JOSEPH NEEDHAM AND THE SCIENCE OF CHINA, BY D. J. DE SOLLA PRICE. pdf

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*Heavenly Clockwork: The Great Astronomical Clocks of Medieval China [Joseph Needham, Ling Wang, Derek J. De Solla Price] on www.enganchecubano.com *FREE* shipping on qualifying offers. A reissue with a foreword and supplement, of a modern classic published in*

The invention of the mechanical clock was one of the most important turning points in the history of science and technology. This study revealed six centuries of mechanical clockwork preceding the first mechanical escapement clocks of the West of about AD Detailed and fully illustrated accounts of elaborate Chinese clocks are accompanied by a discussion of the social context of the Chinese inventions and an assessment of their possible transmission to medieval Europe. For this revised edition, Dr Joseph Needham has contributed a new foreword on recent research and perceptions. In a supplement John H. For those who are looking for material that looks beyond the Western bias when ancient science and technology are discussed, this is a great book to pick up and enjoy. By K27 on Oct 19, arrived on time. Although i could not read the legends i understood that the purpose of the drum and bell towers throughout China was to keep time in a very public way. I was not at all disappointed in the book. It is literally an excellent example of how to do science, how to investigate a historical question, how to marshall facts and prove a difficult point. But the book is not for the faint of heart, or the mildly interested in horology, it is complete, tedious and not a Sunday afternoon light reading. Nor should it be, it is just as the author intended it, a scientific research book on the origin of clock building in China. Not only was it the earliest complex device, heralding a whole age of machine-making, but also its regular imitation of the natural motion of the sun and heavens fascinated men and exerted no small influence on their philosophy and theology. The clock was built, a high astronomical clock-tower more than thirty feet high, with sky observation points, moving globes and rings that would be analogous to the same object in the movie "Dark Crystal" with the planets in their various orbits whizzing around the sun. It was a mobilisation of oecumenical idealism something like that which the League or the United Nations have now and then commanded in our own time. In the West, a series of happy accidents occurred soon after the arithmetically minded Babylonians had communicated their astronomy to the geometrically strongly-developed Hellenic scientists. These accidents of physical fact and mathematical structure had the effect of directing the best period of genius towards the mathematical analysis of planetary motions rather than to any other part of astronomy. This book is my first study into the Needham body of writing and i look forward to working through the 12 volume set on Chinese science. Add a Book Review Book Summary: This particular edition is in a Paperback format. It was published by Cambridge University Press and has a total of pages in the book. To buy this book at the lowest price, Click Here.

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2: Heavenly Clockwork: The Great Astronomical Clocks of Medieval China by Joseph Needham

The great astronomical clocks of medieval China. Joseph Needham, Wang Ling, and Derek J. de Solla Price. Cambridge University Press, New York, xv + pp. Illus. $

Early years[edit] Needham was the only child of a London family. He had intended to study medicine, but came under the influence of Frederick Hopkins , resulting in his switch to biochemistry. His three-volume work Chemical Embryology, published in , includes a history of embryology from Egyptian times up to the early 19th century, including quotations in most European languages. Three Chinese scientists came to Cambridge for graduate study in He then pursued, and mastered, the study of Classical Chinese privately with Gustav Haloun. During this time he made several long journeys through war-torn China and many smaller ones, visiting scientific and educational establishments and obtaining for them much needed supplies. His longest trip in late ended in far west in Gansu at the caves in Dunhuang [8] at the end of the Great Wall where the earliest dated printed book - a copy of the Diamond Sutra - was found. In he visited Yunnan in an attempt to reach the Burmese border. Everywhere he went he purchased and was given old historical and scientific books which he shipped back to Britain through diplomatic channels. They were to form the foundation of his later research. After two years in which the suspicions of the Americans over scientific co-operation with communists intensified, Needham resigned in and returned to Gonville and Caius College, where he resumed his fellowship and his rooms, which were soon filled with his books. He devoted his energy to the history of Chinese science until his retirement in , even though he continued to teach some biochemistry until Science and Civilisation in China[edit] Main article: Within weeks of being accepted, the project had grown to seven volumes, and it has expanded ever since. The first years were devoted to compiling a list of every mechanical invention and abstract idea that had been made and conceived in China. These included cast iron , the ploughshare , the stirrup , gunpowder , printing , the magnetic compass and clockwork escapements, most of which were thought at the time to be western inventions. The first volume eventually appeared in The publication received widespread acclaim, which increased to the lyrical as further volumes appeared. He wrote fifteen volumes himself, and the regular production of further volumes continued after his death in Later, Volume III was divided, so that 27 volumes have now been published. History of Scientific Thought Vol. Mathematics and the Sciences of the Heavens and Earth Vol. Physics and Physical Technology Vol. Chemistry and Chemical Technology Vol. Biology and Biological Technology Vol. The project is still proceeding under the guidance of the Publications Board of the Needham Research Institute , chaired by Christopher Cullen. Needham thought the notion that the Chinese script had inhibited scientific thought was "grossly overrated". In the final volume he suggests "A continuing general and scientific progress manifested itself in traditional Chinese society but this was violently overtaken by the exponential growth of modern science after the Renaissance in Europe. China was homeostatic , but never stagnant. Yingqui Liu and Chunjiang Liu [18] argued that the issue rested on the lack of property rights and that those rights were only obtainable through favour of the emperor. Protection was incomplete as the emperor could rescind those rights at any time. Science and technology were subjugated to the needs of the feudal royal family, and any new discoveries were sequestered by the government for its use. The government took steps to control and interfere with private enterprises by manipulating prices and engaging in bribery. Each revolution in China redistributed property rights under the same feudal system. Land and property were reallocated first and foremost to the royal family of the new dynasty up until the late Qing Dynasty â€” when fiefdom land was taken over by warlords and merchants. These limited property rights constrained potential scientific innovations. The Chinese Empire enacted totalitarian control and was able to do so because of its great size. There were smaller independent states that had no choice but to comply with this control. They could not afford to isolate themselves. The Chinese believed in the well being of the state as their primary motive for economic activity, and individual initiatives were shunned. There were regulations on the press, clothing,

construction, music, birth rates, and trade. It is the State that kills technological progress in China". The experience-based process depended on the size of a population, and while new technologies have come about through the trials and errors of the peasants and artisans, experiment-based processes surpasses experience-based processes in yielding new technology. Progress from experimentation following the logic of a scientific method can occur at a much faster rate because the inventor can perform many trials during the same production period under a controlled environment. Results from experimentation is dependent on the stock of scientific knowledge while results from experience-based processes is tied directly to the size of a population; hence, experiment-based innovation processes have a higher likelihood of producing better technology as human capital grows. China had about twice the population of Europe until the 13th century and so had a higher probability of creating new technologies. Europe had a smaller population but began to integrate science and technology that arose from the scientific revolution in the 17th century. This scientific revolution gave Europe a comparative advantage in developing technology in modern times. Lin blamed the institutions in China for preventing the adoption of the experiment-based methodology. Its sociopolitical institution inhibited intellectual creativity, but more importantly, it diverted this creativity away from scientific endeavours. Totalitarian control by the state in the Chinese Empire inhibited public dispute, competition, and the growth of modern science, while the clusters of independent European nations were more favourable to competition and scientific development. In addition, the Chinese did not have the incentives to acquire human capital necessary for modern scientific experimentation. Civil service was deemed the most rewarding and honourable work in pre-modern China. The gifted had more incentives to pursue this route to move up the social status ladder as opposed to pursuing scientific endeavours. Pierre-Yves Manguin writes, for instance: As Needham found more and more evidence about science and technology in China, he struggled to liberate himself from his Eurocentric original sin, which he had inherited directly from Marx, as Cohen also observes. But Needham never quite succeeded, perhaps because his concentration on China prevented him from sufficiently revising his still ethnocentric view of Europe itself. Contextual Tradition", argues for contextual translations instead of fragmented ones, criticising the faults of Needham in particular. Lin contends that technological advancements at this time were largely separate from economic circumstance, and that the effects of these institutions on technological advancement were indirect. His left-wing stance was based in an idiosyncratic form of Christian socialism and after his sympathy with Chinese culture was extended to the new government. During his stay in China, Needham was asked to analyse some cattle-cakes that had been scattered by American aircraft in the south of China at the end of World War II, and found they were impregnated with anthrax. Zhou Enlai coordinated an international campaign to enlist Needham for a study commission, tacitly offering access to materials and contacts in China needed for his then early research. Needham agreed to be an inspector in North Korea and his report supported the allegations. On a visit to China in he was met by Zhou Enlai, but on a visit in he was deeply depressed by the changes under the Cultural Revolution. Personal life[edit] Needham married the biochemist Dorothy Moyle â€” in and they became the first husband and wife both to be elected as Fellows of the Royal Society. The three of them eventually lived contentedly on the same road in Cambridge for many years. In , Needham became the fourth recipient of the J.

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3: Heavenly Clockwork

Derek John de Solla Price (22 January - 3 September) was a physicist, historian of science, and information scientist, credited as the father of scientometrics.

