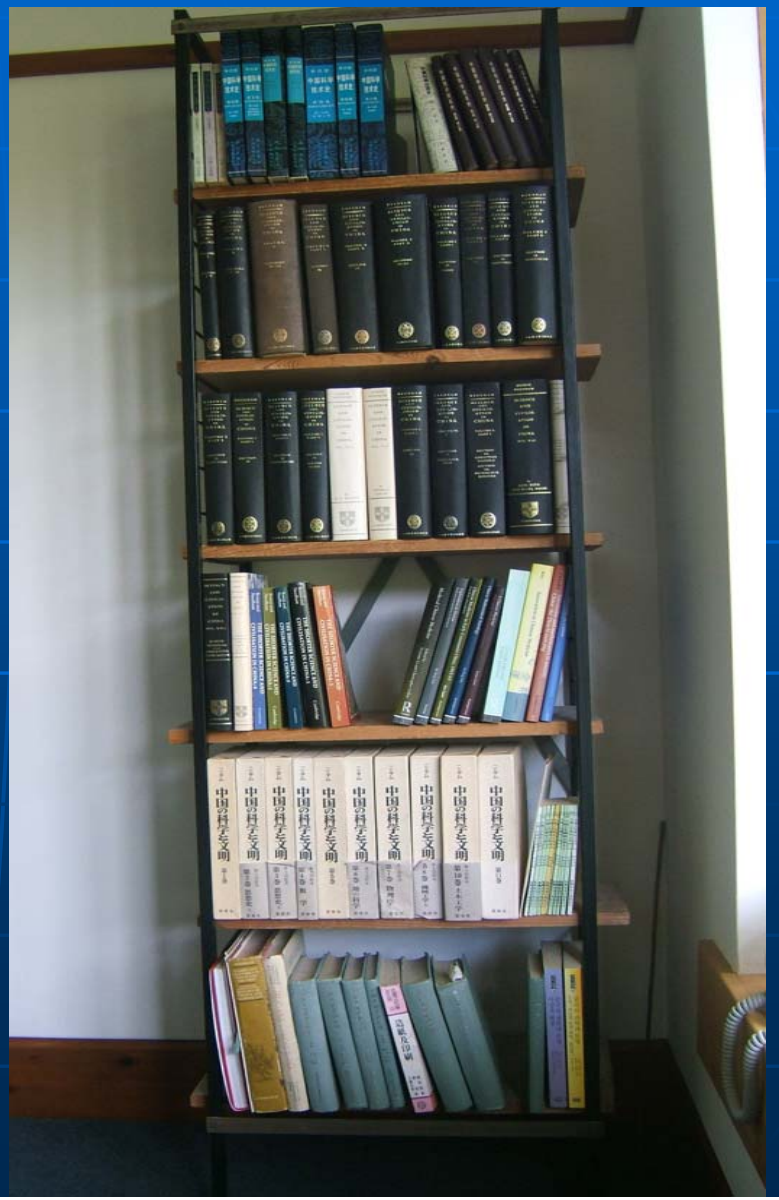
Joseph Needham and His Grand Question

Joseph Needham and His Grand Question

- Since the 1940s, Needham was puzzled by a historical question, a question which in turn provided the strongest motive for undertaking his monumental project, the multi-volume *Science and Civilization in China* (hereafter *SCC*).

