A Critical Study of Jabir ibn Hayyān's

Kitāb al-Ahjār 'alā Ra'y Balīnās

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ABSTRACT

Some fifty years ago, the German scholar Paul Kraus declared that the well-known corpus of Arabic alchemical writings traditionally attributed to Jābir ibn Ḥayyān was not written by a single author. Kraus concluded that these writings, with the possible exception of one treatise, were collectively produced by several generations of Qarmatī-Ismāʿīlī authors who lived no earlier than the latter half of the 9th century AD. Kraus' conclusions, already a scholarly orthodoxy, are reexamined by the present thesis.

The thesis argues that Kraus' conclusions drastically affect the methodology of the historian's approach to Jabirian texts; therefore, these conclusions ought not to be presupposed uncritically. Thus, both Kraus' evidence as well as his reasoning are subjected to an investigation and tentatively dismissed. Several grounds are adduced for this dismissal, one of them being the present work's discovery of a hitherto unknown Jabirian translation of the eighth discourse of Aristotle's *Categoriae*, a translation too archaic to support Kraus' dating. The thesis then develops its own methodological guidelines and moves to its main task: a critical study of Jābir's *Kitāb al-Aḥjār ‘alā Raʿy Balīnās* (Book of Stones According to the Opinion of Balīnās).

Studying Jābir in his own terms, the thesis identifies certain fundamental notions of the Jabirian system and examines how they operate within the framework of the author's cosmological and alchemical doctrines as these latter are developed in the *Aḥjār*. It has been demonstrated that when Jābir's ideas are treated in this manner, they appear to embody a distinct philosophical structure and their notorious incoherence largely vanishes.

The work reconstructs the substantive context of the *Aḥjār*, expounds its central theme, and includes a critical edition of most of its text. With the discovered Arabic rendering of the *Categoriae* as its integral part, the edition has been translated in its entirety and is provided with extensive commentaries and textual notes.
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CHAPTER I
INTRODUCTION

The Legacy

Jābir ibn Ḥayyān still remains one of the most enigmatic figures of the history of science. To begin with, there are doubts as to his very historical existence. But then, even if this question is glossed over, the enigma is hardly simplified for it is not at all clear if a historical Jābir is the real author of that extensive corpus which passes under his name. Thus, the interlocked questions of the authorship and dating of this body of writings have remained a matter of seriously conflicting opinions and speculations. The task of solving what came to be known as the 'Jābir Problem' is further complicated by the remarkable paucity of substantive studies of Jabirian treatises. As a result, much darkness looms over the historical and philosophical sources of these writings and their role in the subsequent development of alchemical thought. In fact, since Paul Kraus' magnum opus which was completed by 1943, these questions have largely been abandoned in a mist of controversy.

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1 In the Jabirian treatises which have either been published or read by the present writer in manuscripts, as well as in the traditional biographies, the kunya of the author appears frequently as Abū Mūsá, but sometimes also as Abū 'AbdAllāh. Often attached to it is the epithet al-Sūfī, the tribal name (nisba) al-Azdi and names indicating Jābir's place of origin al-Kūff or al-Tūsī. Ibn Khallikān says that Jābir was from Tarsūs (see de Slane tr [1842-71], I, p300). Hajīj Khalifa, according to whom Jābir died in 160 Hijra (777 AD), calls him al-Tarsūsī at one place, but at another place says that Jābir was from Tarsūs and is called al-Tūsī (!) (see Flügel ed [1835-1858], p34 and p79). Ibn al-Nadīm, who in naming Jābir wavers between both kunyas, Abū Mūsā and Abū 'AbdAllāh, reports the belief that Jābir was originally from Khurāsān (Flügel ed [1871], p354-358). For a discussion of Ibn al-Nadīm's account see below.

2 This coinage seems to be due to J. Ruska writing in the 1920s and later.

3 It is somewhat ironic that the powerful work of Kraus (Kraus [1942-3]) has been followed by a period of relative indifference. Over the past half century, not one Jabirian text has been made available in a published edition, and from a vast corpus only the following five have received any scholarly attention:
  i) Kitāb al-Mājid (Book of the Glorious, Kr 706 - i.e., number 706 in Kraus' census [1942-3], an identification to be taken as standard hereafter), Corbin [1950];
  ii) Kitāb al-Sumūm (Book of Poisons, Kr 2145), Siggel [1958];
What makes this problem even deeper is the fact that controversy over Jābir haunts the very tradition that has come down to us. As early as around 360/970\(^{3}\), barely 170 years after the supposed date of Jābir's death, the philosopher Abū Sulaymān al-Mantiqī in his Ta'āliq considered Jabirian works as apocryphal, the true author of which, he claims, is one al-Ḥasan ibn al-Nakad al-Mawsīlī whom he personally knew.\(^4\) Later on, in the 8th/14th century, we have, for example, a critic of the history of Arabic literature, Jamāl al-Dīn ibn Nubāṭa al-Miṣrī, who explicitly declares that all writings attributed to Jābir are of doubtful authenticity.\(^5\) And, one of our generally reliable sources, Ibn al-Nadīm (d end 4th/10th century), in whose well-known work the Fihrist we have the earliest preserved biography of Jābir, gives us a lucid report about the prevalent controversies and doubts in an early period not only over the question of the authenticity of the Jabirian corpus, but also concerning the very historical existence of its alleged author.\(^6\)

But Ibn al-Nadīm himself belongs to the opposite side in this controversy, dismissing all doubts emphatically and categorically: "Jābir did exist. His case is certain and famous, his compositions being most important and numerous."\(^7\) On the same side is Ibn Wahshiyya (b second half 3rd/9th century),\(^8\) who in his Kanz al-Ḥikma (Treasure of

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3t Hijra/AD. Dates have been specified in this style throughout.

4 The Ta'āliq is quoted by Abū Ḥayyān al-Tawhīdī (see al-Shabībī [1923], p7).


6 See Arabic text in Flügel ed [1871], 355:11-21 (= page 355, lines 11 to 21. Texts are cited in this style throughout).

7 Ibid., 355:18.

8 On the question of the authenticity of his writings, see Levey [1966].
Wisdom) invokes the alchemical authority of Jābir⁹ and mentions the latter's *Kitāb al-Sumūm* (Book of Poisons) in his own work of the same title. "Jābir ibn Ḥayyān al-Ṣūfī’s...book on poisons", he writes, "is a great work...It is a wonder".¹⁰ Restricting ourselves to this earlier period, we see, likewise, the three major alchemists, al-Rāzī¹¹ (d 313/925), al-Majritī¹² (fl mid 4th/10th century) and Ibn Umayl¹³ (d c349/960), the author Abū Ḥanīfa al-Dīnawarī¹³ᵃ (d c 282/895), and the historians Ibn Ṭāhir al-Maqdīsī¹⁴ (fl mid 4th/10th century) and Ṣā’id al-Andalusī¹⁵ (d 462/1070) - all of whom in one way or another mention Jābir, with no implications in their accounts either that his historicity or that the authenticity of the Jabirian corpus is in any sense a problematic issue requiring an explanation.

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⁹ MS Leyden 1267 f15; f 26.
¹⁰ Tr Levey [1966], p22.
¹¹ According to Ibn al-Nadīm, al-Rāzī used to quote, "our Master Jābir ibn Ḥayyān said" (Flügel ed [1871], 355:20). Indeed, in one manuscript of the *Kitāb al-Asrār* of Rāzī, Jābir is referred to as "our Master" (Stapleton, Azo and Husain [1927], p385). Kraus in his [1942-3] has discussed the relationship between the two alchemists (II, ppLX-LXII), but as opposed to the picture he draws, one notes that the evidence of Stapleton, Azo and Husain points to a much wider influence of Jābir on Rāzī, and a much more extensive knowledge of the former on the part of the latter (op. cit., pp335-340).
¹² See his *Rutbat al-Hakīm*. MS Cairo, Ṭabī‘iyāt 12, f198. It is generally believed that this work was written by one of his pupils, therefore we have to place it somewhat later. Cf Holmyard [1924].
¹³ Ibn Umayl in his *Kitāb Mī‘ al-Waraq* refers to two Jabirian treatises belonging to the Kutub al-Mī‘a wa-l-Ihnnā ‘Ašār (CXII Books, Kr 6-122), namely the *Kitāb al-Khāliṣ* (Book of the Pure, Kr 48) and *Kitāb al-Mujarradān* (Book of Abstractions, Kr 63-64). Ibn Umayl’s text has been edited by Stapleton, ‘Ali and Husain [1933] (see p93, 97).
¹³ᵃ Holmyard [1927] had brought to light a passage from the *Kitāb al-Akhbār al-Tiwāl* of Abū Ḥanīfa al-Dīnawarī (d c 282/895) where a Shi‘ī druggist (ṣāḥīb) by the name of Ḥayyān is mentioned. According to al-Dīnawarī, this Ḥayyān al-‘Aṭṭār was intensely active as a secret Shi‘ī agent (mā‘ṣib) working for the Abbasid cause in Khurāṣān. He also knew Yaqtān to whose son ‘Ali, Jābir has dedicated a book and a poem (Kr 111, and Kr 1143). al-Dīnawarī reports that in 1077/725 Ḥayyān was put to death with other Shi‘ī agents by the Umayyad governor of Khurāṣān (see Guirgass edition of the *Akhbār*, [1888], pp334-337). Ḥayyān appears as a Shi‘ī agent also in Ṭabarī, see De Goeje et al. ed [1879-1901], II, p1488). In this man Holmyard recognized the father of Jābir, the date of whose execution provided him the *terminus ad quem* for the son’s date of birth.
¹⁴ Maqdisī’s testimony is in his *Kitāb Ba‘d wa-l-Ta‘rīkh* (composed c 355/966). See Huart ed [1899-1919], II, p236.
¹⁵ Tahāt al-Umam, Cheikho ed [1912], p61.
Turning to our own times, we see that during the thousand years which separate us from Ibn al-Nadîm, this whole Jâbir question has become even more obscure and elusive. For, in addition to the conflicts in the tradition, the modern historian must now contend with yet another puzzle that has in the meantime set in: are the Arabic Jâbir and the Latin Geber identical? The writings ascribed to this Geber, in particular the *Summa perfectionis*, have been known in the Latin West since the early middle ages, for a long time considered to have been translations of Arabic works of Jâbir. Indeed, the classical editions of the Geberian texts reinforced this view in which the author is variously described as "The Most Famous Arabian Prince and Philosopher", "King of the Arabs", "King of the Persians", and in a rare incunabulum, even as "King of India".

But with the publication in 1869 of Hermann Kopp's *Beiträge zur Geschichte der Chemie* the scholarly world realized that the identification of Geber with Jâbir may well be an oversimplification, for Kopp had announced that he was unable to find any bibliographic trace of Arabic originals of the Latin Geberian texts, and that upon a philological examination by an Arabist, the latter showed no clear signs of having been translated from Arabic. Thus, the same sorts of questions which had troubled the Arabic bio-bibliographers of Jâbir were now faced by the Western scholars of Geber, and much worse: given the Jâbir/Geber identity in the Latin tradition, the scions of Arabic historians can no longer resolve the Geber issue in isolation of the Jâbir issue, nor, indeed, can the

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16 Schmieder [1832] and Hoefer [1842-3] are probably the last historians to identify Geber with Jâbir.
17 Russsell [1678].
18 In the 1842 Danzig edition of the *Summa Perfectionis*.
19 MS Bodellean, Western 19039, entitled *Liber practicus Geberis...de investigatione perfecta magisterii*. Cf Holmyard [1925].
20 *Liber qui flos naturarum vocatur*. 1473. Cf Holmyard [1925].
21 Kopp [1869].
latter be settled without addressing the former. With a new puzzle added, the modern era of the Jābir Problem has now been ushered in.

**The Jābirian Corpus: Scope and Peculiarities**

Unfortunately, all these problems are further compounded by the internal complications of the Jābirian corpus which resists an easy accessibility. A formidable difficulty, for example, is presented by the enormously wide scope of these writings. "No alchemical work of Islam", to quote one authority, "reveals such vast knowledge of ancient literature or has such an encyclopedic character". Thus, on the one hand, these writings deal with the theory and practice of chemical processes and procedures, medicine, pharmacology, astrology, theurgy, magic, the doctrine of specific property of things (Iīm al-Khwāṣṣ) and the artificial generation of living beings - all interspersed with discourses on philosophy, logic, mathematics, natural and artificial languages, music and cosmology. And, on the other hand, many parts of the corpus bear a thoroughly religio-political character in which the author discusses the Shī‘ī hiero-history, the occultation of the Imām and his messianic return, and the chiliastic cosmology of the proto-Shī‘ī gnosis.

The authorities cited, invoked or quoted are equally numerous and diversified. Thus one finds in the corpus references not only to ancient historical or legendary writers such as

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22 Kraus [Plessner], s.v. "Djābir ibn Ḥayyān" [Et²], II, p358.

23 Jābir talks about the possibility of an artificial language in the Kitāb al-Aḥjār. See below.
Zosimus, Democritus, Hermes, Agathodemon, etc., but also cited therein Socrates and Plato, and quotations from all parts of Aristotle's works, as well as from the commentaries of Alexander of Aphrodisias, Themistius, Simplicius and Porphyry. Galen is found to be extensively quoted, and Archimedes and Euclid are not only referred to, but - like Socrates, Plato, Aristotle and Baññas (Apollonius of Tyana), etc - a separate

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24 For example, in the Kitāb al-Hajar (Book of the Stone, Kr 553), Holmyard ed [1928]), 19:12; cf 18:4, 23:2.

25 Mujarradāt, MS Jārallah 1641, f248b, etc. Democritus is also one of those philosophers to each of whom ḽābīr devotes a separate musāḥḥahāt (Emendations) treatise. Thus, Kitāb Musāḥḥahāt Dhīmūqīfīs (Book of Emendations of Democritus, Kr 210).

26 For example, in the Hajar. Holmyard ed [1928], 18:17; Kitāb Uṣūqūs al-Uss.

27 Referred to, for example, in the Kitāb al-Qārār (Book of Stability, Kr 172). See Kraus [1942-3], II, p44, n4.

28 Socrates is held in high esteem by ḽābīr: In the Kitāb al-Taimir (Book of Concentration, Kr 398) he is referred to as the "father of philosophers and their master" (Kraus ed [1935] 389:3). We find him mentioned in several works besides meriting a musāḥḥahāt treatise (Kr 204).

29 A musāḥḥahāt treatise has been devoted to him (Kr 205). While Plato is mentioned elsewhere too, it seems that ḽābīr does not know any of his genuine works. The Timeaus he quotes in the musāḥḥahāt has little in common with the text as we know it. (See Sezgin [GAS], IV, 161ff).

30 For a detailed discussion of references and citations of Aristotle, see below. ḽābīr has written a musāḥḥahāt work for him too.

31 In the later work the Kitāb al-Baḥğ (Book of the Research, Kr 1800), MS Jārallah 1721, f11a.

32 Ibid., f48a.

33 In the Kitāb al-Sīr al-Maknūn (Book of the Hidden Secret, Kr 389-391), MS Paris 5099, f46b-f56b.

34 In the Taimir, Kraus ed [1935], 349:9.

35 The following Galenic works are cited:

i) De pulsibus and De pulsibus ad tirones: Kitāb Ikhrāj, Kraus ed [1935], 51:4-5.


iii) De simplicium medicamentorum temperamentis et facultibus: Kitāb al-Hasil (Book of the Result, Kr 323), MS Paris 5099, f115a.

iv) De elementis secundum: LXX Books (Kr 180), MS Jārallah 1554, f196a.

v) De usu partium: LXX Books (Kr 139), ibid., f81a.

vi) De facultibus naturalibus: Kitāb al-Baḥğ, MS Jārallah, f21a; f31a.
treatise is devoted to each of them. In addition, the Kitāb al-Ḥāṣil preserves a long extract from the Placita philosophorum of ps Plutarch. And, of course, throughout the Jabirian corpus one comes across numerous references to the sixth Shīʿī Imām Jaʿfar al-Ṣādiq (d 147/765) who is claimed to be the author's teacher and lord, the Master under whose direct guidance the author had composed his works.

Given this tremendous vastness of the scope of Jabirian writings, a fuller and intelligible picture of their contents is not easily drawn. It is clear, for example, that these writings have to be approached from at least two different angles: (a) from the perspective of the religious history of Islam; and (b) as a problem of the history of science. But in either case one has to grope in darkness, for just as the early history of alchemy is wrapped in obscurity, so are the historic origins of the Shīʿī sects in Islam. Both these areas are fraught with controversies and chaos as we will have occasion to see below.

But there are other problems associated with the Jabirian corpus, and this leads us to the second difficulty, namely the difficulty of making sense of the language of these writings. To be sure, the author avoids obscure allegories so typical of the Hellenistic alchemists and even of some later Muslim alchemical writers such as Ibn Umayl or Dhu‘l-nūn al-Miṣrī (d 245/859), but his style is often crude and uneven, frequently violating syntactical rules. More serious, however, is the problem of the technical terms in the corpus for which our standard classical lexicographic aids prove to be seriously inadequate.

36 For a fuller discussion of Baʿnās see below. In the corpus we have a Jabirian commentary on Euclid, entitled Kitāb Sharh Uqūdīus (Kr 2813), but this is not extant. The book dedicated to Archimedes bears the title Sharh Kitāb Wazn al-Ta‘i li Arshamīdās (Commentary on the Book of the Weight of the Crown by Archimedes, Kr 2821) for Jabir's account of the latter, see below.

36a See below.

37 In the Ḥāṣil Jabir says: "I have composed this book and my Master has called it the Book of the Result" (MS Paris 5099, f95b). Again, in the Kitāb al-Majīd (Book of the Glorious, Kr 706): "Know that my Master, may God be pleased with him, ordered me to compose these books. He established with regard to them an order of gradation which I am not permitted to violate" (Kraus ed [1935] 79-9). Cf Kraus [1942-3], I, pp XXV - XXVII.
Thus to make sense of Jābir's scientific language, one has to go through the laborious process of seeking help from what we have of the works of other Arabic alchemists, toxicologists, pharmaceutical naturalists, etc. But this may not be a good methodology after all, for if Jābir is the first alchemist of Islam - a possibility we cannot overrule - then to seek illumination from later writings would constitute a reverse process which cannot help us much in settling the question particularly of the dating of the corpus. And as for the earlier alchemical writings, they can hardly throw any light on Jābir for they are themselves wrapped in a thicker blanket of obscurity.

Third, there is this difficulty of Jābir's peculiar brand of "esotericism". As it is generally known, alchemy has traditionally been a secret practice. Thus, at many places in the corpus we read warnings of the author's alleged master Ja'far that these writings should never be allowed to fall into the hands of the unworthy or the irresponsible.38 But unlike the ancient practice of using cover names and allegories, Jābir's "esotericism" - which is not quite the obscurantism of the ancient alchemists - consists in what he calls tabdid al-'ilm, the principle of Dispersion of Knowledge: truth was never to be revealed completely at one place. Rather, it was the aim of the author to cut it up and spread it all over the labyrinth of a vast corpus.39 Therefore, no single treatise was complete by itself - each remained by definition fragmentary. The author always insists that the reader ought to refer to other

38 "By God", says Jābir in the Kitāb al-Khawass al-Kabīr (The Great Book of Properties, K 1900-1970), "my Master disapproved of my having written this book [i.e. the Hāsil], saying: By God O Jābir, if I did not know that nobody will have access to it without merit, I would have ordered you to destroy this book. Do you know what you have divulged to the public?" (Kraus ed [1935], 311:3-6).

Similarly: "My Master often used to say, 'proceed as you wish O Jābir, and reveal the sciences as you please, as long as only those who are truly worthy of it have access to it'" (ibid., 312:5-6).

39 "My books are numerous and knowledge is dispersed among them" (Khawass, qu.(= quoted in) Kraus [1942-3], I, p XXVII, n1).
works in order to get the whole meaning of what is being treated of in the treatise under consideration, other works urge the reader to consult yet others, and so on.\textsuperscript{40}

Full of copious bibliographic references to its own works, the corpus also gives clear instructions as to order in which its different writings are to be looked at, it even specifies the number of times each one them should be read.\textsuperscript{41} Strictly speaking then, one needs to have before oneself the entire body of the corpus if the whole truth of Jābir's teaching is sought. And while it is in principle possible to reconstitute his corpus and to complete the picture, in practice it remains an impossible task. The application of the principle of Dispersion of Knowledge may also explain the fact that in the same treatise, without contextual justification, the author often deals with vastly disparate subject matters.\textsuperscript{42} Thus, all individual writings of the Jabirian corpus are full of digressions, shifts of perspectives, discontinuities and half truths: these features present difficulties of a serious order.

Finally, one is confronted with the problem of an irritating lack of consistency in the Jabirian corpus. Thus, in the classification of substances, for example, mercury is at

\textsuperscript{40} Kraus observes: "Often in the middle of a treatise, which no reason of composition can justify, Jābir inserts long bibliographic notices" (ibid., p XXV). In the Kitāb al-Mīzān al-Saghīr (Small Book of Balance, Kr 369), we read: "First collect my books and read what is in them. It behooves you, O reader, that you join these books together so that through prolonged study the secret of creation and the art of nature is revealed to you" (Kraus ed [1935], 442:14-15).

\textsuperscript{41} According to the Kitāb Maydān al-*Aḍīl (Book of the Arena of the Intellect, Kr 362), the student will draw no benefit unless he has first read a great number of other treatises in the corpus (Kraus ed [1935], 209:3ff). Further, the Kitāb al-Afṣādīl (Book of the Excellents, Kr 313) should be read after all the others (ibid., 209:9). In the Ahjūr one reads: "How can one accomplish the task without reading the Hudūd [Book of Definitions, Kr 328]. Reading of this book is different from reading others. While others should be read once a month, the Hudūd should be kept before the eyes all the time" (MS Paris 5099, f59a).

\textsuperscript{42} For this Jābir himself offers an apology: "Do not be angry, O my brother, if you find a discourse concerning religion in the middle of a discourse on alchemy without the latter having been completed; or if you find a discourse concerning alchemy after a discourse on religion before the principles of the latter have been fully established" (Kitāb al-Majīd, MS Paris 5099, f67b; text in Kraus ed [1935], 115:10-13).
one time counted among spirits and, at another time, among metals, substituting for it sometimes "glass" (zuwājī) and sometimes the Chinese alloy khār sīnī. Also, sometimes the status of mercury is specified categorically as in the above cases, and sometimes equivocally: "There is uncertainty concerning mercury", writes Jābir in the Uṣṭuquss al-Uṣs, "it is a spirit with spirits, and a soul with souls". Similarly, in the LXX Books, in the vein of a numerological speculation, a special status is accorded to the number 18; whereas in the Kutub al-Mawāżīn (Books of Balances) the number 17 is declared as the foundation of everything in the natural world. These inconsistencies require explanation.

**The Thesis of Paul Kraus and its Methodological Implications**

How does one steer through these defeating external and internal complications that surround the figure of Jābir ibn Ḥayyān and the body of his writings? In seeking an answer to this question we can hardly turn to a scholar more erudite in this field than Paul Kraus

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43 For example, in the Kitāb al-Ghasl (Book of Washing, Kr 183), MS Jārullāh 1554, f202 (see Kraus [1942-3], II, p21; Stapleton, Azo and Ḥusain [1927]).

44 For example, in the Kitāb al-Manāfi' (Book of Utilities, Kr 159), ibid., f137

45 For example, in the Ghasl, ibid., f202; von Lipmann [1919], I, p377 identifies this substance as yellow amber.

46 For example in the Kitāb al-Khawass al-Kabīr (Great Book of Properties, Kr 1900-1970), qu. Kraus [1942-3], II, 19, n11. A Kitāb al-Khārṣīnī (Kr 953) is part of the Kitāb Aṣāṣal al-Sab'ā (Book of Seven Metals, Kr 947-953). For a discussion of this alloy see Needham [1980], p429ff.


48 In the Kitāb al-Iḥāṣ (Book of Comprehension, Kr 139), which belongs to the LXX, Jābir presents a critical survey of the doctrines of different schools of thought concerning the numerical proportion of the four Aristotelian qualities in natural substances. He expresses his preference for aṣḥāb al-ḥaṣā'ī (partisans of nature) who, he says, believe that in all things the weights of Fire, Earth, Water and Air exist in the proportion 1 : 4 : 5 : 8, totalling 18 (MS Jārullāh 1554, f81a). This appears to be inconsistent with his doctrine of the number 17 found in the Kutub al-Mawāţīn (Books of Balances, Kr 303-446). See below for an extensive discussion of the latter.
whose monumental study of 1942-43 was a major breakthrough in Jabirian studies. Indeed, historians such as Holmyard and, in more recent times, Fuat Sezgin have found reasons to challenge not only Kraus' conclusions but his very approach, yet this does not reduce the validity of his work. In fact, so comprehensive is his study that it provides the scope of its own refutation, and those who criticize him draw upon the raw material that he himself provides. Thus it hardly seems possible to begin a subsequent study of Jābir without accepting Paul Kraus as the major guide, and his findings as a firmly established starting point.

After investigating at a grand scale the Jabirian corpus and the bio-bibliographic traditions built around it, Kraus had reached two radical conclusions which, if accepted, make the task of the historian much simpler. His first conclusion, which is to be found nowhere in our modern or classical sources, concerns the question of the authorship of corpus: with the possible exception of the al-Rahma al-Kabīr, says Kraus, these writings

49 One of the many valuable contributions of Kraus is his discovery of the internal relative chronological order of various collection of writings belonging to the Jabirian corpus. Thus, beginning sequentially with the oldest:

I) Kitāb al-Rahma al-Kabīr (The Great Book of Mercy, Kr 5),
II) Kutub al-Mi`a wal-Ithna `Ashara (CXXII Books, Kr 6-122),
III) Kitāb al-Sab` in (LXX Books, Kr 123-192),
IV) Kutub al-Mawāzin [KM] (Books of Balances, Kr 303-446),
V) Kitāb al-Khams Mi`a (500 Books, Kr 447-946).

As for other writings, Kraus says that the relative dates of the minor works cannot be determined with much exactitude. The 10 Kutub al-Musahhahāt (Books of Emendations, Kr 203, 212; see n 25, 28-30 above), as well as most of the collections listed by Ibn al-Nadim, seem to date, in Kraus' view, from the time of the LXX or at least before the KM. The Kutub al-Ajisad al-Sab`a follow the 500. Kraus places the Bahth and the Khawass al-Kabīr after the KM in that order. The Khamsin came after these, etc. See Kraus [1942-3], I, pp XXXXX - XXXV.

50 Holmyard wrote prolifically on Arabic alchemy in general, and on Jābir in particular. Until the very end, he remained reluctant to accept the views of Kraus which we are about to discuss. In an article published more than a decade after Kraus' [1942-3], Holmyard still defended the historicity of Jābir against Kraus (Holmyard [1955]). In his last writing published in 1957, he bitterly criticized the methodology of the German school to which Kraus belonged, accusing his teacher Julius Ruska of having developed "an exaggerated and unreasonable scepticism concerning the authorship of any early Arabic alchemical work" (Holmyard [1957], pp65-66). From Fuat Sezgin comes perhaps the most powerful, organized and rigorous offensive against Kraus (Sezgin [GAS], IV, p133ff).
are the work not of a single individual but of several generations of a group of authors sharing certain philosophical, ideological and political concerns. Kraus' second conclusion, which ultimately derives from a hunch of Berthelot, is equally radical: the writings ascribed to Jābir were not composed in the 2nd/8th century. Rather, they are the products of a later period, the oldest part dating at the earliest from the second half of the 3rd/9th century.

The methodological implications of Kraus' thesis have a number of very attractive features: if many hands and a long period of time were involved in the production of the Jabirian corpus, then no longer do we need to undertake the difficult task of explaining the troublesome gaps, the inconsistencies and all the non-uniformities that are found in it - a plurality of authors provides a sufficient explanation and relieves us of this burden. Likewise, by shifting the dates of these writings into, so to speak, broad daylight when scientific activity in Islam was being carried out openly under court patronage, we do away with the need to go into the obscure literature of an earlier century in order to reconstruct the historical context of Jabirian ideas. Thus, on Kraus' view, we will be perfectly justified in consulting the writings of the alchemists such as al-Rāzī and Ibn Umayl to annotate Jabirian texts, this will involve no anachronism.

