

How to Cite Ancient and Medieval Technical Manuscripts*

Prior to the invention of the mechanical movable type printing by Johannes Gensfleisch zur Laden zum Gutenberg in 1440, the preparation of technical manuscripts in ancient (before the 5th century) and medieval (from the 5th century to the 15th century) times has been performed by scribes or even by the professionals themselves. The content of such manuscripts has been preserved in consecutive copies, which have been translated in different languages and disseminated among a limited number of scholars and libraries. The original manuscripts have often been lost throughout history and the libraries around the planet preserve mainly their surviving copies. The existing copies are damaged or incomplete in most cases. Other manuscripts are known only by partial quotations and citations by other authors.

The citation of ancient and medieval technical manuscripts relies on the available information which may not include the year of publication, the publisher (scribe), the town, the country, or even the author's name. Therefore, the said citations remain incomplete from the point of view of the current publishing standards.

The knowledge contained in old technical manuscripts should not be underestimated. The roots of modern technology can be traced in much earlier texts which can be used for review and inspiration. The technological advances of our ancestors must be preserved and also properly cited in related works.

Translated and edited old manuscripts are published in subsequent editions. Such editions result in *indirect citations* by including the names of the editors/interpreters, for example:

Commandino, F. (ed., tr.). 1558. Archimedes. *Opera non nulla* (with commentary). Paolo Manuzio, Republic of Venice - in present-day Venice, Italy (in Latin).

Most prospective authors usually study and cite the said editions rather than the original manuscripts which are often lost or sometimes available as filmed copies or digital files. There is also a language barrier as scholars specializing in technical fields usually have a limited knowledge of ancient and medieval languages.

However, *direct citations* on the basis of known citation details of historically verified or personally examined by the authors old manuscripts could prove useful in assisting the readers with essential information about the origins of the said technical works. One should keep in mind that the provided historical details remain incomplete and there is always uncertainty surrounding the circumstances of the creation of old manuscripts.

Sample *direct citations* of various old manuscripts are provided below as an illustration.

Sample Chinese Manuscripts on the Invention of the Gunpowder and the Compass

Gongliang, Z.; Weide, Y.; and Du, D. (eds.). 1044. *Wujing Zongyao* (Collection of the Most Important Military Techniques). Kaifeng, Song Dynasty of China - in present-day Kaifeng, Henan Province, China (in Chinese).

Xu, W. (Guiguzi). 4th century BC. The lodestone attracts iron. Warring States of China (in present-day China) (in Chinese).

Sample Indian Manuscript on Mathematics and Astronomy

Somayaji, N. 1501. *Tantrasamgraha*. Kerala School of Astronomy and Mathematics, Sangamagrama, Trichur District, Kerala - near present-day Kochi, Kerala, India (in Sanskrit).

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(Continued from the inside front cover)

Sample Greek Manuscripts on Mathematics, Physics, Pharmacology, Botany, Medicine, Mechanics, Architecture, Pneumatics, and Astronomy

- Archimedes. 3rd century BC. On sphere-making. Syracuse, Magna Græcia - in present-day Sicily, Italy (lost work, in Greek).
- Aristotle. ca. 335-323 BC. Physics. The Lyceum, Athens - in present-day Athens, Greece (in Greek).
- Diophantus. 3rd century. *Arithmetica*. Alexandria, Egypt, Roman Empire - in present-day Egypt (in Greek).
- Dioscorides, P. 1st century. *De materia medica* (Regarding medical materials). Alexandria, Egypt, Roman Empire - in present-day Egypt (in Greek).
- Hero. Automata. 1st century. Alexandria, Egypt, Roman Empire - in present-day Egypt (in Greek).
- Hero. *Mechanica*. 1st century. Alexandria, Egypt, Roman Empire - in present-day Egypt (in Greek).
- Hero. *Pneumatica*. 1st century. Alexandria, Egypt, Roman Empire - in present-day Egypt (in Greek).
- Plato. ca. 360 BC. Timaeus. The Academy, Athens - in present-day Athens, Greece (in Greek).
- Ptolemy, C. 2nd century. *Almagest* (Mathematical Treatise). Alexandria, Egypt, Roman Empire - in present-day Egypt (in Greek).

Sample Arabic Manuscripts on Mechanics, Astronomy and Cryptography

- al-Jazari, Abu al-'Iz Ibn Isma'il ibn al-Razaz. ca. 1206. Book of knowledge of ingenious mechanical devices. Artuklu Palace, Amid, Turkish dynasty of Artukids - in present-day Diyarbakir, Turkey (in Arabic).
- al-Kindi, Abu Yusuf Ya'qub ibn Ishaq al-Sabbah. 9th century. Manuscript on deciphering cryptographic messages. House of Wisdom, Baghdad, Abbasid caliphate - in present-day Baghdad, Iraq (in Arabic)
- ibn Musa ibn Shakir, Abu Ja'far Muhammad; ibn Musa ibn Shakir, Ahmad; and ibn Musa ibn Shakir, Al-Hasan (Banu Musa brothers). 850. Book of ingenious devices. House of Wisdom, Baghdad, Persian Abbasid caliphate - in present-day Baghdad, Iraq (in Arabic).
- al-Sufi, 'Abd al-Rahman. ca. 964. Book of fixed stars. Ray, Persian Buyid dynasty - near present-day Tehran, Iran (in Arabic).

Sample European Manuscripts on Mathematics and Natural Science

- Aquinas, T., St. 13th century. Commentary on Aristotle's Physics. Rome, Papal States - in present-day Rome, Italy (in Latin).
- Bacon, R. 1267. *Opus Majus* (Greater work). Paris, France (in Latin)
- Fibonacci, L. 1202. *Liber Abaci* (Book of calculation). Pisa - in present-day Pisa, Tuscany, Italy (in Latin).

A combination of *direct* and *indirect citations* may take place whenever the limitation of space is not an issue, as follows:

- Michalli da Ruodo. 1434-45. Book. 440 pp. Republic of Venice - in present-day Venice, Italy (in Venetian dialect). Published in: Long, P.O.; McGee, D.; and Stahl, A.M. (eds., trs.). 2009. Michael of Rhodes. The Book of Michael of Rhodes. 3 vols. MIT Press, Cambridge, MA, USA. Available: <<http://brunelleschi.imss.fi.it/michaelofrhodes>>.

The old manuscripts have been written not only on paper, but also on stones, tablets, leaves, papyri, parchments, scrolls, etc. The inclusion of such information in a citation is optional.