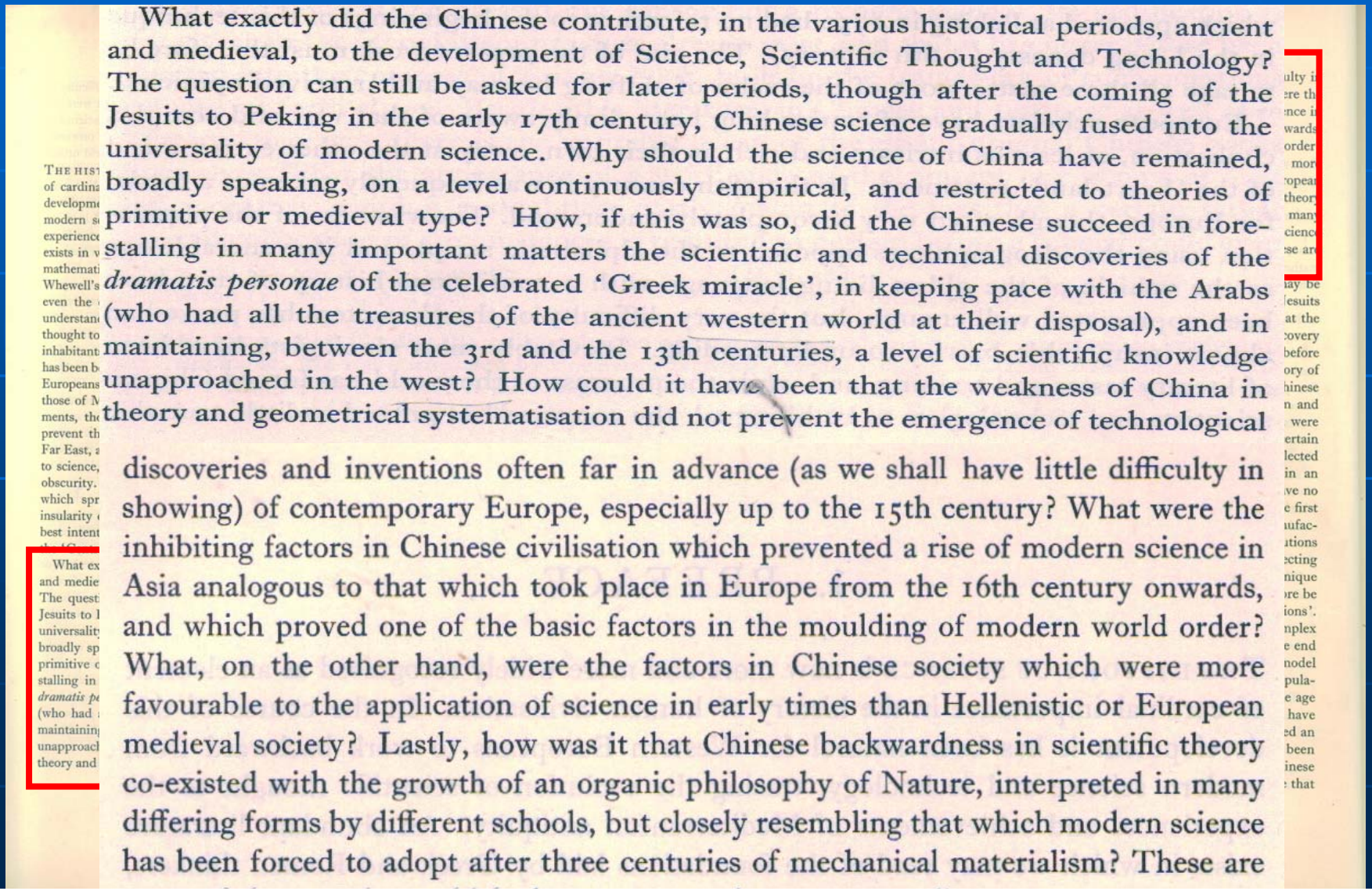
- 自从1940年代以来，李约瑟一直为一个历史问题所困扰，这个问题后来成为他施行其不朽计划的最强动因，那计划就是鸿篇巨制的多卷本《中国科学技术史》（直译“中国的科学与文明”，简称SCC）。

Joseph Needham and His Grand Question



Joseph Needham and His Grand Question

Prologue to Volume I of *SCC* （CUP，1954）
李约瑟在SCC第一卷的序言中提出了一连串问题



What exactly did the Chinese contribute, in the various historical periods, ancient and medieval, to the development of Science, Scientific Thought and Technology? The question can still be asked for later periods, though after the coming of the Jesuits to Peking in the early 17th century, Chinese science gradually fused into the universality of modern science. Why should the science of China have remained, broadly speaking, on a level continuously empirical, and restricted to theories of primitive or medieval type? How, if this was so, did the Chinese succeed in forestalling in many important matters the scientific and technical discoveries of the *dramatis personae* of the celebrated 'Greek miracle', in keeping pace with the Arabs (who had all the treasures of the ancient western world at their disposal), and in maintaining, between the 3rd and the 13th centuries, a level of scientific knowledge unapproached in the west? How could it have been that the weakness of China in theory and geometrical systematisation did not prevent the emergence of technological discoveries and inventions often far in advance (as we shall have little difficulty in showing) of contemporary Europe, especially up to the 15th century? What were the inhibiting factors in Chinese civilisation which prevented a rise of modern science in Asia analogous to that which took place in Europe from the 16th century onwards, and which proved one of the basic factors in the moulding of modern world order? What, on the other hand, were the factors in Chinese society which were more favourable to the application of science in early times than Hellenistic or European medieval society? Lastly, how was it that Chinese backwardness in scientific theory co-existed with the growth of an organic philosophy of Nature, interpreted in many differing forms by different schools, but closely resembling that which modern science has been forced to adopt after three centuries of mechanical materialism? These are

Joseph Needham and His Grand Question

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Joseph Needham and His Grand Question

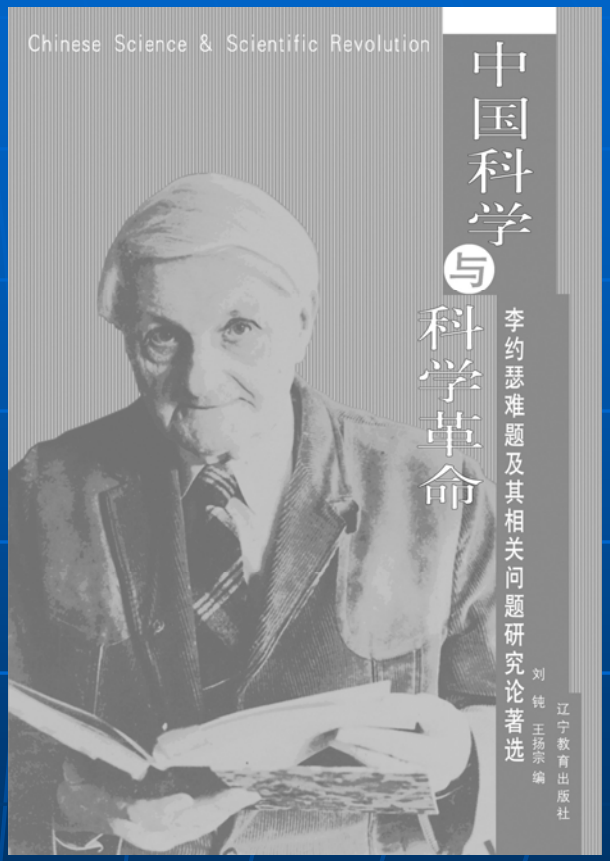
- In a nutshell, these can be summarized as one singular Grand Question: why did modern science, especially the mathematization of hypotheses about Nature, with all of its implications for advanced technology, develop only in the West at the time of Galileo, rather than in ancient and medieval China ?

