

Aḥmad ibn Faḏl al-Bukhārī invented a casting method for making same-volume pieces, but Bīrūnī believes that this method is not a good method because we cannot find the accurate results by using it.

Bīrūnī's efforts for finding the weights of same-volume pieces result in inventing an instrument which is called the "conic-shaped instrument" by him. After gathering the data by this instrument for solving the problem with the help of Menalaus' method, Bīrūnī decided to use this instrument for knowing jewels.

His method and the results of his experiments are gathered in his treatise *Fī al-nisab allatī bayn al-filizzāt wa al-jawāhir fī al-ḥajm*.

In this article the efforts of Bīrūnī for finding data to solve the problem with Menalaus' method are explained.

mushrooms include species of genera such as *Tuber*, *Picoa*, *Terfezia* and *Tirmania*. The characteristics of “ghushanah” and “kashnah/ kashnaj” are also consistent with the morphological characteristics of *Morchella* mushrooms. In the case of the “ghārīqūn”, although this word is a derivative of the Greek word ἀγάρικόν, it cannot be considered that the “ghārīqūn”, considered by Bīrūnī and other Islamic scholars, is equivalent to the species belonging to the *Agaricus* genus, and a large number of Agaricomycotina mushrooms and wood-decay fungi are also included under this term.

In his book, Bīrūnī has even mentioned lichens that arise from the symbiosis of fungi and algae. He also dealt with plants, such as “ṭarāthīth”, that were mistakenly thought to be types of fungi at that time due to the lack of plant vegetative structures. He considered “ṭarāthīth” to be the root of a plant, but he cited the writings of some authors who considered it to be a type of mushroom. It is actually a parasitic plant with the possible scientific name of *Cynomorium coccineum*.

### ***Fī al-Nisab allatī Bayn al-Filizzāt wa al-Jawāhir fī al-Ḥajm*. A Treatise on Densitometry by Bīrūnī**

**Abouzar Farzpourmachiani**

The story of Archimedes and the crown is narrated by Vitruvius but he hasn't explained about Archimedes' method of solving the problem.

There is a treatise by Menelaus that is survived in its Arabic translation. It is about Archimedes' balance which is an instrument for solving the problem.

Scientists were conscious about difficulties of making such instrument and doing exact experiments by it, and tried to find other methods. Menelaus found some mathematical methods for solving this problem without using instruments. Thus, by his method, there is no need to make flawless instruments and doing exact experiments by them. But for solving the problem with these mathematical methods, we need some input data that are the weights of three same-volume pieces of pure metals and their alloy. Scientists also were aware of difficulties of casting such pieces.

and has excluded a large part of it. He did not follow the order of Arabic chapters.

Kāsānī has mentioned the quality and therapeutic properties of each medicine from the book of Abū Ziyd Arrajānī that was one of the references of Bīrūnī in the writing of *Şaydanah*. In the translation and redaction of *Şaydanah*, he has used references that Bīrūnī had not mentioned. There are the names of more than fifteen Arab scientists, linguists and lexicographers in Kāsānī's translation that are not in the Arabic text of *Şaydanah*.

Kāsānī added some information about his observations, and knowledge on plants and other medicinal substances which he had seen in Farghāna, Kāshghar and Khutan. Furthermore, he has mentioned the names of some medicines which were common among people of Farghāna and Transoxiana. In some entries, in addition to the Indian names of medicines provided by Bīrūnī, Kāsānī has added other Indian names himself. Because of adding and removing texts in translation of *Şaydanah*, it is not only a translation, but also a translation and redaction.

## Medicinal Mushrooms in *Kitāb al-Şaydana fi al-Ṭibb* and their Scientific Names

Shamameh Mohammadifar

In the Islamic medical and pharmacological sources written in Persian and Arabic languages, there are mentions of the types of mushrooms and their medicinal, edible and even lethal properties. Abū Rayḥān Bīrūnī, an Iranian physician, has collected the writings of the predecessors and recounted them in his book called *Kitāb al-Şaydana fi al-Ṭibb*. He is one of the authors, who has mentioned a complete description of the types of mushrooms in his book under the headings of “foṭr”, “kam’at”, “ghushanah”, “kashnah/ kashnaj” and “ghārīqūn”, and then their types, equivalents in different languages, morphological characteristics, living conditions and sometimes their use based on the writings of the predecessors.

