

EUROPEAN SCIENCE FOUNDATION EXPLORATORY WORKSHOP

SCIENCES IN ASIA: REPRESENTATIONS AND HISTORIOGRAPHY, 17<sup>th</sup> TO  
20<sup>th</sup> CENTURIES

A Workshop to mark the publication of Joseph Needham's  
“Conclusions and Reflections” in *Science and Civilisation*, vol. VII part 2

Needham Research Institute, Cambridge, UK

12-16 January 2005

## SCIENTIFIC REPORT

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## 1. Executive Summary

### *Introduction*

This workshop was organised by representatives of two major European (British and French) centres concerned with the history of science in Asia, and took place in Europe's only research institute devoted specifically to that field. It brought together a group of active researchers from all over Europe, many of whom were meeting one another for the first time. The launch-pad of the meeting was a review of the work of the late Joseph Needham, Europe's most influential sinologist and historian of science in the 20<sup>th</sup> century. After wide-ranging but well-focussed discussions, the participants agreed that it was essential for the development of their fields that the contacts begun in this meeting should be deepened and widened, and to this end they agreed to co-operate in the development of a Programme proposal to be submitted to the European Science Foundation for support.

### *Scientific content of the event*

Twenty-one scholars made formal contributions to the workshop over the three days during which it was held. Discussion was structured under nine main headings:

Science and Civilisation in China volume 7 part 2: a multi-voice review  
Joseph Needham's historiography and scientific universalism  
What do we do with judgements?  
Jesuit missionaries' narratives for European audiences  
Chinese scholars' narratives, 17<sup>th</sup> and 18<sup>th</sup> centuries  
Who does the past belong to?  
The case of medicine in East Asia  
The invention of scientific traditions  
Colonial and post-colonial historiographies

### *Assessment of the results*

All contributors agreed that the meeting was extraordinarily successful in building intercultural and interdisciplinary bridges. Through the highly specific case studies presented by many speakers, important general issues emerged which bear centrally on Asian-European cultural relations and scientific interchange. These related to such questions as the nature of scientific modernity, and to the validity of sweeping bipolar contrasts between East and West. It was also clear that in order for both Europeans and Asians to comprehend both their scientific pasts as well as their

possible futures it is essential to consider the relations and contrasts between the highly diverse histories of Asian cultures, and to abandon the habit of assuming that such frameworks as 'China and the West', 'India and the West' etc. can capture all that there is to say.

*Contribution to the future directions of the field*

Thanks to the specifications laid down by the ESF for its exploratory workshops, the organisers were stimulated to seek participation well outside their own habitual networks, both national and international. The result of the meeting was a new awareness of the European research potential, and of ways in which it could be turned into a fully self-conscious community that could share research questions and methods. Therefore the participants have agreed to jointly work on a proposal that they will submit to the ESF for setting up an ESF Programme entitled "Europe, Asia and Science: Comparisons, Exchanges and Representations". It seems that the nine ESF countries represented at the meeting would take part in such a Programme, and that scholars from countries such as Italy, Denmark, Sweden etc. could be included in it. Other themes of such a Programme would include:

- a pluralistic comparative study of early traditions of science, technology, and medicine in Asia
- Empires and networks of circulation of knowledge
- Disciplinary boundaries: their construction, subversion and evolution

These themes were selected because while bringing into play precise case studies, they allowed for collaboration between colleagues from different countries, studying the history of various disciplines.

In short, the Workshop opened the way to constructing a major research programme at the European level in the field of history of science, technology and medicine in Asia.

## 2. Scientific Content of the Event

The Workshop opened with a multi-voice review of Joseph Needham's "Conclusions and Reflections", in *Science and Civilisation in China* vol. VII part 2 (Cambridge University Press, 2004). Since Needham (1900-1995) was the founding figure of the study of the history of science, technology, and medicine in China and also in Cambridge, and had an enormous influence on all studies of science in Asia, it was highly appropriate to open a meeting devoted to historiography by reviewing the last volume of his writings to be published, which includes much material relevant to the issue. The three reviewers were: a contributor to the *Science and Civilisation in China* project (Georges Métaillé, who is currently finishing a volume on botany), a scholar working on another major Asian civilisation, viz. India (Dhruv Raina), and a historian of science who, while working on modern Europe, constructs his research in a world-wide perspective (Simon Schaffer).