De Solla Price, Heavenly Clockwork: Cambridge University Press, Reviewed by Clara Austin Hist - Spring The new clock tower supported an armillary sphere large enough for a man to stand in and a celestial globe showing the positions of all the stars. It also included a wheel of puppets or jacks that appeared every quarter hour to the accompaniment of bells, gongs, and drums. The puppets and the "bells and whistles" were for the benefit of the young emperor, but the armillary sphere and the celestial globe had a more serious purpose-to correct errors that had crept into official astronomical observations. The water-wheel drive was wholly self-contained, leading Chinese engineers, says Needham, to dreams of perpetual motion drives. The device, although it kept time, was primarily and astronomical instrument, which turned an armillary sphere and a celestial globe "in imitation of the actual heavens" p. Its purpose was to reduce calendrical errors, and thereby to maintain the favor of Heaven. The fate of the clock was wrapped up in politics, however. As the Sung court fled to the South, they left behind not only skilled craftsmen and scholars, but the plans for the armillary sphere and its water-mechanical drive as well. The north Chin dynasty reassembled the clock and it ran for another thirty years, but it was then allowed to fall into disrepair; Needham is not sure why, but suspects a lack of scientific and technological sophistication on the part of the "barbarous" Mongols p. Once the empire was stabilized under Khublai Khan-and once the Khans gained some polish-astronomical sciences began to flourish once more. By , the Chinese emperor Shun Ti was making his own personal clocks with water-powered driving wheels, but weight-driven mechanical escapements. The great Chinese water-clock tradition came to end, says Needham, when the Ming dynasty came to power in and destroyed the clockwork of the Mongols, and ushered in a period of scientific decline. By the time the Jesuits arrived in the seventeenth century, no one could explain Chinese science and technology to the Europeans, with the result that Chinese achievements have been greatly under-appreciated ever since. The Jesuits, of course, brought European mechanical clocks to China, where they were accepted as amazing novelties. However, the Jesuits and the traders who followed them to China also brought Chinese ideas to the West. Specifically, the astronomical clocks which had been such an important part of the Chinese clock-making tradition influenced Europeans designs for monumental clocks with astronomical instruments and jackwork. Throughout the latter part of Heavenly Clockwork, Needham connects knowledge of Chinese astronomical water-clocks with clocks built in Europe. The final chapter is entitled "Transmission of Astronomical Clocks. His reasoning is this: A The mechanical clock, and especially the escapement, appeared full-blown in Europe without any primitive precursors. B The Chinese had knowledge of the escapement and other mechanical devices before they appeared so precipitously in Europe. C The Chinese, while not in direct contact with Europe, were in contact with India and the Arab world. D The Arabs transmitted many Hellenistic technologies such as the astrolabe with almost no modifications to Europe. Therefore, E it is not out of the question that the Chinese technology came to Europe via the Middle East with little or no modification and then jump-started European clock-making. While Needham cannot prove any connection between Chinese clocks, Islamic and Indian clocks, and European clocks, he concludes that "from the middle of the twelfth century onwards, there is considerable likelihood of the transmission of such Chinese ideas to India and Islam and thence after and to Europe" p. This is mere speculation, however, and Needham does not prove any of it. Heavenly Clockwork is a fascinating venture into the history of Chinese technology. The suggestions of transmission to Europe do not fit nearly so well, either into the organization of the book itself or with the information available. Needham simply provides no real evidence of transmission of mechanical, technological, or scientific information out of China at all. This flaw diminishes the value of book somewhat, but does not negate its possibilities. These and similar questions remain unanswered by Needham, at least in this volume.

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4: Wang Ling (historian) - Wikipedia

Heavenly Clockwork: The Great Astronomical Clocks of Medieval China by Joseph Needham, Ling Wang, Derek J. De Solla Price A reissue with a foreword and supplement, of a modern classic published in

5: Derek J. de Solla Price | Horizon ()

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6: Books by Joseph Needham (Author of Science and Civilisation in China, Volume 1)

The historian of science as ecumenical man: a meditation in the Shingon temple of KongÅ•sammai-in on KÅ•yasan, by J. NeedhamJoseph Needham and the science of China, by D.J. de Solla PriceJoseph Needham, organic philosopher, by S. NakayamaChina, Europe, and the origins of modern science: Needham's the grand titration, by A.C. Graham.

7: TOP 6 QUOTES BY JOSEPH NEEDHAM | A-Z Quotes

Books by Joseph Needham. Science and Civilisation in China, Volume 7: Science and Chinese society, Part 2: Derek J. De Solla Price.

8: Joseph Needham - Wikipedia

--Joseph Needham and the science of China, by D.J. de Solla Price. -- Joseph Needham, organic philosopher, by S. Nakayama. -- China, Europe, and the origins of modern science: Needham's the grand titration, by A.C. Graham.

9: Joseph Needham Books - List of books by Joseph Needham

The historian of science as ecumenical man: a meditation in the Shingon temple of Kongosammai-in on Koyasan, by J. Needham. Joseph Needham and the science of China, by D. J. de Solla Price.

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