According to the characteristics that Bīrūnī and other Islamic scholars have mentioned for “foṭr”s, it seems that they are referring to a large group of mushrooms, including edible, medicinal and poisonous types, and it cannot be commented on their precise scientific names. Also, based on the characteristics of “kam’at”s mentioned in the book of *Şaydana* and other pharmacology works of the Islamic period, these

Nahsha'ī assisted Bīrūnī by asking other pharmacologists about medicines, he also took simple herbal medicines to Bīrūnī and wrote explanation about them from different pharmacological books. Bīrūnī added some more explanations, names of medicines in different languages and dialects, and also described about strange herbal medicines based on their morphology.

*Şaydanah* includes a long introduction which contains five sections, and then there is the main text which contains pharmaceutical terms with plant, animal and mineral origin that are arranged in alphabetical order. In the introduction, Bīrūnī writes about the term “Şaydana” (i.e. pharmacology) and Şaydanānī (i.e. Pharmacologist), he also explains about responsibilities of pharmacist and the place of pharmacology among medical fields.

Then he explains about categorizing medicines into simple and compound, and explains about substitutes. He also mentions how he learned Greek names of plants from a Greek man in Khwārizm. He writes about the references for writing *Şaydanah*. Bīrūnī doesn't want to focus on properties of medicines except for those that are necessary.

The main part of the book contains entries that Bīrūnī writes about signs of purity and quality of medicines. Bīrūnī discusses about the names of medicines in different languages such as Arabic, Greek, Syriac, Hindi, Persian, Khwārizmī, Sughdīan and Turkish. He explains also about the dialects of the people of Khurāsān, Transoxiana, and the Indian subcontinent.

He sometimes explains about the Arabic names of medicines by using a poem, and writes his observations about medicines. The other characteristics of this book is that the properties of each medicine are described by the citations from Greek and eastern authors. Bīrūnī describes the original and substitutes of the medicines too.

He has benefited from the works of two hundred and fifty physicians, historians, poets, geographers, travelers, philosophers, naturalists, and linguists. Many of these works have not survived. Bīrūnī writes about the geographical areas of medicinal substances, he mentions also the valuable forgotten medicinal plants in this book.

We only found one survived Arabic manuscript of *Şaydanah*. The old Persian translation and redaction of this work was done by Abū bakr ibn 'Alī ibn 'Uthmān Kāsānī in the early 13<sup>th</sup> century AD. He presented it to the King of Delhi, Shams al-Dīn Abu'l-Fatḥ Iltutmish.

Kāsānī has written a detailed introduction with Arabic poems for his translation. He has not translated Bīrūnī's introduction completely,

## Abstracts of Persian Articles

### The sources of the first modern physics textbook in Iran, and the lexico-semantic, and grammatical problems in its translation

Tofiq Heidarzadeh

The first modern physics textbook in Iran was a translation of the lecture notes of August Karl Kržiž, the Austrian instructor of military sciences and physics in the Dār ul-Funūn school in Tehran. The book was published in 1857 and according to the translator's preface, it was translated from French. The original French text, however, was not known until recently.

This article, for the first time, introduces the original sources of the first Persian physics textbook. The article shows that the book is an outcome of selective translations from two German books. However, since a skillful German-to-Persian translator was not available, Kržiž had to translate the text to French to let the school's French-to-Persian translator make the lecture notes accessible for the students. Lack of appropriate Persian equivalents for the new scientific concepts, lack of experience in writing textbooks in Persian, and the process of double translation from German to French and then to Persian made the first Persian modern physics textbook difficult to read and understand.

The article compares the Persian text with the original German sources chapter-by-chapter and gives examples of vague terminology, and incorrect and unclear translations.

### *Kitāb al-Ṣaydanah fi al-Ṭibb* of Abū Rayḥān al-Bīrūnī and its Persian Redaction by Kāsānī

Sara Farzpourmachiani

*Kitāb al-Ṣaydanah fi al-Ṭibb* is the only known book of Abū Rayḥān al-Bīrūnī in pharmacology and one of the most valuable written books in this subject in the east of Islamic world. According to the introduction of *Ṣaydanah*, Bīrūnī wrote this book when he had more than 80 years old (after 443 A.H). He had benefited from the assistance of Abū Ḥāmid Aḥmad ibn Moḥammad Nahsha'ī due to his poor hearing and eye sight.

In closing, I would like to remember and commemorate the contributions of Abbas Zaryab Kho'i, Abolqasem Ghorbani, Ali Akbar Danaseresht, and Parviz Azkai. Each of these individuals has made commendable efforts in researching and publishing the remarkable works of Abū Rayḥān Bīrūnī.

Cultural, and Educational Organization on November 11, 2021, to mark the 1050<sup>th</sup> anniversary of the birth of the prominent Iranian scientist Abū Rayḥān Bīrūnī, served as a source of inspiration for us at the Miras Maktoob Research Institute to embark on planning an International Conference on the Scientific Legacy of Abū Rayḥān Bīrūnī in the year 1401/2022. Additionally, we aimed to publish some of Bīrūnī's works alongside the conference.