Georges Métaillé's contribution was a reflection on the implications of dividing history of science into fields defined by modern disciplines, as is the case in *Science and Civilisation in China*; in the case of botany, there is no equivalent of this category in pre-modern Chinese sources; reconstructing Chinese categories is one of the ways to further Needham's enterprise while renewing the historiography. Dhruv Raina reviewed the significance of Needhamian history of science to Indian scholars, exploring the implications of the "why not" question raised by Needham ("Why did the Scientific Revolution take place only in Europe, not in China?"). Discussions on the origins and nature of Indian science have also led to questioning the idea that there has been one unique form of modernity, which has spread from Europe to the rest of the world: in fact a study of 17<sup>th</sup> and 18<sup>th</sup> century India suggest, that there have been other endogenous forms of modernity in world history. Simon Schaffer discussed the implication of Needham's project for the historiography of European science, and how recent changes in historiography allow us to reflect back on this project. First, he pointed out that the criticism of the superiority of Western civilisation had been reinforced, and now stemmed from within; secondly he emphasised the new importance given to the geographical term in the study of European science; thirdly, he outlined how, somehow in response to the challenge epitomised by the volume under review, the great discontinuity known as the "Scientific Revolution" is more and more seen as having taken place at the turn of the 18<sup>th</sup> and 19<sup>th</sup> century, in relation with the emergence of empires.

Two sessions were then devoted to discussing various aspects of Needham's historiography, and to the ways in which they related to his scientific universalism. Patrick Petitjean showed how Needham's anti-fascist stand in the 1930s and his militant view of science as the heritage of the whole humankind, as well as a conviction that doing good history contributed to preserve world peace, led him to the construction of a historiography that emphasises all civilisations' contributions to this heritage. Karine Chemla looked at the dominant historiography against which Needham was, in part, reacting, especially as regards the issue of the relations between language and thought. She showed how Wilhelm von Humboldt (1767-1835) and Marcel Granet (1884-1940) contributed to the idea that the Chinese language was unsuitable for expressing scientific thought. Needham, although focusing himself on the ways in which classical Chinese was used in scientific texts, did not entirely steer clear of the debate stemming from their claims. Hans Ulrich Vogel (who is currently working on the *Science and Civilisation in China* volume on salt industry) discussed the distinction between invention and innovation made by Needham, whose claim was that Chinese society was not always successful in moving from the former to the latter. Using the example of salt industries in the last four centuries, Vogel, comparing China to Europe, argued that the Chinese economy, characterised by cheap labour and high cost of machinery, as well as the low social status of technical specialists, were crucial hindering factors for innovation in China. Finally, Shigehisa Kuriyama reflected on the famous Needhamian metaphor of confluence, according to which the merging of various scientific traditions into modern universal science takes place at different times, depending on the discipline one is discussing. Using today's Japan as a case study, Kuriyama argued that such a confluence had not yet taken place in the field of medicine, and that the reason for that is of an epistemological nature: in the case of medicine, perception and substance cannot be fully dissociated.

In a session devoted to the issue of judgement in the history of science, Geoffrey Lloyd starting from an analysis of the potentially disastrous effects of value judgements, went on to emphasise that modern historians' standpoints, obviously different from those on who they work, make such judgement difficult to avoid. He concluded by the proposal that the recovery of the ancients' own aims and programmes provide relevant criteria of judgement, and thus open the way to more nuanced evaluations. Nicolas Standaert proposed a typology of the ways of describing the circulation of knowledge, taking the world map published in China by Matteo Ricci (1552-1610, the founder of Jesuit mission in China); he showed how the various models that he called transmission, reception, invention, and interaction, corresponded to emphasis on different actors in the

circulation of knowledge, and how each of them corresponding to a way of assessing this circulation.