51 To this French historian of science we owe the publication, for the first time in the history of modern scholarship, of nine Jabirian treatises, with their French translations carried out by Houdas (Berthelot [1893], III). Below is the list of these texts, the first eight of them come from MS Leyden Arabe 440, the last from MS Paris 5099:

I) Kitāb al-Mulk (Book of the Dominion, Kr 454)
II) Kitāb al-Rahma al-Saghīr (Small Book of Mercy, Kr 969)
III) Kitāb al-Rahma al-Kabīr
V) Kitāb al-Tajmī'
V) Kitāb Zībaq al-Sharqī (Book of Eastern Mercury, Kr 470)
VI) Kitāb Zībaq al-Gharbī (Book of Western Mercury, Kr 471)
VII) Kitāb Nār al-Hājir (Book of the Fire of the Stone, Kr 472)
VIII) Kitāb Ard al-Hājir (Book of the Earth of the Stone, Kr 473)
IX) Kitāb Mawazin al-Saghīr (Small Book of Balances, Kr 980)

52 Kraus [1942-3], I, pp XXVII - LXV.
From the point of view of the historian's convenience, another favourable methodological implication of the late dating of the corpus is the fact that it renders unproblematic the Jabirian familiarity with the vast scope of the Greek scientific and philosophical literature. If the writings ascribed to Jābir were composed in the second half of the 3rd/9th century and later, then no problem is presented by the fact that they contain quotations from, for example, the works of Aristotle - by this time translations of Greek works into Arabic had already become a full-scale activity and the Abbasid Caliph al-Ma'mūn (r. 198/813-223/833) had established in Baghdad his celebrated Bayt al-Hikma. Thus, the contents of the Jabirian corpus do not demand a fresh examination of our long-held modern views concerning the history of the transmission of foreign ideas into Islam, nor can these writings be taken to throw any new light on this phenomenon.53

Given all these attractive features of Kraus' theory, it is small wonder that the bulk of modern-day scholars chooses to accept it, since it points to a simpler way out. Thus, when Alfred Siggel learnt that in a discourse on the anatomy of the eye, the Jabirian text Kitāb Ikhraj ma fi'l-Owwa ila'fi'l speaks of three moistures (rutūbāt) and seven layers (tabaqāt)54 which constitutes an advance over the belief of the Christian physician Yuḥanna bar Māsawayh (b 161/777), he disposed of it by saying that the Ikhraj must be dependent on the works of Ḥunayn ibn Ishāq (d 264/877).55 If Siggel had not accepted the late dating of Kraus, Jābir's anatomical knowledge would have opened up a whole set of challenging questions for him. Similar is the case of another historian of Arabic science, Martin Plessner, who strongly criticized Fuat Sezgin for his suggestions that it would be more

53 It is interesting to note that in their extensive studies of ps Aristotle in the Middle Ages, neither Burnett [1986] nor Zimmermann [1986] makes use of Jābir as a source.
54 Kraus ed [1935], 57:3-11; cf Rex tr [1975], p41.
55 Siggel tr [1958], p2.
fruitful, though at the same time more challenging, to take a relatively conservative approach to Jābir than the one shaped by the views of Kraus.\textsuperscript{55a}

But the temptation to follow Kraus uncritically must be curbed: for if the writings ascribed to Jābir were, after all, composed in the 2nd/8th century, then we have in them a whole literary treasure which can tell us much about the period of transition of Islam from its formative stage of a unitary cultivation of religious sciences to its intellectually polarized mediaeval phase of Hellenism and of burgeoning natural scientific activity. Many questions pertaining to this transitional period still lurk about - questions concerning the role of the Ḥarrāniyans, the dissemination of Hermetic ideas, the origins and the assimilation of pseudo-Greek works,\textsuperscript{56} the nature and channels of Oriental influences, and so on. Jabirian texts tell us something about all of these questions and can serve as a valuable source if they are not later compilations. We see, then, that the need to investigate Kraus' conclusions is rather pressing.

\textit{A Preliminary Criticism of Kraus}

It is evidently beyond the scope of the present work to attempt an exhaustive examination of the evidence which constitutes the grounds of Kraus' thesis. Thus the criticism that follows remains preliminary and tentative. It aims merely at a summary investigation of some of the major arguments of Kraus, and claims to go no further than stating a first result.

\textsuperscript{55a} Plessner [1965], and [1972].

\textsuperscript{56} For a glimpse of the importance, persistence and complications of this question see Kraye, Ryan and Schmitt eds [1986].
A) The Problem of the Size and Unevenness of the Jabirian Corpus

Kraus presents two main arguments to support his theory of a group authorship of the Jabirian corpus. The first argument concerns what came to be regarded as the "immense" and "fantastic" size of the collective body of these writings, while the second is based on a consideration of the fragmentary nature of its individual treatises which arises out of the Jabirian practice of the principle of tabdīd al-ʿilm, and which results in a corpus marred by a thorough and deliberate unevenness.

In his census of the writings belonging to the Jabirian corpus, Kraus had enumerated 2,983 works. For an individual author this is an enormous figure indeed. Thus, Kraus argued, "the great number of works [constituting the corpus] renders the hypothesis probable that they are not due to a single author." And again, "...the attribution of thousands of treatises to a single author of the 2nd/8th century contradicts all the ideas which have been formed concerning the evolution of Arabic literature." These arguments appear to be sound too. But does the Jabirian corpus contain literally 2,983 works? And precisely how large are these works? When we examine these questions, the whole picture changes drastically:

• The enumeration of Jabirian writings does not run continuously in Kraus' census. Thus, for example, from the number 500 a leap is made to the number 530 with nothing in between; the number 532 in the census is followed by 553, and the interval from 533 to 552 is not accounted for; no titles correspond to the

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58 Kraus [1942-3], I, p3-171.
59 Ibid., p XXXIII.
60 Ibid., p XLVIII.
61 Ibid., p105.
62 Ibid., p106.
numbers 554 to 629⁶²a or from 1751 to 1777,⁶²b and so on. Kraus' counting of Jābir's treatises, then, is full of numerous large vacancies which were introduced out of consideration either of the internal indications of the corpus, or of the Arabic bibliographers rough estimates of the wealth of literature. When we deduct these vacancies, the total number of titles restituted by Kraus reduces to a little over 500: a drastic drop from 2,982.

- In the census of Kraus each section or part of a single treatise has been counted separately as an independent work. Thus, the single treatise, the Kitāb al-Jumal al-‘Ishrūn (Book of Twenty Maxims, Kr 338-357), has been counted as twenty works; the lost al-Arba‘ūn Kitāb (Forty Books, Kr 1101-1140) as forty works; the Kitāb al-Aḥjār, which is in four parts, appears as four works (Kr 307-310); to the three parts of the Kitāb Ustuquss al-Uṣs, three different numbers have been assigned (Kr 6-8), and the commentary that follows it receives another separate counting (Kr 9). Such examples can easily be multiplied. It is evident that Kraus' total of 2,982 is not only inflated, it has also been arrived at through a very liberal method of enumeration.

- Many of the Jabirian works reckoned to be complete independent treatises barely occupy a single leaf in the manuscripts. The entire Kitāb al-Sahl (Book of Facility, Kr 947) consists only of one paragraph - it begins and ends on one half of folio 64 of MS Paris 5099. The Kitāb al-Nūr (Book of the Light, Kr 17) claims but one folio (no. 183) in the same MS. This Paris manuscript also contains the Kitāb al-Qādir (Book of the Powerful, Kr 530) which occupies the second half of the folio 66 and the first half of the following folio 67; in MS

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⁶²a Ibid., pp106-107.
⁶²b Ibid., p142.
Damascus, the text of the Qādir begins on the first half of folio 136 and ends on the first half of folio 137. Again, in MS Paris 2606, for example, the lengths of the Kitāb al-Wahīd al-Kabīr (Great Book of the Unique, Kr 11) and the Kitāb al-Wahīd al-Saghr (Small Book of the Unique, Kr 12) are, respectively, three folios, and two folios and a half (f92b-94b, and f94b-96a). Most of the treatises in the corpus are similarly very small.

The Kitāb al-Sab'īn (LXX Books, Kr 123-192) consists of 225 folios in MS Jarullāh 1554. Each folio has the dimension 19.5 cm x 13.5 cm, containing 15 lines per page. This means that on average, the length of each treatise in this collection is just over three folios. Likewise, if we add all the folios of different manuscripts which comprise another collection entitled Kitāb al-Khams Mi'a (500 Books, Kr 447-946), the total would barely go beyond 120.63 The 500, then, does not even occupy 500 folios. Other collections of the corpus similarly turn out to be much smaller than an uncritical glance at the census of Kraus would lead us to believe.64

This rough investigation makes it abundantly clear that we should view with a great deal of suspicion any arguments for a plurality of authors which is based on Kraus' inflated estimate of the volume of the Jabirian corpus.

But Kraus has another argument to support his thesis: "Despite one's constant efforts", he writes, "to impress upon the [Jabirian] corpus a homogeneous character, we find each time gaps and contradictions which can only be explained by an evolution in time

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63 This figure is somewhat imprecise because 11 treatises of the 500 Books are lost. But on the basis of the average length of treatises in this collection, the approximation of 120 is not radically inaccurate.

64 It is to the credit of Joseph Needham that he was able to recognize the inflatedness of Kraus' enumeration (Needham [1980], p392, note "g").
[extending over several generation of writers].65 The practice of tabādīd al-ʾilm provided further evidence-"could we not imagine", asks Kraus, "that the bibliographic indications [which are found practically in all individual Jabirian treatises] ... and such extravagant use of the principle of tabādīd al-ʾilm are called upon not only to assure [the reader] of the literary unity of the corpus, but also to conceal the gaps which exist between its various parts? When in each collection Jābir declares that the preceding collections present the science in an incomplete ... form, and that they need to be complemented by a new explanation, isn't that a very ingenious means to allow [a constant] addition of new treatises and new collections to the original stock?"66 Kraus goes on to say that besides all these indications of a collective authorship, he has found conclusive evidence-"The fluctuations in the classification of naturally occurring substances which one finds between one collection and another is a conclusive argument in favour of a plurality of authors".67

Yet it is ironic that Kraus' own position on this issue fluctuates. Elsewhere he had observed that the Jabirian writings "have certain stylistic and linguistic properties in common", and- at least from this point of view- they were so interlinked that "it is impossible to pick out [from these writings] any single work and declare it as fake without proposing that the whole collection is spurious".68 And as for the doctrinal uniformity of the corpus, one discovers from Kraus' own comprehensive study that in various Jabirian writings "all scientific details are woven into a coherent system and it is the latter which gives them meaning and justification. Philosophical reasoning is the starting point of all these writings... Again and again, emphasis is laid on the idea that in science practice

65 Kraus [1942-3], I, p XXXV.
66 Ibid., p XXXIV.
67 Ibid., p XXXV.
68 Kraus [1930], p24.
('amal) can lead to nowhere unless theory ('ilm, qiās, burhān) has had its due".69

Given the stylistic homogeneity of the Jabirian corpus on the one hand, and its substantive coherence on the other, the argument for a collective authorship loses much of its ground.

What about the thematic and stylistic continuity through the various independent collections of the corpus? Kraus admits that "the differences of doctrine and style between [the four major collections, namely] the CXII Books and the LXX Books on the one hand, and the Kitāb al-Mawāzin [KM] and the 500 Books on the other, are not great enough for one to admit that the two groups of writings were composed with more than 100 years between them".70 And further, "despite the divergences, the teachings of the KM are the direct continuation of those of the LXX Books."71 Again, this would mean that there is some degree of unity in the Jabirian corpus, and the differences between various groups of its writing are not great after all.71a

As for Kraus' speculative argument that the Jabirian practice of the principle of tabdīd al-ilm suggests a plurality of authors, it is interesting that once again he himself provides the grounds for a criticism of his own views. In his learned discussion entitled "The Principle of Dispersion of Knowledge in Antiquity and the Middle Ages"72, Kraus informs us that Jābir's use of this principle is no anamoly in the history of dissemination of ideas. Maimonides practiced it, and so did Roger Bacon. And if that is the case, why do we postulate a collective authorship of the Jabirian works when we don't do the same with the writings of Maimonides and Roger Bacon?

69 Ibid., p25 (emphasis added).
70 Kraus [1942-3], I, p LVII.
71 loc. cit.
71a Indeed, at one point, Kraus had categorically acknowledged that "the coherence and unity of thought expressed therein [sc. in the Jabirian corpus] is astonishing" (Ibid., II, p135).
72 Ibid., I, p XXXI.
A similar remark can be made concerning Kraus’ argument which he calls "conclusive": could we not imagine that some explanation other than a plurality of authors may legitimately be sought for the Jabirian fluctuations in the classification of natural substances? One is reminded of Marjorie Grene who talks of what prima facie appears to be a "glaring contradiction at the root of Aristotle's thought"\(^{73}\), but by constructing a fresh perspective she undertakes the challenging and interesting task of making this contradiction vanish. Why should our methodology be otherwise for Jābir?

\textbf{B) Jābir and the Shi’i Imām Ja’far}

Jābir’s alleged relationship with the sixth Shi’i Imām Ja’far al-Ṣādiq (d 147/765) plays a central role in the traditional accounts of the former’s life and times. Our standard sources agree that Jābir was in close rapport with the Imām.\(^{74}\) On the other hand, in the writings of the Jabirian corpus there are numerous occasions when the author claims to be his intimate disciple: it is in the first place to this "Master" (Sayyid) that Jābir owes the knowledge of the secrets of alchemy, it is under his direct inspiration that Jābir composes his writings, and it is this \textit{Ma’dan al-Hikma} (Mine of Wisdom)\(^{75}\) who is Jābir’s critic and guide \textit{par excellence}.\(^{76}\)

From the point of view of the dating of the Jabirian corpus, an enquiry into the Jābir-Ja’far relationship is obviously of crucial importance. Of the dates of the Imām we have much reliable historical information - if Jābir is his disciple, then we can determine his

\(^{73}\) Grene [1963], p23.

\(^{74}\) Ibn Khallikān mentions Jābir in the section devoted to Ja’far (see n1 above). The alchemist Jildak (d 743/1342) in his \textit{Kitāb al-Burhān ft Asrār ‘Ilm al-Mizān} says: "It is thanks to Imām Ja’far al-Ṣādiq that he [sc. Jābir] became Imām himself" (see Holmyard [1925], p442).

\(^{75}\) \textit{Kitāb Ikhātī}, Kraus ed [1935], 72-9.

\(^{76}\) "Due to the knowledge he has implanted in me I derive from him as a son derives from his father" (\textit{Kitāb al-Rahīb} (Book of the Monk, Kr 630), Kraus ed [1935], 528:5-6). See n37 above.
dates too. Thus it is hardly surprising that, before presenting the constructive part of his
thesis, Kraus addresses the question of the link of the two figures. His teacher Julius
Ruska had already "eliminated Ja'far from the history of alchemy",76 now Kraus sets out
to eliminate him from the story of Jābir.

But before examining Kraus' arguments, let us look at some of the significant
peculiarities of the manner in which the Imām is mentioned by Jābir:

* Throughout the Jabirian corpus, there are literally hundreds of references to
Ja'far. But in a vast majority of cases, these references take the form of an
invocation which consists in the formula "wa ḥāqqī sayyīdi" (by my Master...).
In fact so numerous is this invocation that it practically functions in the texts as
the conjunctions "however", "and so therefore", "thererby", "but", and the like.

* In a very few cases does Jābir add the name Ja'far to this formula.77 And the
instances in which he specifies an actual encounter with the Imām are even
fewer.78

* It emerges from an examination of a good number of Jabirian texts79 that all those
writings belong to the earlier part of the corpus concerning which an actual
encounter with the Imām is reported. To the best of our present knowledge of the

76 Ruska [1929] (The citation is from the reprint [1937], p310).
77 In the 25 Jabirian treatises published by Kraus (ed [1935]), and 11 by Holmyard (ed [1928]),
there are about 90 occasions when the author invokes the authority of his Master. Yet out of these, only 4
times does Jābir actually specify him by name.
78 To the best of our present knowledge of the corpus, only the following works mention an actual
encounter with Ja'far: i) Kitāb al-'Ayn (Book of the Essence, Kr 315); ii) Kitāb Ikhrāj; iii) Kitāb al-Ḥāṣil;
iii) Kitāb Nār al-Hājar; iv) Kitāb al-Rahma al-Ṣaḥīr; v) Kitāb al-'Ahd (Book of the Pact, Kr 1053 - 1055);
vii) Kitāb Khawass al-Kabīr. For the last two see below.
79 These include all the texts published, totalling 57, and some additional 50 treatises which the
present writer has examined in manuscripts.
Jabirian writings, the last such work is the Kitāb al-‘Ahd in which the author records a face-to-face conversation with Jaʿfar. Now, in Kraus' census in which the works are enumerated in a chronological sequence, the 'Ahd occupies the numbers 1053-1055.79a The last count in the census, as we have noted, is 2,982. This means that when the text in question was written, only about 35% of the Jabirian corpus had been constituted.79b

- Although the invocation "by my Master..." is found in the latter part of the corpus too, there are no indications in these subsequent references that Jaʿfar is alive at the time when the writing of these text is actually carried out. In fact, references to Jaʿfar in the Kitāb al-Khawaṣṣ al-Kabīr, which is a later work, make it quite evident that the Imam has now died: (a) In the "Sixteenth Discourse" Jābir relates a conversation with the Master (without naming him). But this report, which has been inserted totally out of context,80 concerns a conversation whose topic is an earlier work, the Kitāb al-Ḥasil, not the work in which the conversation is being reported.81 (b) In the "Seventeenth Discourse", talking about Jaʿfar, Jābir says: "My Master often used to say" (laqad kāna Sayyidī yaqūlu ilā kathīrān).82 Note the use of the past continuous tense. (c) In the "Sixth Discourse" we find mentioned two Jaʿfars - the Imam Jaʿfar al-Ṣādiq and the vizier Jaʿfar ibn Yaḥyā al-Barmakī.83 The latter Jaʿfar was born in c 150/767, two years after the death of the Imam. Obviously it would be absurd to assume that the author was trying to

79a Kraus [1942-3], I, p133.
79b This situation is indifferent to the question of the size of the corpus, for no historian has ever challenged Kraus' relative chronological ordering of the Jabirian writings (see n49 above).
80 See n40 above.
81 See n38 above. The text appears in Kraus ed [1935], 311:2-9.
82 Ibid., 312:5.
83 Ibid., 303-305.
give the impression that both Ja‘fars were alive at the same time - given the
religious importance of the Imām, and the fact that his dates have always been
rather well-known, nobody could get away with such miscalculation. In fact, the
opening sentences of this "Discourse" clearly imply that it had been some time
since Jābir was in the service of the Imām: "One day", writes Jābir, "when my
renown as a learned man and true disciple of my Master had become known...".84
The author is talking about a time when his reputation had been publicly
established and consolidated, and this implies a passage of time. (d) Another
possible evidence is to be found in MS Cairo Ṭabī‘īyyāt 621. In the "Sixth
Discourse" where the Imām is actually named, the MS adds the formula "radiya
Allāhu ‘anhu" (may God be pleased with him) after "Sayyidī Ja‘far" (my Master
Ja‘far).85 Indeed, one cannot overrule the possibility that this standard prayer,
which is always used for the dead, is a spurious addition made by the scribe.85a
But at the same time one notes the absence of the formula from the manuscripts of
earlier Jabirian writings.85b

Kraus finds no credibility in Jābir’s story. He dismisses it first on rational grounds:
(i) "According to the calculations of Holmyard", he recalls, "Jābir was born at the
beginning of 2nd century Hijra and [having lived a long life] died towards 200H.86 When
Ja‘far died (about 147H) he [sc. Jābir] could scarcely have been more than 35." But since
references to former are found throughout the corpus, "it is necessary to assume that all

84 Ibid., 303:4-5.
85 Ibid., 305, n8.
85a The manuscript in question is dated 1280 Hijra.
85b This statement must be viewed as tentative due to our limited and often indirect knowledge of
the Jabirian manuscripts.
86 Holmyard had based his calculations essentially on the testimonies of Abū Ḥanīfa al-Dinawarī
(see n13a above) and of the alchemists ps Majrīṣī and Jildaki (see Holmyard [1924], [1925], and [1927]).
writings [of Jābir] were composed before the death of Ja‘far, that is to say, in their author’s youth".87 (ii) The Jābir-Ja‘far relationship "furthermore implies a chronological misinterpretation". For if we assumed that the earlier parts of the Jabirian corpus were composed during the lifetime of Ja‘far, and the latter after his death, then "how can it be explained that already the first collection [of the corpus], the CXII Books, contains treatises dedicated to the Barmecides whose coming to power took place in 170/786 [i.e. some 21 years after Ja‘far’s death], and particularly a treatise dedicated to Ja‘far ibn Yaḥyā al-Barmakī born around 150/767?"88

By virtue of what we have already said, (i) can easily be disposed of. A closer examination of the manner in which the Jābir refers to the Imām suggests that it is only necessary to admit that some 35% of the Jabirian writings, not all of them, had been completed during Ja‘far’s lifetime. And now that we have redrawn the picture of the size of the corpus, there is nothing fantastic in the assumption that by the age of 35 Jābir had accomplished this much. As for (ii), Kraus stands on seriously problematic grounds.

It is a consistent feature of the Jabirian corpus that each treatise mentions, and is mentioned by, numerous others. There is hardly an exception, for this is the only way the principle of tabdīd al-‘ilm could work. In fact so copious and so frequent are these intra-corpus bibliographic notices that Kraus calls them 'bothersome'.89 And it is also thanks to these mutual references that Kraus was able to establish the relative chronological order of these writings. Now, there is something remarkably anamolous about the three treatises which reportedly belong to the first collection in the corpus, the CXII Books, and are, Kraus tells us, dedicated to the specific members of the Barmecide family. These works

87 Kraus [1942-3], pp XLVII - XLVIII (emphasis added).
88 loc. cit.
89 ibid., p XXXIV.
leave no trace anywhere in the entire corpus: in no other works are they referred to, and no manuscripts of them have been found. And more, they are mentioned nowhere in the external tradition, and the only source stating their existence is Ibn al-Nadîm. Also, there is something seriously suspicious about them: two of them are dedicated to figures totally unknown to historians—ʿAlī ibn Ishaq al-Barmakî and Maṣūr ibn Ḥaṭim al-Barmakî (?). 90

But in Kraus' catalogue of the CXII, two additional texts appear as dedications to the Barmecides in general. These titles, which Kraus has taken from Ibn al-Nadîm, read "Kitāb Uṣūquṣṣ al-Uṣṣ al-Awwal ila'-Barāmika" (The First Book of the Element of Foundation Dedicated to the Barmecides) and "Kitāb Uṣūquṣṣ al-Uṣṣ al-Thanī ilayhim" (The Second Book of the Element of Foundation Dedicated to Them). In 1928 Holmyard published these texts from a Bombay lithograph edition of 1891, and subsequently, in 1979, Peter Zimis made them the subject of a critical edition. It is most significant that neither Holmyard's text, nor any of the additional manuscripts studied by Zimis (MS Paris 5099, f194a-f194a, and Ms Berlin Or. Add. Oct. 2250) make any mention of the Barmecides. The first title reads "Kitāb Uṣūquṣṣ al-Uṣṣ 'ašā Ra'y al-Falāṣīfa li ḽābir ibn Ḥayyān wa huwa' al-Awwal min al-Thalātha" (The Book of the Element of Foundation According to the opinion of the Philosophers by ḽābir ibn Ḥayyān. This is the First of the Three); there are no references to the Persian family in the second title either, which appears as Kit. Uṣ. al-Uṣṣ 'ašā Ra'y al-Diyāna wa huwa al-Thanī li ḽābir" (The Book of Elem. Found. According to Religious Opinion. This is the Second by ḽābir). 94

90a Cf Fück [1951], p130.
91 Holmyard ed [1928].
92 Zimis [1971].
Ibn al-Nadîm's titles are evidently corrupt: "they [sc. these titles] are incorrectly listed in...[the] Fihrist".94a

In fact, there is yet another title in the Fihrist of Ibn al-Nadîm presented as the third book of the Ustuquss, and immediately following the above two. This reads "Kitâb al-Kamâl huwa al-Thalith ilayhim" (Book of the Perfection. This is the Third Dedicated to Them, [sc. Barmecides]).95 Here Kraus himself, after examining the extant manuscripts, drops the reference to the Barmecides. In the MSS the title is restricted to "Kitâb al-Kamâl" (Kr 10), and Ibn Nadîm is evidently wrong in reporting that this work is the third part of the Ustuquss.96

We have, then, sufficient grounds to conclude that as far as the first half of the Jabirian corpus is concerned, the alleged mentions of the Persian family are highly suspect and utterly undocumented. It is only in the latter half that the Barmecides are clearly and evidently referred to. This makes good chronological sense and answers to Kraus' objection.

Kraus' next argument for dismissing the Jâbir-Ja'far relationship is of a historical nature which stems from his inability to find a mention of Jâbir in authentic Shi'i sources. If Jâbir was such an intimate disciple of Ja'far, then he should have certainly been referred to in the bio-bibliographic sources of the sect: "It is surprising", says Kraus, "that the figure of Jâbir leaves no trace in the vast biographic literature of the Shi'i imamate, where conscientious theologians have gathered together the lives of the famous men of their sect. These works...go to great pains to enumerate all people who approached the Imâm Ja'far,

94a Zimis, op. cit., p22. Sezgin's titles do not refer to the Barmecides either ([GAS], IV, p233).
95 Flügel, loc. cit.
96 There does exist a third part of this work (Kr 8; Holmyard, op. cit., p99ff; Zimis, op. cit., tr p74ff), as well as a commentary Tafsîr, Kr 9; Holmyard, op. cit., p115ff; Zimis, op. cit., tr p92ff). Again, neither of them refers to the Barmecides, and both of them are missing from Ibn al-Nadîm's catalogue.
even those of the humblest state, or those considered to be the worst heretics and
apostates...The imāmī biographers would scarcely have hesitated to reserve him [i.e. Jābir]
a place in their works if they had reason to believe in his existence."97

What is the evidence of Kraus? We find him citing three works. The Kitāb Ma'rifat
Akhbār al-Riǰāl (Book of the Knowledge of Reports Concerning [famous] People) of
al-Kashshī (d c 340/951);98 and two later compilations - Kitāb Tanqih al-Maqāl fi Ahwāl
al-Riǰāl (Book of the Re-examination of the Accounts Concerning [famous] People) of
al-Māmaqānī,99 and Muḥammad Muḥsin's Kitāb al-Dhā'i ila Taṣānif al-Shī'a (Source
Book of Shīʿī Writings).100 None of these, Kraus reports, mention Jābir. But one wonders
if he has not been unusually hasty in making a sweeping generalization on the evidence just
of three works. In fact, Kraus seems to be wrong in this generalization:

1. He himself speaks highly of the modern encyclopaedic work of al-Amīn
al-ʿĀmilī entitled Aʿyān al-Shīʿa (Eminent Shiʿī Personalities), which draws
upon, and quotes, numerous important early classical sources.101 Kraus had
regretted that he could not make use of this compilation because "it has not yet
reached beyond the [first] letter [of the Arabic alphabet] alif".102 Since Kraus, the
encyclopaedia has progressed further, and, indeed, we see Jābir not only
mentioned, but covered extensively.103 al-ʿĀmilī quotes, among several others,

97 Kraus [1942-3], I, p XLVI.
98 The name appears as al-Kashī in Kraus (ibid., pXLVI, n2), but Sezgin's reading is al-Kashshī
99 Kraus cites (ibid., p XLVI, n. 2) the Najaf lith. ed [1349/1927].
100 Muḥsin [ed 1357/1938], see Kraus, loc. cit.
101 Kraus, loc. cit.
102 The Aʿyān had reached its 12th volume at the time when Kraus was writing.
See Kraus, loc. cit.
103 al-ʿĀmilī devoted 26 pages to Jābir (al-ʿĀmilī [1940], XV, p115-140).
the Shīʿī astrologer ‘Alī ibn Ṭawūs al-Ḥillī (d 664/1266) who in his Faraj al-Humūm bi Maʾrifat ʿIlm al-Nujūm (Relief from Anxiety through the Knowledge of Astrology) introduces Jābir as a companion of Jaʿfar al-Ṣādiq, and as one of those Shīʿīs who were knowledgeable in the science of astrology. Likewise, al-ʿĀmilī cites a similar testimony of ʿAbdAllāh al-Yāfīʾī (d 769/1367) which is found in his Miʿrāt al-Janān (Mirror of the Heart). As for the modern author of the encyclopaedia al-ʿĀmilī himself, he strongly sides with this opinion.

2. But perhaps the classical authors just mentioned are too late to be reliable. Is Jābir mentioned in earlier Shīʿī sources? In fact, he appears in a source that may well be treated as the earliest possible testimony we could imagine not only for Jābir’s relationship with Jaʿfar, but also for his very historicity. One of the first Shīʿī agents (dāʾī) of the 2nd/8th century, al-Muḥaddal ibn ʿUmar, has left us a small body of reports of wise sayings of Jaʿfar on issues of moral conduct, a compilation put together in a manner akin to Ḥadīth collection. In this short work, entitled al-Hikam al-Jaʿfariyya (Jaʿfarī Wisdom), the author twice presents Jābir in the company of Jaʿfar. It should be noted that the historical personage al-Muḥaddal was a student of the well-known ghāli (Shīʿī extremist), and for a while a companion of Jaʿfar, Abuʾl-Khaṭṭāb (d 135/755). Both

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104 al-ʿĀmilī op. cit. p117 (does not give dates). See Brockelmann [GALS], I, p911-913. For a good account of Ibn Ṭawūs see Āl Yāsīn [1965]. The title of the work appears in Sezgin ([GAS], VII, p17, p26) as Faraj al-Humūm fi Maʾrifat Nahi al-Ḥalāl min ʿIlm al-Nujūm.

105 al-ʿĀmilī, loc. cit.; al-Yāfīʾī’s work is available in a modern edition [1919].

106 He has separate sections on the questions of Jābir’s Shīʿism and of his relationship with Jaʿfar (ibid., p125; p127).

107 The alchemist’s name appears as “Jābir ibn Ḥayyān” on p27 and p42 of Arif Tamir’s edition [1957].

al-Ashʿarī (d 324/935) and al-Shahrastānī (d 548/1153) mention al-Muṣafḍāl and say that after the death of Abu'l-Khaṭṭāb, the sect Ḥaṭṭābiyya was named after the the former as Muṣafḍalīyya.\textsuperscript{109} The work in question, the Ḥikam, is found in the Majālis al-Muʿminīn of Nūrallah al-Shustārī (d 1019/1610),\textsuperscript{110} and there seems to be no pressing reason to doubt its authenticity.\textsuperscript{110a} So we have here a mention of Jābir by a contemporary whose historicity has never been called into question.

3. The famous Shīʿī biographer al-Najāshī (d 450/1058) mentions two brothers al-Ḥusayn and Abū ʿAtāb, sons of Bīstām ibn Sābūr al-Zayyāt, both of whom, he says, wrote a number of works on therapeutic medicine.\textsuperscript{111} The date of the death of al-Ḥusayn is given in the sources as 401H (=1010 AD).\textsuperscript{111a} To these two brothers a short work entitled Tibb al-Aʿimma (Medicine of the Imāms) is attributed\textsuperscript{112} - another Ḥadīth type of compilation which reports, with a chain of authority, different medicaments prescribed for a host of ailments by Shīʿī Imāms. And in this work again, we see Jābir figuring: the authors report a letter written by him to Jaʿfar seeking his benedictions during an illness.\textsuperscript{113} al-ʿĀmīfī also refers to this work, and, in addition, to another work by the same pair of authors entitled Rawḍat al-Jannāt (Gardens of the Paradise) which latter he

\begin{itemize}
  \item \textsuperscript{109} al-Ashʿarī, Maqālīt al-ʾIslāmiyyīn, Ritter ed [1963], p13; al-Shahrastānī, Milāl wa al-Nihāl, Badrān ed [1951], I, pp343-346.
  \item \textsuperscript{110} Sezgin [GAS], I, p530; Brockelmann [GALS], II, p607.
  \item \textsuperscript{110a} The last transmitter (rāwī) in al-Muṣafḍāl's chain of authorities (ḥisnād) happens to be Abu'l-Khaṭṭāb.
  \item \textsuperscript{111} al-Najāshī, op. cit., p30.
  \item \textsuperscript{111a} See Sezgin [GAS], III, p295.
  \item \textsuperscript{112} Mahdi al-Khurāsān ed [1358/1965].
  \item \textsuperscript{113} Ibid., p70. Transliterated without short vowels, the name appears in print as "JĀBR IBN ḤSAN ALṢŪFĪ", but the nasab here is undoubtedly "Ibn Ḥayyān". See immediately below.
\end{itemize}
quotes: "Abū Mūsa Jābir ibn Ḥayyān is among the most famous of the scientists."  \(^{114}\)

4. The rather well-known 5th/11th century Ismā'īlī compilation, **Dastūr al-Munajjimīn** (The Way of the Astrologers) also mentions Jābir, and in a most instructive manner: he is counted among the four "most famous supporters of Ja'far", \(^{115}\) the other three being Abūl-Khaṭṭāb, al-Mufaḍḍal ibn ‘Umar, and the historically important religio-political figure ‘Abdallāh ibn Muyīn al-Qaddah (d end 2nd/beg.9th century). \(^{116}\) Kraus is familiar with Dastūr's reference to Jābir, but commits this information to a footnote. \(^{117}\)

Indeed, much of what has been said above requires further investigations. But one thing is certain: in saying that the figure of Jābir leaves no trace in classical Shi‘ī sources, Kraus has been too hasty.

**C) Religious Trends of the Jabirian Corpus: Kraus' Late Dating**

The emergence of the Ismā‘īlī movement from the breast of proto-Shi‘ī gnosis is one of the most perplexing episodes of the religious history of Islam, no less shadowy, and no less controversial, than the Jābir-problem itself. \(^{118}\) What are the origins of the

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\(^{114}\) al-‘Āmilī op. cit. p117.


\(^{116}\) Cf Stern s.v. "'Abd Allah b. Muyīn" [EI²], I, 48.

\(^{117}\) Kraus [1942-3], I, p XL., n. 7.

\(^{118}\) For example, Ivanow [1955] and Madelung (s.v. "Khattābiyya" [EI²], IV, p1133ff) have tended to minimize the importance of certain early Shi‘ī groupings of the 2nd/8th century for the formation of Qarmatī and Fatimid Ismā‘īlīsm. Others such as Massignon (s.v. "Karmatians" [EI¹], IV, p767ff), Strothmann (s.v. "Sab‘iya" [EI¹], IV, p23ff), Lewis [1940], Stern op. cit., and Halm [1978] have accepted some link between various sectarian currents of the 2nd/8th century and the earliest speculations of the Ismā‘īliyya.
Ismāʿīliyya? Who was the founder of Ismāʿīlism? When and how did the Qarmatī branch of the Ismāʿīlīs come into existence? What kind of literature was being written and circulated among the early leaders of this sect, and who were the authors? There are no clear answers to these questions. The period between the death of Jaʿfar al-Ṣādiq and the appearance of the Ismāʿīliyya as a secret revolutionary organization is a time interval sunk in darkness.

All we know clearly is this much: after the death of Jaʿfar a group of his followers held fast to the imāmate of his son Ismāʿīl who had been designated by him as his successor but had predeceased him. Some of them maintained that Ismāʿīl had not died but will reappear as the Qāʿīm or Mahdī; others recognized Ismāʿīl's son Muḥammad as the Imām, yet others - who were to be the later Ithnā ʿAshāfī (the twelver Shīʿīs) - chose Ismāʿīl's brother Mūsā al-Kāẓim as Jaʿfar's successor. After more than a hundred years, around 264/877, emerged the Ismāʿīlī movement under the leadership of Ḥamdān Qarmat in Kūfa, Khalaf in al-Rayy, and under various leaders elsewhere. What happened in the intervening period is a blank spot, and so far historians have been able to fill it but only partially. And given this fragmentary nature of our knowledge of the formative phase of the Ismāʿīliyya, one feels somewhat surprised that it constitutes the very foundation of the constructive part of Kraus' thesis. But to explain one obscurity in terms of another is not a very promising methodology.

119 This question is the subject matter of Ivanow [1957].
119a To get some idea of the obscurity of these questions see Madelung [1985].
120 Cf Madelung s.v. "Ismāʿīliyya" [El2], IV, p198ff.
121 Madelung (ibid., p198) says: "Nothing is known about the history of of Ismāʿīlī movement developing out of this nucleus until after the middle of the 3rd/9th century." However, Madelung himself was subsequently able to throw some light on this dark period (see below).
In a nutshell, Kraus' reasoning runs as follows: Jabirian writings showed Qarmati-Ismaili tendencies and employed the esoteric vocabulary of this sect. And this provided a definite clue to the dating of the entire corpus. These writings could not have been composed earlier than 270/883, because it was at this time that the Qarmati appeared on the scene. And since the relative chronology of the various parts of the corpus had already been established, we could now date the whole body of these writings.

Two questions immediately arise: First, to what degree of certainty can we claim that Jabirian texts do, indeed, display a Qarmati character? And second, does our present knowledge of the origins of the Isma'ili movement allows us to declare with confidence that the technical vocabulary of the Qarmati religio-political propaganda did not originate and come into usage before the year 270/883?

As to the first question, it is interesting that although Kraus insists that the Jabirian corpus displays "Ismaili trends", he himself drastically wavers in his judgments. Thus, sometimes Jabirian ideas are "contrary to the official doctrines of the Isma'iliis"; sometimes, "he is close to the teachings of the Nusayris"; but, then, he also "distinguishes himself from them". There are times when he has the "tendency to surpass the teachings of Muslim gnostics", and occasions when he "compile[s the list of

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122 Jabir uses the terms kunf qadar (see Kraus [1942-3], I, pp XLVII - LVII). Cf Halm [1978].
123 Ibid., I, p XLIX. He gets his date from Tabari, III, s.a. 278H. But Madelung (EI2), IV, p198 gives an earlier date.
123a See n. 49 above.
124 The very title of Kraus' section is "The Isma'ili Trends of the Corpus" (Kraus [1942-3], p XLVII).
125 Ibid., p LII (emphasis added).
126 Ibid., p LIII (emphasis added).
127 loc. cit.
128 loc. cit. (emphasis added).
heirarchical grades of Shi‘I gnosis] from the vocabulary of different sects".129 Here we find Jābir expressing the aspirations of the Fatimids who named themselves after the Prophet's daughter Fāṭima,130 there we see him in the condemned camp of the Ghulāt excluding the Prophet's son-in-law ‘Alī from the list of seven Imāms, and supporting the imamate of Muḥammad ibn al-Ḥanafiyya, the son of ‘Alī, but not by Fāṭima!131 This gives a very confused picture of Jābir's religious tendencies.

But there are further confusions that Kraus does not point out. For example, take the question of the number of Imāms in Jābir's system. In the Kitāb Ikhraj ma fi'lw Quwwa ila'l-FiT, he talks about two religious groups who, among others, fixed the number of Imāms to seven,131a but - contrary to what Kraus says -132 Jābir does not approve of it, rather he forbids the reader to share such views.133 In the Kitāb al-Khamsīn (Fifty Books, Kr 1835-1874), Jābir has six Imāms.134 But again, in the Kitāb al-Ḥajar (Book of the Stone, Kr 553) he refers to seven Imāms. In his religious orientation, we see: Jābir does not seem to be allied to any one group, nor is he consistent.

Kraus sees in Jābir's reference to the seven Imāms an Ismā‘īlī tendency. But in the Ḥajar where there is, indeed, a mention of seven Imāms, Jābir assigns to each one of them a different function,135 something that does not seem to be in harmony with the Ismā‘īlī
doctrines. And the context in which all this occurs is entirely non-religious: "He
[sc. Zosimus] also mentions seven combinations. One is confronted again with the seven
combinations in the agreement between astrologers that seven planets govern the universal
course of events, and also in religion there are seven Imāms".136 This passage in fact is
reminiscent of the late 1st/7th century Wāqīfī doctrines of the sevener type whose role in
the formation of Ismāʿīlī cosmology has been emphasized by Strothman.137

There are yet other elements in the religious ideas of Jābir which place him at a great
distance, both in substance and in time, from the Ismāʿīliyya. For example, he often talks
about cycles of metempsychosis (takrīr),138 and this seems to have come directly from the
teachings of the ghāli leader Abu'l-Khaṭṭāb (d c 145/762) whose followers had believed in
reincarnation and even in the transmigration of human soul into sub-human bodies.139
Similarly, the gnostic symbolism of the three letters ʿAyn, Mīm and Sīn, to which Jābir's
Kitāb al-Majīd (Book of the Glorious) is devoted,140 had crystallized in the pre-Ismāʿīlī
ghāli groups of the 2nd/8th century.141

Let us now look at the second question we raised above, namely the question
concerning the technical vocabulary of the Qarmatī-Ismāʿīlīs. It has been some time since
Massignon had said that "an examination of the Karmatian technical terms shows that this
doctrine was formed before the end of the second century AH [8th century AD] in the

136 Ibid., 23:5-8. Again, this was also brought into focus by Sezgin in [GAS], IV, pp199-200.
(Note a mistake in Sezgin p199, line 24; p199, n7; p200, n1: Read Hajar for Bayān).
138 For example, in the Kitāb al-Bayān (Book of Explication, Kr 14-15), Holmyard ed [1928],
11:13. See also Kraus [1942-3], II, p119, p123.
139 See Hodgson, op. cit.
140 Corbin ed [1950].
141 These are the first letters of the names of ʿAlī, Prophet Muhammad, and the Prophet's first
companion from a foreign race, the Persian Salmān. The proto-Shīʿī gnostics had stripped these personages
of their historical character, designating them by the three letters as the three hypostases of divinity and its
manifestations on earth. See Massignon [1934] and Corbin [1983].
Imamī circles of Kūfa".\textsuperscript{142} And further, "the first clearly Қarмаțiаn author is Abu‘l-Khaṭṭāb...In cosmogony he replaced the use of letters...by their corresponding numerical values...After him Abū Shākir Maimūn al-Қaddāḥ...(d towards 180=796)\textsuperscript{143} gave definite dogmatic form to the Қarмаțiаn doctrine of emanation".\textsuperscript{144} Kraus is familiar with these observations of Massignon but shuns them by his remark that "whatever the origins of the Qarmaṭīs, it is certain that they appeared on the scene around 270/883".\textsuperscript{145} It should be noted, however, that the views expressed by Massignon have been challenged by others too, and that we are dealing here with a highly controversial issue which has been approached by recent scholars from a host of different angles.\textsuperscript{146} An active participation in this controversy, or even a critical survey of different views, is obviously outside the narrow confines of the present work, and therefore, we content ourselves with a cursory remark that follows.

In recent scholarship, perhaps the most extensive and rigorous studies of proto-Ismā‘īlism are due to the historian Wilfred Madelung. Many of Madelung's findings, one notes, seem to support the conclusions of Massignon with the strength of fresh evidence. For example, in an article published in 1961,\textsuperscript{147} Madelung points out the importance of al-Qāsim ibn Ibrāhīm al-Rassī (d 246/860) for the understanding of the early history of the Ismā‘īliyya. In his al-Radd ‘alā Rawāfiḍ (Refutation of the Rāfiḍīs), the Zaidī Imam al-Rassī gives much valuable information concerning the relationship of many 2nd/8th

\textsuperscript{142} Massignon "Қarмаțiаns", p770 (emphasis added).
\textsuperscript{144} Massignon, "Қarmațiаns", loc. cit.
\textsuperscript{145} Kraus [1942-3], I, pLIX.
\textsuperscript{146} One can mention, for example, recent works by Richard Frank [1965], and Junyboll ed [1982].
\textsuperscript{147} Madelung [1961]. This was further developed in idem [1965].
century groups with the Ismā‘īlīs. A work actually written in the 2nd/8th century, *Kitāb al-Rushd wa'l-Hidāya* (Book of Rectitude and Guidance) is also referred to by Madelung. This book seems to have played an important role in the formation of early Ismā‘īlī terminology. Later, in a work entitled, "Bemerkungen zur imamatischen Firaq-Literatur", Madelung examined "the relationship of the books on Shī‘ite sects by al-Nawbakhti (d c 310/922) and Sa’d ibn ‘Abd Allāh al Qumrī (d 301/914), suggesting that their source for the early developments is the lost *Kitāb Ikhtilāf al-nās fi'l-Imāma* (Book of Controversy over the Question of Imamate) of Hishām ibn al-Ḥakam (d 179/795-6)".

All this indicates an earlier dating for the formation of the doctrines of the Ismā‘īliyya and their esoteric vocabulary than that which is suggested by Kraus. It seems quite clear, anyway, that Kraus did not have sufficient evidence available to him to claim that the appearance of Qarmatī terminology in Jabirian writings proves that they were not composed before the latter years of the 3rd/9th century. We still know very little about the 2nd/8th century, but recent researches seem progressively to weaken the position of Kraus.

D) Citation of Greek Works in the Jabirian Corpus

It has been pointed out above that a number of genuine as well as apocryphal Greek works are found cited in the Jabirian corpus. And this provides Kraus with further evidence for a late dating of these writings. "If the Jabirian writings are authentic", he argues, "then the Arabic translations of the works of Aristotle, of Alexander of

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148 al-Rassī states that Ismā‘īlīs were called "al-Mubārakiyya". He also relates the former with Khattābīyya (See Sezgin [GAS], I, p561).
150 Madelung [1967].
151 Madelung [1985], "Preface", p X.
Aphrodisias, of Galen, of ps Plutarch must have been carried out more than a century before the date admitted by all. Thus it would no longer be Khwarizmi who introduced the Indian [techniques of numerical] calculation, nor the school of Hunayn which definitively fixed the scientific terminology in the Arabic language."\(^{152}\) But against this conservative view, we already have the strong dissenting voice of Fuat Sezgin. "We should free ourselves", Sezgin charges us, "from the earlier illusion that the time of translations of Greek works into Arabic began only in the 3rd/9th century".\(^{153}\)

Sezgin's generalizations notwithstanding, his opinion in the specific case of Jābir seems to be correct. When we actually compare the quotations of Greek works in the corpus with their Arabic translations carried out in the 3rd/9th century, Jābir turns out to be independent of the latter. Also, we sometimes find archaic terminology in Jābir's citations, as well as inconsistencies in the translation of a given Greek term - all this may easily be taken to point to an early dating.

It should be noted that although Jābir refers to his Greek predecessors throughout his corpus, in a vast majority of instances he either paraphrases their writings, or simply expounds their doctrines in his own words. Direct quotations from Greek works, or translations of Greek titles, these are relatively rare. Thus a comparison of Jābir's citations with standard Arabic versions is not easily carried out. But obviously, an argument for a late dating of the corpus which is based on Jābir's indirect citations of Greek authors cannot be a strong one. And this is what Kraus seems to have done.

Because, on the other hand, it is on those rare occasions when Jābir gives a direct translation of a Greek work that he definitively falsifies Kraus' conclusions. As we shall

\(^{152}\) Kraus [1942-3], I, p XLVIII.

\(^{153}\) Sezgin [GAS], IV, p170.
witness from the few cases examined below, these Jabirian translations are totally independent of those of the Ḥunayn circle, they are unmistakably archaic in terminology, and they are much inferior and cruder in style and structure. But we must now present our evidence.

1. The present work has discovered in Jābir’s Ahjār a hitherto unknown translation of Aristotle's Categoricae, 8, 8b25-11a37 - that is, a translation of Aristotle’s entire discourse on quality.¹⁵³a This Arabic rendering of the Categoricae appears in the third part of the Ahjār, a work that has never been published or studied before, and, therefore, it is hardly surprising that no modern scholar, including Kraus, seems to have identified it.

Indeed, Jābir’s version of the Categoricae has nothing whatsoever to do with the standard translation of Isḥāq ibn Ḥunayn (d 299/911). More than that, one finds in it clear signs of an older age. This text is an integral part of the critical edition of the Ahjār which forms the main body of the "Chapter IV" below, and, in the chapter that follows, it has been translated, examined, and compared with both the text of Aristotle as well as with the translation of Isḥāq. It will be seen that any suggestion to the effect that Jābir is dependent on the the Ḥunayn school flies in the face of overwhelming evidence to the contrary.

2. In Jābir’s Kitāb al-Qadīm (Book of the Eternal, Kr 981), Aristotle’s Physica appears as "Kitāb Sam‘ al-Kīyān" (MS Paris 5099 f 172b). Note the archaic character of the Arabic title: the term kīyān is an Arabicization of the Syriac kēyānā

¹⁵³a Edited text 29: 5-32:11. (As a standard style of citation throughout this work, this specifies the pagination and lineation of the critical edition of the Ahjār in "Chapter IV" below).
(= Gr. phusis). a term which had already been abandoned by the time the Ḥunayn school emerged, having being replaced by the word "ṭabī'a" derived from an Arabic root. Thus, we have here an unmistakable evidence that Jābir's translation is older. In fact, the use of the term in question is described by Peters in his Aristoteles Arabus as the "telltale" sign,154a that is, a sign openly betraying the pre-Ḥunayn origin of a text.

But the title changes in a later treatise. In the Kitāb al-Baḥth (Book of Research, Kr 1800) it becomes the standard "Kitāb al-Samā' al-Ṭabī'ī" (MS Jārallah 1721, f15a) of Ishaq ibn Ḥunayn. But despite this identity of titles, Jābir's text shows no dependence on that of Ishaq, for

3. In the Bahth (f 92a) there also appears an actual quotation from Aristotle:

"He [i.e. Aristotle] goes as far as to say in the beginning of the first chapter (mīmar) of his Physica that form is prior to all else. It is by virtue of form that there exists in a thing its nature, its essence and its ma'nā".

There is no such passage at the beginning of the Physica in the translation of

154 Other archaic terminology is also found in Jābir- for example, in the Kitāb al-Safwa (Book of the Elite, Kr 384) the term used for the Aristotelian quality moisture is "nadāwa" (MS Paris 5099, f117a). Likewise we have in Jābir the oldest mention of the word "māl" for a quadrilateral (cf Kraus [1942-3], II, pp62-66, p178). It is to be remarked that Plessner was certainly wrong in declaring that "Jābir always uses the scientific language as perfected by Hunain ibn Ishaq and his pupils..." (Plessner [1972], p212, emphasis added).

154a Peters [1968], p32.
Ishāq ibn Hunayn, nor do we find at the place referred to by Ḥābir any mention of form in the standard Greek text of Bekker. And once again, we read an archaic term, mīmar (chapter) which, like kīyān, happens to be of Syriac origin. This stands in contrast to the later Arabic term "maqāla" of the Ḥunayn school.

But in the passage quoted, we also see a specific use of the term maʿnā. Note that maʿnā has here been placed in opposition to dhāt (essence), and, in the context, it can legitimately be taken to mean the totality of secondary properties, or accidents, of a physical body, as opposed to its essential or primary properties. And this particular technical sense of maʿnā seems to betray affinities with the cosmological speculations of early kālām. To be sure, the term in question is found to be used everywhere in the philosophical and scientific literature of Islam, but, as a first observation, one notes that Ḥābir is here employing it to denote a concept which it denoted in the writings of the mutakallimūn (practitioners of kālām, sing. mutakallim) of the late 2nd/8th and early 3rd/9th centuries. Indeed, we find maʿnā being feverishly and widely discussed in the kālām literature of this period, with al-Ashʿarī in his Maqālāt tracing it all the way back to Hīshām ibn al-Ḥakam (d 179/796). The mutakallim Ibrāhīm al-Nazzām (d 221/836) wrote a whole work on maʿnā, entitled Kitāb al-Maʿnā

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155 Badawi ed [1964].
156 See Klamroth [1886], p631.
156a Kālām is often translated as "Scholastic Theology". However, recent scholars have increasingly felt that such rendering is somewhat misleading. See, for example, Wolfson [1976]; van Ess, s.v. "Muʿtazila" [ER], X, p220.
156b The term maʿnā, rendered by mediaeval Latin translators as "intention", has a long and complex history which has recently been captured by Sabra in his work on Ibn al-Haytham (see Sabra [1989], pt II, pp70-73). It should be noted that Ḥābir applies this term in other contexts too (see n55 in the "Prefatory Note" [Chapter III] below).
156c For the kālām doctrine of maʿnā, see especially Frank [1967] and Daiber [1975].
156d Ritter ed [1963], p369, p345.
'alā Mu‘ammar (Book of Ma‘nā Against Mu‘ammar), and this Mu‘ammar (d215/830) is another early mutakallim whose doctrine of ma‘nā has been expounded by al-Khayyāt (d after 300/910) in his Kitāb al-Intisār. Given this climate, it does not seem surprising to find a kalām concept in Jābir, and this is yet another indication that he is drawing upon traditions which antedate the Bayt al-Hikma.

4. In the same Jabirian work, the Bahth, we have another quotation from the eighth chapter of Physica (250b11-15). When this quotation is compared with Ishāq’s translation, one does find a correspondence, but no dependence. The two versions are totally dissimilar not only in terminology, but also in style and structure, with the version of Ishāq showing a much higher degree of sophistication. The left and right columns below give, respectively, Jābir’s text and that of Ishāq:

قال ارسطوطاليس:

لايت شعرى هل حدثت الحركة ولم تكن قبل؟ وهل تفند انيا ما ليكون معه شيء اصلاً يتحرك؟ أم الحركة لم تحدث ولا تنسد لكنها لم تزل فيما مضى ولا تزال ابداً؟ وهذا امر لا يزال له ليست تنتش في الموجودات...

Notat in the ibar al-thamin:

ليت شعرى كانت الحركة لم تزل اكانت بعد ان لم تكن وحل تدثر بعد كونها إن كانت او كيف الحال نينا ثم خذ في الكلام فيها نتال في رسها او حدها. الا اولاً نتال اها تمام ما بالقوة وصورة وما ثانية نتال اهاطريق من الثوبة الى العمل...

156e Ibn al-Nadīm, Fihrīst, Tajaddud ed [1971], 206:16. (This is missing from the text of Flügel [1871]).

156f Nader tr [1957], p15. Cf Daiber [1975], p78ff.

156g We have noted also that Jābir talks about, and expresses a preference for, asḥāb al-tabā‘ī (the partisans of the natures). This was a pre-Hunayn epithet which was applied, among others, to a group of early mutakallimūn. See al-Ash‘ari, op. cit.; Kraus [1942-3], II, p166.

5. Turning now to the works of Galen, we note that the title of his De compositione medicamentorum secundum locus appears in Jābir as "Kitāb al-Mayāmir" (Book of Chapters; "mayāmir" is the plural of the abandoned term mīmar).\textsuperscript{157a} Against this, we have the literal rendering of Ḥunayn ibn Isḥāq which reads Kitāb al-Adwiya bi-ḥasab al-Mawādiʿ al-ʿĀlma.\textsuperscript{158} Evidently, Jābir's translation is older.

6. Galen's De elementis secundum Hippocratem is cited by Jābir under the title "Kitāb al-ʿAnāṣir",\textsuperscript{158a} as opposed to Ḥunayn's Kitāb fiʿl-Uṣṭuqsāt ʿalā Raʿy Buqrāt.\textsuperscript{159}

7. In another title there is a slight difference. In Jābir we find Galen's De propriis placitis referred to as "mā lʿtaqadahu Raʿyan",\textsuperscript{159a} in Ḥunayn it is "fi mā Yaʿtaqiduhu Raʿyan".\textsuperscript{160}

8. As for the actual citations of Galen's texts, they are not being examined here. But it should be pointed out that this matter has already been investigated by Sezgin who testifies that Jābir's quotations do not generally agree with the translations preserved.\textsuperscript{161} Pending further research, this testimony must prevail.

9. The legendary account of Archimedes' discovery of the hydrostatic balance is given in detail in Jābir's Baḥth (f131b-f132b). Kraus quotes this entire passage,

\textsuperscript{157a} Tajmiʿ, Kraus ed [1935], 374:11.
\textsuperscript{158} Bergstraesser [1925], no. 79.
\textsuperscript{158a} Kitāb al-Ikhtilāt (Book of Mixing, Kr 180), qu. Kraus [1942-3], II, p326.
\textsuperscript{159} Bergstraesser op. cit., no. 11.
\textsuperscript{159a} Baḥth, qu. Kraus [1942-3], II, p329, n7.
\textsuperscript{160} Bergtraesser, op. cit., no. 113.
\textsuperscript{161} Sezgin [GAS], IV, p172; III, p71f
but remains completely silent as to the source which may have been available to
the author.\footnote{Kraus [1942-3], II, pp330-331.} It should be noted that the comprehensive work on physical
balances by al-Khāzīnī (composed c 514/1120)\footnote{This work entitled Kitāb Mizān al-Ḥikma (Book of the Balance of Wisdom) has been
thoroughly studied by Khanikoff [1860].} does contain the legend, but in
terminology and in matters of detail, it is totally dissimilar to the text of Jābir. For
example, the term used for crown is "ḏāji" in Jābir, "iṭtīl" in Khāzīnī, the king in
question is Māliqiyyādūs (Domitian?) in the former, Hiero in the latter, and so
on.\footnote{See Khāzīnī's text in Khanikoff, op. cit., pp12-13.} Obviously the two texts draw upon different sources. But this whole
question needs further investigation.

The evidence just presented is neither exhaustive nor overwhelming,\footnote{For example, the notorious question of Jābir's familiarity with the Arabic translation of
PsPlutarch's Placita philosophorum has not been investigated here. But this is a complex matter and would
have involved an inappropriately lengthy digression. Besides, a consideration of this question does not seem
necessary for the point of the argument.} but it seems
sufficient enough to point to the problematic nature of Kraus' assertions.

E) The Dating of the Sirr of Balīnās: Kraus' Search for a terminus post quem

One work which has influenced in a fundamental way the cosmological and
alchemical doctrines of Jābir is the well known Kitāb Sirr al-Khāliqa wa Sanʿat al-Ṭabīʿa
(Book of the Secret of Creation and the Art of Nature) falsely attributed to Apollonius of
Tīyana (in Arabic, Balīnās, Baʿīnūs, Baʿīniūs etc.).\footnote{For a fuller discussion of Balīnās see "Commentary and Notes" below.} Also known as the Kitāb al-ʿĪlāl
(Book of Causes), this text has exercised scholars for nearly two centuries.\footnote{The inaugurator of modern researches into the Sirr was Sivestre de Sacy (see his [1799]).} While the
Sirr still continues to puzzle historians, certain facts about it have been conclusively

\footnote{162 Kraus [1942-3], II, pp330-331.}
\footnote{163 This work entitled Kitāb Mizān al-Ḥikma (Book of the Balance of Wisdom) has been
thoroughly studied by Khanikoff [1860].}
\footnote{164 See Khāzīnī's text in Khanikoff, op. cit., pp12-13.}
\footnote{165 For example, the notorious question of Jābir's familiarity with the Arabic translation of
PsPlutarch's Placita philosophorum has not been investigated here. But this is a complex matter and would
have involved an inappropriately lengthy digression. Besides, a consideration of this question does not seem
necessary for the point of the argument.}
\footnote{166 For a fuller discussion of Balīnās see "Commentary and Notes" below.}
\footnote{167 The inaugurator of modern researches into the Sirr was Sivestre de Sacy (see his [1799]).}
established by Ruska, Plessner, and, above all, Kraus himself: (i) The Sirr shares with the Syriac Book of Treasures (in Arabic, Kitāb al-Dhakhā’ir) of Job of Edessa (Ayyūb al-Ruḥāwī, d 220/835) a problemata physis source; (ii) its longer version (and this is the version used by Kraus) includes extracts from the book De natura hominis (in Arabic, Kitāb fī Ṭabī’at al-Insān) of Nemesius of Emesa (composed c 400 AD); (iii) it shares some material with the Arabic Hermetic treatise Iṣṭimāṭis and (iv) it contains the first occurrence of the tabula smaragdina (al-lawḥ al-zumurrud) which is also found in the Secretum secretorum (in Arabic, Sirr al-Asrār) of ps Aristotle.

When was the Sirr written? The dating of this text is an involved problem to which Kraus had a simple answer. After a rigorous discussion of Jābir’s debt to the ps Apollonius literature, Kraus brought to light a passage in a writing of the Ismā’īlī agent Abū Ḥātim al-Rāzī (d 322/933) in which he found the key. In his Kitāb A’lām al-Nbuwwa (Book of the Signs of Prophethood), Abū Ḥātim reports a debate between himself and the alchemist Abū Bakr al-Rāzī during which he is asked about the author of the Sirr. Abū Ḥātim replied that the book was written at the time of Caliph al-Ma’mūn who reigned from 198/813 to 218/833. Kraus felt that this dating is acceptable because other indications were apt to confirm this. Now he had found a terminus post quem for the Jabirian corpus.

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168 Ruska [1926].
169 Plessner [1927]; [1931].
170 Kraus [1936]; [1942-3], II, pp270-303. The summary that follows is largely that of Zimmermann [1981].
171 Cf Burnett [1986].
172 The Tabula appears in Jābir’s third Uṣṭuquss and in the Kitāb al-Ḥayy (Book of the Living One, Kr 133). Cf Manzalaoui [1974]; Ulmann [1972], p171.
173 Kraus [1942-3], II, p270ff.
174 Ibid., p275, Kraus translates the passage in n2.
175 Ibid., I, p LVIIL.
Once again, one obscure issue is being explained by another which happens to be just as obscure. To date the Sirr we first have to date (a) the Arabic translation of Nemisius' De natura hominis, and (b) the compilation of the Hermetic treatise Istimātis. But neither task has been accomplished. As for (a), the standard translation of Ishāq ibn Hunayn could not have been available at the time of al-Ma'mūn, since the translator was two years old when the Caliph died. Besides, a comparison of the text of the De nat. hom., as it appears in the Sirr, with that of Ishāq’s translation shows the archaic nature of the former's terminology and style.\textsuperscript{176} This means that we have to presuppose an earlier translation - this has not been discovered. But more serious is the problem concerning (b): Istimātis still remains undated.\textsuperscript{177}

A significant progress towards the dating of the Sirr has recently been made by Ursula Weisser who has made available to us for the first time a critical edition of the text.\textsuperscript{178} An important discovery of Weisser is that there exist two extant versions of the Sirr: a short version, which she calls A, and a longer version, styled B. Weisser believes that A was translated from a Greek original in the 2nd/8th century, and it antedates B. Now, Kraus knew only the longer version B, and the text which Abū Ḥātim refers to is also, in Weisser's view, the same version B.\textsuperscript{179}

Weisser's conclusions have not gone unchallenged.\textsuperscript{180} But since the publication of her work, one fact has been established: the dating of the Sirr suggested by Kraus is seriously problematic, and his late dating of the Jabirian corpus based on that of the former is equally problematic.

\textsuperscript{176} Weisser [1979], Arabic Section, p13; Weisser [1980], p54,64,68.
\textsuperscript{177} See for example Zimmermann [1981], p440.
\textsuperscript{178} Weisser [1979].
\textsuperscript{179} Weisser [1979], Arabic Section, pp12-18; Weisser [1980], pp1-70.
\textsuperscript{180} Zimmermann, op. cit., pp439-440.
The Present Work

As early as 1929, Julius Ruska had proudly made a resounding declaration. "After so many errors, oscillations and reverses", he wrote, "the Arabic Jābir Problem has [at last] been brought to a satisfactory solution". It now seems that Ruska's sense of triumph was much too premature. Even the grand work of Kraus only throws into sharp relief the fact that we know so little as yet about the contents of the Jabirian texts on the one hand, and about the 2nd/8th century intellectual history of Islam on the other, that any solution proposed is bound to remain highly precarious.

Kraus' thesis, or, in other words, his solution of the Jābir Problem, cannot be taken to be faultless and critically established. His work is a milestone, but not the destination; he helps us formulate our questions, but does not provide incontrovertible answers. Indeed, our preliminary criticism of Kraus leads to the conclusion that it is a better strategy for the moment to place in abeyance the question of the authorship and the dating of the corpus, and to invest our energies into critical studies of Jābir's writings themselves. And, at the same time, to investigate further the scientific and philosophical climate of the century in which the alchemist allegedly lived.

About the texts of the Jabirian works our knowledge is painfully lacking. There exist literally hundreds of manuscripts of these writings in various libraries of the world lying unread and unstudied. To be sure, this is a lacuna not only in the Arabic Jābir Problem, but also in the Latin Geber issue, a handicap both for the Latinist as much as it is for the Arabist: we now accept that Geber is not to be identified with his Arab namesake,

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181 Ruska [1929] (the citation is from the reprint [1937], p310).
182 This is what Netton has so successfully done with the analogous case of the Rasā'il of Ikwān al-Ṣafā' (see Netton [1982]).
but we also know that the ideas of the author of the Geberian texts were not altogether independent of Arabic alchemists, and these ideas display also a dependence on Jābir.\footnote{Newman [1985] points out that the Geberian Summa presents three principles of metals - sulphur, mercury and arsenic. As to the third principle, he says that he has "not been able to locate it in the well-known Arabo-Latin texts" (p85, emphasis added). This is a cautious statement, for we have on the other hand the uninvestigated testimony of Holmyard: "Several of [Berthelot's] conclusions have been proved to be incorrect, notably his statement that Jābir does not admit arsenic as a third constituent of metals" (Holmyard [1924], p497).}

What is the nature of this dependence? And how was Jābir appropriated in the Latin West? We know too little about Jabirian texts to answer these questions satisfactorily. In fact, even those works of Jābir which are known to, or strongly suspected to, exist in mediaeval Latin translations largely lie unexamined.\footnote{As early as 1922, Holmyard had identified a number of Latin manuscripts as mediaeval renderings of Jabirian treatises (Holmyard [1922]). And these were in addition to the two translations with which modern scholarship is familiar, namely, Liber Misericordiae = Rahma, Darmstaedter ed [1925], and Liber de septuaginta = LXX, Berthelot ed [1906]. But, as the following critical survey will show, over the last 70 years very little attention has been paid to Holmyard's suspicions:}

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\begin{itemize}
  \item i) Kitāb al-Mawāzin = Liber de ponderibus artis in Borellius, Bibl. Chim., Paris 1654, p103. This has not been been investigated.
  \item ii) Kitāb al-Mulk (Book of the Dominion, Kr 1985) = Liber regni of Geber in Borellius, loc. cit. There is a complication concerning this title: Ibn al-Nadim quotes Jābir as saying, "I composed a book known as the Books of MLK [transliterated without supplying vowels]". (See text in Flügel [1871], p 359). Indeed, there are two Jabirian texts with the same title, one was published by Berthelot, [1893], III, the other by Holmyard himself, ed [1928], p161. In both cases, Holmyard reads MLK as 'mulk' (dominion), whereas Kraus reads the word in the latter case as 'malik' (king). Thus, in Kraus [1942-3], the former, i.e., the Kitāb al-Mulk is part of the Five Hundred Books (Kr 454), and the latter, i.e., the Kitāb al-Malik (Kr 1985) is grouped among those individual treatises of the Jabirian corpus which chronologically come towards the end. Now, since Holmyard does not distinguish between the two titles, it is not clear with which of the two he is identifying the Latin work. This whole matter remains uninvestigated.
  \item iii) Kitāb al-Mujarradat (Book of Extracts, Kr 63-64) = Liber Denudatorium quoted in De aluminibus et salibus of pseudo al-Rāzī. This has been verified by Ruska [1935].
  \item iv) Kitāb al-Thalāthīn Kalima (Book of Thirty Words, Kr 125) = Liber XXX verbis, anonymous, appended to Liber de septuaginta in the British Museum, MS Arundel 164. This is a correct identification, but neither text has been critically studied. Cf Kraus [1942-3], I, p42.
  \item v) Kitāb Khamsat ʿAshara (Book of Fifteen, Kr 137) = Liber XV ascribed to Geber in the Trinity College Cambridge Latin MS 1363 f137v-f 140v. This equivalence has been recognized by Kraus ibid., p48, but no further studies have been conducted.
  \item vi) Kitāb Musḥbḥat Suqrāt, (Book of Emendations of Socrates, Kr 204) = Ad laudem Socratis dixit Geber Bodleian MS Ashmole 1416, f148. Holmyard was somewhat doubtful about this equivalence. The Arabic text is no longer extant, but Jildātī's Nihāyat al-gīlah (End of the Search) contains an extract in Cairo MS Tābiʿīyat 114, f47. However, the manuscripts remain uninvestigated.
\end{itemize}
introduces gaps in our understanding of Geber, and ultimately, of the Chemical Revolution. The pages that follow constitute a modest step towards supplying this deficiency.

But one cannot study Jābir's texts in total isolation from their milieu and without making some presuppositions concerning their historical period. This is the reason why the vexed question of the authorship and dating of the Jabirian corpus is relevant, for it governs in most fundamental ways the historian's very approach to these writings. Concerning this question, which is here demonstrated to be unresolved, the present work takes a position of considered and systematic indifference.

In carrying out a critical study of one the most important and difficult treatises of the entire Jabirian corpus, the primary aim of the work is to understand Jābir in his own terms. That is, to identify certain fundamental notions of his system, and, then, to examine how these notions operate within the internal perspective of his scientific and philosophical doctrines. But to make sense of Jābir's ideas, and to reconstruct their historical and conceptual framework, the present work seeks illumination essentially from those doctrines and writings which are known to have come into existence by the 2nd/8th century, and which could have been, in principle, available to an author of this period. For Kraus, and, indeed, for the vast majority of contemporary scholars, this would constitute only a subset of the sources available to Jābir, for Sezgin and Holmyard, this is the entire set. But such an approach impinges upon the views of neither school, and an indifference is maintained.

vii) Kitab Sharh al-Majist (Book of Comment on Almagest, Kr 2834) = Comment on Ptolemy. tr Gerard of Cremona, MSS Corpus Christi College Oxford 233, f32-f67; Bodleian Ashmole 357, f97-f 78v; Cambridge University Library Mm II, 18, f2- f49, and li 1, 13, f58v- f60. The Arabic manuscript is lost.
viii) Kitab al-Usul (Book of Roots, Kr 412-413] = Liber radicum. With the assistance of the present writer, this was actually discovered and verified in 1985 by William Newman (see Newman [1985a]).
CHAPTER II
RECONSTRUCTING THE CONTEXT OF JĀBIR'S KITĀB AL-AḤJĀR:
SUBSTANCE, QUALITIES AND THE SCIENCE OF BALANCE

By the time Islam emerged on the world scene, the two towering giants of Greek philosophy, Plato and Aristotle, had been blended into Neoplatonism. In fact the marriage of the two sets of ideas had already been consummated when Porphyry (d 309 AD) made it a philosophical orthodoxy that Plato and Aristotle were in agreement. Islam found itself heir to an Aristotle soaked in Neoplatonism both of the pagan Athenian as well as of the Christian Alexandrian kind, and inherited both the debates as well as the commentatorial preoccupations of the two schools.

1 Appendices which immediately follow chapters II and III contain Arabic quotations which form an integral part of some of the footnotes below. The numbers that precede these quotations denote the footnote to which they attach.

2 Muslim philosophers in general espoused this dogma, with al-Fārābī devoting to it a whole treatise, namely Kitāb al-Jam‘ bayna Rā‘y al-Hakīmīn Aflāṭūn al-Jābi wa Aristotēlis (Harmony between the Views of the Two Philosophers, Plato the Divine and Aristotle). See Waltzer, s.v. “al-Fārābī”, [El2], II, p778; Mahdi [1962].

3 It should be added at once that Neoplatonism, or even Hellenism in general, was not the only mode of thought inherited by Islam from the ancient world. When Alexandria fell in 21/641, the Arab conquest of the Near East was virtually complete, and with this came the legacy of many Hellenized centers of learning that had flourished in the first six centuries of the Christian era, and where many indigenous ideas had been integrated with the Greek tradition. But in 47/667, the Muslim armies crossed the river Oxus, and by 95/713 Sind and Transoxania had come within the expanding fold of Islam. And on the Western side, 'Abd al-Rahmān I had inaugurated his Andalusian Umayyad dynasty in the 3rd decade of the 8th century. Thus there was, in fact, more in the Arab booty than the Hellenistic legacy of the Near East. Ruska, for example, points in his [1926] to Central Asia as an important locus for the role it played in integrating and transmitting the human cultures of the West, East and South. And, singling out Harrān (class. Carrhae), Kraus had identified the Sabians as a group which seemed to have served as the agency for the transmission to Islam not only of Neopythagorean, Hermetic and Gnostic doctrines, but also of indigenous Chaldean 'Nabatean' notions, and certain characteristically Chinese ideas and things. (See Kraus [1942-3], II, p 305 ff).

To be sure, Jābir himself displays a great deal of eclecticism, and it is not at all clear what his immediate and specific sources are. However, as far as his cosmology is concerned, a Neoplatonic substratum is its most striking feature, and it is this feature which provides the perspective in which his cosmological doctrines are here being examined. But this is not to say that Jābir is a Neoplatonist.
In the hands of the Neoplatonists, Aristotle underwent a drastic transformation. Thus, for example, his (prime) matter, which he had defined negatively as an abstraction which can only be arrived at by thinking away forms, became extension (diastema) in Simplicius (wrote after 529 AD). In John Philoponus (Ar. Yahyā al-Nahwī, d 570s AD), it became "the three dimensional". This had the anti-Aristotelian effect of making matter, the 'first subject' (hupokeimenon prōton) of properties in bodies, concrete and knowable. For Aristotle it was neither concrete nor knowable in itself: matter was known only by analogy.

Jābir goes one step further. First, despite Aristotle's warnings to the contrary, he confounds matter and substance, thus rendering matter a 'this something' (tode ti); he then makes the four primary Aristotelian qualities (hot, cold, moist and dry) concrete, independent and corporeal entities. For Aristotle, we recall, qualities were forms, and were in themselves no more than logical abstractions. However, Jābir here makes a Neoplatonic compromise: his substance, as well as his four qualities, still remained incorporeal in the intelligible world. It was only in the natural world that he endowed them with corporeality. He thus bridged the gap between Plato and Aristotle much in the Porphyrian spirit. But all these observations must now be examined in detail.

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4 The expression Protē hulē (primary matter) is very rarely used by Aristotle. See Ross [1923], p73, 168.
5 "Apophasei deloutai", Aristotle Metaph. 10.8, 1058a 23.
6 See below.
7 Simplicius in Phys. 229, 6; 230, 19-20, 26-7; 623, 18-19 etc. See Sorabji [1988], p7.
8 "The thing in bodies which is independent (authupostata) [of any substratum] ...is the indefinite three dimensional which is the ultimate subject (eskhaton hupokeimenon) of everything". (De Aeternitate Mundi contra Proclum 405, 23-7, qu. Sorabji, op. cit., p29).
10 "Agnōstos kath' hautēn" (Arist. ibid., 7.10, 1036a 9-10).
11 Arist. ibid., 7.3, 1029a 28.
12 Arist. Phys. 1.1, 190a-b; 191b.
Let us begin with the question of historical evidence supporting this filiation of ideas. To what extent is Jābir familiar with Aristotle and his commentators? As for Aristotle, the evidence is overwhelming and unmistakable: Jābir seems to know almost the entire scope of his writings. Of his familiarity with the *Physica* (Kitāb al-Kiyān/Samā' al-Ṭabī'ī) and the *Categoriae* (Kitāb al-Maqālāt/ al-Qāṭīghūriyyās) we already know.\(^{13}\) But Jābir also refers to several other components of the *Organon*,\(^{14}\) and mentions, quotes, or paraphrases, *inter alia*, the *De coelo et mundo* (Kitāb al-Samā' wa'l-'Ālam),\(^{15}\) the *De phaenomenis meteorologicis* (Kitāb al-Āthār al-'Ulwiyya),\(^{16}\) the *De generatione et corruptione* (Kitāb al-Kawn wa'l-Fasād),\(^{17}\) and the *Metaphysica* (Fī mā Ba'd al-Ṭabī'a).\(^{18}\) He also knows several works of the greatest proponent of Aristotelianism, Alexander of Aphrodisias (fl c 205 AD),\(^{19}\) besides referring to his commentary on Aristotle's *Topica* (Ṭūbīqā).\(^{20}\)

The independent Aristotelian commentator Themistius (fl late 340s-384/5 AD) is known to Jābir too. "Aristotle says in his *Physica* that form is the completion and perfection of motion (tamām al-ḥaraka wa kamāluha'ī)," writes Jābir in the *Kitāb al-Bahīth*, "- this is what Alexander had reported in his *Risāla* (Epistle). The same was reported by

\(^{13}\) See the "Introduction" above.

\(^{14}\) In the *al-Mawāzin al-Saghir*, for example, Jābir refers to the *Categoriae*, *De interpretatione*, *Analytica priora*, *Analytica posteriora*, and the *Topica*. See Berthelot ed [1898], III, p107ff.

\(^{15}\) For example, in the *Bahīth*, qu. Kraus [1942-3], II, p322, n1.

\(^{16}\) *Bahīth*, qu. Kraus, ibid., p323.

\(^{17}\) For example in the *Tasrif*, Kraus ed [1935], p394-7.

\(^{18}\) *Bahīth*, MS Jārullāh 1721, f31a; 36a, 80a. See Kraus [1942-3], p323.

\(^{19}\) In the *Bahīth* he mentions the *Kitāb al-Nafs* (Book of the Soul); a *Kitāb/Maqāla fil-'Ināya* (Book of/Discourse on Providence); the *Kitāb al-'Aql wa'l-Ma'qūl* (De intellectu et intellecto); a refutation of Galen's *Kitāb al-Muharrak al-Awwal* (Book of the Prime Mover) which the Arabic tradition attributed to Alexander (see Pines [1937], p73); and a *Risāla* (Epistle) without a particular title. See Kraus [1942-3], II, p324-5.

\(^{20}\) *Bahīth*, MS Jārullāh 1721, f38b. See Kraus, ibid., p320, n2.
Themistius in his commentary on the Physica. As for Themistius, he censured the philosophers in his Risāla on the 'Book A' of the Metaphysica... Concerning Jābir's direct knowledge of the Neoplatonists, the matter is somewhat problematic. In several works, he refers to Porphyry, and in the Kitāb al-Tājīf he quotes this pagan Neoplatonist frequently and extensively. But it is not clear if Jābir had access to any of his genuine texts, or if he did, which ones. In the Tājīf, a Kitāb al-Tawḍīdat (Book of (Artificial) Generation) of Porphyry is cited, but this is very likely a spurious text, although the ideas which Jābir attributes to him could well have been derived from some earlier Porphyrian works such as the Philosophy of Oracles or the Letter to Anebon. Porphyry also appears in the Jabirian corpus as an alchemical authority along with such figures as Zosimus, Hermes, Pythagoras, Democritus, Aristotle etc. In the Kitāb al-Sīr al-Maknūn (Book of the Hidden Secret, Kr 389-391) Jābir gives an account of the classification of spirits according to several historical personages of the antiquity Porphyry is among them. The same is true of Simplicius, he too is referred to in an alchemical context. But as for Simplicius' arch enemy Philoponus, he is not mentioned by Jābir, nor is Porphyry's teacher Plotinus (generally referred to by the Arab writers as

21 Bahth, f166a, qu. Kraus p321, n2.
22 Bahth, f48a, qu. ibid., p323, n8.
23 Kraus ed [1935], 361:17; 362:12; 363:3; 364:3; 373:3 etc.
24 Ibid., 364:3-4.
25 Porphyry's correspondence with Anebon leaves many traces in the Arabic tradition. For example see Ibn Nadim, Flügel ed [1871], 300:17; al-Mas'ūdī, Kitāb al-Tanbih, Carre de Vaux tr [1896], p222. Cf Kraus [1942-3], II, p127ff and Sezgin [GAS], IV, p163.
26 For example in the Mujarradat, MS Jārunāṭ f247b; Kitāb al-Nuḥās (Book of Copper, Kr 949), MS Paris 5099, f35a. See Kraus [1942-3], II, p30, 114.
28 In the al-Sīr al-Maknūn. See Kraus [1942-3], I, p94.
al-Shaykh al-Yūnānī, d 260 AD). Likewise, the name of Proclus (d 485 AD) is nowhere to be found in the Jabirian corpus.

However, from a substantive, philosophical point of view, Jābir's cosmological doctrines betray not only a marked influence of Neoplatonism, but, as we shall see, even a continuity with that mode of thought. For one, the theory of emanation and hypostases, which form the cornerstone of Neoplatonism, is accepted by Jābir as a given, without any criticism as to its metaphysical justification. Furthermore, there are several historical reasons which suggest that it is more natural to assume that Jābir was familiar with Neoplatonic ideas, than to do otherwise. These ideas had reached the Arabic tradition at an early date, having been received, orally or textually, from the existing Hellinized Syriac intellectual culture. In fact, there exists in Arabic a whole series of early fragments ascribed to the founder of Neoplatonism, Plotinus, and it so happens that "the Greek work whose impact was most decisive on Arabic philosophical thought [sc. falsafa]" is an apocryphal text derived from the same 'Shaykh'.

This is the well-known Theologia Aristotelis (Uthulûjiyya) whose ultimate substratum is Plotinus' Enneads iv-vi in Porphyry's arbitrary arrangement. But this work of ps Aristotle includes also parts of Proclus' Elements of Theology and some metaphysical doctrines of Alexander of Aphrodisias. The Theologia has been described as the epitome

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29 See Wright [1894]; Duval [1899]. It is now generally accepted that the Arabic translation of Porphyry's Eisagôgê was the first entry of Aristotle into the Muslim world (see Peters [1968], p11). The MS Beyrouth, Univ St Joseph 338, names Ibn al-Muqaffâ' (d 143/760) as the translator, and this is accepted by Furlani (see his [1926]). In his [1965], Richard Frank has attempted to show that Neoplatonism had reached Islam as early as the first half of the 2nd/8th century: he talks about the Neoplatonism of Jaḥm ibn Ṣafwân, an early mutakallim who died in 129/746. (But see Zimmermann [1986] in which Frank's conclusions have been challenged).

30 See Rosenthal [1952]; [1953]; [1955]; Badawi, ed [1955].

31 Fakhry [1983], p19.

32 Zimmermann, op. cit., p113, 134.
of Neoplatonism as it strove in Hellenistic times to blend together all the elements generated during the period of greater activity,\textsuperscript{33} and it made an appearance in Islam quite early. The question of the exact dating of the Arabic version of this text is, however, still not quite settled yet,\textsuperscript{34} but we shall let that pass. For our purposes, we have sufficient evidence to assume at least an indirect knowledge of Neoplatonists on the part of Jābir.

Substance and Matter

According to one explication of the notion of substance which Aristotle provides in the \textit{Categoriae}, his substance in the primary and strict sense of the word denotes the being of every concrete, individually existing thing: this table, this tree, Socrates. It is the first and most fundamental mode of being or category essentially distinct from nine others (quality, quantity etc) all of which express accidental mode of being. "That which is called substance most strictly, primarily and most of all - is that which is neither said of a subject nor in a subject, e.g. the individual man or the individual horse."\textsuperscript{35} Further, "every substance seems to signify a certain 'this'..."\textsuperscript{36} The idea is again elaborated in the \textit{Metaphysica}: "Substance... is not predicated of a subject, but everything else is predicated of it.”\textsuperscript{37} Thus, Socrates is a substance, this one here, an \textit{esse per se}. His being an Athenian (quality), his stature (quantity), his being a son of Sophroniscus (relation) - all these are predicated of him, but he is predicated of none of these: these are all \textit{esse per aliud}, accidents of the substance Socrates.\textsuperscript{38}

\textsuperscript{33} See Duhem [1953-59], IV, p325.
\textsuperscript{34} The latest extensive examination of this question is due to Zimmermann, op. cit.
\textsuperscript{35} Arist. \textit{Categ.} 5, 2a11-15.
\textsuperscript{36} Arist. \textit{Categ}. 5, 3b10-13.
\textsuperscript{37} Arist. \textit{Metap.} 7.3, 1029a8-9.
\textsuperscript{38} Arist. \textit{Phys.} 1.7, 190a-b; 8, 191b.
But, then, is substance not the ultimate subject of all properties of a body, itself predicated of nothing? Aristotle would answer that it is not quite true to say that substance is predicated of nothing: substance is predicated of a 'this', for we meaningfully say, 'this is a substance'. Thus substance itself needs a subject, a subject "made definite" by accepting a form, becoming differentiated and individualized. And this ultimate or first subject (hupokeimenon prōton) is matter (hulē). Aristotle warns that matter is not to be confused with substance: "It has now been stated...what substance is: it is not predicated of a subject, but everything else is predicated of it. But we must not merely put it like that, for that is not enough. The statement is not clear and further [sc. on this view] matter becomes substance...

"By matter I mean that which is not in itself said to be a given anything, nor of a given quantity, nor characterized by any of the other categories that define being. For there is something of which each of these is predicated, and its being is different from that of the predicates. For the rest are predicated of substance, and substance of matter, so that the last thing [sc. matter] is in itself neither a given any thing, nor of a given quantity, nor anything else...

"So for those who think of things from this point of view, it turns out to be matter that is substance (ousia). But this is impossible, for separability and being a 'this' are thought be special characteristics of substance." In the same passage just quoted, Aristotle makes it plain that matter was only an abstraction and could be reached only by means of a thought experiment: one was to take a body and in one's thought strip away all its properties (colour, taste, smell, length,

40 Arist. Metap. 7.3, 1029a2, see below.
41 Arist. Metap. 7.3, 1029a6-29.
breadth, depth etc) to reach the ultimate subject underneath. Through this thought experiment, one distinguishes between the sum total of properties making this body what it is, and that which by its properties is made into this thing. The latter is matter, while the former is form. "Aristotle would insist that the separation here is separation only in thought. There is no suggestion that the first subject could ever exist without having properties [or, conversely, that properties could exist without a subject]. The idea is only that one can think of the first subject without thinking of the properties that it undoubtedly has." 42

Aristotle’s idea of matter proved elusive. When all properties of a body are stripped away, what is left? Plotinus called it a "mere shadow upon shadow". 43 Jabir declared it as "nonsense". 44 Like Descartes’ mind, there was no language to talk about matter, except by analogy. And there were internal problems too. Prime matter was imperceptible, 45 and it was thought of as a potentiality, having the capacity to receive forms. But this very capacity to receive forms is an inalienable property, so matter could not after all be conceived without at least this property attached to it - but, if this is the case, then matter is no longer unanalyzable. 46 Small wonder that Philoponus dispensed with it as something useless and impossible, and replaced it with three dimensional extension. 47

42 Sorabji, op. cit., p5.
43 Plotinus 6.3.8 (34-7), qu. Sorabji, op. cit., p45.
44 This comes from the Ahjar. See the full quotation in the immediately following paragraph.
46 There were other problems too. For example, Aristotle says in the De Coelo that one must suppose as many distinct species of matter as there are bodies (4.5, 312b) - in other words, matter is differentiated! Perhaps these were the considerations that led some scholars to deny that Aristotle believed in prime matter at all. See, for instance, King’s [1956] which has the title "Aristotle without Prime Matter"; also Charlton [1983].
So bothersome was the idea of prime matter for Jābir that in the Ahjār he wrote a whole critique of this elusive entity, ruthlessly censuring those who postulate it:

[You believe that] it is not a body, nor is it predicated of anything that is predicated of a body. It is, you claim, the undifferentiated form of things and the element of created objects. The picture of this [entity], you say, exist only in the imagination, and it is impossible to visualize it as a defined entity...

Now all this is nonsense! 47a

And, concerning the theory that natural objects arise out of a prime matter which is not only "eternal and indestructible, [but also] devoid of all natural and fabricated acts", Jābir says:

Philosophers dismiss this theory, and they deny the existence of prime matter. To support [their idea] of an object devoid of all acts, they [sc. the upholders of this theory] have been able neither to offer a proof of what they claim, nor to establish it by an indirect demonstration. 47b

So Jābir too dispensed with matter, but he did what Aristotle had dreaded. Substance was for Aristotle the subject of nine categories of being, while matter, in turn, was the subject of substance. Jābir's substance (jawhar) needs no subject: it is the first subject. The alchemist thus identifies one with the other. Aristotle, we just saw, had declared this confounding "impossible". And confounding it indeed was, for Jābir' jawhar has the attributes both of Aristotle's matter, as well as his substance.

On the one hand, the Jabirian substance was simple (basīt) and unique (wāhid), capable of receiving all forms, and belonging to all natural, perceptible things:

Substance is that which has the capacity of receiving all things [sc. all categories of being]. It is in everything, and everything arises from

47a Edited text 38:11-16.
47b Edited text 42:3-5.
it, and everything reverts to it. 48 This is how the Most High Creator, our Lord, has made it and placed it in everything. Everything is derived from it. 49

Indeed, substance (jawhar) is what some people called havûla (hulê):

It is the jawhar from which arises ...the constitutive frame of this world. A group of people call it havûla. 50

Sometimes the term 'fifth principle' is applied to it:

The four natures [sc. hot, cold, moist and dry] are the principles of everything. To these natures there is a fifth principle, namely: the simple substance (al-jawhar al-basî), called havûla. 51

In fact, Jâbir uses a number of familiar terms synonymously to designate the same entity. Thus, criticizing the doctrine of the Šâbians in the Ahjar, Jâbir has in a single passage three different appellations:

[They say that] the first...stage [in the formation of bodies] is tîna 52...
[According to them, when] we see water turning into fire, the same jawhar, which was the carrier first of the qualities and dispositions of water is the carrier now of the qualities and dispositions of fire...
Therefore, [they believe that] the eternal havûla is one and the same. 53

48 In the Ahjar, Jâbir criticizes the Šâbians for rejecting the idea that bodies ultimately returned to jawhar: "What harm do you see in saying that things will return to that which happens to be indestructible?". (Edited text 41:5-6).
49 al-Miżân al-Šaghîr. Kraus ed [1935], 428:8-10. See Arabic text in the "Appendix".
51 Sabînî. ibid., 482:5-6. See Arabic text in the "Appendix".
52 Literally 'clay'. This term is sometimes employed by the Muslim atomists (see Pines [1936], p39; al-Jâhîz, Kitâb al-Hayawán, VII, 5, 'Abd al-Salâm Hârûn ed [193842]), al-Maqdîsî says that "jawhar is called tîna, madda, havûla, juz', [etc]" (Huart ed [1899-1919], I, 39). Kraus gives a highly learned account in his [1942-3], II, p171, n1.
53 Edited text, 38:11ff.
If Aristotle had been among Jābir’s audience, he would have simply said that the
alchemist is in fact talking about the first subject of properties in bodies, namely matter. He
uses different terms to denote the same entity, but this can be condoned as mere verbal
vacillation. But then, Aristotle would soon find Jābir totally estranged. For, on the other
hand, Jābir’s substance exists independently, it is concrete and differentiated, and - as far
as the natural world is concerned - it is visible, though not corporeal in itself. Let us see
how this comes about.

In Jābir’s cosmology the universe is presented as a hierarchy of concentric spheres
(aflāk, sing. falak) lying under the three Plotinian hypostases, the First Cause
(= Demiurge-Creator, al-Bārī), Intelligence (al-‘Aql), and Soul (al-Nafs). The first
sphere under the third hypostasis, which is often represented as a circle, is the one which
embraces our world: “This circle is the Supreme Luminous Sphere, namely the one which
embraces the world in which we are.” In fact, this Supreme Sphere, which is identified
with the Ether, and which forms the boundary between the three hypostases and the
natural world, is the World of Substance (‘Ālam al-Jawhar).

In this Supreme Sphere a cosmological process comes to pass which makes
substance visible, endows it with a form and a distinct colour:

As for substance, God bless you, it is the thing by which the
interstices are filled (al-mamlū bihi al-khalal). It is capable of taking any
form. Everything is in it, everything is constituted out of it, and everything
dissolves back to it. If this account does not enable you to understand what
substance is, then [let me explain further that] it is the dust (al-habā), and
its colour is somewhat white. And when the sun radiates on it, it becomes

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54 A detailed account appears in the Tashiff, Kraus ed [1935], 392-424.
55 Ibid., 412:14-15. See Arabic text in the “Appendix”.
56 Ibid., 413:11.
57 Ibid., 408.
inflamed and visible. Thus you ought to know that it is the mass (jîrm) of the Supreme Luminous Sphere, may its Creator be praised, and His name hallowed. This is the body which is in all three kingdoms of nature, namely animals, plants and minerals.\(^{58}\)

At another place, the diffuseness of substance, which is indicated by its identification with dust, is categorically stated:

Substance is diffused dust (al-habîb al-mantîr)\(^{59}\).

With their corpuscularian suggestions, these assertions of Jâbir are so remarkable that they deserve a separate study in their own right. However, restricting ourselves to a narrower perspective, we note that our author, in terms of his general approach, continues to operate from within a Neoplatonic mode of thought. He says that substance is what fills up the interstices, the unoccupied space between physical objects. He then equates substance with diffused dust. One can argue that Jâbir is here prompted by the same considerations which had led Simplicius to identify Aristotle's first subject with extension. In fact, at one place Jâbir does, indeed, visualize substance as empty space.\(^{60}\) And the similarity is deeper: for Simplicius had persistently stressed the diffuseness of extension which put it at the opposite of the unity of the One.\(^{61}\) Evidently, Jâbir lacks the

\(^{58}\) al-Mîzan al-Saghir, Kraus ed (1935), 429:3-9. See Arabic text in the "Appendix".

\(^{59}\) Târif, ibid., 407:14. Jâbir here quotes a verse of the Qur'ân in which this phrase occurs (Sûra al-Furqân, 23).

\(^{60}\) Plato had introduced the idea of the 'Receptacle' in Timeus 48e-53c, which he identified with space (khôra). He viewed space as a receptacle which receives qualities, and these qualities were copies of Forms. This idea had inspired, both in the Greek as well as Arabic traditions, the identification of matter with some kind of a qualityless extended entity. Indeed, Simplicius refers to Plato's Timeaus, and we have in Arabic a text entitled "Naql Aflatûn" (Transmission of Plato, MS Berlin 5031) in which hûlû (hayyîla) is explicitly identified with space (al-Makân): "In the Timeaus he [Plato] said that hayyîla and balad (lit. geographical space) are one and the same thing. And since hayyîla is balad, and balad is space (al-Makân), what Plato inevitably means is that the intellect is the space for the natural forms...Space does not have a shape or figure, and is without qualities..." (See Arabic text in the "Appendix"). For an excellent account of Simplicius see Sorabji, op. cit., p3-21. For Jâbir's (analogical?) identification of jawhar with empty space see below.

\(^{61}\) Simplicius (in Phys.) calls matter an extremely diffuse material dimension. (Qu. Sorabji, op. cit., p34, see also p17 and 21). Matter was an "indefinite diffusion" (Khusis aoristos). It was also a source
philosophical sophistication of Simplicius, and does not offer any arguments for a metaphysical justification of his cosmology, nor is he consistent - but he does seem to be reflecting the concerns of his Neoplatonic predecessor.

Plotinus, we recall, had taught that in the hierarchical descent, One (*to hen*) → Intelligence (*nous*) → Soul (*psychē*) → Matter (*hulē*), each intermediate step has something of those on each side of it. Jābir's Supreme Luminous Sphere also shows an intermediate character appropriate to the place halfway between the intelligible and the material world: this is the place where it lies, serving as the link between the first three hypostases and the 'world in which we are'. The Supreme Sphere, which was the World of Substance, happened to be the last of the incorporeal, and, simultaneously, the first of the corporeal beings. By virtue of its incorporeality it was simple and uniform, in which the universal and the particular coincided; but at the same time it had certain features of corporeal bodies, for it had parts (*mu'allaf*), it took part in motion, and was subject to time and space.

The idea of habāʾ (dust) is particularly interesting here. What is habāʾ? Fakhr al-Dīn al-Rāzī tells us that it is "like the cloud of tiny particles (*ghubar*) which enters a small opening with the ray of the sun", and, Jābir explains, "it manifests itself to you of stretching, diffusion and indefiniteness. (Simplic. *in Phys*. 537, 22-538, 14; extensive quotations are to be found in Sorabji, op. cit., p3-21).

62 See Deussen [1911-1915], II, i, p497; Inge [1929], I, p189; II, p70; Whittaker [1918], p54f, 94.
63 *Tasrif*, Kraus ed [1935], 412:7-12. See Arabic text in the "Appendix".
64 Ibid., 412:16-413:1. See Arabic text in the "Appendix".
65 al-Mīzān al-Ṣaghir, ibid., 427:9-10. See Arabic text in the "Appendix".
66 *Tasrif*, ibid., 408:2-3. See Arabic text in the "Appendix".
67 For a comprehensive discussion of this term, see Kraus [1942-3], II, p154, n4.
68 *Maṣṭūḥ al-Ḥayb* ed [1308/1890], VI, p314.
(bayyin laka) when the sun shines on it."69 One gets the impression that Jabir is here groping for something incorporeal, yet familiar; an entity endowed with some attributes of material bodies, though not material in itself. The particles of dust must have seemed a good candidate for this intermediate status between the intelligible and the sensible. They became visible only in a ray of the sunlight, but remained invisible otherwise; they could not be held in the hand, nor could they be perceived by any sense other than the sense of sight. So substance:

It is not possible for anyone to perceive substance by the sense of touch. Even if someone comes into contact with it, he will not find it perceptible to touch. Nobody can handle substance by his hand...70

Moreover, sheer visibility does not endow corporeality. In explaining the generation of everything from the One, Plotinus had used the metaphor of light,71 conceived strictly as an incorporeal entity.72 Light was visible, but it was not corporeal; it made other things visible, but this was not an instance of material causation. Jabir's notion of the Luminous Sphere, his idea of substance becoming visible and acquiring a colour when the sun shines over it - all this is reminiscent of a Plotinian spirit.

Jabir's jawhar, as it existed Supreme Sphere, was not a body, but there it certainly turned into a 'this'- differentiated, independent, and visible. It was no longer Aristotle's matter, rather it was his substance. Again, this identifiaction of matter with substance is not without parallel in the Neoplatonic tradition. Philoponus, as we have noted, had identified Aristotle's 'first subject' with his indefinite three dimensional extension. But he had also

69 "Huwa bayyinun laka idhā tala'at 'alayhi al-shams." (Sah'a, Kraus ed [1935], 482:6-7).
70 Al-Mizān al-Saghir, Kraus ed [1935], 429:9-10. See Arabic text in the "Appendix".
71 Enneads, V, 1:6. (Henry and Schwyzer ed [1951-73]).
72 Ibid., IV, 5:6-7; Wallis [1972], p61.
called this first subject the form, differentia, essence, or essential attribute of body. But if the three dimensional extension is "the essence of body, then he [sc. Philoponus] is turning it into substance." As a matter of fact, he explicitly calls it substance: "The substance of the body is nothing other than the indefinite three dimensional." Moreover, in the contra Proclum Philoponus goes as far as to say that his indefinite three dimensional can be called body.

*The Four Natures (Ṭabā'i*)

Jābir has only a limited interest in abstract issues. He introduces them merely for a philosophical bolstering of his own cosmological and alchemical doctrines, and rarely offers logical arguments or proofs. The notion of substance is a case in point. He introduces it as a cosmological necessity, only to slip it into the background. As a practically minded alchemist, he did not have much use for substance: it was common to all things of the world, it was unique, and it did not admit of any alchemical operations.

Much more important from an operational point of view were the four Aristotelian elementary qualities. As a matter of fact, Jābir's theory of qualities forms the very core of his entire natural scientific system. "The whole of Jabirian science", wrote Kraus, "reduces itself to the theory of qualities, their place and their combinations." This is a penetrating observation and has to be taken very seriously. For if one keeps in view the central theme of the Jabirian system- namely to reduce all explanations of the natural world to an explanation of the four qualities- then the gains are many and with far-reaching

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73 Philoponus contra Proclum, 405, 24-7; 423, 14-424,11; 424, 24; 425, 5-6; 427,8.
75 Ibid., qu. p29.
75a Ibid., see the long list of textual references on p27, n29.
76 Kraus [1942-3], II, p151.
consequences. It is no small gain, for example, that when Jābir's scientific texts are studied in the context of this reductionism, they appear to bear a clearly recognizable doctrinal unity. In this way their notorious incoherence largely vanishes.

In developing his doctrine of qualities on clearly Neoplatonic lines, Jābir moves in a direction far removed from his Hellenistic predecessors. For, breaking with the tradition, he hypostasizes his four qualities. On the one side of the Supreme Sphere, as we have seen, lay the three Plotinian hypostases. But on the other side of it he now places what he calls the World of Simple Elements (‘Ālam al-‘Ānasir al-Baṣrīt) - significantly, the term 'simple elements' here denotes not the Empedoclean bodies but the four qualities, hot cold, moist and dry. The Supreme Sphere is represented by a circle, the World of Simple Elements is a smaller concentric circle inside it. Like substance, these qualities - or rather, simple elements - were incorporeal, but they were concrete, differentiated, and independently existing entities.

The idea of the Ṭaṣrīf to hypostasize the elementary qualities beyond their corporeal existence is not certified in the Neoplatonic tradition. On the contrary, the Hellenistic philosophers had read in the Timeaus that the Heaven was made of the four elements, and, in the world of Ideas, there existed some "absolute Fire, prototype of the material fire". Thus, essentially deriving from this doctrine, it was the four Empedoclean elements which the predecessors of Jābir had hypostasized, placing them in the intelligible world. Jābir accords this position to the qualities. And this means that the qualities, not the Empedoclean

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77 Ṭaṣrīf, Kraus ed [1935], 392-424.
78 "Then, let us visualize inside the Circle of Substance, another Circle whose size is unknown. This latter is the Circle of Simple Elements (dā’irāt l-‘ānasīr l-baṣrīt), namely hot, cold, dry and moist." (Ibid., 408:5-6).
79 For an extensive and rigorous account of Jābir's World of Simple Elements, see Kraus [1942-3], II, p135ff.
80 Tim., 51b8.
elements, were the true elements of the natural world. In the intelligible World existed not some "absolute Fire", but the incorporeal hot.

But how do these qualities manifests themselves below the sphere of the planets? How does the intelligible turns into the sensible, the incorporeal into the corporeal, and the simple into the compound? Jābir explain the formation of material objects in terms of the doctrine of progressive descent which is central to Neoplatonic metaphysics. At the root of the generation of the corporeal world lay the Desire (shahwa, shawq, tawqān) of the Soul which endowed substance with a formative power. At some stage in the complex hierarchy of concentric circles beneath the Supreme Luminous Sphere, the Soul also imparted to substance a geometric form, a figure which was necessarily spherical. Due to the Desire, this spherical substance attached itself to one of the four isolate qualities whence it became a corporeal body. This progressive organization of the material world has been explained, for example, in the Maydān al-‘Aql:

First, we visualize a region of space which is empty (bu‘dam mā lā shay‘a fihi).
Then, we imagine a substance which has acquired a form by virtue of which a figure has come to pass in it. This figure can only be spherical.
Next, [we visualize] that this mixture [substance + form] is attached to one of four isolate natures [sc. elementary qualities].

In Jābir’s cosmology, a whole series of circles are conceived as lying in a complex hierarchy under the Supreme Sphere, extending all the way down to the celestial world.  

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81 Kitāb Maydān al-‘Aql (Book of the Arena of the Intellect, Kr 362), Kraus ed [1935], 211:3; 212:4; 213:10, 11.
82 Ibid., 211:15; 213:11.
82a Ibid., 212:2
83 Ibid., 207:6-8. See Arabic text in the "Appendix".
83a See particularly Taṣrif, ibid., 392ff; al-Mizān al-Šaghīr, ibid., 425ff.
Inside the concentric circles representing the worlds of the four qualities, the Tasrif places another circle which after some hesitation is called void (khalā').\textsuperscript{83b} And this void is the place where, according to the al-Mizān al-Ṣaghīr, substance becomes differentiated (ḥast),\textsuperscript{83c} and it is here that the qualities attach to it.

This process has been described more fully in the Maydān al-‘Aql.\textsuperscript{83d} Thus, substance according to the Desire of the Soul passes through void into the world of elementary qualities, and here it is charged with different quantities of hot, cold, dry and moist. The manner in which substance mingles with the qualities is similar to that of "paste" (‘ajīn)\textsuperscript{83e} when soaked in wine, vinegar, honey etc. When substance takes a definite quantity of, say, hot, its capacity for absorbing other qualities is reduced.

Beneath Jābir's void, both substance and qualities were corporeal entities. All objects of the natural world ultimately arose out of the attachment of the qualities to substance, and this was a corporeal process. The variety of things in the our world was thus reducible to the variety of combinations and and the variety of quantities in which the qualities attached to substance. And in this way Jābir set out to explain the entire natural world in terms of his four natures.

The four qualities were the first simple elements (al-'anāsir al-basā'īt/al-basā'īt al-uwal) of all bodies. These were uncompounded entities (mufradāt) out of which the first

\textsuperscript{83b} Ibid., 411:16; 412:1.  
\textsuperscript{83c} Ibid., 453:2.  
\textsuperscript{83d} Ibid., 211:14ff.  
\textsuperscript{83e} This is reminescent of the ekmageion of Timaeus, 50c.
compound elements (al-murakkabât). Air, Water, Earth and Fire were formed, which latter he sometimes calls 'second elements' ('anâşir thawânin). Specifically, two of the qualities unite with substance to form one of the four Empedoclean elements. Thus, Fire = hot + dry + substance; Earth = cold + dry + substance; etc. Further, qualities were not the simple accidents of Aristotle, differentiating prime matter, and endowing the elements with actual forms. With regard to the Empedoclean bodies, they possessed a real constitutive character, and took their place, in the hierarchical order of beings, above these elementary bodies.

Jâbir has drifted far away from Aristotle. To be sure, as Kraus has pointed out, he avoids designating the four qualities by the Aristotelian appellations, dunamis (quwâ) or poiôtes (kayfiyyât). He calls them 'principles' (usjil, sing. āsl), 'bases' (arkan, sing. rûkhn), 'first simples', 'first elements' - but most frequently he refers to them by the term 'natures' (tabâ'i, sing. tab'), and sometimes explicitly distinguishes them from

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84 "The simple elements, namely hot, cold, dry and moist." (See n78 above).
85 "The first simples are not compounds, rather they are uncompounded entities...such as hot and its sisters [sc. cold, dry and moist], and such as the Soul, the Intelligence and the Substance. And the examples of compounds are Fire, Air, Water and Earth..." (Tasrif, Kraus ed [1935], 412:11-13. See Arabic text in the "Appendix").
86 "The simples are hot, cold, moist and dry out of which Fire, Air, Water and Earth are formed." (al-Mizân al-Saghîr, ibid., 425:6-7. See Arabic text in the "Appendix").
87 "In our discourse it is first of all necessary for you to know that hot, cold, moist and dry are absolutely higher than Fire, Air, Water and Earth." (al-Mizân al-Saghîr, ibid., 426:12-14)
88 In Jabirian writings quwâ never denotes an elementary quality- in fact, this is the term Jâbir uses to designate the intensity of the four qualities in different bodies (see below). Kayfiyya for quality is extremely rare (see edited text, 38:4).
89 See n51 above.
90 "The four mutually dissimilar contrary (al-mutadhâda al-mutabâyina) arkan are hot, cold, moist (nâdîwa) and dry." (Šafwa, MS Paris 5099, f17a).
91 To be found throughout the corpus.
kayfiyyāt. The appellation 'nature' was never used by Aristotle in this sense. Here we have, then, a case of a profound conceptual and terminological difference.

In fact, once Jābir leaves his cosmological mode of discourse and enters the area of natural philosophy, he speaks in terms that are clearly mechanistic and materialistic: qualities come to live together, to subsist (ḥalla) in a body. But this did not mean the inherence of accidents in a material substrate. Substance unites with (ta'allaqā), sticks to ('aliqā), clings to (tashabbatha) the natures; it mixes (imtazajā) with them. While, on the other hand, the natures attach or cling to one another, they enter into a mixture and become mingled (ikhtalata). Finally, the natures are composed in or with substance, they are implanted in substance; the natures attack substance, and act upon it: they shape it, embrace it and compress it.

By conferring to the qualities this independence and corporeality, Jābir has assigned to them the role of real elements. The primitive bodies were not the four Empedoclean

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91a See n160 below.
92 For example, see Sab'in, Kraus ed [1935], 462:7.
94 Maydān, ibid., 207:8; 208:4.
95 Maydān, ibid., 207:15.
96 Maydān, ibid., 208:13.
97 Sab'in, ibid., 462:9; al-Mīzān, ibid., 438:9.
98 Sab'in, ibid., 463:7.
99 Sab'in, ibid., 460:3; 463:7.
100 "Fama tarrakaba min hadhīhi'l-anāširī fi hadhā'l-jawharī wa inḥamala 'alyh..." (Sab'in, ibid., 482:12). "turkab al-tabā'i'i wa'll-jawhar." (al-Mīzān, ibid., 451:17).
101 "Turkabu al-tabā'i'u 'ala'l-jawhar." (al-Mīzān, ibid., 455:6).
102 "Hamala al-tabā'i'u 'ala'l-Jawhar." (Occurs frequently in the al-Mīzān, cf n100 above).
103 "al-mu'athhira." (Sab'in, Kraus ed [1935], 482:9).
104 "ta'tawiruha." (al-Mīzān, ibid., 444:14).
105 "al-tabā'i'u taḥšīru...al-jawāhira." (al-Mīzān, ibid., 444:13).
106 "tujammi'u al-jawhara." (al-Mīzān, ibid., 454:2).

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elements, but the four natures. Air, Water, Earth and Fire, were effectively composed of
the natures, and more than that: these Empedoclean bodies could literally be decomposed
into the latter. Aristotle had said that to each elementary body there was only one affection -
"each of them is characterized simply by a single quality: Earth by dry rather than by cold,
Water by cold..., Air by moist..., and Fire by hot."\(^{107}\) This meant that when, say, Fire is
deprived of hot, always the contray quality, i.e. cold, appeared. Fire which was hot and
dry thus became Earth which was cold and dry.\(^{108}\) Jābir's doctrine stands in sharp contrast
to this. According to him, we can extract hot from Fire, and in this way reduce the latter to
pure dry. This removal of hot does not result in the appearance of cold. Indeed, there did
exist bodies which were only hot, or only cold, and so on.

How does one extract and isolate a nature from a body? Here is a recipe for the
reduction of water to cold:

The operation is performed in the following manner. You project
water in a cucurbit, where you have placed a substance possessing strong
dry, like sulphur or a similar substance. In this way the moist of water will
be dried up by the dry [of sulphur] and the hot [of the fire of distillation].
The moist will be entirely burnt, and only the isolated cold will remain.\(^{109}\)

The physical characteristics of these isolated natures are also specified.

For example, dry

is hard, dull and siccative. Or, it is a dust of atomic constitution,
which decreases its volume by the contraction [of its atoms] and increases it
by [their] expansion.\(^{110}\)

\(^{107}\) *Gen. et Corr.*, 2.3, 331a3-6.

\(^{108}\) Ibid., passim.

\(^{109}\) *Sab'In*, Kraus ed [1935], 473:3-5. See Arabic text in the "Appendix".

\(^{110}\) *Sab'In*, ibid., 474:10-11. See Arabic text in the "Appendix". Once again, we note Jābir's
corpuscularian tendencies.
And in the material world, the natures have weights too, so does substance. "Hot, cold, moist and dry", teaches Jābir in the al-Mizān al-Saghīr, "possess weights, and substance too has a weight: this is inevitable..."111 Otherwise, the union of two things which are neither visible, nor actually existing would produce nothing. The suggestion to deprive natures or the substance completely of weights was absurd.

We have now effectively entered into the original aspects of Jābir's thought, for neither the hypostasizing of the qualities, nor their corporeality is certified anywhere in the standard Greek tradition. Kraus suggested that the idea of qualities as bodies is an indirect borrowing from the Stoics112 for whom, as we know, corporeality was the hallmark of existence.113 However, this does not seem to be the case. The Stoics, according to Kraus, "considered elementary qualities as bodies which due to their active energy inform matter".114 But, then, the intention of the Stoics, unlike that of Jābir, was not to treat qualities as so many extra bodies packed into a single body: it was rather a reductionist attempt to represent the qualities of a body as various dispositions of a single body - pneuma disposed in so many different ways.115

The Stoics embraced a theory of categories and they "sometimes thought of quality in terms of the third category - matter, or pneuma, or soul, or reason disposed in a certain way. For the Stoic materialists, each of these ...would be thought of as body. [However], they would not be four distinct bodies, for pneuma is soul and reason, and all of them are matter variously disposed. The [Stoic] idea about qualities...is strongly reductionist."116

111 Ibid., 432:4-8. See Arabic text in the "Appendix".
112 Kraus [1942-3], II, p168ff.
113 See Long and Sedley [1987], pl62, 163.
114 Kraus, op. cit., p168.
115 See Sorabji, op. cit., pViII.
116 Ibid., p89-90.
Thus the qualities cannot be corporeal substances. "I do not see", declares Sorabji, "that the view owes anything to the Stoics as Kraus suggests."\footnote{117}

On the other hand, there are both terminological and conceptual links between Jābir's doctrine of qualities and that found in ps Apollonius' Sirr al-Khaliqa. Likewise, the writings of Job of Edessa carry views which are significantly close.\footnote{118} "Listen to what I say to you!", commands ps Apollonius, "all things are from the four natures (tabā'i) namely hot, cold, moist (al-лин) and dry...All of them move in a circle about the same center...All of them are from the same substance...which is homogeneous (lā ikhtilāf fihi) until accidents come to pass in it. When this happens, its breaks up and its parts become different from one another..."\footnote{119} Again, "when the Sphere (al-falak) moves perpetually and becomes vigorous in its motion, the four natures form pairs (izdawajat), one with the other. They become different, and one knows one pair from the other by its essence and form."\footnote{120} The term tabā'i, the hypostasizing of the qualities, the pairing of these entities through some cosmological process in the intelligible world- all this is shared by Jābir.

And like Jābir, Job of Edessa also believes that the simple elements of all bodies are hot, cold, moist and dry, while the most fundamental bodies, Air, Water, Earth and Fire are compound elements (‘anāsir murakkaba) made of these. The four qualities should be viewed as substances (jisyas).ootnote{121} These are not accidents (gesdsi) or properties belonging

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\footnote{117} Ibid., p56, n54. One can, however, argue that the question here is historical rather than philosophical. Thus, one might say that it is irrelevant what the Stoics really meant when they said that qualities were bodies. Our concern should be with the way the Stoics were received and perceived by the Arabs. But- given that there is no evidence of a direct transmission, and that the scope of the present work must remain narrow- to take up this question is to digress.

\footnote{118} We have spoken of these authors in the "Introduction" above.

\footnote{119} Sirr, Weisser ed [1979], 3:3-11.

\footnote{120} Ibid., 186:11; 187:1.

\footnote{121} The Book of Treasures, Mingana ed [1935], Discourse I, Chap. I.
to a substance. In another work of this Syriac author, the *Kitāb al-Tafsīr* (Book of Interpretation) which is quoted in Maqdisī's *Kitāb Bad' wa al-Ta'rīkh* (Book of Origins and History, comp. 355/966), certain assertions are almost identical to Jābir's. "The principle (mabādī = Gr. archai) of all things", writes Job, "are isolate elements (al-‘ānāsīr al-mufrada), namely, hot (harr), cold (bard), moist (balla) and dry (yubs). By the combination (tārīdī) of these, the compound elements (al-‘ānāsīr al-murrakaba), namely Air, Water [etc]...are formed". These assertions could well have come out of a Jabirian text.

The eclecticism of Jābir is here evident. In fact, he is quite aware of this feature of his ideas:

[My] affirmations will be equally valid for those who profess the existence of natures without substrate (hāmil); for those who accept accidents alone to the exclusion of bodies; as well as for those who say, on the contrary, that the accident is invisible, and that all things are, rather, bodies.

**Quantification of Qualities and the Science of Balance**

Let us now turn to the most important, most interesting, and most productive aspect of Jābir's theory of qualities. If, in the natural world, qualities are corporeal, and if they

122 Ibid., Chap.3.
123 Ed Huart [1899-1919], I, p140.
124 Jābir seems to be referring to an interpretation of Plato's *Theatus* that properties need no subject- that bodies are just a bundle (hathroisma, sundromā) of properties (see "Bodies as Bundles of Properties" in Sorabji, op. cit.). This question is also taken up by Plutarch (*Stoicorum veterum fragmenta*, 2.126, von Arnim ed [1903-24]).
125 al-Ash'arī in his *Maqālāt* attributes this view to the 2nd/8th century mutakallim Dirār ibn ‘Amr (See Ritter ed [1963]). For a critical discussion see van Ess [1967]; [1968]).
126 Again, such views are attributed to some early mutakallims such as al-Nazzām (d 220-230/835-845; see al-Ash'arī, Ritter ed, op. cit.). In fact it seems that in all three cases (natures without substrate, reduction of bodies to accidents, and denial of accidents) Jābir may well be referring to the debates in the early kalām cosmology. A mere glance over *Maqālāt* supports this view. Kalām cosmology has been discussed by van Ess, op. cit.
possess weights, then they should in principle be amenable to quantitative treatment. Indeed, the four natures were not only quantifiable, they were also subject to measurement, and they admitted of a whole range of quantitative manipulations. And here, from the standpoint of the history of filiation of ideas, we have something rather significant. For like the attempts to quantify qualities at Montpellier and Oxford in the early 14th century AD, Jābir's quantification of his tabāti also makes an appearance in a medico-pharmacological perspective. In fact, the two attempts, namely the Jabirian and the Latin, bear fundamental similarities of a formal and methodological nature.

Recent scholars have stressed the importance of two pioneering Latin works in the modern history of mathematization of medicine in general, and that of pharmacy in particular: the Aphorismi de gradibus composed at Montpellier around 1300 AD,\textsuperscript{127} and the Icocedron, a Mertonian work postdating the former by a few years.\textsuperscript{128} It is interesting to note that both these works are written by authors known to be alchemists - namely, Arnald of Villanova and Walter of Odington respectively. Also, it has been shown that these two writings were the direct precursors of the famous dynamical law of Thomas Bradwardine, hence their significance in the history of physics.\textsuperscript{129} And, most important from our point of view, both the Aphorismi and Icocedron have been found to be dependent on the Fī Maʿrifat Ouwaʿl-Adwiyaʾl-Murakkaba (On the Knowledge of the Intensity of Compound Medicines, Lat. Quia primos) of the well-known and the earliest Arab philosopher (faylasuf), al-Kindī (d c 257/870).\textsuperscript{130}

\begin{itemize}
\item \textsuperscript{127} McVaugh [1967], [1969], [1975].
\item \textsuperscript{128} Skabelund and Thomas [1969].
\item \textsuperscript{129} Natural philosophers at the beginning of the 14th century AD supposed that an object's speed was arithmetically related to its motive force and resistance, \( V \propto F/R \). Bradwardine proposed a law of proportionality arguing that "the proportion of velocities in motion follows the proportion of the power of the motor to the power of the thing moved" (qu. McVaugh, [1967], p56). His elaboration makes it clear that he is suggesting the following relationship: \( V = \log_a (F/R) \), where \( a = F_1/R_1 \). (See n 134 below).
\item \textsuperscript{130} It was Marshall Clagett who first suspected a connection between Bradwardine's law and the system devised by Kindī to measure the qualitative intensity of compound medicines (Clagett [1959]).
\end{itemize}
What are the salient features of all these attempts? First, all four of them - Jābir, al-Kindī, Arnald and Walter - aim at making more precise, elaborate and fuller the Galenic classification of simple drugs according to the degrees (taxeis) of intensity of each quality in them. Indeed, Jābir’s interests go far beyond drugs into a general methodology for measuring the quantities of the four natures in all things belonging to all the three kingdoms of the natural world. Jābir further distinguishes himself from his three counterparts by replacing Galen’s classification schema with a more sophisticated computational system claimed to be founded upon universal theoretical principles, rather than upon the empirical generalizations of medical experience.132

Second, al-Kindī makes a very important and conceptually fruitful distinction between the intensity of a quality and its extension. Thus, in effect, he distinguishes between heat and temperature. Arnald and Walter not only followed him in maintaining this distinction, they placed a strong emphasis on it - something that in the Latin West proved particularly germane to a critical examination of the nature of heat.133 But in Jābir too we find a conceptual discrimination between intensity and extension - in fact, as we shall see, one of the grounds on which he criticizes Galen is this very confounding of the two.

Chap.7). This question was taken up by McVaugh in his [1967], [1969] and [1975], and by Skabelund and Thomas [1969]. These researches have confirmed Clagett's suspicions. McVaugh in his [1967] suggested the following filiation: Kindi-Arnald of Villanova-Bradwardine, to which Skabelund and Thomas added another link between Arnald and Bradwardine, namely Walter of Odington. Siggel has studied a 1759 AD Arabic version of Kindi’s work (Siggel [1953]).

131 Kindi’s system has been discussed in detail by McVaugh in his [1975]. But Skabelund and Thomas [1969] also provide a good summary. Arnald’s work is the subject of McVaugh’s [1967], [1969] and [1975], whereas the latter authors, op. cit., have presented a comprehensive account of Walter’s Icoedron.

132 See below.

133 Skabelund and Thomas, op. cit., passim; McVaugh [1967], [1975], passim, see particularly his [1969], p405.
And, finally, through one quantitative mathematical formula or another, all four authors - Jābir, al-Kindī, Arnald and Walter - relate the intensive qualities of bodies to their extensive characteristics. The specific relationship proposed by al-Kindī, and which was accepted both by Arnald as well as Walter, is one which links a geometric increase in the number of 'parts' of a quality to an arithmetic increase in the sensed effect.\[134\] As for Jābir's system, it will presently be our subject for a detailed study, but in the mean time it should be noted that the validity of the formulae of al-Kindī and his Latin scions is, once again, limited to drugs. Jābir, on the other hand, considers his quantitative system as having an unlimited scope, applicable universally to all things of the natural world.

We see, then, that from a substantive point of view, Jābir seems to be at the head of the al-Kindī-Arnald-Walter quantificatioinist tradition. Yet we have no direct historical evidence at hand to support this conclusion. Indeed, if we accept Kraus' late dating of the Jabirian corpus, the evidence might even appear to point to the contrary, for then the question of al-Kindī's familiarity with the ideas of Jābir would hardly arise. Likewise, no scholar has so far pointed out any textual indication that Arnald of Villanova, or Walter of Odington had direct access to the mediaeval Latin translations of the Jabirian texts. We can only suspect an indirect Latin familiarity with Jabirian ideas through the writings ascribed to Geber.\[134a\] Evidently, these are involved questions and it seems prudent to leave them at this juncture. But let us proceed with a closer look at Jābir's system.

Galen, we recall, had accepted the 'four fold' schema which had brought the four Hippocratic humors, the elementary qualities, and the Empedoclean elements into common

\[134\] According to Kindī, the degree of intensity (I) of a compound drug can be determined by adding up 'parts' of hot and of cold contained in the simple constituents (each of known degree) and determining their ratio. Since \( H/C = 2^I \), \( I = \log_a (H/C) \), where \( a = 2 \).
The system of both Arnald and Walter are modally identical to this, and Bradwardine simply seems to have imported it into natural philosophy.

\[134a\] Walter of Odington does refer to Geber (see Skabelund and Thomas, op. cit., p334).
Drawing upon Aristotle's idea of contraries, he had believed that when one of the bodily humors develops to the detriment of others, destroying the humoral equilibrium, the body loses health. The medicament for countering the harmful effects of the excess humor was therefore required to possess a quality contrary to that of the humor. It was this great general principle of cure by contraries which served as the rationale for the classification of simple drugs according to their pharmaceutical potencies.\footnote{McVaugh [1969], p399.}

This was a classification in terms of opposing pair of primary qualities: a medicine was determined to be either hot or cold, and, less significantly, either dry or moist. Galen further assigned to these qualities a scale of measurement in degrees. Introducing a scale of four degrees, he classified the action of drugs according to the supposedly innate degrees of hot, cold, moist and dry they possessed. According to Galen, in each quality four degrees of intensity could be distinguished: the first included ordinary food whose elementary quality is hardly appreciable, the second degree of intensity was found in weak medicines and stronger food, the third in medicines whose effects were appreciably severe, and, finally, the fourth degree included poisons which were so strong as to destroy the body.\footnote{The subject is covered in Galen's De simplicium medicamentorum, Bk 3; the scale of four degrees is introduced in Chap. 13 (See Kühn ed [1821-33]).} This numerical specification had found its way into the Arabic medical tradition through which it continued in Latin medical writers.

Like the Greek physicians, Jābir accepts that, in practice, all bodies possess all the four qualities: when we say that such and such body is hot or cold, it simply means that the hot or cold has come to dominate the other three.\footnote{Jābir develops this point in the Bahth, MS Jārullah 1721 (see quotations in Kraus [1942-3] passim).} But as for the Galenic approach to the
classification of drugs, Jābir is highly critical of it - he dismisses it both on empirical as well as rational grounds. To begin with, it was an arbitrary classification, for it grouped together a very large number of drugs under a single degree of intensity of a given quality. But, argues Jābir, even if all the drugs allegedly of the same group did show comparable effects, the quantity of the quality in each of them was different. For example, among the drugs classified under the third degree of hot, "we definitively know that the hot in the sugar (al-Sukkar) is not the same as the hot in the aniseed (al-anīsūn). Nor is it the same as the hot which is in the colocynth (shāhm al-hanzal), nor the same as the hot in the euphorbia (farbiyūn)." To translate Jābir in modern terms, a number of bodies may have the same extensive effect (temperature), but they do not necessarily possess the same quantity of intensity (heat) producing that effect.

Secondly, the Galenic classifications were refuted by experience. For, says Jābir, if we take all the drugs which are supposed to belong to the same degree of intensity, and administer them in identical doses (measured in terms of weight), their effects will not be identical. Thus, for example, among the drugs belonging to the third Galenic degree of hot, only 1 dirham [dir.] of euphorbia (farbiyūn) produces the same effect as 2 dir. of scammony (saqmūniya), 10 dir. of turpeth (ghāriqūn), and 20 dir. of white agaric (ghāriqūn). Similarly, Jābir continues, in terms of extensive effects, 1/2 dir. of colocynth = 2 dir. of dodder of Crete (al-afithimūn al-iqrīṭī) = 3 dir. of ḥabb al-nil. etc. These drugs, then, did not have equal strengths: to classify them all under the third degree of hot was unsystematic and arbitrary.

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139 See quotations from the Bahth in Kraus, op. cit., II, p191, n2, 3.
140 Bahth MS Jārullāh 1721, f126a. See Arabic text in the "Appendix".
For the identification of the Arabic names of drugs see especially Meyerhof [1932-40]; Siggel [1950].
141 Seed of Pharbitis (Siggel [1950], p28).
142 Bahth, f100b.
Next, Jabir attacks the physician's classification on rational grounds. The knowledge of Galen's four degrees of intensity of each quality in a thing (taxeis) rested exclusively on the senses. But the testimony of the senses could not be trusted. Colours and smells are not reliable guides to the constitution of a body, writes Jabir in the Bahth: one colour may represent each of the four qualities; and as for smells, they may turn putrid in which case one smell is likely to be confused with another. Likewise, taste is no indication of a body's qualities - indeed, a large number of bodies, such as gold and silver, had no taste whatsoever. It was obvious that sense experience could not be taken as reliable basis for the exact determination of the preponderant quality in a body, much less the intensity of this quality.143

Jabir is thus seeking a theoretical system that goes beyond the fallible empirical impressions of the superficial senses. And in doing so, he stands aloof in the medical tradition which had viewed itself as essentially grounded in experience. Prior to the 14th century AD, a recent scholar tells us, "physicians...were nearly unanimous in insisting that in practice medicine was an experiential art in which certain knowledge could never be achieved."144 Indeed, it was Galen's dictum that a knowledge of the properties of simples comes only by experiment. Commenting on this dictum, the 4th/10th century physician 'Ali ibn 'Abbās al-Majūsī (Lat. Haly Abbas)145 had "remarked despairingly that a full experimental knowledge would take a thousand men a thousand years, and his statement was repeatedly quoted in the Middle Ages."146 For Jabir there is no cause for such

143 Bahth f99a. See Arabic text in the "Appendix".
145 Haly Abbas, whose dates are only vaguely known, was a personal physician to the Būyid Amīr 'Adud al-Dawal (338-372/949-82) in Baghdad. It is to this patron that he had dedicated his Liber regius. (See Plessner [1974]).
146 McVaugh [1969], p402.
despair. He simply rejects empiricism in favour of a philosophical system of eternal truths which alone, he believes, could serve as the theoretical foundation of scientific knowledge.

Jābir feels that the physicians' classification of drugs operates in a theoretical vacuum. But before supplying this deficiency, he proceeds to make an algorismic improvement in the computational structure of Galenic degrees. Without a refined system of subdivisions, he thinks, these degrees were crude units: even if one were to distinguish in each Galenic degree a minimum (awwal al-martaba), a maximum (akirihā), and a mean (wasaṭīhā) value of intensities, the precision of the result is hardly improved. Thus, Jābir proposes a much extended scheme of elaborate subdivisions. One degree (martaba) is divided into certain number of grades (daraja), a grade into minutes (daqiqā), a minute into seconds (thāniya), a second into thirds (thāliθac), a third into fourths (rāba), and, finally, a fourth into fifths (khamisa). Since all natural bodies contained all the four qualities, there were now 4 (qualities) x 4 (degrees) x 7 (subdivisions) = 112 different positions, as opposed to Galen's 16.

It is significant that Jābir borrows the names of his units from ancient astronomy. His aim is to elevate the practice of medicine to the infallibility of an exact science. In fact, he sometimes emulates completely the astronomical units of measurement: in the Aḥjar, the units of his Bālīnās follow a geometric progression with 60 as its base. Thus, 60 fifths =

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147 Bahth, f99a. (qu. Kraus [1942-3], II, p191, n3).
148 It is interesting that Walter of Odington also talks about degrees and minutes. (Skabelund and Thomas, op. cit., p344).
149 For example we read in the al-Khawass al-Kabīr: "These seven subdivisions are called martaba, daraja, daqiqā, thāniya, thāliθa, rāba, and khamisa." (Kraus ed [1935], 237:11-12).
150 "Each of these [seven] subdivisions recur four times" (al-Khawass al-Kabīr, ibid., 237:12; see Arabic text in the "Appendix"). "...and when 28 [= 7 x 4] is multiplied by 4, it becomes 112" (Bahth, f125a; see Arabic text in the "Appendix").
1 fourth; 60 fourths = 1 third \(= 60^2\) fifths; 60 thirds = 1 second \(= 60^3\) fifths; 60 seconds = 1 minute \(= 60^4\) fifths\) etc.\(^{151}\)

But how does one measure the strengths or intensities of qualities in a body? Or, more generally, how does one discover the quantitative structure of the objects of the physical world? It is here that Jābir's Science of Balance (\(\text{\textit{Jilm al-Mizān}}\)) makes an entry. This was a universal science \textit{par excellence}, a divine science (\(\text{\textit{ilm lähūi}}\)),\(^{152}\) whose aim was to reduce all facts of human knowledge to system of quantity and measure.\(^{153}\) The scope of this Science was not limited merely to the measurement of qualitative potencies of drugs- in fact, "all things fall under [the principle of] Balance",\(^{153a}\) and, "it is by means of this principle that man is able to make sense of the world."\(^{154}\)

The principle of Balance was truly cosmic in its range. On the one hand it governed the sublunar world (\(\text{\textit{ajnās thalāthā}}\)),\(^{155}\) submitting all change, generation and corruption to the exactness of mathematical laws. On the other hand, it served to measure the distances and movements of the celestial bodies and even linked them to the hypostases of the intelligible world- just as physical bodies had a balance, Soul and Intelligence had balances too.\(^{156}\) The principle of Balance was the Supreme Principle (\(\text{\textit{Qā'ida 'Uzma}}\)) of the world.\(^{157}\)

\(^{151}\) Edited text, 1:10-3:7.
\(^{152}\) \textit{Kitāb al-Khamsīn}. MS Shahid Ali Pasha 1277, f131a, qu. Kraus [1942-3], II, p188, n3.
\(^{153}\) Kraus has provided us a meticulous general survey of Jābir's \textit{Mizān}, ibid., p187-303.
\(^{153a}\) \textit{Ahjār}. MS Paris 5099, f60a, 20.
\(^{154}\) \textit{Bahth}. f15b.
\(^{155}\) \textit{Ahjār}. f59a, 7-8.
\(^{156}\) Ibid., edited text 34:16-35:1.
\(^{157}\) In the \textit{Ahjār}, Jābir equates \textit{Mizān} with \textit{al-hadd} (definition) and then says: "Definition is the Supreme Principle." (MS Paris 5099, f60a).
In the natural world, to give merely an outline of Jābir's doctrine, all bodies contained the four qualities in a specific, unchanging, and noble proportion which was governed by the Supreme Principle. This proportion was $1:3:5:8$ whose sum $17 (=1+3+5+8)$ was the foundation (qā'ida) of the entire Science of Balance. Thus, the qualities in a given body are arranged in the order hot, dry, cold and moist, and if the hot weighs 1 dir., then: dry will be 3 dir., cold will be 5 dir., and moist will be 8 dir. The alchemist who has mastered the Science, discovers through this proportion the quantitative structure of all things. He is then able to change anything into any other by creating in it a new configuration of qualities. In fact, he can even change inanimate objects into living beings. Likewise, by means of the Science of Balance the adept uncovers the inner structure of the precious metals, and then effects transmutations of base metals into precious ones by bringing in the former the qualitative structure of the latter - this is carried out by augmenting those qualities which are weak and suppressing those which are excessive.

But this is Jābir's doctrine only in its bare outline. To its development, elaboration, and explanation he devotes a whole collection of texts which he calls the Kutub al-Mawāzin (Books of Balances). The Ahjar, which occupies a central position in this collection, is the subject of a detailed textual examination in the chapters that follow.

159 Here one might recall Arnald of Villanova's declaration that "excellence of action in all things comes only with their proper and harmonious proportion." (McVaugh [1967], p61).

160 "First you should know", writes Jābir in the Ikhraj, "that a thing is characterized by one nature or another. This nature is signified by a quality (kayfiya). If you augment a contrary quality in this body, it will undergo transmutation and will take up another form." (Kraus ed [1935], 92:5-8).

161 This is Jābir's Science of Artificial Generation (takwin) which is developed in the Tajmi'. (See the chapters below).
Appendix to Chapter II
[149] الجوهر، الطائر لكل شيء، وهو الذي في كل شيء، ومنه كل شيء وإليه يعود كل شيء.
[261] أصل الأشياء أربع طبقات ولها أصل حاسم وهو الجوهر البسيط المسمي الهيول.
[553] إن تلك الدائرة هي الفلك النيار الأرض الذي يسق الفلك الحاوي للعالم الذي نحن فيه.
[559] فاذا الجوهر، عناك الله، فهو الشيء الملؤه به الخلل، وهو المشكل بكل صورة وفيه كل شيء ومنه كل شيء يتحرك وإليه ينحل كل شيء، وإن كنت لا تعلم ما هو من هذا.
[676] وقال في كتاب طياموس إن الهيول والبلد أشيء واحد، فإن كانت الهيول البلد والبلد هو المكان، فلا حالة أن أفلاطون يريد بقوله... إن العتل مكان للصور الطبيعيه... وإنما لا شكل للمكان ولا كينية...
[683] ويتبغ أن يتصور بعد ذلك انه يكون منه دائرة عظيمة لأن الأشياء إذا كانت أجزاءها وكياناتها واحدة، وذلك لا يكون إلا من البساطت...
[644] وليصور أنه ما كان بقصد وتأليف إنذدكت حكينا أن ما كان مؤلفاً غير بسيط...
[651] وإنه بنفس حركته متولدة بين الحرارة والبرودة شيء لا هو حار ولا بارد.
[667] ثم نتصور ليسا من جوانب هذه الدائرة داخلها أو خارجها أو توافدها إما في حدود الدوائر أو غيره الزمان والمكان.
[770] وليس يمكن احدثا لمسه ولا إذا مسّة وجد له لما، ولا يقدر أن يأخذ منه شيئاً بيده.
[839] وتمت أولئك بعدا، لا شيء فيه، ثم نتصور أن جوهراً قد أخذ صورة، فقد صار فيه
(...)

الساييس最主要的 الفردات لا المركبات، والاسائس الفردات كالحرارة وغيرها من
أخواتها، كالنفس، والجوع والجزء والحرارة والهواء والغواء والإرث....

إن الفردات هي الحرارة والبرودة والطوية والليوسية التي منها تحكم النار، والغواء،
والهواء والإرث.

ووجه التدبير أن تلقى الماء في الترعة، وتبث في الفرصة شيئاً في بيي شديد قوى
كالكبريت وما جانبه، فإن الرطوبة تشغبليوسية الحرارة ويجرق ما فيه من
الطوية فتبقى البرودة مفردة.

وهذة البروسية أن تكون صبة كمثا ناشفة أو هباء لا جزء له يتعت في الجمع ويكترب بالتذوق.

وقد وجب الآن على التحقيق أن للحرارة والبرودة والطوية والليوسية أوزان وأن للجزء
وزناً لا يد من ذلك، ولاأ نوِب أنا إذا جمعنا لا يرى ولا يوجد ... ولا زمن لأحد
منهم لم يكن منه شيء.

إذا نعلم ضرورة أن الحرارة التي في السكر ليست الحرارة التي في الأتيسون ولا
الحرارة التي في شحم الحنطل ولا الحرارة التي في الغريبين.

(142) وذلك لأن الروائح والألوان لا تصدق، أما الألوان فإن الألوان الواحد قد يفسمه
البارد والبرد والطيب، فلا يكون في ذلك دليل ولا علامة البينة. وأما الروائح
فإنها تنسوب وتنشفه وأمثال ذلك. وأما الطروم فإنها السبب والمفتاح الموصل إلى طبيعة
الشيء لاغير ذلك، وهذا أيضاً قد يفسد على القوم من قبل أحوال الأشياء التي لا
طمح لها البينة كالذهب والنفسة وأشياء كثيرة جداً مثل هذه.

إن كل واحد يتبكر أربع مرات...

وذلك يكون من مضروب شمائي وعشيرين في أربعة ويبلغ ذلك مائة وأثناعشر.
CHAPTER III
A PREFATORY NOTE ON THE CENTRAL THEME OF THE

KITĀB AL-AḤJĀR:
THE BALANCE OF LETTERS

Jābir's Science of Balance was at once a metaphysical doctrine and a
methodological thesis. Viewed as metaphysical doctrine, it embodied a universal principle
which governed not only the sublunar world of generation and corruption, but also that
which lay beyond the Sphere (al-Falak) in the intangible (ghayr malmūsa) realm of the
hypostases. Thus we read in the Aḥjār that there is a characteristic Balance of the stars, their
distances, and their movements; and there is a Balance by means of which the Sphere
manifests itself to man. But over and above these, there are Balances even of the Soul and
the Intelligence,1 "beyond which there is no end" (lā nihāya ba'd dhālik).2

As a methodological thesis, Jābir's Balance was the 'way' (tariq)3 through which
one understood, made sense of, and, above all, measured and manipulated the objects and
the processes of the universe. And since the universe was diverse, so were the Balances.
These Balances also formed a hierarchy: while all of them were useful (mufid), and all of
them served the aim of attaining scientific knowledge, the best of all Balances was the
Balance of Letters (Mizān al-Hurūf):

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1 In the Kitāb al-Khamsin (Fifty Books, Kr 1825-1874) Jābir compares his Balance with the First
Cause: "Physical objects are governed by the Balance, spiritual objects by the First Cause" (MS Shāhid ʿAlī
Pāshā 1277, f137b, qu. Kraus [1942-3], II, p187, n4). See Arabic text in the "Appendix".
2 Edited text 35:1.
3 This term occurs throughout the Kutub al-Mawāzin.
The Balances are divided according to the diversity of natural objects. There are Balances of the Intelligence, of the Soul, of Nature, Form, and the Sphere of the stars; there are Balances of the four natures, animals, plants, and minerals - these are all useful Balances. But, finally, there is the Balance of Letters: and this is the most perfect of all.4

This 'most perfect Balance', which is also called the Balance of Articulation (Mīzān al-Hiirā)5 and the Balance of Language (Mīzān Lafz),6 is further characterized elsewhere:

A group of people says that the knowledge of matters relating to the four natures (ahwāl al-tabi'ī), as well as an understanding of the qualities (kayfīyyat),6a may be attained by a more suitable method: that is, by means of the names (asmā') of foods, drugs, organs of animals, and parts of animals and plants. We have called this method the Balance of Letters. In it lies a meticulous science ('ilm daqa'iq)7 through which one reaches an understanding of the real characteristics of natural objects (haqa'iq ahwāl al-mawi'dat).8

Indeed, Jābir does raise his Balance of Letters doctrine to a highly sophisticated level, defending and justifying it on powerful, and often cogent, logical and metaphysical grounds. And in the process we find him articulating a comprehensive theory of knowledge, language, and music. Thus, under one central principle, namely Mīzān al-Hurūf, Jābir attempts a grand philosophical synthesis in which the four natures systematically and coherently relate to phonetics and morphology on the one hand, and to

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4 Khamsīn, f131a, in Kraus, op. cit., p 188, n3. See Arabic text in the "Appendix".
5 In the Kitāb al-Taimī (Book of Concentration, Kr 398), MS Leyden 1265, f167a-b, qu. Kraus, op. cit., p244.
6 In the al-Sirr al-Maknūn, MS Paris 5099, f55a.
6a Once again, we note, Jābir distinguishes between tab (nature) and kayfiyya (quality).
7 Early kalam writers use the term daqīq (pl. daqī'iq), or lāṭif (pl. lātīf) to characterize cosmological questions, as opposed to questions of a purely theological nature. Thus, the mu'tazili 'Abd al-Jabbār (d 415/1025) says of his predecessor al-Nazzām (d c 230/843) that he discussed the daqīq of kalam with Hishām ibn al-Hakam (see Qādī 'Abd al-Jabbār's Fāḍl al-l'tizāl, Sayyid ed [1974], p254). The term lāṭif occurs in al-Khāyyāt's Kitāb al-Intiqār (Nader ed [1957], p14-15).
8 Bahth, MS Jarullah 1721, f110a, qu. Kraus, op. cit., p223, n7. See Arabic text in the "Appendix".
prosody and musical harmony on the other. From all this emerges the ontological
counterpart of his reductionist thesis: we have seen that in Jabir's physics all explanations
of the natural world were reduced to an expiation of the four natures - now he proposes an
ontological equivalence between the natures and the letters of the alphabet. The Kitāb
al-Āhjār is devoted to an elaboration of this very thesis.9

Let us begin by isolating Jabir's claims. Just as the words of language, he says, are
composed of letters, so denominated things are composed of natures. This was not a
simple analogy, rather it implied an effective and real coordination between the letters of a
word which names an object, and the physical structure of the object itself; between the
science of morphology which studies the structure of words, and the science of physics
which studies the structure of things. "Look!", he writes in the Kitāb al-Taṣrīf (Book of
Morphology, Kr 404),9a

how letters are copied upon the natures (wudi'at 'alā al-taba'ī),
and how the natures are copied upon letters, and how the letters and natures
interchange (tanqulu).10

9 The account which follows integrates material from a large number of Jabirian treatises other
than the Āhjār itself. However, this is not so much of a statement of virtue as much as it is one of
necessity, for the Āhjār seems to have been the subject of a ruthless application of Jabir's principle of tabdīl
al-ʿilm (Dispersion of Knowledge). Thus, it is practically impossible to make sense of this text as it stands:
like so many other treatises of the corpus, it remains a 'fragmentary' work in which the truth was only
partially revealed (for a discussion of the Principle of Dispersion see "Introduction" above). To understand
the Āhjār one has to do what the 8th/14th century alchemist al-Jīldakī did, that is, to gather all the
'fragments' in order to complete the picture (al-Jīldakī says in his Kitāb al-Misbah fī 'Ilm al-Miftāḥ that in
thirst of knowledge he travelled enormous distances, and visited regions as remote as Byzantium, North
Africa, Egypt, Iraq and Syria to collect more than one thousand books by Jabir (MS Paris 2165, f144a, qu.
Kraus [1942-3], I, pXXII, n6)).

9a There are two treatises in the corpus with the same title, Kr 112 and Kr 404. The former, which
is part of the CXII Books, is not extant.

10 MS Paris 5099, f144a. See Arabic text in the "Appendix".
It is interesting to note here a significant difference between the views of Jabir and those of the Ikhwān
al-Ṣafā'. Thus, in the very beginning of their Rasīlī, the Ikhwān express the Pythagorean lore: one studies
the properties of existing things through the study of the individual numbers corresponding to these things.
The very first Risāla of the Brethren is "On Numbers" reflecting their stated belief that arithmetic was the
first stage on the way to wisdom, and in their preface they say that "the forms of numbers in individual
souls corresponds to the forms of existing things in prime matter (hayūdā)" (Zarkālī ed [1928], I, p1)- in
The morphological analysis of words made it possible to determine the quantitative and qualitative structure of things they designate. The order of letters in a name was an actual representation of the order of the natures in the object named. Similarly, the numerical values assigned to the letters of the alphabet revealed, and were equivalent to, actual quantities of natures comprising the thing in whose name these letters occurred.11 This letter-nature correspondence is stated categorically and forcefully:

A single isolated letter cannot be pronounced.12 It is clear that we cannot speak by means of an isolated letter, unless we attach to it another letter. Similarly, it is not possible for us to know the weight of a nature [sc. to know that it exists in relation to us], unless it unites with another nature and thus becomes intelligible - so know this principle!13

An individual thing cannot exist with less than two elements [sc. natures]...it may have three elements, but it cannot exist with a single element - this is impossible.13a

...other words, existing things are in accordance with the nature of numbers. But Jabir accords no such status to numbers. In fact, as we shall see, numbers do not even figure in his ontology. On the other hand, and in contrast, he believes that the structure of language corresponds to the structure of existing things. And while language did follow the rules of numbers, it was not ontologically identical with numbers. (Several other differences between Jabir and the Ikhwan have been pointed out in a recent comparative study by Marquet[1988]).

11 The relationship between things and names which designate these things is one of the earliest and highly developed questions discussed and debated by Muslim thinkers. al-Suyûtí in his al-Muzhir gives an extensive account of these discussions in some of the disciplines which had been cultivated prior to the full scale reception in Islam of Greek philosophy and logic, namely the disciplines of kalâm, the principles of jurisprudence (usûl al-fiqh), and philology (lugha) (see al-Mawûtī ed [1949], I, p7ff). An examination of the relationship between utterance (laʃ2) and the objects of the world had led the early thinkers to an inquiry into the relation between nature and convention or law. "This inquiry", to quote Mahdi, "occupies the center of stage in the discussions of language in classical Islamic thought as it had done earlier in classical Greek thought" (Mahdi, "Language and Logic in Classical Islam" in von Grunebaum ed [1970], p52). As we shall presently see, Jabir too is led to the same inquiry, and, in arguing for his views, he leans heavily on the question whether language is natural or conventional.


13 Hasîl. MS Paris 5099, f96a. See Arabic text in the "Appendix".

13a But if this is the case, how can Jabir justify his claim that individual natures can be isolated through alchemical procedures? Further, how can he maintain his belief that each nature, as well as substance, has a weight? (For these views of Jabir see 'Chapter II' above). However, one can exonerate him.
Correspondingly, words - for example "Muhammad" or "Ja‘far" - exist only in virtue of a combination of letters. A word may have two letters; it may have three letters, or less than three. But it cannot exist with a single isolated letter - this is equally impossible. A word cannot be with less than two letters: a letter of articulation (harf al-nutq) and a letter of rest (harf al-istrāhā), and this is required for vocal emission.\(^{13b}\)

So consequently, the combination of letters corresponds to the combination of the natures in all natural objects.\(^{14}\)

The grammarians, writes Jābir in the *Tasrif*, treat the morphology of words and discuss the letters of which the words are composed. Correspondingly, the philosophers have a morphology of their own which applies to the elements (bāṣṣīt = tabā‘ī*) of bodies. Thus, grammar and physics follow homologous methodological procedures. This is the reason why he had called this work "the Book of Morphology",\(^{15}\) for:

> there can be no discourse (kalām) except through a composition of letters (tālīf al-hurūf), and a similar situation necessarily exists in the case of the natures...In fact, the morphology of the natures (tasrif al-tabā‘ī*) bears a parallel in the morphology of letters (tasrif al-hurūf).\(^{16}\)

...of holding contradictory views, for in the natural world, he taught us, the four natures do not exist freely in isolation of one another: the adept could isolate them, but he cannot weigh an isolated nature. Nowhere, in describing the characteristics of an alchemically extracted nature, does Jābir say anything about its weight. The point is that while both substance and individual natures do possess weights, these weights cannot be known to us unless they appear in combination. Of course, here we have a theory that cannot be refuted.\(^{13b}\)

Arab grammarians designate vowels by the term harakat (motions), whence a consonant that is followed by a vowel is said to be mutaharrik (moving, = Jābir’s harf al-nutq), and that which has no following vowel is called sakin (quiescent, or at rest, = Jābir’s harf al-istrāhā). Hence the symbol which denotes vowellessness, jazm, is called sukun. Our author makes his second element ‘at rest’ to indicate the apocopate form. (See Wright [1862], II, p255).

\(^{14}\) Ibid., f95b. See Arabic text in the "Appendix".

\(^{15}\) Kraus ed [1935], 393:4-6. See Arabic text in the "Appendix".

\(^{16}\) Ibid., 393:13-15. See Arabic text in the "Appendix".

The use of the term *tasrif* in a physical sense is also found in Shahrastānī’s *Milal*. Expounding the cosmological doctrines of the Šābians, he writes that they considered spiritual substances (al-rūḥānīyyat) as the power (quwwa) of "tasrif al-a‘āṣm wa tāqīf al-‘āṣm" (Badrān ed [1955], II, 703:17-18). Also, spiritual substances are to the Šābians those which "tutṣāṣārīfū fīl-a‘āṣm tasrifan wa taqīfban" [Ibid., 703:5-6].
The Quantification of Language

It is significant that in the passage just quoted, Jābir employs the term "taʿlīf" which has been rendered "composition". But this term has strict numerical connotations in its Jabirian usage, and is applied equally to music. Musical harmony, we read in the Ahjār, is no more than a numerical composition (taʿlīf ʿadadī), and it is the same composition that occurs in speech.17 Thus conforming to a fundamental Pythagorean idea that harmony of numbers produces music, Jābir makes a further claim that language too was a harmony of numbers: language and music were governed by the same principles, they were thus essentially related. This seems to be the reason why, as we shall witness in the Ahjār, Jābir is interested in language fundamentally from the point of view of phonetics, morphology, and metrics. All these were reducible to quantities and their combinations.18

Phonetics is concerned with sounds and therefore its relationship with music was easily established. In the Ahjār, Jābir draws a parallel between the fingers of the player of a musical instrument on the one hand, and the tongue, throat and the lips of a speaker on the other.19 In fact there was a structural correspondence between the physical organs of

17 Edited text 9:10.
18 This is not to say that Jābir has no interest in grammar. As a matter of fact, he is even aware of the classical disagreements between the traditional grammarians (ahl al-lugha) and the champions of the new Greek logic, a disagreement that found in later centuries its most instructive expression in the celebrated debate between the philologist and mutakallim al-Shāfiʿī, and a protagonist of the new philosophic school Mattā ibn Yūnus. (This debate, which took place in 320/932, has been analyzed by Mahdi, op. cit. Mahdi's account is based on the report of Abū Ḥayyān al-Tawhīdī whose al-Imtāʿ wa-l-Muḥnasa preserves the text of the debate). Significantly, Jābir does not use the later appellation manṭiqiyyūn for the members of the new school. He calls them "people of substantial discourse" (ahl al-kalām al-jawhari).
According to the grammarians, writes Jābir in the Ikhrāj, "ordered letters (al-hurūf al-manţāma) denote ism (noun), fil (verb) and harf (particle). In contrast, the people of substantial discourse... believe that ordered letters denote, by convention (ṣūlāḥ), three categories: either an ism (Gr. onoma) or a kalima (verb, Gr. rhēma), or a qawl (Gr. logos)" (Kraus ed [1935], 9:10-13). As for his own views, Jābir is a supporter of the latter. A noun and a verb, or two nouns, he says, are sufficient to form a true or a false proposition: "The qawl is formed either out of a participation of a noun with a verb, or of a noun with a noun" (ibid., 10:9-10). The particle was not an integral part of a qawl- the conjunction (ribāṭ) links one noun with another, and the preposition (ṣila) determines the relationship between a noun and a verb (ibid., 9:14-17).

19 See below
speech and the sounds which derive from them, just as there was a correspondence between the structure of a musical instrument and the music that it generates:

The letters may derive their vocal articulation from the natures. There are in the throat several sources of vocal emission of letters.\(^{20}\)

As for the letters of the alphabet, they were designated figures for the denotation of sounds. Thus, in the Kitāb al-Hudūd (Book of Definitions, Kr 328)\(^{21}\) we find the following definition of letters:

They are designated figures which by general agreement (bi'l-muwāda'a) indicate articulated sounds. By convention, the ordered composition of these figures signifies meanings (ma'ānī).\(^{22}\)

And in this way, letters were related to meanings too. In fact, meanings were forms, and the object of letters was to evoke these forms:

This is the definition of meanings: they are the forms intened by the letters.\(^{23}\)

The homology between music and meaningful utterances was evident: just as there existed sounds which were musical, and those which were not, so there existed sounds

\(^{20}\) al-Sirr al-Maknūn. MS Paris 5099, f54a. See Arabic text in the "Appendix".

\(^{21}\) There are three additional texts in the corpus with the same title: Kr 181, 780 and 2745.

\(^{22}\) Kraus ed [1935], 109:4-5. Once again, Jābir seems to differ fundamentally from the Ikhwān al-Safā'. He repeatedly expresses his belief that the 28 letters of the Arabic alphabet, or the '28 signs that designate the sounds', are a matter of convention and do not have the force of natural law. Thus, like Zakariyyā al-Rāzī in his Ḥawī (see Kraus [1942-3], II, p245, n3) and Birūnī in his Kitāb al-Šaydāna (See Meyerhof [1932], p14), Jābir criticizes the Arabic script for having ambiguities and needing radical reform: "If one were to replace...similar signs by dissimilar signs", he writes in the Ikhrāj, "people would be saved from corruption and mistakes of language. This is where the flaw of the inventor (nāzīm) lies. [Such reform] is in effect possible not just in the nature of writing, but also in its power to evolve" (Kraus ed [1935], 9:5-8, see Arabic text in the "Appendix"). In contrast, the Ikhwān teach that the codification of the Arabic script is definitive (Rasā'). Zarkali ed [1928], III, p151ff), and its inventor (wālik) was divinely inspired (Ibid., III, p357, where one reads the phrase hikmat al-Bārī). Arabic alphabet, they believe, can be reduced to eternal geometric figures (Ibid., I, p28).

which carried meaning (bi-ma'nan tahtuhu), and those which did not (bi ghayr ma'nan).\textsuperscript{24} And just as for a sound to be musical it had to follow natural rules of music, for it to be meaningful it had to follow natural rules of phonetics - both these sets of rules were governed by quantities and their combinations. Thus, treating letters solely from a phonetic point of view, Jābir tells us in the Ḩijrā that the maximum number of moving (vocalized) and quiescent (non vocalized) consonants that can cluster in a row is naturally fixed.\textsuperscript{25} Elsewhere,\textsuperscript{26} he classifies the letters of the alphabet according exclusively to their phonetic value - there were some letters which were sonorous (māhirā), others which were 'deaf' (al-summ),\textsuperscript{27} yet others were litterae productionis (hurūf al-lūn), and so on.\textsuperscript{28}

Morphology is treated by Jābir as if it were a branch of arithmetic - a science of numbers and their permutations.\textsuperscript{29} Indeed, in the context of the Arabic language this does not seem to be too far-fetched. Arab grammarians had pointed out at an early date that a vast majority of the words of their language were traceable to a consonantal root with a fixed number of radicals. Once these roots were discovered, almost the entire Arabic vocabulary could be built up by different permutations of the vowels adjoined to these radicals, by rearranging the radicals, and by adding other letters to these radicals.\textsuperscript{30} Thus the Arabic language easily lent itself to a quantitative treatment - a feature fully exploited by Jābir.

\textsuperscript{24} Ikhrāji, ibid., 15:5. In the same work Jābir tells us that he has written a special Epistle in which he has described hundreds of animal sounds (ibid., 14:15). This work is lost.

\textsuperscript{25} Edited text 9:11-13.

\textsuperscript{26} Ikhrāji, Kraus ed [1935], 11:14; 13:9ff.

\textsuperscript{27} This term is used by the grammarians to designate triliteral verbs with identical second and third radical: verbum mediae gemitae.

\textsuperscript{28} See Bravmann [1934].

\textsuperscript{29} Note the emphasis here. Jābir does not say that morphology is a branch of arithmetic, nor that it can be reduced to numbers (cf n10 above).

\textsuperscript{30} This was already accomplished in the 2nd/8th century by Khalīl ibn Aḥmad in his Kitāb al-'Ayn.
In our text Jābir gives us a whole set of rules for restituting the root of a word \( (\text{radd ila'\text{-}asl}) \) so that its structure exactly reproduced the structure of the thing it named. The task of the expert of Balance (Ṣāḥib al-Mīzān) was to reduce a word to its primitive elements by identifying and removing all the additions, and reversing all the variations it had undergone. Once this was done, the analysis of the word would correspond to the analysis of the object of which it was the name. Thus, feminine designations, additions made to the radicals to denote the dual and the plural, the inflexions of the noun (i‘rāb), and of the verb (tasrīf), the article, and all other augmentations must be stripped away to extract the primitive core - this is what Jābir calls in the \( \text{Ahjār} \) "\( \text{iqsāt/ittirāh al-zawā'id} \).\(^{31}\) He also specifies the letters which are in general to be regarded as additions to the radicals, they were ten in number. Clearly, all this is borrowed from the Arab grammarians.\(^{32}\)

Again, in agreement with the grammarians, Jābir classifies Arabic roots according to the number of radicals. In the \( \text{Ahjār} \) he distinguishes three types of roots: triliteral (thulāṭī), quadriliteral (rubā‘ī), and quinqueliteral (khumāṣī).\(^{33}\) He then gives different permutations of the vowels modifying the structure of a root, yielding 12 paradigms (awzān) of triliteral roots, 5 of quadriliteral, and 4 of quinqueliteral roots.\(^{34}\) But this was a mathematical exercise constrained by semantic and phonetic considerations, for many more paradigms are possible if one treated the radicals, as well as the adjoining vowels and the sukūn\(^{35}\) as symbols of a formal system. Indeed, this is precisely what Jābir does in his Kitāb al-Ḥāsil.

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\(^{31}\) Edited text passim.

\(^{32}\) See de Sacy [1831].

\(^{33}\) He recognizes biliteral (thunāṭ) roots too, of which he gives in the Bahth 6 paradigms (Ms Jārullāh 1721, f130b).

\(^{34}\) Edited text 7:9-8:5. This account is in full agreement with the grammarians (see, for example, al-Suyūṭī, op. cit., II, passim).

\(^{35}\) see n13a above.
In the Ḥäsīl we find our alchemist taking a special delight in churning out virtually endless lists of roots that can arise out of all possible permutation and combinations of the 28 letters of the Arabic alphabet. This produced a large number of unknown and novel words. Traditionally, these words had no meaning, but it was quite conceivable, Jābir felt, that in times to come they would be incorporated into the Arabic vocabulary. Thus, to construct biliteral roots, Jābir combines to the first letter of the alphabet, alif, each of the 28 letters one at a time - this yielded 28 letter pairs. The same treatment is given to the second letter, bā'. In constructing the triliteral roots, he gives all the possible arrangements of the three radicals, 6 in total (\(= 3 \times 2 \times 1\)), to manufacture an enormous body of words with three consonants.\(^{36}\) We are told that quadriliteral roots admitted of 24 different combinations (\(= 4 \times 3 \times 2 \times 1\)), and quinqueliteral roots of 120 (\(= 5 \times 4 \times 3 \times 2 \times 1\)).\(^{37}\) All this is aimed at illustrating the same fundamental idea: namely that language, like music, was governed by the laws of quantities and their combinations.

Equally, Jābir exploits the quantitative nature of the already familiar Arabic metrics. The phonetic characteristics of the Arabic language, as well as the superficial features of its script, had contributed to an early rise in Islam of a science of prosody (\(\text{ʾilm al-ʿarūḍ}\)) based solely on quantitative considerations.\(^{38}\) Classical Arabic verse is a 'quantitative' verse, in that its rhythm is attained largely by regularly recurring sequences of short and long syllables, forming metrical 'feet', which last the same length of time - a quality it shares with ancient Greek poetry.\(^{39}\) The founder of the Arabic science of metrics, al-Khaṭṭī ibn

\(^{36}\) Kraus in his [1942-3], II, p248-9 has reproduced many of these lists.

\(^{37}\) Bahṭh, f131a, qu. Kraus, ibid., p247, n1; 248, n1.

\(^{38}\) In the extended sense "\(\text{ʾarūḍ}\)" embraces not only the science of metre, but also the science of rhyme. More usually, however, the term is treated in the narrower sense of the former which is what it denotes in the present work.

\(^{39}\) Unlike Germanic languages, the quantity of every syllable in every word in ancient Greek is absolutely fixed. Thus, in the former, the characteristic means of distinguishing definite syllables from their neighbours is stress, rather than their fixed quantity.
Aḥmad (d c 175/791), did not seem to possess the concept of syllable, but he was nevertheless able to identify what we call short and long syllable: he achieved this through an ingenious use of the peculiarities of the Arabic script in which the face of each word was a guide to the quantity of its syllable. One individual 'moving' consonant (mutāhārrik) corresponded to what we call a short syllable; and two consonants, of which the first is moving and the second is 'quiescent' (sākin) corresponded to what we call a long syllable.⁴⁰

This whole theory of Arabic metrics is not only known to Jābir, he reproduces it systematically and rigorously in the ḤāJR, finding yet another support for his Balance of Letters doctrine. Like al-KhaÊÊ, Jābir identifies 8 rhythmic feet - significantly, he calls them "parts of the numerical composition" (ajizz̲ al-ta'īf al-'adad) - whose recurrence in definite distribution and sequence gave rise to all metres. Two of them were quinary feet (khumāsiyyān), and the remaining six were septenary (subā'iyya). These feet, Jābir adds, are modified by additions (ziyāda) and separations (nuqṣān) to produce an unlimited number of metres.⁴¹

He feels that music and metrics were evidently cognates. Small wonder, then, that in the ḤāJR Jābir speaks of both of them in the same breath - in the same passage and in the same sentence, employing to both the same terminology. In fact, music proper was the highest stage of learning, preceded only by metrics and morphology:

It is not possible for anyone to learn music without first mastering the science of metrics and morphology, the science of melody and harmony, the science of versification, and the art of composing poetry...⁴²

⁴⁰ Weil "'Arūf", s.v. [EI1], I, p667; Freytag [1830]; Jahiz, Bayân Cairo ed [1932].
⁴¹ Edited text 10:2-3.
⁴² Ikhrais, Kraus ed [1935], 14:10. See Arabic text in the "Appendix".
Just as there were eight rhythmic feet in metrics, there were, we read in our text, eight rhythmic modes in music too. And just as additions and separations (of syllables) gave rise to ever new metres, variations in the primary modes gave rise to novel modes. Clearly, it was the ordering of numbers and their combinations which created music, and the same was, indeed, true of metrics as well as of morphology. A rather strong-worded expression to this effect is to be found in the al-Sīr al-Maknūn where Jābir declares that it is simply wrong (khata') to say that only music is a harmony of numbers - in fact much else, in particular metrics, was a manifestation of numbers and their harmony. Harmony of numbers, he writes, was to be viewed as a genus (jins): "like 'animal', to which a number of things belong."43

Among the members of this genus were the "wonders" ('ajā'ib) of the motions of celestial bodies - these motions followed a numerical system (al-nizām al-ta'rif) : "and by this I mean a musical system."44 But more than that, the individual soul too was a harmony of numbers. In the al-Sīr al-Maknūn Jābir defines the soul:

Harmony of numbers is not the name of the soul, rather it is the definition of the soul. Definition is a predicate of a given subject.45

And on the same subject he invokes the authority of Plato:

Plato believed that the soul is rational substance (jawhar 'aqīf) whose essential motion is governed by the harmony of numbers.46

In fact, prosody, and the art of melody and rhythm were identical with the soul:

42a Edited text 10:14.
43 MS Paris 5099, f54b. See Arabic text in the "Appendix".
44 Bahth. MS Jārullāh, f145b. See Arabic text in the "Appendix".
45 MS Paris 5099, f55b. See Arabic text in the "Appendix".
46 Häsil. MS Paris 5099, f115b. This comes verbatim from ps Plutarch's Placita philosophorum (Daiber ed [1980], Text' 50:10-11). (See "Introduction", n165 above).
Prosody and the art of melody and rhythm are the soul. This is so because these arts arise only out of the soul, and are possessed only by those who possess the soul.\textsuperscript{47}

Indeed, these are the considerations

which yielded our statements concerning the harmony of numbers, considerations which led to our doctrine that the natures and the degrees [of their intensity] are harmony of numbers.\textsuperscript{48}

\textit{The Metaphysical Synthesis}

The reader stands in awe of Jābir's commanding expertise in so many classical disciplines. And yet, what is equally striking, our author makes hardly any original contributions to the body of knowledge that had existed in the Arabic tradition from the earliest times. Despite his vast knowledge, his elucidation of phonetics, morphology and syntax adds barely anything new to what the Arab grammarians had been saying, and his exposition of metrics and musical modes appear no more than a faithful reproduction of standard traditional accounts - he breaks no novel grounds in these individual areas. Indeed, in each case he frequently invokes the authority of experts (nahwiyyūn, asḥāb al-ʿarūd etc)\textsuperscript{49} and does not conceal the fact that he is drawing upon the discoveries of others.

Evidently, Jābir's originality does not lie in these fields considered in isolation. It lies, rather, in the remarkable and daring synthesis which he was able to forge, and in which all these components cohered to form an all-embracing philosophical system. To be sure, it is a philosophical system because, as we shall see, it is founded upon certain well-defined metaphysical principles. It is this foundation to which his entire thesis owed its

\textsuperscript{47} al-Sīr al-Maknūn, MS Paris 5099, f55a. See Arabic text in the "Appendix".

\textsuperscript{48} loc. cit. See Arabic text in the "Appendix".

\textsuperscript{49} Repeatedly throughout the Books of Balances.
meaning and justification."Some people consider me a fool", wrote Jābir in the Tājīmī. "for proposing a relationship between the letters and the natures". But they are, he declares, ignorant: for this relationship is founded upon something that is as firm and as indubitable as the foundation of mathematics.50

He proceeds to prove his proposition in two steps. First, he constructs a logical argument to demonstrate that language arose not out of convention or blind chance, but out of 'the natural intention of the soul'. Next, he presents his grand ontological thesis: language, he tells us, is an embodiment of what is represented in the intellect, and that which is represented in the intellect is the substance, essence and reality of being. Thus, language signified being, and since - by virtue of Jābir's physical thesis - all naturally existing objects were reducible to the four natures, language signified the four natures. But language, like physical bodies, was reducible to primary elements - these elements were letters. Therefore, at the primitive level, letters signified the natures. The ontological equivalence of letters and natures was thereby established.

Here we have an interesting situation: we saw earlier that Jābir treats the Arabic script to be a matter of mere convention. But if this is so, how can letters signify the tabā'ī in a natural and immutable way as he seems to suggest here? Kraus declares this to be another Jabirian inconsistency,50a even a contradiction.50b But this inconsistency vanishes if one keeps in view the fact that in Jābir's system a clear distinction is maintained between letters (al-hurūf) and the alphabetical 'signs' (ashkāl) representing these letters. These were two different entities. The former existed in potentiality (or, one may say, letters were

50 MS Leyden 1265, f106b, qu. Kraus [1942-3], p252, n4. See Arabic text in the "Appendix".
50a Kraus [1942-3], p256, n5.
50b See n52 below.
Platonic Forms), and the latter was a human attempt to bring this into actuality (or, in Platonic terms, alphabetical signs were mere copies of letters):

this is a portrayal by means of lines (tamthīl al-khūṭūt), and [a process of] bringing it [sc. the letters] from potentiality into actuality.\(^{50c}\)

As for the question of how to bring letters into actuality, that is, how to represent them most accurately and in the best fashion, this was a matter of agreement and convention. The 'signs' could change and evolve, in fact they needed to.\(^{50d}\)

But let us proceed with our examination of Jābir's proof of his proposition. This is how he presents his logical argument:

In a discourse Aristotle had said that in the world of generation and corruption no other creature except man is endowed with the faculty of articulated speech (nusq).\(^{51}\)

Articulated speech consists in [the ability of] discrimination and judgment (tamyīz), and [written] discourse (kalām) consists in the ordering of letters. And by carrying out this translation [of speech into the written word], the ordering of letters leads to the grammar of a given language.

But is it [sc. language] due to convention (istilāḥ), chance (‘alā ma‘ā wa ittafaqa), or is it due to the natural intention of the soul (qasd tabī‘ nafsān)?

I say: the affirmation that it [sc. language] is a coinage (wad‘), a convention, or an accident (‘arad) is a mistake, for language is a substance (jawhar) by nature, and did not arise out of convention (bi‘l-wad‘). Indeed, it is due to the intention of the soul, and all acts of the soul are substantial...So letters, which are the prime matter (hayūq) of discourse, are an invention of the soul.\(^{52}\)

\(^{50c}\) See n56 below.

\(^{50d}\) See n22 above.

\(^{51}\) Gr. ὁλος from which the word "logic", manṭiq derives.

\(^{52}\) Khamsīn, MS Shahīd 'Ali Pasha 1277, f.132b, qu. Kraus [1942-3], II, p.256, p.4. See Arabic text in the "Appendix". Kraus (op. cit., p.256, p.5) finds Jābir clearly contradicting himself in the Ikhraj where he says: "meaning (ma‘na) can be considered as if it were substance (kalā‘-jawhar), discourse (kalām) as if it were accident (kalā‘-‘arad)" (Kraus ed [1935], 8:10). But, evidently, Jābir is not saying that language is an accident. He is presenting to the reader an analogical explanation of the relation between meanings and words which designate those meanings.
The argument can be put in a syllogistic form. Jābir's premises are: (a) man is the only creature endowed with the faculty of speech; (b) only man possesses soul (not stated but certainly presupposed); and (c) every act of the soul is substantial (as opposed to accidental). Conclusion: speech is substantial. The same type of argument, similar both in substance and form, appears in the al-Sirr al-Maknūn:

To every naturally existing thing belongs some characteristic act. Then let it be known that to man in particular belong most of the acts, and the greatest of them...Thus necessarily, man developed and discovered the science of logic, grammar, geometry, medicine and astronomy... Likewise, it is undeniable that discourse (kalām), and the composition of letters (ta'īf al-ḥurūf) and their shapes (ʿamal ashkāluhā) are among the works of man (min taʿīf al-ʾinsān) - except that these come to pass by nature.

It is thus indubitable that discourse and the ordering of letters are part of man's natural disposition (lahu tab投身). This is so because every naturally existing thing possesses a natural disposition (tabṭ’a), and man exists naturally. 53

This completes the first step. Jābir's ontological doctrine, his second step, which also carries a familiar psychological theory of knowledge, runs roughly as follows:

• First, there is being ('the thing'). Being has three aspects - substance (ʿayn), essence (dhāt), and reality (ḥaqīqa).

• Second in the ontological hierarchy is the representation of being in the intellect (taʿāwwur biʾl-aql). The intellect performs a judgment on the representation. This judgment consists in the determination, inter alia, as to whether the object represented is real or otherwise, necessary or impossible, true or false.

53 MS Paris 5099, f54a. See Arabic text in the "Appendix".
• The third place is occupied by enunciation (al-nutq), that is, vocal articulation of the representation. This is carried out by means of a knowledge of phonetic rules.

• And finally, there is the written word (al-katb). This is the portrayal of the object by means lines, and a process of bringing the word from potentiality to actuality.54

In Jābir’s own words:

You ought to know that geometry, logic, music, arithmetic, the Art (= alchemy), the science of [artificial] generation [of living beings], and the science of all higher and lower bodies are not merely meanings (ma’ānī).55 Rather, they are meanings subsisting in the soul, and meanings that are enunciated. This we have already explained in the book of logic called Peri Hermeneias (Bāṭr Minyās).

All things are considered under four aspects. First, their substances (aʿyān), essences (dhwāt), and realities (haqāiq). For example, [the nature] hot in its essence, or [the nature] cold in its essence, independent of their existence in relation to us.

Then, the representation of things in the intellect, and [the judgment] as to whether they are real or not - such as affirmation or negation of the existence of the object in question, and the declaration true or false. Next, their enunciation (al-nutq biḥā), and the knowledge of ...(?55a the quiescent letters, hamza bearing letters, mobile letters, linking letters, and others.

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54 In their general outline, Jābir’s ideas concerning the perception of external objects bear a striking similarity with those of Avicenna in his Kitāb al-Nafs (Rahman ed [1959]), and of Averroes in his compendium of Aristotle’s De sensu et sensato (Blumberg ed [1972]). Evidently Jābir’s source is, likewise, the Parva Naturalia of Aristotle. We note that in the Bahth the author does refers to both the De anima (Fi’l-Hiss waṭ-Maḥṣūs; ibid., f31b, qu. Kraus, p323, n5).

55 The translation of “ma’ānī” as “meanings” is rather loose. Kraus equates this term to Greek pragmata (ibid., p258, n5), and it occurs both in Avicenna’s Nafs and Averroes’ Hiss waṭ-Maḥṣūs where it seems to signify representations in the mind, or representations in the sense. “The object of sense perception”, writes Avicenna, “is form, and that of imagination (wahm) is ma’nā” (op. cit., p167). Averroes says, “The ma’nā in memory is not the ma’nā in imagination (takhayyul)” (op. cit., p38).

In the Ḩikmat, Jābir explains his “ma’nā” by stating its relationship with discourse (kalām) (see n52 above). Cf Farābī, Ilṣa al-ʿUlīm, Palencia ed [1932], p22.

55a The word could not be deciphered in the manuscript.
Finally, putting them in writing (al-kath bihā). This is a portrayal by means of lines (tamthīl al-khūṭūrī), and [a process of] bringing it [sc. the written word] from potentiality into actuality.⁵⁶

There is no disagreement between philosophers, says Jābīr, that each existing thing reflects the nature of a higher thing from which it derives.⁵⁶⁸ And this was true also of the ontological chain - being (substance, essence, reality) → representation in the intellect → enunciation → written word. The idea finds a lucid expression in the Kitāb al-Khamsīn:

What is in writing signifies that which is in enunciation (dāla ‘alā mā fī’l-lafẓ), and that which is in enunciation signifies what is in the intellect (mā fī’l-fikr), and what is in the intellect signifies the quiddity of things (mahiyat al-ashyā’).⁵⁷

Application of the Balance of Letters

Jābīr is interested in philosophical issues only insofar as they serve his practical ends. His metaphysical excursions must now yield concrete results. Thus, after constructing a speculative framework, he proceeds to apply theory to practice. But this process of the application of Mizān al-Hurūf would give rise to its own tensions and challenges, bringing into focus the gaps and weaknesses of his system. He is going to tackle them with a great deal of ingenuity, but often by means of ad-hoc strategems. Yet, at the same time, we shall see him making some powerful and rich theoretical generalizations which are suggested soley by practical considerations.

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⁵⁶ Taṣrif, MS Paris 5099, f140b. See Arabic text in the "Appendix".
⁵⁶⁸ al-Sīr al-Maknūn, MS Paris 5099, f54a, qu. Kraus [1942-3], p257, n3.
⁵⁷ Khamsīn, MS Shāhīd ‘Alī Pāshā, f134a. See Arabic text in the "Appendix".

It is interesting to note the following passage in the first Risāla of the Ikhwān: "Enunciations signify meanings, meanings are the things named, and enunciations are names." (Zarkaḥ ed [1928], I, p24).
To measure the quantities of the four natures in a given substance, one needed to analyze morphologically the name of the substance. As we have seen, while Jābir had accepted Galen's classification of each quality in a body into four degrees of intensity, he had subdivided each degree into 7 subdivisions. This gave a total of $7 \times 4 = 28$ positions: it so happens that the letters of the Arabic alphabet are also 28 in number! Thus in the *Ahjūr* he constructs a table in which the letters are arranged according to the ABJAD scheme with each letter representing one of the four natures - for example, alif = heat, bā' = cold, jīm = dry, dāl = moist; hā' = heat, wāw = cold, zā' = dry, ḥā' = moist, etc. Similarly, it is specified in the table as to which subdivision of the degree each letter corresponds to.

Finally, the table - which, curiously, our author attributes to Socrates - assigns to each letter four different weights, according to whether the letter represents the first degree of intensity, the second degree, the third, or the fourth. This was to be determined by the place of the letter in the name being analyzed: if a letter, say alif, is the first radical (such as in *usrub*), it signified the first degree on intensity; if it is the second radical (such as in *kāfūr*), it signified the second degree, and so on. Since each letter was to be reckoned in four different ways, the table yielded a grand total of $28 \times 4 = 112$ positions. But what is most important, this scheme of numerical classification of letters followed the proportion $1 : 3 : 5 : 8$ - indeed, as we read in our text, everything in the world was governed by the number 17 ($= 1 + 3 + 5 + 8$):

58 See "Reconstructing the Context" (Chapter II) above.

59 ABJAD is the first of the eight mnemotechnical terms into which the 28 letters of the Arabic alphabet are traditionally divided, and each of them is given an integral numerical value. In the Islamic East, these numerical values followed the series 1 to 9, 10 to 90, 100 to 900, and 1000. Significantly, Jābir does not assign to the letters these numerical values as, for example, the Ikhwān do (see Zarkaft ed [1928], I, p23-48).

60 In a strict sense, the table that follows is an adaptation of Jābir's table (see edited text 19:1ff), this is so because:
   a) Jābir does not use Indian numerals, all his numbers are expressed in words.
   b) He expresses his weights in three different units- qirāt, dānaq, and dirham. In our table all weights are specified in the same unit (see immediately following note).
The Åhjar is full of examples worked out through the use of this table. Thus, to reveal the quantitative and qualitative structure of, say, lead, one proceeded in the following way: The word that named lead was USRUB - this was free of any additions or variations, and already existed in its primary form, therefore no 'stripping away' (ittirâh) was needed. Now, this name had four consonantal elements - alif, sin, ra', and bâ'. in that order. The first letter alif signified a nature in the first degree of intensity: from the table, one discovered that this nature was hot and its weight was 7 dânaqs; by the same rule, the

\[\text{Sub-} \quad \text{Ist} \quad \text{IInd} \quad \text{IIId} \quad \text{IVth} \quad \text{Hot} \quad \text{Cold} \quad \text{Dry} \quad \text{Moist} \]

\[\text{div.} \quad \text{Deg.} \quad \text{Deg.} \quad \text{Deg.} \quad \text{Deg.} \]

\[1: \quad 3: \quad 5: \quad 8 \]

<table>
<thead>
<tr>
<th>Degree</th>
<th>7°</th>
<th>21</th>
<th>35</th>
<th>56</th>
<th>alif</th>
<th>bâ’</th>
<th>jîm</th>
<th>dâl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>3</td>
<td>9</td>
<td>15</td>
<td>24</td>
<td>hâ’</td>
<td>wâw</td>
<td>zâ’</td>
<td>hâ’</td>
</tr>
<tr>
<td>Minute</td>
<td>2+1/2</td>
<td>7+1/2</td>
<td>12+1/2</td>
<td>20</td>
<td>tâ’</td>
<td>yâ’</td>
<td>kâf</td>
<td>lâm</td>
</tr>
<tr>
<td>Second</td>
<td>2</td>
<td>6</td>
<td>10</td>
<td>16</td>
<td>mîm</td>
<td>nûn</td>
<td>sîn</td>
<td>‘âyn</td>
</tr>
<tr>
<td>Third</td>
<td>1+1/2</td>
<td>4+1/2</td>
<td>7+1/2</td>
<td>12</td>
<td>fâ’</td>
<td>sâd</td>
<td>qâf</td>
<td>nâ’</td>
</tr>
<tr>
<td>Fourth</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>shîn</td>
<td>xî</td>
<td>hâ’</td>
<td>khâ’</td>
</tr>
<tr>
<td>Fifth</td>
<td>1/2</td>
<td>1+1/2</td>
<td>2+1/2</td>
<td>4</td>
<td>dâhîl</td>
<td>dâd</td>
<td>zâ’</td>
<td>ghayn</td>
</tr>
</tbody>
</table>

c) Since each letter was to be reckoned four times, Jâbir divides his table into four separate sections. This method is somewhat clumsy and has not been reproduced in our table.

* All the weights in this table are expressed in dânaqs according to the following system used by Jâbir:

\[1 \text{ habba} = 1 \frac{1}{3} '\text{ashîr}\]
\[5 '\text{ashîr} = 1 \text{ qirât}\]
\[2 \text{ qirât} = 1 \text{ dânaq}\]
\[6 \text{ dânaq} = 1 \text{ dirham}\]

It should be noted that the relative values of different units of weights have not remained uniform in the Arabic tradition. An instructive manifestation of this problem is to be found in the differences that exist between the conversion tables given by modern scholars- thus, for example, Siggel’s conversion table (Siggel [1958], p223) does not agree with that of Lory ([1983], p86).
second letter َسَن َسِيَن َسْيَن َسَيَن signified cold in the second degree whose weight in the table was given as 6 َدَانَاق َدَانَاق َدَانَاق َدَانَاق. Likewise, َرَجَّي َرَجَّي corresponded to dry in third degree with a weight of 7 1/2 َدَانَاق َدَانَاق َدَانَاق; and, finally, َبَل َبَل was moist in the fourth degree, weighing 56 َدَانَاق َدَانَاق. Lead therefore was constituted out of 7 َدَانَاق َدَانَاق َدَانَاق َدَانَاق of hot, 6 َدَانَاق َدَانَاق َدَانَاق َدَانَاق of cold, 7 1/2 َدَانَاق َدَانَاق َدَانَاق of dry, and 56 َدَانَاق َدَانَاق َدَانَاق of moist.

But immediately, Jābir recognizes a fatal flaw in his system: the natures of lead as revealed by the the analysis of its name are not arranged in the proportion 1 : 3 : 5 : 8 - this was a cardinal violation of the "Supreme Principle" of Balance and threatened his whole philosophical edifice. 61 There were other problems too, though of a relatively minor magnitude - for example, the question of homonyms and synonyms had be addressed, a method had to be developed for the analysis of those names which did not have exactly four consonantal radicals; and, of course, there was this nagging question of the plurality of languages!

To cope with the most serious problem, Jābir proposes in the َعِجْر what clearly seems to be an ad-hoc hypothesis. The analysis of names (َهِجْل) only revealed the external or manifest (َذَهِيْج) nature of a thing. But there was in all things also a complementary inner or latent (َذَهِيْن) nature - and this was to be discovered by conjecture (َهَدُس). This meant that to find out the qualitative/quantitative structure of a given body, one needed to take three steps: the first step was to reduce the name of the body to its primitive elements, the rules for carrying this out were already given. The second step involved an analysis of letters, and, by the use of the 'Socratic' table, the determination of the natures and their weights these letters signified - this step gave the external nature of the body.

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61 The question as to why this proportion and the sum of its elements 17 is so fundamentally important to Jābir has remained a matter of speculation and search among modern scholars. For a discussion see "Commentary and Notes" below.
And finally, the third step consisted in the discovery of the latent complement of the external natures - this was a conjecture whose aim was to make the natures of the body conform to the proportion $1 : 3 : 5 : 8$, represented by the number 17. In our text, Jābir calls this third step "completion to 17". In more specific terms, if the second step yielded a result that fell short of 17, one made additions (ziyāda); but if the result happened to be in excess of 17 or its multiple, one supressed the excess (ittirāh).

We find a large number of concrete examples worked out by the author to illustrate this 3-step method. For instance, he takes silver (fīḍḍa) and shows how one determines its complete nature (manifest + latent):

- The primitive elements of the name fīḍḍa were F D (the second D was a repetition and was therefore to be 'thrown away', the ta marbūṭa was feminine designation and was likewise to be discarded).
- F was the first letter and therefore represented the first degree of intensity. From the table one discovered that it corresponds to the nature hot with the weight of 1 1/2 dānaqs. D was 1 1/2 dānaqs in the second degree of cold.
- Finally, noting that the weights fell short of 17, one determined the complements to discover the complete qualitative/quantitative structure of silver, and the result was the following:

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62 MS Paris 5099, f59a.
63 Edited text 6:4-5. (The actual calculation is to be found on f78a of MS Paris 5099).
<table>
<thead>
<tr>
<th>Nature</th>
<th>Result of the Analysis</th>
<th>Conjecture</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot</td>
<td>$F = 1 + \frac{1}{2}$ dānaq</td>
<td>$5 + \frac{1}{2}$ dān.</td>
<td>7 dān.</td>
</tr>
<tr>
<td>Cold</td>
<td>$D = 1 + \frac{1}{2}$ dān.</td>
<td>$3 + \frac{1}{4}$ dirham</td>
<td>$3 + \frac{1}{2}$ dir. ($=3 \times 7=21$ dān.)</td>
</tr>
<tr>
<td>Moist</td>
<td>--</td>
<td>$5 + \frac{5}{6}$ dir.</td>
<td>$5 + \frac{5}{6}$ dir. ($=5 \times 7=35$ dān.)</td>
</tr>
<tr>
<td>Dry</td>
<td>--</td>
<td>$9 + \frac{2}{6}$ dir.</td>
<td>$9 + \frac{2}{6}$ dir. ($=8 \times 7=56$ dān.)</td>
</tr>
</tbody>
</table>

Now, as we note, the four natures are in the proportion $1 : 3 : 5 : 8$, and the final result conforms to the number 17, for $7 + 21 + 35 + 56 = 119 = 17 \times 7$. Having saved his theory, Jābir repeatedly emphasizes the importance of this number, not only in the Ahjār, but throughout the Books of Balances. Thus, for example, the number 17 is equated to form (ṣūra): "the form of all things is 17".64 Similarly, it is affirmed that all minerals (ahjār) had 17 powers.65 In fact, the entire method of Balance was an attempt to discover how the number 17 determines the qualitative and quantitative structure of all things.

But if the structure of all things was governed by the same number, then, ultimately, all things were structurally identical. Indeed, this is a consequence which is not only recognized by Jābir, he develops into a universal law of nature. All bodies which exist in their normal state, he writes in the Ahjār, are in the state of equilibrium, and they are in equilibrium because their constituent natures exist according to the number 17. If the equilibrium of a body is lost (or, in other words, its natures do not conform to 17), it will decompose, and will lose the structure that makes it what it is. Stones whose natures reach beyond 17, or fall short of it, do not retain their natural state - they crumble and pulverise (la kharaja mutafattitan). And this is the universal Cannon of Equilibrium (Qānūn li‘l-I‘tidāl).66

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64 Edited text 14:1.
65 Edited text 20:4.
66 Edited text 37:11. A similar idea of equilibrium is found in other Jabirian texts too (see, for example, Berthelot ed [1893], III, 115:2-6).
A drastic corollary of this doctrine of structural identity of natural objects is that it abrogates the traditional hierarchy of bodies: gold is no more in equilibrium (a‘dal) than, say, copper; the fruit of a tree is no more in equilibrium than its leaf; the body of animals is just as much in equilibrium as that of man. In our text, Jābir forcefully declares, that "each body belonging to the three kingdoms of nature as long as it remains in its normal state is in equilibrium. This is also true of its parts: the parts of an animal body, for example, have their own proper constitution possessing their own equilibrium. Once the fundamental equilibrium of a body is established, there is no reason to attribute to one body more equilibrium than another. Gold is no more in equilibrium than any other metal and it is only distinguished by its utility." This is a daring statement on the part of an alchemist.

The idea of the latent and manifest nature of things, which is suggested solely by practical considerations, is now developed into a fully-blown alchemical theory. We are told that all bodies in the world have an inner nature and an outer nature, and when these are combined one finds out that the four natures in every natural object is governed by the number 17. Every metal, writes Jābir in the Ṣub‘īn, contains within itself another metal of opposite constitution. For example,

lead is cold and dry externally...but hot and moist internally...And as for gold, it is hot and moist externally, but internally it is cold and dry.

Again, this had some far-reaching consequences, for, by virtue of what we just read, the metal we call lead was only manifestly lead: latent in it was the precious metal gold. Indeed, this was so -

lead is latently gold, and tin (qala‘T) is latently silver.

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67 This is Kraus' paraphrase of the section of the Ahjār dealing with the concept of equilibrium (Kraus [1942-3], II, p233, n2). Cf edited text 22:3-13.
68 LXX Books. Kraus ed [1935], 467:4-5; 468:15. See Arabic text in the "Appendix".
69 Tajmi‘, Berthelot ed [1893], III, 161:15. See Arabic text in the "Appendix".
Similarly, in the Ahjar our author says that lead only manifests itself to us as a base metal. In it lies gold which is hidden from people. But if what is hidden is extracted out, lead will turn into gold. Indeed, the task of the alchemist in carrying out transmutation is nothing but making manifest what is latent. In keeping with his view that the four natures were real material constituent of natural objects, Jabir even specifies the location of the two complementary sets of natures in physical objects—thus, in the Tajmit he tells us that external natures existed at the periphery (muhit) of the body, and internal natures were located in the inside (batin), that is, at the center.

The classical idea of 'red' and 'white' metals is also smoothly and ingeniously incorportioned into this alchemical theory. Thus, gold, tin and copper were red metals in whose external nature hot and dry were preponderant; in contrast, the metals iron, silver and lead were white with an external preponderance of cold and moist.

So we see that in the process of tackling a dangerous problem with his system, Jabir adds several interesting and rich ideas to his theoretical repertoire. As for the minor problem of the analysis of those names which do not have precisely four letters in their primitive form, his idea of conjecture has already solved it partially. If the number of letters in a primitive name was less than four (fidda → FD was a case in point), the gap was to be filled by finding complements through conjecture. But if the number of letters exceeded four, then, we are taught, these letters must be divided into four groups. Our text carries a number of examples to illustrate this method.

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70 Edited text 34:14-15.
71 Tajmit, Berthelot ed [1893], III, 13-16.
72 Edited text 20:4-9.
73 This division of the letters of a name into four groups does not, prima facie, follow any system. However, Kraus suspected that Jabir's scheme is governed by musical considerations (see Kraus [1942-3], p256, n2).
The question of homonyms and synonyms is addressed by Jābir on the grounds of the natural origin of language. In the Ahjār he declares that two different names never designate the same thing, nor do two different things have the same name or the same definition. In some treatises we see him painstakingly involved in etymologies in order to justify his views. Our text carries a discussion on what is regarded as different appellations applied to the same metal: qala‘T, rasās, zāwus and mushtari. The author, invoking the authority of Socrates, decides in favor of zāwus as being the correct name of the substance in question. The others were not synonyms, but names of other things.

Jābir feels that many colloquial forms have obscured the original core of words, and language needs to be purified. We see his Balīnās saying in the Ahjār that one ought to consider not colloquial names (‘ind al-mudhākira) but names which are established from the point of view of the application of Balance (‘ind al-‘amal), that is, names purged of corruptions. And although this sage is quoted in the text as saying that the practitioner of Balance need consider no language except Arabic, in general Jābir seems to hold the opinion that any language when sufficiently purified will yield the same results as the data of his own language. Perhaps this is why the question of plurality of languages does not seem to trouble him. In fact, his Balīnās even talks about the possibility of developing an unambiguous artificial language!

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73a Edited text 24:4-5; MS Paris 5099, f59b.
74 In the LXX Books (MS Jārullāh 1554, f211b), for example, Jābir gives the etymology of the words kiburt (sulphur), zibaq (mercury) and zarnikh (arsenic). In the Hasil he has a list of the names of metals in several different languages including Greek and Persian (Kraus ed [1935], 535:11-537:15).
75 Edited text 25:7-16. For a discussion on zawus see "Commentary and Notes" below.
76 Edited text 5:7-8.
77 Edited text 4:7-9. See "Commentary and Notes" below.
78 Edited text 5:8-11. For a discussion on Jābir's idea of an artificial language see "Commentary and Notes" below.
Appendix to Chapter III
لاشياء الطبيعية نحو الميزان والروحانية نحو السبب الأول.

والجزءين تتسم بحسب أنواع المكونات وذلك أنَّ ميزان الحيوان والنفس والطبيعة والصورة والألفاظ والكلمات والطبائع الأربع والحيوان وأبنية والحجازة، وأتبس

مئذ الحروف ...

كنت طالبة قالت إنَّ أحوال الطبائع وإدراك الكيفيات... قد يمكن أن بطرق أثر من هذه من أساطير الأذية والأدبي وأعضاء الطبيعة وأجزاء الحيوان وأجزاء الطبيعة الذي سميت ميزان الحروف وفيه علم دقيق يتواصل به إلى إدراك حقائق أحوال المكونات.

وأشار إلى الحروف كيف وضعها على الطبائع و إلى الطبائع كيف وضعها على الحروف وكيف تتقلل الطبائع إلى الحروف والحواف إلى الطبائع.

إذن الحروف الواحد لا ينطق به.

وتد وضح أنا لا نتضر أن نتكلم بحرف أو نضيعه إلى حروف أخرى، كذلك لا يمكننا وزن طبع واحد إلا بالإضافة إلى طبع آخر ليتبينن، فلما هذا الأصل?

أولَّا أن شئاً واحداً لا يكون على أقل من عنصرين منها أو ثلثية، ولا يكون على واحد فإن هذا باطل. وننال أن نقولا كلمة مثل محمد وجعفر... لا يكون إلا بتركيب الحروف، وقد تكون كلمة من حرفين وثلاثة أو أكثر من ذلك أو أقل، إلا أن كلمة لا تكون من حرف واحد، وإن هذا ممتنع أيضاً لأن لا تكون كلمة أقل من حرفين...

حرف ثلاث وحرف الإستراحة وتتامس السكت، وقد يجب أن يكون تركيب الحروف كتركيب الطبائع في سائر المكونات.

لأن ذلك الوضع من تأليف الحروف للكتب حتى تسمى ترفينا، وهذا الوضع من البساط يستوفي الفلاسفة ترفينا، فلم يجز أن يكون اسم الكتب غير « تصريف ».
لا كلام إلا بتأليف الحروف لم يكن بد من أن يقع في الطبعات مثل ذلك، فتجد أن يكون تصريف الطبعات كتصريف الحروف.

[162] صح أن الحروف... تكتب من طبعات مخالفة في الصوت... ومدارج الحروف للكثير في الحلق.

[163] وإن الحروف أنها الأشكال الدالة بالخواصة على الأصوات المتصلة يدل بنظمه بالواطء عليها.

ولو جعل مكان كل واحد من تلك الأشياء مثال غير مثال المشابه لمن الناس من تصحيح الكلام واللغة، فهذا مما تضر ناظره، وهو ممكن في الطبيعة والتنوع معاً.

[164] وإن حد المعاينة أنها الصور المتصورة بالحرف.

[165] وليس يمكن أحداً أن يعلم الموسيقى إلا بعد علم المعروض والتصريف وعلم النغم والإيقاع وعلم الشعر.

[166] وإن مثل الذي يتناول إن الموسيقى تتأليف ذو عدد وإن هذا خطأ في التعليم وإن كان حذراً. فإنه مثل قولنا "الحيوان" الذي هو جنس تحته أشياء كثيرة... وأيضاً ليس تولنا تأليف ذو عدد في الموسيقى بأخص منه بعلم العروض الذي تأليف أيضاً على شانى طرق.

[167] وقد كنا قائنا فيما سبق أن التعلم قد نظموا أفعال الكواكب لعجائب الأعمال من أجل مناسبات حركاتها للنظام التأليفي أعنى النظام الموسيقى الذي فيه العجائب.

[168] تأليف ذو عدد ليس إسماً للنفس، لكنه حدّ لها، والحدّ محدود على الحامل.

[169] وأما أنطوان فيرى أن النفس جوهر عقل متحرك من ذاته على عدد ذي تأليف...
إنّ الحروف وصناعة اللحون والإيثاء هي النفس، وهي كذلك قِيل أن هذه الصناعة،
إنّا كانت عن النفس ولا تتحمل إلا على ذي النفس.
فهذا الذي أنجز تولنا تأليف ذر عدد، وتولنا في المراتب والطبائع أنها تأليف ذر عدد.
وإني أُكرر في كثير هذا البرهان على الحروف وقتنا بعد وقت لما أعلم أن توماً
يستجهلونى على وضع هذه الحروف على الطبائع ويتولون إن ذلك المجال من قِيل ما
يسرع إليه عقولهم من دفنه وعظمته في تنوسهم. فانّا من دفع ذلك بغير برهان فنحن
والناس جميعاً يستتجهلون ويعفون على ذلك... فأنا من أخذ في دفع ذلك على
طريق الپرهان لا يكون في وجهين مختلفين واحداً إذ هو خلف لا يمكن.
وأقول إن كلام أرسلت أن الإنسان هو ناطق وحده في عالم الكون والنساء لا غير,
ومعنى النطق التمييز، ومعنى الكلام نظم الحروف... وهل ذلك بالإصلاح (وا) على ما
جاء واتفق، أو يتصدق طبيعيّة نفسانيّة، وهل ذلك عرض أو جوهر؟ فأقول: التول بأنها
وضع الإصلاح ومرض خطأ، لأنه جوهر بالطبع لا بالوصف لكن يتصد نفسانيّ لأن الأفعال
النفسية جوهيرها كلها... فالحروف التي هيكل الكلام ابتداها نفسانيّ.
وإذ كان قد ظهر أن كلّ شيء موجود فعلًا فليعلم أن الإنسان خاصّة أكثر الأفعال
أكبرها، فليعلم ضرورة أن عمله واستخراجه علم المنطق وال نحو والهندسة والطب
والنحو... وغير مدافع أن الكلام وتأليف الحروف عمل أشكالاً من تأليف الإنسان إلا
أنها قد وتمت بالطبع... فغير شك إذن أن الكلام ونظم الحروف له طبع ما إذ كان
موجود له طبيعة ما وهذا موجود.
لا ينبغي أن تعلم أن الهندسة والمنطق والموسيقى والحساب والصناعة والتوليدات وعلم جميع
السفنيات والعلويات ليست معاني فقط بل إنها معاني قائمة في النفس ومعناى يعبر عنها.
وذلك قد أوجتنا في كتاب المنطق المسمى بارير ميسياس. وذلك أن الأشياء كلها تتأل
على أربعة أوجه: الأول منها أميان الأمور وذواتها وحثائرها، كالحرارة في ذاتها والبرودة
في ذاتها وإن كان غير موجودين لنا. ثم تصور ذلك بالمثل وهل له حقيقة أم لا،
cالواجب والسالب والصدق والكذب، ثم المنطق بها ومعرفة مواضيع...؟ وهي الحروف
السواكن... وحروف الهمزة وحروف الحركات والوصول وغير ذلك. والكتب بها وهو
تمثيل الخطوط وإخراج ذلك من القوة إلى العمل.

إن الكتب دل على ما في اللفظ، وما في اللفظ دل على ما في الفكر، وما في الفكر دل
على ماهية الأشياء.

إن الأسرب بارد يابس في ظاهره... وهو حار رطب في باطنه... و أما الذهاب فحار
ربط في ظاهره، بارد يابس في باطنه.

الأسرب ذهب الباطن، والتلقي فنّتة في باطنه.
CHAPTER IV
THE TEXT OF THE KITĀB AL-AḤJĀR

(A) PRELIMINARY OBSERVATIONS

The Aḥjar, whose full title is Kitāb al-Aḥjar 'ala Ra'y Balīnās (Book of Stones According to the Opinion of Balīnās, Kr 307-310), belongs to the Jabirian collection entitled Kutub al-Mawāzin (Books of Balances, Kr 303-446). It is one of the larger texts of this group of treatises, having been divided by the author into four parts of more or less equal length. As for the collection itself, