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# BĪRŪNĪ, ABŪ RAYḤĀN V. PHARMACOLOGY AND MINERALOGY

**BĪRŪNĪ, ABŪ RAYḤĀN**

v. Pharmacology and Mineralogy

*Pharmacology*. Bīrūnī, a traveler proficient in several Asian languages and an inquisitive and attentive observer, was interested all his life in gathering precise information on plants and their medicinal uses. At the end of his long life, he arranged them alphabetically in a treatise entitled *Ketāb al-ṣaydana*. This book was known to Orientalists only in its Persian translation until Velidi Togan discovered the original Arabic text at Bursa in 1926 (for details on the authenticity of the work and the various manuscripts, cf. Anawati, 1976, pp. 75--97).

The work has been published (in a photographic reproduction of one manuscript) and translated into English by a team of scholars from the Hamdard National Foundation in Karachi under the direction of Hakim Mohammad Said (1973). A second volume, containing a long introduction and commentary, was published by Dr. Sami Hamarneh of The Smithsonian Institution, also in 1973 under the auspices of the Hamdard Foundation.

In a preliminary remark in the introduction, Bīrūnī defines *ṣaydana* (or *ṣaydala*), or rather *ṣaydalānī* as “he who makes a profession of gathering medications in their best forms and of experimentally testing the best types, whether they be simple or compound, according to the best formulas transmitted by the most renowned physicians.” He describes the relation of pharmacology to medicine, to which it serves only as an introduction.

The second chapter is devoted to the study of medications as such (*dawāʾ*, plur. *adwīa*, also called *ʿoqqār*, plur. *ʿaqāqīr*), as distinguished from poisons (*somūm*) and foodstuffs (*aḡḏīa*). In the third chapter Bīrūnī speaks of *ṣaydana* itself, which is the knowledge of the virtues and properties of medications through experience and deduction. The pharmacist must be acquainted with two operations: omission (*ḥaḏf*) of one constituent of a compound medication without negation of the primary action of the latter and replacement (*tabdīl*) of one medication by another that is almost equivalent.

In the fourth and fifth chapters there is a now classic panegyric to the Arabic language, which is the language of science but has the defect of not lending itself easily to transcription of foreign words.

This introduction represents only a very small part of Bīrūnī’s book (hardly a twentieth of the text pages printed by Meyerhof, more precisely, 22 of 855 pages of the manuscript in the University of Baghdad). Its Birunian character is manifest: spontaneity and elegance of style, philological comments, reminiscences of India, extensive erudition. But the bulk of the book is obviously devoted to the description of medications. Some articles are long, elaborate, and full of lexicographical notes, whereas others are limited to several lines or even to simple mention of terms.

Altogether 1,197 drugs are mentioned, however, some drugs are cited under several synonyms.

Bīrūnī’s sources number nearly one hundred: botanists, pharmacologists, physicians, philosophers, grammarians, poets, and so on.

Finally, attention should be called to the many languages and dialects that he mentions for a single drug. Generally, the entry for a single drug will not include more than four or five languages. Overall about twenty languages or dialects can be counted (cf. the list in Anawati, 1976).

*Mineralogy*. When he was already eighty years old, Bīrūnī devoted a book

entitled *Ketāb al-jamāher fī maʿrefat al-jawāher* (The sum of knowledge about precious stones) to mineralogy. It is the most comprehensive book on this subject in medieval Arabic literature. In it Bīrūnī describes the minerals and metals of Europe, Asia, and Africa, drawing upon earlier sources and his own vast experience. The work was edited by F. Krenkow (Hyderabad, 1355/1936), who relied on three extant manuscripts. M. Y. Haschmi devoted his short doctoral thesis (48 pages) to the analysis of its sources (*Die Quellen des Steinbuches des Bērūnī*, Bonn, 1935). Different parts of the *Ketāb at-jamāher* have been translated by various authors, and the entire book was translated into Russian in 1968 (for details of all these publications, see Anawati, 1979).

The work consists of three parts, beginning with an introduction composed of a *dībāja* (preamble) devoted to praise of the wisdom possessed by created beings and fifteen *tarwīḥa* (sections) describing the situation of man in nature and how he came to use gold and silver and to make use of jewels for his adornment (32 pages of the printed text).

The second part (200 pages) is devoted to precious stones (*al-jawāher*), as well as to other minerals. The principal stones described are the following: *yāqūt* (hyacinth, sapphire), *yāqūt aḥmar* (ruby), *yāqūt aḵżar* (green corundum), *yāqūt jamrī* (carbuncle), *laʿl* (spinel), *bījādī* (garnet), *almās* (diamond), *sanbāḏej* (emery), *loʾloʾ* (pearl), *zomorrod* (emerald), *fayrūzaj* (turquoise), *ʿaqīq* (agate), *jaẓʿ* (onyx), *ballūr* (rock crystal), *jamast* (amethyst), *lazaward* (lapis lazuli), *dahanj* (malachite), *yašm* (jade), *yašb* (jasper), *sabaj* (obsidian), *bādzahr* (bezoar), *kahrobā* (amber), *magnaṭīs* (magnetite), *šaḏenj* (hematite), *zojāj* (glass), *mīnā* (enamel), *qīsaʿ ṣīnīya* (porcelain). Metals (*felezzāt*) include *zeʾbaq* (mercury), *ḏahab* (gold), *feżża* (silver), *noḥās* (copper), *ḥadīd* (iron), *asrob* (lead), and *ḵār ṣīnī* (Chinese iron, i.e., zinc).

Bīrūnī makes use of numerous ancient Greek and Arab authors and cites many verses from Arab or Persian poets. He carefully analyzes the names of minerals from the philological point of view, citing authors like Ḵalīl b. Aḥmad, Aṣmaʿī, Farrāʾ, Abū Ḥanīfa, and Dīnavarī.

Bīrūnī accepts the vapor theory, more specifically Jāber b. Ḥayyān's sulphur-mercury theory, of the origins of the minerals and metals. He rejects the notion of transmutation, though he admits the growth and gradual transformation of metals into gold in nature.

Finally, thanks to an apparatus he constructed himself, he succeeded in

determining the specific gravity of a certain number of metals and minerals with remarkable precision.

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