- 这一系列问题可以归结为一个具有重大意义的历史谜题，那就是：

  为什么近代科学，尤其是对自然的数学化的假设，及其所蕴含的所有先进技术，只产生在伽利略时代的西方，而不是在古代与中古时代具有辉煌文明的中国？

Joseph Needham and His Grand Question

- Many of Needham's writings concerning the scientific achievements of ancient China are devoted to this question and related issues. Numerous answers, including several from Needham himself, have been proposed over the past half century. Nowadays historians of science call this comparative problem the “Needham question”. It has been a subject of great interest to historians generally, and its significance goes well beyond the subject of science in China.
- 对此问题已有许多解答，包括李约瑟自己提出来的。它引起了全世界历史学家的兴趣，其意义远远超出了“中国科学”这一论域。



Chinese Science & Scientific Revolution, ed. Liu Dun & Wang Yangzong, Shanyang:Liaoning Education Press, 2001 ※

Joseph Needham and His Grand Question

- I do not intend to discuss here the various dynamic factors, both internal and external to science, that have been used to help answer the “Needham question.” Instead, I want to focus on the origins and subsequent development of the “Needham question”, and the significance of this questions in the contemporary world.

- 这里将不讨论涉及“李约瑟问题”的各种动力因素，无论是科学内部的还是社会方面的。事实上，这类历史问题没有唯一的标准答案。下面，演讲人将特别强调“李约瑟问题”的来源和发展，它对世界科学编史学的启示，以及它的当代意义。

Discussions Before *SCC* Was Published ※

- The relation between the “Needham question” and the issue of “lagging behind” of Chinese culture
- In fact, the issue of “lagging behind” aroused heated debate in China and stirred up what amounted to a media frenzy in the 1980s.
- Chinese scholars are inclined to treat the “lagging behind” issue as an equivalent of the “Needham question”.

- “李约瑟问题”与中国“落后”议题的关系
- “落后”议题在中国1980年代的“文化热”中达到高峰。典型的例子是一个题为“中国近代科学落后原因”的讨论会在四川成都举行，后来在学界内被称为“落后”会。
- 无论如何，探讨“中国近代科学落后”的原因激发了整个中国知识界对“李约瑟问题”的强烈兴趣。

Discussions Before *SCC* Was Published

- The earliest to consider the “lagging behind” issue in Chinese science were the Jesuits who came to China in the early 17th century.
- Later, some scientists and thinkers of the 17-18th century Europe also explored appropriate explanations.
- More recently, during the first half of the 20th century, a number of Chinese scholars devoted themselves to the “lagging behind” issue.
- All of these discussions and related arguments about science in China emerged before the impact of *SCC* in academic circles.

- 早在17世纪，来到中国的传教士们就已注意到中国科学的“落后”问题。
- 随后在18世纪，欧洲的一些启蒙思想家和科学家试图寻找对此现象的合理解释。
- 到了在20世纪上半叶，若干中国学者也曾注意到“落后”问题。
- 所有这些论争都出现在SCC对知识界发生影响之前。

Discussions Before *SCC* Was Published

- In 1915, Ren Hongjuan published an article, “On the Reasons Why China Dos Not Have Science.” This appeared in the very first volume of the new journal, *Science.*
- Other leading scholars: Liang Qichao and Feng Youlan also participated.

- 1915年任鸿隽在《科学》杂志上发表“说中国无科学之原因 ”。
- 此后，许多中国学者加入了讨论并从自己的背景和经验出发提出了不同的答案。如梁启超：《清代学术概论》（1920）和《中国近三百年学术史》（1924）中。；冯友兰：《为什么中国没有科学——对中国哲学的历史和影响的解释》。

Discussions Before *SCC* Was Published

- Later, enthusiasm for science in China was rising in pace with the growth of scientific organizations in the 1930s and 1940s. During this period a number of scholars began to consider problems about science and modernity. All of this came to a head in 1944.

- 20世纪三、四十年代，随着科学组织在中国的出现与发展，对科学的热情也在增长。许多学者在这段时间内开始考虑科学和现代化的问题。这一倾向在1944年前后达到了顶点。

Discussions Before *SCC* Was Published

- In October of that year, when the Chinese Society of Science celebrated the thirtieth anniversary of its founding, Joseph Needham participated in the activities, which took place at Zhejiang University, then located at Meitan, Guizhou. Zhu Kezheng, the well-known meteorologist and at the time President of the University, recorded in his diary what happened in the auditorium that day on October 24.