Over the course of two to three years, numerous correspondences were exchanged, and during a meeting of the Institute's board of trustees, unanimous agreement was reached to allocate the necessary funds to the Miras Maktoob Research Institute for this purpose. The conference was intended to coincide with the publication of two works by Bīrūnī. However, despite our best efforts, we encountered numerous obstacles, and unfortunately, this endeavor did not materialize, as no priority was given to this matter.

The two other countries successfully organized celebrations to honor the impressive legacy of Abū Rayḥān. It is regrettable that Iran, the country in which Bīrūnī wrote his influential work *al-Taḥfīm* in Persian, which is an integral part of the nation's rich cultural heritage, did not take any action to commemorate his achievements. Magnificent celebrations took place in 1350/1971 across several countries, including Iran, India, and Afghanistan, to mark the millennium of Bīrūnī. Additionally, several books were published during that time, including the *Kitābshināsīy-i Abū Rayḥān Bīrūnī* [Bibliography of Bīrūnī's Works] by Seyyed Hossein Nasr, *Bibliography of Abū Rayḥān* in Pashto by 'Abd al-Hayy Ḥabībī, and *A Bibliography of the Works of Abul-Rayhan al-Biruni* in English by Ahmad Saeed Khan in Delhi. These endeavors in the past few decades have aimed at promoting Bīrūnī's works and increasing awareness about his contributions.

Miras Maktoob Research Institute takes great pride in publishing significant works by this prominent Iranian scientist. Among these works are three valuable publications, namely *al-Āthār al-Baqīyah*, *al-Jamāhir fi al-Jawāhir*, and *Rāshikāt al-Hind*. Currently, we are in the process of releasing a new edition of Bīrūnī's *al-Taḥfīm* by Jalāl al-Dīn Humā'ī, which has been expertly edited by Rizwān Massāh. This eagerly-awaited edition will be available next year.



## Foreword by the Managing Director

As the managing director, I feel compelled to provide a brief note about this special issue and the work that was planned regarding Abū Rayḥān Bīrūnī. Firstly, I would like to pay tribute to the late Parviz Azkai, who served as one of the esteemed scientific advisors of this journal. Unfortunately, he passed away earlier this year, leaving the scientific community bereaved of his profound presence. Parviz Azkai was the author of significant works, which showcased his extensive knowledge of historical scientific sources. One of his remarkable contributions was his research and correction of the Arabic text of Abū Rayḥān Bīrūnī's *al-Āthār al-Bāqiyah* [*The Chronology of Ancient Nations*] (1380/2001, Miras Maktoob) and the translation of Sachau's annotations. He further enriched this work with valuable additions and subsequently translated the entire text into Persian (Elmi 1392/2013, Nashr-e Ney, 1397/2018). These commendable achievements have become an integral part of his scientific legacy.

In the 1980s, Homayoun Sanatizadeh entrusted Parviz Azkai with the translation of Bīrūnī's *Qānūn-i Mas'ūdī*. Recently, I had the opportunity to witness excerpts from this book at Azkai's endowed library. These excerpts are scheduled to be published in the Mādīstān Publications series, owned by his endowment. Azkai also penned a highly valuable monograph on the life and works of Abū Rayḥān, which stands out as one of the most enlightened pieces ever written about this extraordinary scholar (Ṭarḥ-i Naw, 1375/1996).

We have been diligently working for some time towards organizing a conference to commemorate the achievements of Abū Rayḥān Bīrūnī, following our successful conferences on the scientific legacies of Khwājah Naṣīr al-Dīn al-Ṭūsī, Ghīyāth al-Dīn Jamshīd Kāshānī, and Kūshyār Gilānī. The news of Abū Rayḥān Bīrūnī's inclusion in the UNESCO World List of 2022-2023 Commemorations as a joint registration by Iran, Uzbekistan, and Tajikistan during the General Conference of the UNESCO Scientific,



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**Cover photo:** The colophon of the autograph manuscript of Birūnī's  
*Coordinates*, preserved in Istanbul (Ms. Fatih 3386)

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ISSN: 2322-3669



*Miras-e Elmi-ye  
Eslam va Iran*

Semiannual Journal on the Scientific Heritage  
of  
Islam and Iran

**vol. 11, nos. 1 & 2, Spring 2022 to Winter 2023**

Managing Director: **Akbar Irani**  
Chief Editor: **Mohammad Bagheri**  
Managing Editor: **Zeinab Karimian**  
Publisher: **Written Heritage Research Institute**

Tehran, Iran