Zeitschrift:	L'Enseignement Mathématique
Herausgeber:	Commission Internationale de l'Enseignement Mathématique
Band:	8 (1962)
Heft:	1-2: L'ENSEIGNEMENT MATHÉMATIQUE
Artikel:	MODERN FUNDAMENTAL OPERATIONS IN AN EARLY ARABIC FORM: 'ANAB'S HEBREW COMMENTARY ON IBN LABBN'S KITE F USL HISB AL-HIND
Autor:	Levey, Martin / Petruck, Marvin
Kapitel:	3. Kitb f usul hisb al-hind and its Hebrew translation.
DOI:	https://doi.org/10.5169/seals-37970

### Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. <u>Mehr erfahren</u>

#### **Conditions d'utilisation**

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. <u>En savoir plus</u>

#### Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. <u>Find out more</u>

## Download PDF: 07.08.2025

ETH-Bibliothek Zürich, E-Periodica, https://www.e-periodica.ch

# M. LEVEY AND M. PETRUCK

variants used for his name were Djabah [5], Halebi [6], or al-Kiya [7]. He evidently came from a place called Jili (Djilan), a village on the south of the Caspian Sea.

It has been stated that ibn Labbān was a Jew but there is no evidence for this [8]. He was the teacher of al-Nasawī (ca. 1030) who also wrote on mathematics [9]. Unfortunately, almost nothing has come down to us of ibn Labbān's biography. However, some of his mathematical works are extant as well as others in astrology and astronomy.

# 2. EXTANT WORKS OF IBN LABBAN.

The following works of ibn Labbān are known [10]:

- 1. al-ziğ al-jami'.
- 2. kitāb al-mudkhal fī sinā 'at ahkām al-nujūm;
- kitāb al-asţurlab wakaifīyat 'amalihī wa'tibārihī 'ala't-tamām wal-kamāl;
- 4. risalāt al-ab'ād wal-ajrām;
- 5. tağrīd uşūl tarkīb al-juyūb;
- 6. kitāb fī uşūl hisāb al-hind.

The last one is the subject of this work and will be described at length in the next section.

# 3. KITAB FI USUL HISAB AL-HIND AND ITS HEBREW TRANSLATION.

This treatise, "Book on the Foundations of Hindu Reckoning", is extant in Arabic in only one manuscript [11]. There is also a Hebrew commentary [12], '*Iyyūn hā* '*iqqārim*. The latter is treated in this study.

The Hebrew version gives not only much translation from the Arabic but also gives a very full explanation as well as a commentary upon the fundamental operations as given by ibn Labbān.

The Hebrew text is the work of Shālôm ben Joseph 'Anābî who lived in Constantinople. He completed this commentary sometime between 1450 and 1460. Other of his works extant are on the syllogism, the foundations of the Torah, and a commentary on the *Physics* of Aristotle [13].

The Arabic text is divided into two major books: the first is concerned with the fundamental operations using the decimal system while the other takes up the pure sexagesimal reckoning.

The Hebrew manuscript comprises the following twelve chapters: 1. numerals, 2. addition, 3. subtraction, 4. multiplication, 5. addition of the multiplication, 6. division, 7. remainder in division, 8. square root, 9. what comes from the root, 10. cube root, 11. what comes from the cube root, 12. checking by casting The first eight chapters are analogous to the first out nines. eight of the first book in the Arabic [14]. The twelfth Hebrew chapter is in the ninth and tenth (the last) sections of the first Arabic book. The subject of the tenth chapter of the Hebrew is found in the sixteenth section of the Arabic, book II. In most of the appropriate Hebrew chapters, an appendix discusses operations with the sexagesimal system. In this way, an attempt was made to cover the two books of ibn Labban [15]. It is evident, therefore, that the integral sexagesimal system was in use by some people at this time.

The appreciation of the integral decimal system in the history of reckoning encountered quicker acceptance than has generally been supposed. This is seen in the reckoning treatise of al-Nasawī, the pupil of ibn Labbān. From the two extant texts of ibn Labbān's arithmetic, it is obvious that the author had written them in such an abbreviated style that it was difficult to understand when studied alone. Al-Nasawī's [16] text is essentially an elaboration of that of his teacher; it is very clear and practical and may be used without oral teaching.

4. IBN LABBAN'S ARITHMETIC IN BRIEF.

a) Addition (Chap. 2).

# Ex. 5627 482

The two amounts are written, like order to like, one above the other. Addition is begun on the left instead of on the right