- 这一年，中国科学社庆祝它成立三十周年，作为荣誉会员和中英科学合作代表团的团长，李约瑟出席了在贵州湄潭举行的年会,并发表《科学与中国文化》的演讲。在演讲中，他首先批评一些学者此前提出的关于中国古代没有科学的论断。他说，中国古代哲学非常接近于科学解释，中国人的发明创造对全世界都产生了巨大影响。因此，基本的问题是为什么近代实验科学，以及与之相关的理论体系产生在西方，而不是在中国。这里，他已经非常清楚地提出了所谓的“李约瑟问题”。

Discussions Before *SCC* Was Published

- “八点在文庙大成殿请李约瑟讲Observation on the history of science in China as compared with the West。余首先介绍并读The University Bureau of the British Empire来函。次李讲。首述中国儒教注重人伦，不谈天然，与道教不同，故炼丹术源于道教。至宋儒始有科学精神，以其兼佛、道也。次述中国对于炼丹、营养化学及数学上之供献，不亚于他国。但近世科学之不能兴起，由于环境，即四个inhibitory factors，为地理、气候、经济与社会。后二者乃由中国之无商人阶级。地理方面，中国为大陆国，故闭关自守、固步自封，与希腊、罗马、埃及之海洋文化不同。天气方面，因雨量无一定，故不得不有灌溉制度。因此，地主尽为一国之王所吞并，而〔官僚〕封建制度bureaucratic feudalism不可消灭，商人无由兴起云云。讲约一小时余，次讨论。余谓如近世科学作实验科学解，则中国人之不喜用手，亦一原因。晓沧谓《史记》、《前汉书》〔之〕“货殖传”中对于商人竭力排斥，其时中国方脱离封建帝皇，恶商人势力倾人主，遂排斥之，以崇尚儒术，提高士大夫地位，而此辈亦遂高自位置，遂使商工阶级一蹶不振。季梁讲中国炼丹术起源，于《前汉书》中有之。魏伯阳之《参同契》、葛洪《抱朴子》及六朝梁陶弘景，皆为著名人物。所用术语等，与阿拉伯、西欧全同。琢如谓中国科学之所不兴，由于学以致用为目的，且无综合抽象之科学，不用deductive方法，更无归纳法。刚复最后起言，时已十一点。散。”

- 竺可桢日记，一九四四年十月二十四日

Discussions Before *SCC* Was Published

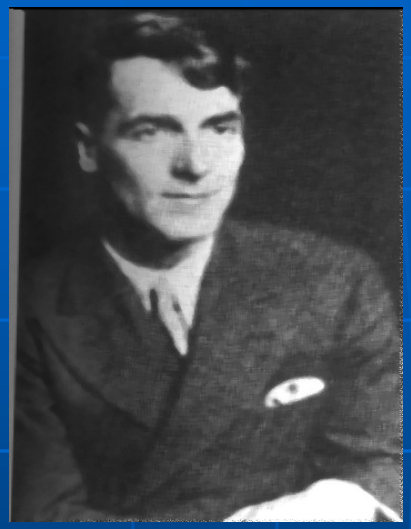
- From the diary of Zhu Kezhen on October 24 1944: 日记要点

- Needham's speech focused on the history of Chinese science, as compared with the development of science in the West.
- He listed a number of achievements in science and technology beginning from ancient China, and gave several reasons for China's later underachievement in modern times.
- He summarized the inhibitory factors, associated with geography, climate, economy and society, four areas in all.
- The lecture lasted for three hours, and was followed by debates in which a number of Chinese scholars participated, including Zhu Kezhen, Zheng Xiaocang 郑晓沧, Wang Jin 王琎, Qian Baocong 钱宝琮 and Hu Gangfu 胡刚复.
- The atmosphere in the hall was intense and spirited.

Discussions Before *SCC* Was Published

"Visible College" 有形学院 ※

贝尔纳 J. D. Bernal



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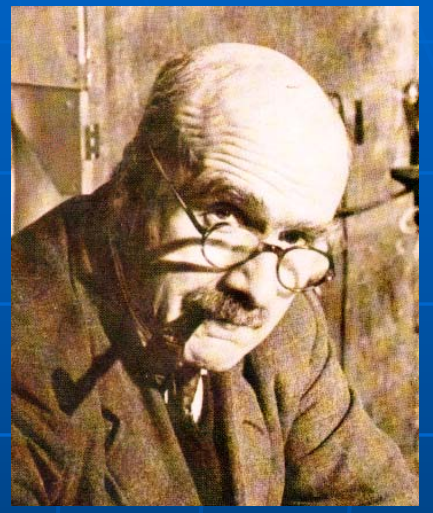
L. Hogben