The next session was devoted to the role of the Jesuits in the construction of European representations of Chinese science, and especially astronomy. Noël Golvers discussed the material sent to Europe by Ferdinand Verbiest (1623-1688) in the 1680s, when he was in charge of the Astronomical Bureau in Beijing; he showed in particular how this material had first been shaped by the controversies surrounding the Jesuits' engagement with science in China, that is to say, by issues pertaining to theology; scholarly interest in this material came only later. Vladimir Liscak discussed the correspondence of Karel Slavicek (1678-1735) with various European scholars, as a case of information on China was made available to the latter, especially in the context of academies of science. Like many of his confreres, Slavicek produced evidence in favour of the scholarly interest of ancient Chinese sources, and in particular of the value of ancient astronomical records.

A session was then devoted to Chinese representations of the history of mathematics and astronomy at the time of contacts with Europe through the Jesuits. Catherine Jami showed how elements of Western origins were integrated in a historical narrative of mathematics and astronomy centred in China, and discussed the role of Manchu rulers in this debate. Two different oppositions underlay the debates on history of science in China at the time: Chinese vs. Western, but also, more importantly, ancient vs. modern. This double tension was resolved by the idea that "Western learning originated in China". This allowed for an appropriation of the former into Confucian scholarship, as well as for the representation of Manchu emperors as defenders of the Chinese tradition. Tian Miao, looking at late 18<sup>th</sup> century scholars, argued that mathematicians' marked interest in the history of their discipline at the time was closely linked to their effort to give mathematics and astronomy a status comparable to that of the study of the Classics and Histories, that were the basis of the selection of scholars at imperial examinations. This effort also led mathematicians to dismiss earlier claims that their field of study was important because of its practical applications, in favour of a view of mathematics as a more abstract and theoretical field of studies.

Moving the geographical focus to the Middle East, the following session was devoted to the issue of appropriation of the past. Eleanor Robson pointed to the implications of the successive attributions of mathematical texts written in cuneiform scripts: until about 1980, 'Babylonian' mathematics was essentially taken to be of interest as the origins of Greek mathematics; this went together with a selective reading of material that

related to topics thought of as ‘Greek’. In the 1980s however, the same material has been called ‘Mesopotamian’, while being analysed as the ancestor of Arabic mathematics. In contrast, she proposed to look at the cuneiform material in its own terms, rather than as the precursor of some later, supposedly more sophisticated mathematics. Feza Guner Gun analysed the work of the first Turkish scholars to write on the history of science in the late 19<sup>th</sup> century and in the first half of the 20<sup>th</sup> century. She contrasted the work of Salih Zeki (1864-1921), whose historical research should be seen as an element of his broader contribution to mathematical education in Turkey and that of Adnan Adivar (1882-1955), whose main work, *La Science chez les Turcs Ottomans* (Paris, 1939) aimed at making scientific activity and contributions of the Ottoman period (14<sup>th</sup>–19<sup>th</sup> century) visible to a Western European audience. It is interesting that both scholars contributed to the construction of modern scientific institutions in Turkey.

The case of medicine in East Asia was studied in a session. Florence Bretelle-Establet, starting from the question of how modern historians select their sources, argued that the way that the history of Chinese medicine is written today is heavily determined by the collection and selection of medical works done by the Chinese imperial state in the 18<sup>th</sup> century. Her quantitative study shows that the overwhelming domination of Jiangnan scholars on classical scholarship in late imperial China is matched by the predominance of their works in the field of medicine. By contrast, medical practice and literature at the periphery of the empire still awaits study. Harmen Beukers used the diaries of the Dutch surgeons who resided in Deshima (Japan) in the 18<sup>th</sup> century to propose a new, less “centralised”, reading of the phenomenon of “Dutch learning” in Edo Japan. He argued that the actual influence of the import and translation of European medical texts on medical practice remained very small even after the Meiji Restoration. He also showed that the role of Japanese interpreters had hitherto been underestimated, while the credit of the introduction of European medicine into Japan had mostly been attributed to scholars based in Edo, the Shoguns’ capital.

