NEEDHAM RESEARCH INSTITUTE NEWSLETTER

Newsletter No. 1 EAST ASIAN HISTORY OF SCIENCE TRUST January 1987

NEEDHAM RESEARCH INSTITUTE

The *East Asian History of Science Trust* was founded in August 1968, and in June 1983 the Trustees decided to confer the title *Needham Research Institute* for the activities which have the East Asian History of Science Library at its centre. The three bodies of Trustees comprise the following members:

The United Kingdom: The Lord Roll of Ipsden (Chairman), Professor Patrick Bateson, Mr Roland Berger, Mr W Brian Harland, Mr John Horwood-Smart, Mr Stephen Keynes, Dr Lu Gwei-Djen, Sir Brian Pippard and Dr George Salt.

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Dr Joseph Needham FRS, FBA, Director of the Institute, is assisted by Dr Lu Gwei-Djen, Associate Director, and Mr Colin Ronan, Secretary to the UK Trust and Project Coordinator. Sir Brian Pippard FRS, Emeritus Professor of Physics, Cambridge, is Chairman of the Committee of Management, whose members include Dr Frederick Ratcliffe, Librarian of the University Library, Cambridge. The staff of the Institute includes Mrs Diana Brodie, administrative assistant and secretary, Miss Carmen Lee (Li Chia-Wên), Librarian, and Mr Steven Simmonite also, a librarian, recruited to prepare a computerised subject-index and to assist in library reclassification. In addition, Mr Kenneth Robinson is a contributor to *Science and Civilisation in China* and is also responsible for editing Volume VII of the project, and Dr Ma Bo-ying, Director of the Department of Medical History, Shanghai First Medical College, is working with Dr Lu as a collaborator, while Mrs Liang Lien-chu and Mr Gregory Blue, who are assistants working with Dr Needham, are also contributing to the project.

The academic policy of the Institute is determined by the Director in consultation with members of the Institute and the Academic Committee, which includes Professor Glen Dudbridge, Mr Brian Harland, Dr Michael Hoskin, Dr Gordon Johnson, Dr Frederick Ratcliffe and Dr George Salt.

Scholars from overseas who have visited the Institute and worked there in the course of 1986 include the following: Dr Hans Ågren (Faculty of Medicine, Uppsala University), Dr Marianne Bastid (Centre National de la Recherche Scientifique, Paris), John Berthrong (Centre for Religious Studies, University of Toronto), Dr Helen Dunstan (Department of Far Eastern History, Australian National University, Canberra), Professor Else Glahn (formely of the Ostasiatisk Institut, Århus), Professor Christoph Harbsmeier (Ostasiatisk Institutt, University of Oslo), Dr Huang Hsing-Tsung (National Science Foundation, Washington), Dr Dieter Kuhn (Max Planck Gesellschaft and University of Berlin), Professor Nathan Sivin (Department of the History and Sociology of Science, University of Pennsylvania, Philadelphia), Dr Hans Ulrich Vogel (Swiss Foundation for the Promotion of Science and the University of Zürich), and Mr Donald Wagner (East Asian Institute, University of Copenhagen).

THE MANY BENEFACTIONS

The Institute records with deep thanks a number of benefactions that have been received during the last few years and which have been of the greatest value in promoting its work. Some of the gifts have been intended to help with the construction of the South Wing of the new building. In particular the Institute wishes to express its thanks to Mr George Hicks of Hong Kong for a generous contribution; and to Mr Ch'en Li-fu of Taipei, for the large sum which he has collected from a number of friends of the Institute in Taiwan.

Two important gifts to the Library are fortunately reaching the Institute at a time when they can be housed directly in the new building. These are copies of the newly produced reprint of the *Ssu k'u ch'üan shu,* which has been presented by the National Palace Museum, Taipei, and of the *Cheng-t'ung tao-tsang*. A note on these valuable gifts will follow in later issues of this Newsletter.