霍尔丹
J.B.S.Haldane

莱维
H. Levy

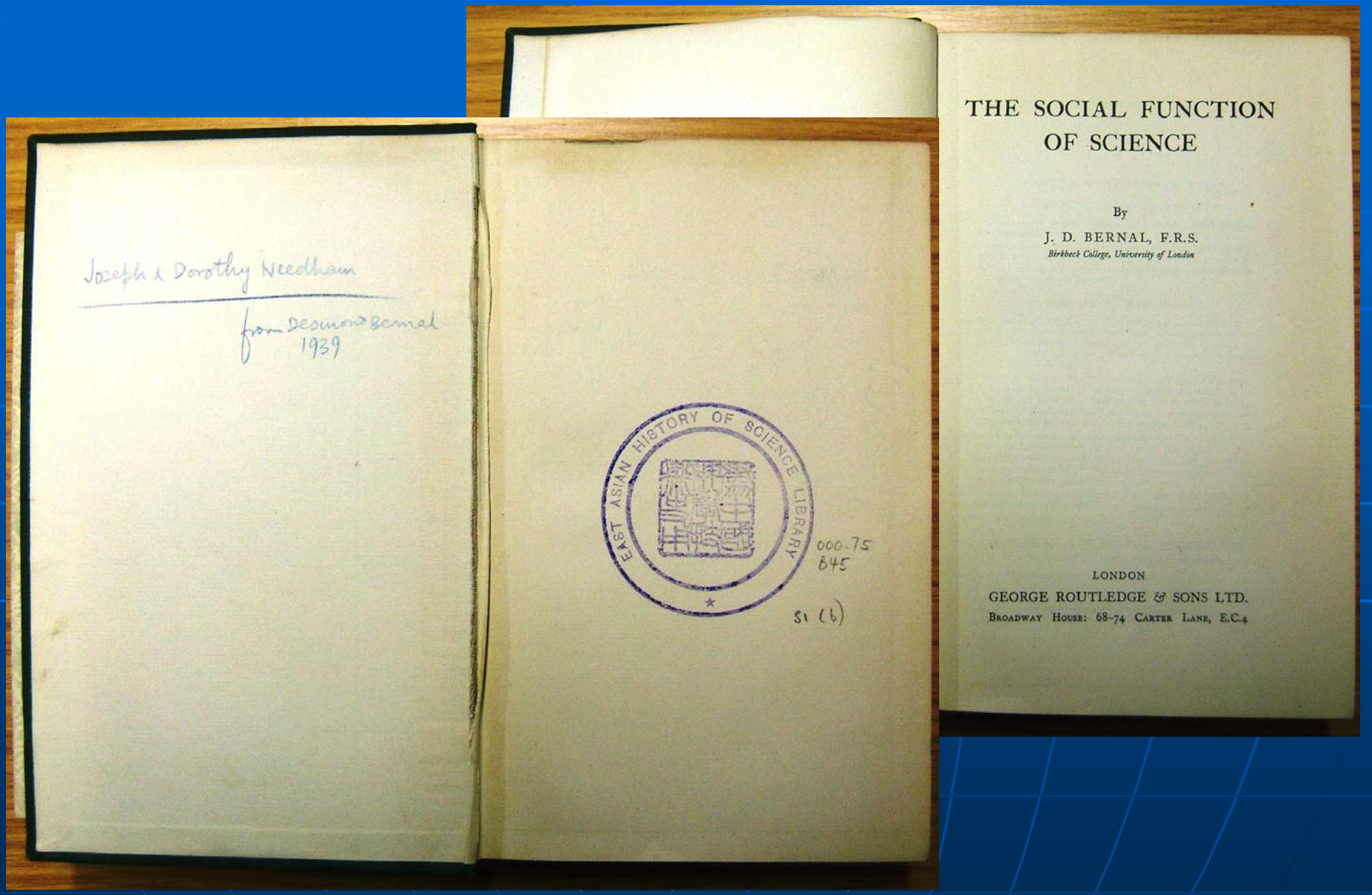
Discussions Before *SCC* Was Published

- Needham's old friend at Cambridge, the physicist and one of the founders of the sociology of science, J. D. Bernal, points out in his celebrated *The Social Function of Science* （1939）:

- Throughout most of recorded history China has been one of the three or four great centers of civilization, and for the greater part of this time the one which possessed the highest political and technical developments. It would be interesting to inquire how it was, in fact, that the appearance of modern science and the technical revolution that followed it did not occur in China rather than in West?

- 有史以来的大部分时间，中国一直是三四个伟大文明中心之一，而且在这一时期的大部分时间内，他还是一个政治和技术都最为发达的中心。研究一下为什么后来的近代科学和技术革命不发生在中国而发生在西方，是饶有趣味的。