A session was devoted to an often ignored side effect of the introduction of scientific ideas or disciplines from the West, namely the wide-ranging phenomenon of the retrospective construction, nay invention, of scientific tradition. Iwo Amelung showed how “Chinese optics” had been read back into ancient texts, especially the Mohist canon, which was for that purpose edited in a way that contradicted well-established philological principles. In this way, he argued, a whole counterpart to the tradition of optics in the West has been created in China. Christopher Cullen analysed the claims that the idea of a spherical earth had been present in ancient China. His

brief historical review showed that the shape of the earth was not an issue of much importance in China prior to the Jesuits' introduction of the idea in the 17<sup>th</sup> century. Specialists in astronomy then adopted geosphericity, and some of them were the first to make this a case of the "Chinese origin of Western learning". Closer to us, during the Cultural Revolution, historians of science took up the claim that the sphericity of the earth had been present in ancient China. Such a bias has obscured the fruitfulness of this case study of comparative history.

Colonialism and nationalism's role in shaping historiography was discussed in the last two papers. Sujit Sivasundaram, focusing on the case of the British Ceylon, argued that the strong emphasis put on the discontinuity brought about by colonisation. In contrast to the British account of how Ceylon's past could be retrieved thanks to archaeological and textual research brought about by colonisation, local peoples' representation of the new rulers was essentially that of a continuation of the rule by outsiders experienced in the more recent past. More generally, learning imported by the British was fitted in prior patterns of learning, rather than being perceived as radical novelty. Agathe Keller discussed non-academic representations of ancient science in contemporary India, presenting a work published in 1962, *Vedic mathematics*. She showed how the construction of Vedic science, done mostly outside academic institutions, closely related to Hindu nationalism. In this narrative of the origins, simplicity is turned into a core value, again in a wide-ranging attack on intellectual elites.



### 3. Assessment of the Results, Contribution to the Future Direction of the Field

#### a. Assessment of the results

The theme of historiography appeared to be well suited to the purpose of bringing together scholars who work on the history of science, technology and medicine in Asia. Confronting case studies has thrown light on the ways in which, beyond the undeniable specificities of each, the complex history of the relations between Europe and Asia in the past four centuries has marked representations of Asia on both sides. This is especially important when discussing science, as it has overwhelmingly been taken as a characteristic of European modernity, as opposed not only to pre-modernity, but also and mainly to the rest of the world. On the other hand, the diversity of Asian civilisations (Mesopotamia, Turkey, India, China and Japan were discussed) and of the modalities of their interactions with Europe implies that one should be guarded against broad generalisation. It is difficult and possibly not highly relevant, for example, to extend the thesis of Edward Said's famous work *Orientalism*, to encompass East Asia. The extreme diversity of situations encountered in case studies further invalidates the old "East-West" dichotomy that has so far dominated historiography, and that has been used in every particular case ('China and the West', 'India and the West' etc.). Instead, the contributions brought together at the workshop pointed to possible ways of constructing a multi-sided 'world history of science'.

#### b. Contribution to the future direction of the field

This double conclusion - discerning general patterns, while fully taking into account the diversity of situations - highlights the relevance of furthering collaboration amongst scholars who study science, technology and medicine in Asia. These scholars are situated at the intersection of the discipline of history of science (understood broadly) and of the field of Asian studies, while being regarded as marginal by colleagues of both sides. All participants agreed that coordinating research efforts at the European level would result allow for a sufficient 'critical mass': a network or programme at that level would be able to cover most if not all Asian civilisations.

In other words, the most obvious result of the meeting was a new awareness of the European research potential, and of ways in which it could be turned into a fully self-conscious community, that could share research questions and methods.

Historiography seems one important theme that needs to be further researched, and that can bring all scholars together. Therefore the participants have agreed to jointly work on a proposal that they will submit to the ESF for setting up an ESF Programme entitled “Europe, Asia and Science: Comparisons, Exchanges and Representations”. It seems that the nine ESF countries represented at the meeting would take part in such a Programme, and that scholars from countries such as Italy, Denmark, Sweden etc. could be included in it. Other themes of such a Programme would include:

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These themes were selected because while bringing into play precise case studies, they allowed for collaboration between colleagues from different countries, studying the history of various disciplines.