"FROM PAO-P'U-TSE TO MAWANGTUI": AN EXCERPT[1]

By Cao Tianqin

When Joseph Needham and I met, the first topic of conversation was ancient Chinese alchemy. We were introduced by my good friend H T Huang in August 1944, when I had just graduated from Yenching University, and was taking over the work Huang had been doing as Needham's secretary. I had arrived in Chungking from Ch'eng-tu and had managed to find the provisional headquarters of the Sino-British Science Cooperation Office. I was waiting with curiosity and unease to meet this chemical embryologist with a worldwide reputation. When he came out to see me, he was holding a copy of Ko Hung's ancient philosophic work *Pao-p'u-tzu,* and immediately, with great enthusiasm, struck up a conversation about its sections on the chemistry of lead and mercury. Only after he had finished with "external alchemy" and "the yellow and the white" did he get round to briefing me about my future work. He wanted me to accompany him and his wife Dorothy Needham, the internationally renowned muscle biochemist, departing immediately for a working tour of the Yunnan and Kweichow areas. That is how a friendship of more than thirty years began.

Bronze bust of Joseph Needham by Nigel Boonham. This will stand in the entrance to the Institute.

In August of 1972, during the Cultural Revolution, I was summoned from my "supervised labour" in a workshop that made briquettes from coal dust. I was excused for a couple of days in order to welcome Needham, who had come on a visit. As I sat next to him in the workshop's reception room for important guests, I noticed the Chinese literary name "Taoist of the Ten Lunar Lodges" in a corner of the card that he was handing out. This conveyed, even more vividly than the sobriquet "Elixir Radiance" that he had used in his Chungking days, the Taoist orientation of his thoughts. One wave after another of feeling from our days →

[1] Originally published in Chinese in *Explorations in the History of Science and Technology in China Compiled in Honour of the Eightieth Birthday of Dr Joseph Needham,* FRS, FBA, eds. Li Guohao, Zhang Mengwen and Cao Tianqin (Shanghai Chinese Classics Publishing House, 1982); pp. 77-88; translated by N Sivin.

together during the war washed across my mind.

In August 1945, along with Ch'iu Ch'iung-yün, I had accompanied the Needhams to Lou-kuan-t'ai, deep in the Chung-nan mountains, to visit the Taoists there. With the seventy-year-old abbot Ho Chen, the "Taoist who Duplicates the Buddha", he discussed *The Way and Its Power*, and toured the Elixir Preparation Hall. Alas, Lou-kuan-t'ai belonged to the Dragon Gate sect, founded by the Perfected Immortal of Eternal Spring, Ch'iu Ch'u-chi, so the alchemy they practised was of the "internal" sort, a matter of meditation. Their Elixir Preparation Hall, it turned out, was a place for self-cultivation, and not at all a chemical laboratory.

On the same journey we also visited the shrine to Chang Liang at Miao-t'ai-tzu, deep in the Ch'in Range. That was a Taoist temple of the "Three Religions United" movement, dedicated to the hero Chang Liang of two thousand years ago who, when he retired, had gone off with the Yellow Stone Master. The Taoists of Miao-t'ai-tzu did not practice alchemy, but they were skilful at using the iron ore of their mountains, along with tree stems, to make grey iron. The iron cooking-pots they made were sold far and near, and made them well known.

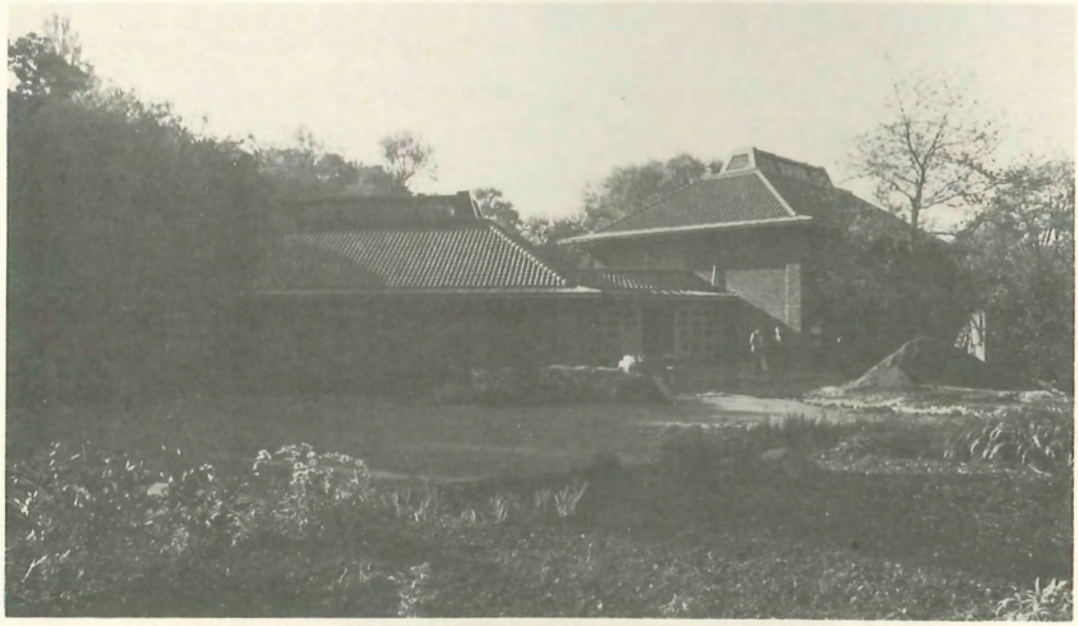
Nor can I forget our experiences at the Recumbent Dragon Temple and the Stone Sheep Shrine in the eastern outskirts of Pao-chi. At the time the Japanese invaders were making trouble in Honan. A number of the professors and students of Honan University had moved to Pao-chi and were living there in the poorest circumstances conceivable. They were lodging in these ramshackle temples, pressing on with classes. I sat listening with fascination to Needham's endless conversations with members of the chemistry faculty, huddled together knee to knee. They were discussing Wei Po-yang's ancient alchemical classic *Kinship of the Three*. Nor will I forget Needham taking shelter for three days in the bell tower at Hua-hsi-pa in Ch'eng-tu, holding discourse with Professor Kuo Pên-tao on the Taoists' "internal alchemy".

On that long journey of 1944-1945 through the Southwest and Northwest I saw him, on the one hand, busily engaged in scientific meetings and activitites and, on the other, indefatigably asking questions, noting replies, setting down translations from classics, untiringly collecting materials for the history of Chinese science and technology. What thus accumulated drop by drop, twenty-seven years later had collected to form a torrent. The plans and ideas of those days had turned into one volume after another of *Science and Civilisation in China*. The man sitting by my side might be a Cambridge biochemist, but he was also a steadfast friend of the Chinese people; a FRS, but in an earlier dynasty he would also have been a member of the Imperial Academy; a man learned in all philosophies, but above all a Taoist.

In May 1978 and October 1980, when we met again in Shanghai and Cambridge, China had experienced great changes in politics and society, and I had regained my freedom. I was able to see clearly how the forty years of untiring effort that had gone into *Science and Civilisation in China* had influenced Chinese culture, and world culture. The volume after volume of this book, along with translations into many languages, arrayed on the shelves of his East Asian History of Science Library in Cambridge, were a profound encouragement and a formidable challenge to Chinese scientists and historians. I too was once again stimulated by his utter concentration through long hours of work every day. Who could believe that he is already in his eighties?

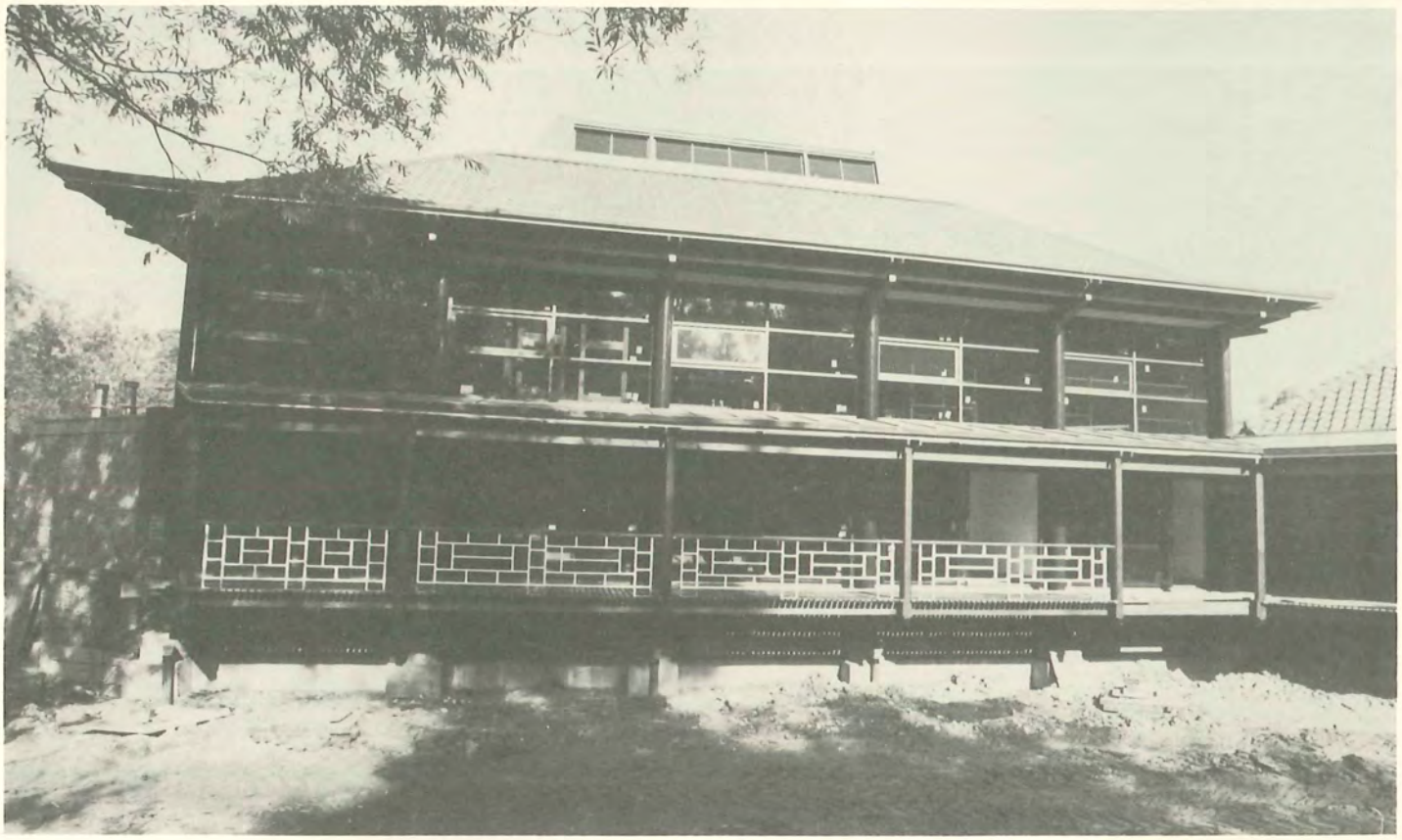
THE INSTITUTE'S NEW HOME

AN ARCHITECTURAL DESCRIPTION By Christophe Grillet



Front (north facing) entrance of the Needham Research Institute during the last stages of construction.

The move into of the new building of the Needham Research Institute in Sylvester Road, Cambridge will mark the culmination of a six-year long collaboration between the East Asian History of Science Trust and the Architects, Lyster, Grillet & Harding. The brief for the building was written by Dr Needham and developed with the help of Christophe Grillet of Lyster, Grillet & Harding. From the brief, a detailed cost plan was produced with the quantity surveyors Davis Belfield & Everest in 1981. In 1984, the Trust was able to negotiate the purchase of the lease for the corner site between Sylvester Road and Herschel Road. The 'hinged pavilion' form of the building



Rear (south facing) view of the main Library block of the Institute.

enabled fine adjustments to be made to the plan to 'fit' the site. As the building is designed in three parts, it could, if necessary, be built in phases as and when funds became available.

The Institute's Library is housed in the two-storied, central block, together with the Librarian's office, studies, and a reference and rare book section. In the eastern single story block are the Director's and Associate Director's rooms, adjoining a cataloguing-room as well as a common room, kitchen and cloakrooms. The south wing, as yet unbuilt, will contain more studies, bookstacks, an exhibition room for technological artefacts and models of machines and scientific experiments.

The southern edge of the site is well wooded and will be left in a natural state. There is a fall across the site from north to south down to a small stream, known as Bin Brook, which runs parallel with Herschel Road. The Brook will be widened to form a pool which will be the central feature of a new landscaped garden.

Conceptually, the new south garden is intended to be an East Anglian interpretation of the traditional Chinese garden. Plants will be selected for their symbolic, medicinal or aromatic qualities, and hard landscaping materials will progress from smooth materials near the building to rough boulders near the edge of the pool. There will be a deliberate contrast with the traditional English north garden which belongs with the existing interesting western house designed in the modern style by Hugh Hughes in the 1930's.

Bin Brook has influenced the planning and the construction of the building. The ground floor had to be set above the highest recorded flood level. The south wing will actually bridge over the stream, and the veranda will form an access to the right bank.

Because the sub-soil is composed of silt on shrinkable clay, the building is founded on bored piles. The foundations support load bearing walls, steel columns, concrete floors and the tiled roofs carried on exposed trusses. Great care has been taken in the selection of materials. The external walls are of handmade red brick, in a mixture of six colours that range from orange to brown, and the roofs are of red clay pantiles with copper cappings and flashings. Internally the roof trusses are of solid ash timber with cast bronze connectors and tie rods. The high ceilings are of ash boarding. The floors throughout incorporate the heating system and are mainly carpeted. The walls and ceilings are finished in timber or in white painted plaster. The windows are in bronze finish aluminium and are all double glazed with grey tinted glass. Window cills are of black slate, gutters and rainwater pipes are of copper. The new bookcases are entirely of ash timber and are specially designed to contain Western and Chinese books without segregation for size. The heating is gas fired; sophisticated fire and intruder alarms are built in. All the offices, workspaces, studies etc are wired for power, telephone and access to the computer cataloguing. An air conditioned room has been included for rare books. There is a hydraulic lift large enough for a person in a wheelchair. The materials have all been selected for their qualities of simplicity, strength, permanence, low maintenance and low energy consumption.

The design of the building is a synthesis of several important and diverse elements. Its location in leafy Cambridge suburban roads raises questions about the scale and form of the building. There are similarities between the climates of East Anglia and East Asia and, as a consequence, of some of their building traditions. This consideration suggested that the building should be framed structures and roofs with large overhangs, but with loadbearing infill walls to cater for library loadings and sound proofing. There are other obviously cultural connections with China in the great temple-like columns and in the use of the octagon in doors and windows. Chinese elements have been subtly and sparingly woven into the design: traditional colours have been used on the exterior of the building - red for the main supporting columns, green for the steel cantilever brackets supporting the roof overhangs, with yellow beams and green rafters. Dr Needham's personal seal in red with gold leaf Chinese characters is used for the decoration of the ends of some roof brackets. The seal of the East Asian History of Science Library is used in the door push plates. The main stair will incorporate cast plates from T'ang period paving tiles found by Dr Needham at Ch'ien-fo-tung in Kansu Province.

The veranda, which provides a sheltered link between the pavilions and also acts as a 'brise soleil', is not a purely Chinese device but a European Colonial invention. However, it has an oriental flavour. The floor and the posts of the veranda are of Iroko, a south east Asian timber. A traditional Chinese pattern is used in the veranda's painted softwood balustrade.

If one were searching for a stylistic label for the building, it could perhaps best be described as East Anglian Asian, or perhaps East Asian Anglian? The architects hope that whatever label is applied they will have made use of some of the best of both worlds.

SCIENCE AND CIVILISATION IN CHINA

Joseph Needham's great enterprise has been praised from many quarters and has been described as 'perhaps the greatest single act of synthesis and intercultural communication ever communicated by one man' (*The Guardian*) and '...one of the greatest and most captivating works of scholarship to grace our age' (*The Times Educational Supplement*). Cambridge University Press is proud to be associated with Dr Needham and the Needham Research Institute in the publication of this major work.

In January 1987 the next part of *Science and Civilisation in China* is being published. **Volume V, Part 7, The Gunpowder Epic** is one of three planned publications on military technology. Gunpowder was invented in China by the ninth century AD and its use developed rapidly. The range of technology from bombs to the metal-barrel hand-gun was invented in the Chinese culture area before Europeans even had any knowledge of gunpowder. Dr Needham's new work continues to demonstrate the major importance of Chinese science and technology to world history.

Spring 1987 will see the publication of **Volume V, Part 9, Textile Technology: Spinning and Reeling,** by Dieter Kuhn, which will be the first of two parts to cover Chinese textiles and technology.

Volume I:	INTRODUCTORY ORIENTATIONS	£37.50 net
Volume II:	HISTORY OF SCIENTIFIC THOUGHT	£65.00 net
Volume III:	MATHEMATICS AND THE SCIENCES OF THE HEAVENS AND THE EARTH	£80.00 net
Volume IV:	PHYSICS AND PHYSICAL TECHNOLOGY	
Part 1:	Physics	£42.50 net
Part 2:	Mechanical Engineering	£75.00 net
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Volume V:	CHEMISTRY AND CHEMICAL TECHNOLOGY	
Part 1:	Paper and Printing	£50.00 net
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Part 3:	Spagyrical Discovery and Invention: Historical survey from Cinnabar Elixirs to Synthetic Insulin	£42.50 net
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Part 6:	Military Technology, Projectiles and Sieges	
Part 8:	Shock Weapons and Cavalry	
Part 9:	Textile Technology: Spinning and Reeling	
Volume VI:	BIOLOGY AND BIOLOGICAL TECHNOLOGY	
Part 1:	Botany	£50.00 net
Part 2:	Agriculture	£60.00 net

For further details of these titles please write to the Publicity Department at Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU

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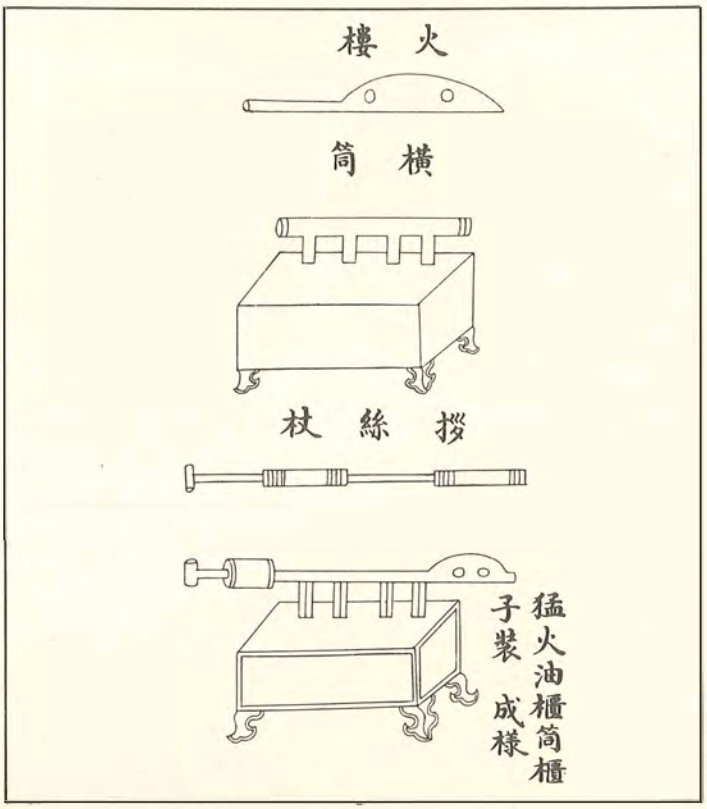

Flame-thrower. The Byzantines left no designs for their flame-throwers, but the earliest use of gunpowder was as a slow-match in the "fire-tower" for igniting the petrol pumped out.

THE SHORTER SCIENCE AND CIVILISATION IN CHINA

'Colin Ronan has done a remarkable job of reduction, keeping most of the essential detail, reproducing many of the illustrations. He has heroically preserved as much of the original style as possible.' So said Marie Boas Hall in her review in *New Scientist* of *The Shorter Science and Civilisation in China, Volume 2*. This volume, which corresponds to Volume III and one half of Volume IV, Part I of the original work, was initially published in hard covers only, but is now also available in paperback.

July of this year saw the publication of *Volume 3* of the abridgement - *Nautical Science*. In the original text, the material covered here had appeared in Volume IV, Part 1, and Volume IV, Part 3 of the original. In this abridgement the discovery of the magnetic compass, and nautical science and technology are conveniently presented in a single unified account and the opportunity has been taken to include the official Pinyin transliterations alongside those of the original work.

The following list shows the prices of the abridged volumes:

Volume 1:	
Hard covers	£30.00 net
Paperback	£10.95 net
Volume 2:	
Hard covers	£37.50 net
Paperback	£12.95 net
Volume 3:	
Hard covers	£30.00 net
Paperback	£12.50 net

Two other titles recently published by Cambridge University Press focus on horology.

Heavenly Clockwork by Joseph Needham, Wang Ling and Derek J de Solla Price is a reissue of a modern classic published in 1960 and provides a detailed and fully illustrated study of the great astronomical clocks of medieval China. Dr Needham has contributed a new foreword on recent research and perceptions, and John H Combridge, in a supplement, details a modern reconstruction of Su Sung's timekeeping device. £35.00 net

The Hall of Heavenly Records is the result of close collaboration between four distinguished historians of Asian science, Joseph Needham, Lu Gwei-Djen, John H Combridge and John S Major, to demonstrate the context, purpose, nature and specific workings of Korean astronomical instruments and clocks between 1380 and 1780. Specially commissioned drawings and other illustrations demonstrate their complexity of design and operation £25.00 net