贝尔纳《科学的社会功能》


Joseph & Dorothy Needham
from Desmond Bernal
1939
EAST ASIAN HISTORY OF SCIENCE LIBRARY
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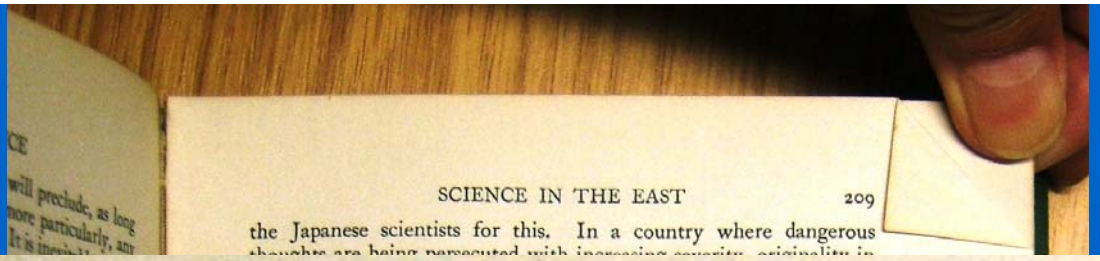
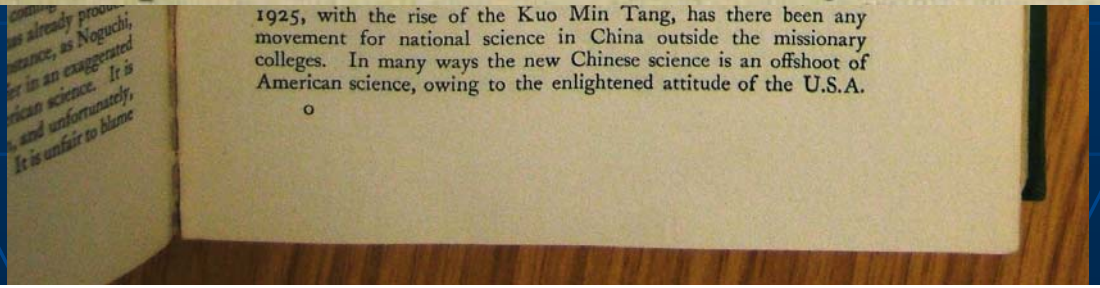
THE SOCIAL FUNCTION
OF SCIENCE
By
J. D. BERNAL, F.R.S.
Birkbeck College, University of London
LONDON
GEORGE ROUTLEDGE & SONS LTD.
BROADWAY HOUSE: 68–74 CARTER LANE, E.C.4



SCIENCE IN THE EAST 209

the Japanese scientists for this. In a country where dangerous

Science in China.—The last few years have witnessed the beginning of an independent development of science in China. Throughout most of recorded history China has been one of the three or four great centres of civilization, and for the greater part of this time the one which possessed the highest political and technical developments. It would be interesting to inquire how it was, in fact, that the appearance of modern science and the technical revolution that followed it did not occur in China rather than in the West. Probably it was the very satisfactory equilibrium of agricultural life with a classically educated governing class, an ample supply of necessities and luxuries and of the labour necessary to produce them, that removed from China the need for developing technical improvements beyond a certain point. However that may be, once the West had



1925, with the rise of the Kuo Min Tang, has there been any movement for national science in China outside the missionary colleges. In many ways the new Chinese science is an offshoot of American science, owing to the enlightened attitude of the U.S.A.

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Global Significance of the “N-question”

- The ultimate goal of Needham' s *SCC* was to promote mutual understanding among different cultures.
- The fundamental contribution of Needham' s *SCC* is generally deemed to lie in pioneering the integration of non-Western traditions and achievements into world history of science.
- In a word, science is the common heritage of all humankind.

- SCC的最终目的是推进不同文化的相互理解。
- 李约瑟的基本贡献是开创了将非西方的传统和成就整合到科学的世界史中去的先河。
- 一句话，科学是全人类的共同遗产。

Global Significance of the “N-question”

- As an advocate of continuity and universality in science, Needham argued that modern science should not be identified as European ethno-science.
- Consequently, non-Western cultures should not be considered as “lagging behind”, and modern science should instead be considered as a grand compendium of all the scientific knowledge contributed by every one of the world’s civilizations, from antiquity through the middle ages to the present.

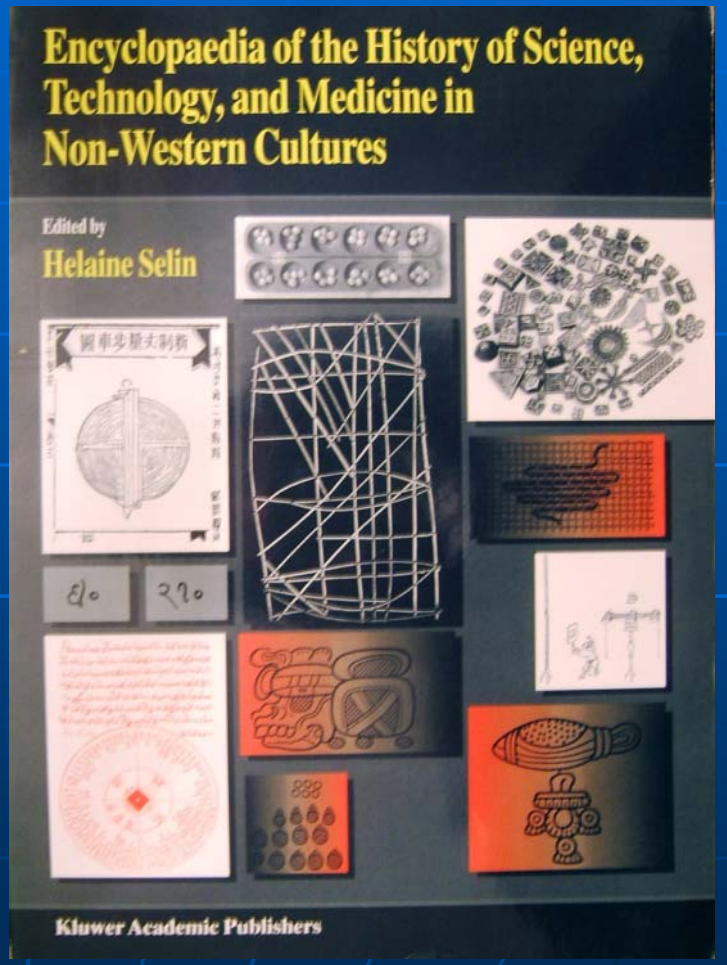
- 作为科学中连续性和普遍性的拥护者，李约瑟论证说近代科学不可能是欧洲人的种族科学。
- 在李约瑟眼中，所有非西方的文明不再被视为“落后”的，而近代科学不过是众多不同文明中科学知识的总汇。