In short, the Workshop opened the way to constructing a major research programme at the European level in the field of history of science, technology and medicine in Asia.

## 4. Final Programme

### Thursday 13 January 2005

*Location (a.m.): Department of History and Philosophy of Science, Seminar Room 2*

09:30

**OPENING: Christopher CULLEN, Catherine JAMI**

### **SCIENCE AND CIVILISATION IN CHINA 7.2: A MULTI-VOICE REVIEW**

Chair: **Christopher CULLEN** (NRI, Cambridge)

09:45

Contributions by **Georges MÉTAILIÉ** (CNRS, Paris),  
**Dhruv RAINA** (JNU, Delhi), **Simon SCHAFFER**  
(University of Cambridge)

11:15

Coffee Break

11:30- 12:30

Discussion

*Location (p.m.): Needham Research Institute*

13:00

Lunch

### **JOSEPH NEEDHAM'S HISTORIOGRAPHY AND SCIENTIFIC UNIVERSALISM I**

Chair: **Agathe KELLER** (CNRS, Paris)

14:00

**Patrick PETITJEAN** (CNRS, Paris), *Needham's and  
Febvre's participation in the UNESCO project of a  
"scientific and cultural history of mankind": an aborted  
attempt to depart from a Eurocentric history*

14:45

**Karine CHEMLA** (CNRS, Paris), *Chinese language and  
science: Historiographical reflections inspired by Science  
and Civilisation in China, 7.2*

15:30

Coffee break

### **JOSEPH NEEDHAM'S HISTORIOGRAPHY AND SCIENTIFIC UNIVERSALISM II**

Chair: **Feza GÜNERGUN** (Istanbul University),

16:00

**Hans Ulrich VOGEL** (University of Tübingen), *Invention,  
innovation and diffusion of salt production techniques: A  
comparative approach*

16:45

**KURIYAMA Shigehisa** (International Center for Japanese Studies,  
Kyoto), *Ecumenical science and the exception of medicine*

18:00

Reception at the Cambridge University Press Bookstore

19:15

Workshop Dinner at Gonville and Caius College

### Friday, 14 January 2005

*Location: Needham Research Institute*

## WHAT DO WE DO WITH JUDGEMENTS?

Chair: **Karine CHEMLA** (CNRS, Paris)

- 09:30 **Geoffrey LLOYD** (NRI, Cambridge), *Value judgements in the history of science*
- 10:15 **Nicolas STANDAERT** (Catholic University, Leuven), *The 'failure' and 'success' of the 'Ricci map': Its historiography and an attempt to look at the map from the point of view of communication*
- 11:00 Coffee break

## JESUIT MISSIONARIES' NARRATIVES FOR EUROPEAN AUDIENCES

Chair: **Luis SARAIVA** (University of Lisbon)

- 11:30 **Noël GOLVERS** (Catholic University, Leuven), *The spread and reception of Ferdinand Verbiest's materials on Western astronomy in China in 17<sup>th</sup> and 18<sup>th</sup> century Europe*
- 12:15 **Vladimir LIŠČÁK** (Oriental Institute, Prague), *Chinese science through the eyes of an 18<sup>th</sup>-century Jesuit missionary: Karel Slavíček and his correspondence from China with European astronomers and other scholars*
- 13:00 Lunch

## CHINESE SCHOLARS' NARRATIVES, 17TH AND 18TH CENTURIES

Chair: **Nick JARDINE** (University of Cambridge)

- 14:00 **Catherine JAMI** (CNRS & Churchill College), *Ancient and Modern, Chinese and Western: Constructing the history of mathematics and astronomy in late Ming and early Qing China*
- 14:45 **TIAN Miao** (IHNS, Beijing), *Qing scholars' approach to the history of mathematics and astronomy: the cases of Li Rui and Qian Daxin*
- 15:30 Coffee break

## WHO DOES THE PAST BELONG TO?

Chair: **Annette IMHAUSEN** (University of Cambridge)

- 16:00 **Eleanor ROBSON** (University of Cambridge), *Babylon, Mesopotamia, or Iraq? Locations and appropriations of an ancient mathematical culture*
- 16:45 **Feza GÜNERGUN** (Istanbul University), *In search of "Islamic" and "Turkish" contributions: The beginnings of history of science in Turkey (first half of the 20th century)*

## Saturday, 15 January 2005

Location: Needham Research Institute

### THE CASE OF MEDICINE IN EAST ASIA

Chair: **Shigehisa KURIYAMA** (International Center for Japanese Studies, Kyoto)

09:30 **Florence BRETTELLE-ESTABLET** (CNRS, Paris), *Who shaped the historiography of Chinese medicine, if not the Chinese state?*

10:15 **Harmen BEUKERS** (Leiden University), *The introduction of Western medicine in Japan seen through the Deshima diaries*

11:00 Coffee Break

### THE INVENTION OF SCIENTIFIC TRADITIONS

Chair: **Joachim KURTZ** (EHESS, Paris & Emory University, Atlanta)

11:30 **Iwo AMELUNG** (University of Tübingen), *Discovering "Chinese Optics" in late 19th and early 20th century China. The reception of scientific knowledge from the West and the formation and development of research into a field of indigenous science*

12:15 **Christopher CULLEN** (NRI, Cambridge), *The retrospective invention of discovery: China and the sphericity of the Earth*

13:00 Lunch

### COLONIAL AND POST-COLONIAL HISTORIOGRAPHIES

Chair: **Patrick PETITJEAN** (CNRS, Paris)

14:00 **Sujit SIVASUNDARAM** (University of Cambridge), *British imperial science recontextualised: The case of Sri Lanka*

12:45 **Agathe KELLER** (CNRS, Paris), *"Vedic mathematics" and late 20th-century trends in the historiography of science in India*

15:30 Coffee Break

16:00 **General discussion and prospects for a European network**  
Chair: **Catherine JAMI** (CNRS & Churchill College)

17:30 Close

## 5. Final List of Participants

Name	E-mail	Address
Amelung, Iwo	Iwo_Amelung@gmx.de	Seminar für Sinologie und Koreanistik Eberhard Karls Universität Tübingen Wilhelmstr. 7 72074 Tübingen, Germany
Beukers, Harmen	H.Beukers@lumc.nl	Universiteit Leiden Metamedica Wassenaarseweg 62 2333 AL Leiden, The Netherlands
Bretelle-Establet, Florence	f.bretelle@wanadoo.fr	REHSEIS – UMR 7596 Université de Paris 7 2 place Jussieu 75251 Paris Cedex 05, France
Chemla, Karine	chemla@paris7.jussieu.fr	REHSEIS – UMR 7596 Université de Paris 7 2 place Jussieu 75251 Paris Cedex 05, France
Cullen, Christopher	c.cullen@nri.org.uk	Needham Research Institute 8 Sylvester Road Cambridge CB3 9AF, UK
Golvers, Noël	Noel.Golvers@arts.kuleuven.ac.be	<i>Seminarium Philologiae Humanisticae</i> Erasmushuis Blijde-Inkomststraat 21 B-3000 Leuven, Belgium
Günergun, Feza	fezagun@attglobal.net	Istanbul University Faculty of Letters Chair for History of Science 34459 Beyazit İstanbul, Turkey
Imhausen, Annette	ai226@cam.ac.uk	Trinity Hall, Cambridge CB2 1TJ, UK
Jami, Catherine	jami@paris7.jussieu.fr	Churchill College Cambridge CB3 0DS, UK
Jardine, Nick	nj103@cam.ac.uk	Department of History and Philosophy of Science 2 Free School Lane Cambridge CB2 3RH
Keller, Agathe	kellera@paris7.jussieu.fr	REHSEIS – UMR 7596 Université de Paris 7 2 place Jussieu 75251 Paris Cedex 05, France
Kuriyama, Shigehisa	kuriya@nichibun.ac.jp	International Research Center for Japanese Studies 3-2 Oeyama-cho, Goryo, Nishikyo-ku, Kyoto 610-1192, Japan
Kurtz, Joachim	jpkurtz@emory.edu	CEMC, EHESS 54 boulevard Raspail 75006 Paris, France
Liščák, Vladimír	<a href="mailto:vlad.liscak@t-email.cz">vlad.liscak@t-email.cz</a>	Oriental Institute Pod vodárenskou věží 4, 182 08 Praha 8 - Libeň, Czech Republic
Lloyd, Geoffrey	gel20@hermes.cam.ac.uk	Needham Research Institute 8 Sylvester Road Cambridge CB3 9AF, UK
Metailié, Georges	metailie@cimrs1.mnhn.fr	Centre Alexandre Koyré MNHN - Pavillon Chevreul 57 rue Cuvier 75251 Paris Cedex 05
Petitjean, Patrick	petitjean.patrick@free.fr	REHSEIS – UMR 7596 Université de Paris 7 2 place Jussieu 75251 Paris Cedex 05, France
Puente Ballesteros, Beatriz	<a href="mailto:b_puente_ballesteros@yahoo.com">b_puente_ballesteros@yahoo.com</a>	Dep. History of Science Unit History of Medicine Complutense University of Madrid

		28040 Madrid, Spain
Raina, Dhruv	d_raina@yahoo.com	Jawaharlal Nehru University Zakir Husain Centre for Educational Studies School of Social Science, Room No 234 New Mehrauli Road, New Delhi 110067, India
Robson, Eleanor	er264@cam.ac.uk	Department of History and Philosophy of Science 2 Free School Lane Cambridge CB2 3RH
Saraiva, Luis	mmff5@ptmat.fc.ul.pt	CMAF Av Prof. Gama Pinto 2 1649-003 Lisboa Portugal
Schaffer, Simon	sjs16@cam.ac.uk	Department of History and Philosophy of Science 2 Free School Lane Cambridge CB2 3RH
Sivasundaram, Sujit	sps20@hermes.cam.ac.uk	Department of History and Philosophy of Science 2 Free School Lane Cambridge CB2 3RH
Standaert, Nicolas	Nicolas.Standaert@arts.kuleuven.ac.be	Afd. Sinologie Blijde-Inkomststraat 21 B-3000 Leuven, Belgium
Tian, Miao	miaotian17@hotmail.com	Needham Research Institute 8 Sylvester Road Cambridge CB3 9AF, UK
Vogel, Hans Ulrich	hans-ulrich.vogel@uni-tuebingen.de	Seminar für Sinologie und Koreanistik Eberhard Karls Universität Tübingen Wilhelmstr. 7 72074 Tübingen, Germany

## 6. Statistical Information on Participants

### Gender:

Men: 17

Women: 9

### Countries:

Belgium: 2

Czech Republic: 1

France: 7

Germany: 2

Netherlands: 1

Portugal: 1

Spain: 1

Turkey: 1

United Kingdom: 7

Non- ESF countries: 3 (China, India, Japan)

**TOTAL NUMBER: 26**

### Age structure:

Under 30: 1

30-40: 5

40-50: 9

50-60: 8

60-70: 2

Over 70: 1

### Notes:

The gender ratio and age structure seem to reflect that of the field of history of Asian science. As to the latter, since most scholars have a double training (history of science and one or more Asian languages), it is not unusual to complete a PhD well after the age of 30.

Regarding countries of origin, with the help of the ESF, we made efforts to locate colleagues in as many ESF countries as possible. However, since the two convenors' field is China, we were able to locate colleagues in East Asian studies in a number of countries, but colleagues studying other parts of Asia mainly in our respective countries. The choice to have three colleagues from China, India and Japan (approved by the ESF) reflects our conviction that collaboration with scholars from Asia is essential to the development of our field at a European level.