

## A Historical Survey: "Arithmetic" in the Service of Medieval Medicine in the Islamic Era (9<sup>th</sup> -13<sup>th</sup> Century AD)

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### ABSTRACT

Arithmetic in the Arabic world was introduced with the loanword *Aritmāṭiqī* which is derived from the Greek root *ἀριθμός* meaning "number", and depending on the context, it is used in two quite distinct senses. In the first sense, arithmetic as a technical term refers to a branch of mathematics that deals with the theory of numbers, numerical computations, and calculations, which is known as *ʿilm al-ḥisāb* from the Islamic era onwards; in the second sense, arithmetic deals with magical matters, talismans, or even some mystical traditions based on numbers and ABJAD letters which could be generally supposed to be used for superstitious purposes. The period from the 9th to the 13th century is well-known as "The Islamic Golden Age" in which works in science and medicine flourished. During this time, knowledge was synthesized from works originating in ancient Mesopotamia, ancient Greece, ancient Rome, ancient Egypt, North Africa, Persia, India, China, and Byzantine civilizations, and the most remarkable treatises on the subject of medicine, specifically in pharmacology and in the profession of apothecary, were published by Arabs and non-Arabs in Muslim-ruled areas enriched by both preserving earlier traditions and enhancing extra experiences and findings of their own. On the other hand, the natural and cultural resources, as well as trade relations, had contributed greatly to the spread of these scientific works. Now, it may be asked, how these two completely distinct disciplines, arithmetic (in both senses) and medicine converge?! The purpose of this study is to investigate the relations between these two fields by examining the significant sources, treatises, ancient texts as well as by introducing notable scientists, physicians, mathematicians in the guise of a physician and polymaths who have written a treatise, monograph or even who collected an encyclopedia and were accomplished in numerous fields of endeavor and inquiry that had writings on both medicine and mathematics besides other fields of study like physics and philosophy. The present research intends to provide a short review on textbooks written by physicians in math but with a remarkable medical approach, on topics, for example, including weights and quantities required in posology (the study of dosages) observed as an example in al-Kindī's pharmaceutical work by the title "*Risālah fī ma-rifat qūwah al-adwiyah al-murakkabah*", where the efficacy (qūwah) of compound

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medicine is based on geometric progression; or what Avicenna described and formulated in dispensing of medical material in his far-famed medical work *al-Qānūn fī al-Ṭibb (The Canon of Medicine)*. Pharmaceutical works are typically about *materia medica* (a Latin term for medical substances from the work of Dioscorides: *De materia medica*), singular medicine, their specifications, and some others are mainly about compound medicines (Greek term: γράφιδιον) which are produced by ingredients in certain proportions. Aritmāṭiqī in terms of occult (Arabic term: *Ḥaḥīya*) is considered a sort of supernatural belief recommended and used widely by especially non-academic practitioners in disease cures outside the scope of science, which leads us to spot the use of magic squares and their applications in medicine as a way of assumed treatment.

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