Global Significance of the “N-question” ※

- All of us in the field of non-Western science owe him （Joseph Needham）an enormous debt for bringing the intellectual worlds of the East and West together. In a sense all of our work follows from him.
- 今天我们在西方与非西方科学传统之沟通上的所有工作都来源于李约瑟博士的启发。

Helaine Selin, the Editor-in-chief

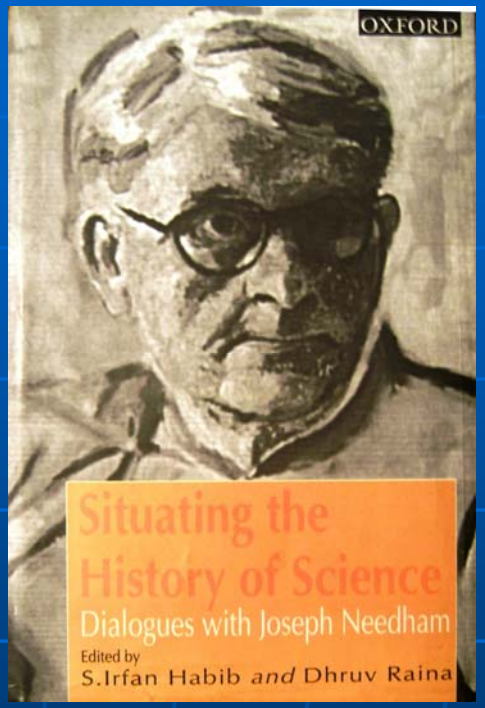
Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures. Boston: Kluwer Academic Publishers, 1997



Global Significance of the “N-question”

- “Science—the Refreshing River” , The theme of the conference, “inspired by and reflecting Needham’s lifelong engagement with crossing disciplinary and institutional boundaries, drew on the constituencies of academic and professional colleagues with varied intellectual and political concerns.”

  Habib I. and Raina D. eds. *Situating the History of Science: Dialogues with Joseph Needham*, Oxford: OUP, 1999



本次会议的主题，“科学--常新之流”，“既受启发于也反映了李约瑟在跨学科、跨领域方面，以超凡的智慧和政治关怀来鼓励学界人士和同行们所做的终身努力。”

Global Significance of the “N-question”

- Jeon Sang-Woon: “Traditional Korean Science and East Asia—science and technology drawn from East Asian experience” .
- Park Seong-Rae: “Some Indices of the Rise of Modern Science in Korea”.
- Togo Tsukahara *et al*: “Needham’s Impact on Japanese History of Science”.
- Pascal Crozet：“Modernization of Science and Its History Outside Europe: Egyptian projects in the nineteenth century”.

- 全相运：“韩国传统科学与东亚——来自东亚经验的科学与技术”
- 朴星来：“近代科学在韩国兴起的一些标志”
- 塚原东吾等：”李约瑟对日本科学史的影响“
- 克罗兹：“科学的现代化及其欧洲之外的历史——十九世纪埃及人的计划”

Science, Modernity, and the Future

- The triumph of modern science initiated in seventeenth-century Europe has given rise to a widely disseminated mythology: that science is a particular heritage that could only have emerged from Western civilization, which originated in ancient Greece and was rediscovered in Renaissance Europe; hence "modernization" is simply an equivalent of "science" and hence—to some extent—"Westernization."

- 源自十七世纪欧洲的近代科学的胜利导致以下神话的广泛传播：科学仅仅是西方文明的专擅，这一文明被认为是源自希腊，又在欧洲文艺复兴时代被重新被发现；因此"现代化"就简单地等同于"科学化"甚至"西方化"。

Science, Modernity, and the Future

- In his article “Traditional vs. Modern in the Japanese Context,” Tadashi Yoshida concluded that Japanese “modernization” occurred in the Meiji period (1868–1912), although there was considerable Western pressure exerted on Japan in due time.
- Similarly, Men Yue provided another case study practices at the *Jiangnan* Arsenal(1864–1897), which the title “Hybrid Science versus Modernity”.
- These two authors suggest that there were different approaches taken to modernization in Japan and China, and these differ considerably from what is described in most textbooks of the history of science.

- 吉田忠发表了“日本的传统对现代”，指出日本的“近代化”始于明治时代（1868-1962），当然是在西方的很大压力下发生的。
- 孟月则提供了对江南制造局（1864-1897）的个案研究，她将那个自强运动的活动属性概括为“混血科学对阵近代化”。
- 两位学者的研究指出，存在着多种同大多数科学史教科书中描述的不一样的近代化道路。

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- The problem is: Did Chinese, or other non-Western nations, experience something that we could identify with “modernization” when they were unfamiliar with what is normally considered as “modern science”? In his “Modernization Less Science,” Pierre-Etienne Will introduced a more broadly-conceived concept of modernity, based on his analysis of some examples in China and Japan before any Westernizing movement or trend prevailed in these two countries. He concluded as follows: “If there was not much real ‘science’ in pre-1850 East Asia, at least not in our sense, there occasionally were interesting moves in that direction; and there definitely was an amount of mordernization—an amount fairly variable in nature and according to country or region, to be sure, but sometimes an impressive amount.”

- 问题是：中国，或其他非西方国家，在不熟悉一般意义的所谓近代科学之前，是否经历过可称为“近代化”的历程？在魏丕信的《缺少科学的近代化》中，基于对中国和日本在西方化之前一些例子的分析，引入这一更为广泛的近代化的概念。他得出结论说：“如果在1850年前的东亚没有真正的‘科学’，至少没有我们意义上的‘科学’的话，那也有偶然的向着这一方向的有趣的运动；并且的确有着相当数量的近代化的努力，其数量按不同的国家或地区在本质上很不相同，但有时却给人以深刻的印象。”

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- “定位中国的文明到底要建设一个什么样的格局，这样一个新的理想既符合中国的实情，又能够给其他民族和国家带来希望，这是需要我们探索的。如果说有科学理论的话，实际上这个科学理论还在探索之中，我们只能用科学的方法来探索，而看不到现成的答案，但是大家可以争论、讨论，尤其要讨论我们现在引进的美国、欧洲的经济发展模式，包括它的社会保障制度，它的管理产业格局的问题在什么地方，什么是新的经济增长点，哪些环节是不可持续、必须改革的。中国的生态环境、资源状况和人口压力，远比美国、欧洲大，所以，适合中国国情的道路和美国、欧洲已经走过的道路，显然是不可能重复的。”

Chen Ping. Farewell the model of Testing each step before taking it and forward that of overall survey (告别摸着石头过河走向全局观海). Interview. http://theory.people.com.cn/GB/12976180.html

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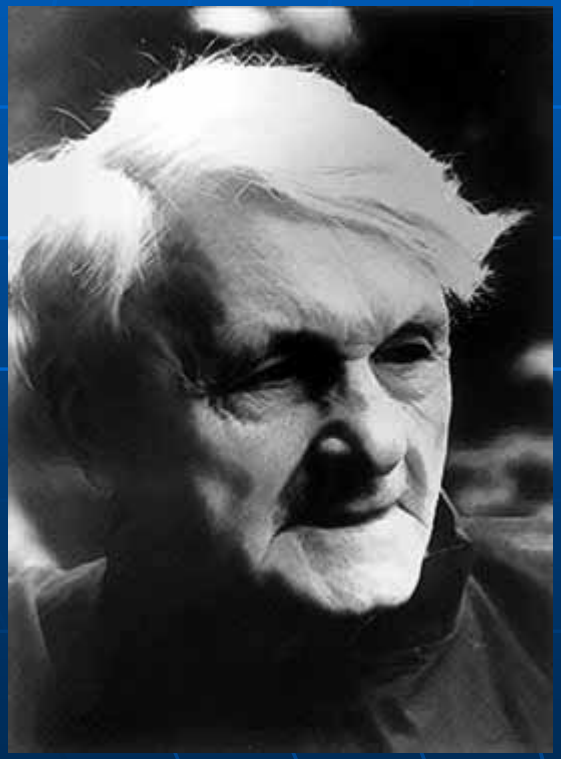
- In developing countries, people should not simply explore the reasons for any possible "lagging behind"; more importantly, they must also to find ways to support the coexistence of modern science and their own traditional heritages, and of promoting their prosperity together, as some people are now doing with traditional Chinese and modern Western medicine.

- 在发展中国家，人们不应只是探究"落后"的原因；更重要的是，他们应该找到使现代科学与传统科学并存的方法，同时促进它们的共同繁荣，如同我们今天对传统医学与现代医学一样。

Conclusion

- As science continues to develop, greater concern for humanity generally should also be given, cultural diversities ought to be respected, the harmony between man and nature must be maintained, and the coexistence of traditional cultures and modern science should be preserved--these are all part of the modern gospel that Joseph Needham sought to convey through his life, and especially through the pioneering work he did putting the Science into UNESCO, and the Civilization into his mastepiece *SCC*.

- 在发展科学的同时倾注更多的人文关怀，尊重人类文化的多样性，保持人与自然的和谐，允许传统科学与现代科学并存，这些都是李约瑟通过其工作向人类传达的当代福音。
- 这样，我们今天才能更清楚地认识李约瑟博士的伟大贡献。特别是，他将“科学”包容进UNESCO这一国际组织的提议，以及将“文明”吸纳进有关中国的科学与技术的研究之中的深远意义。



Thank You, Dr. Needham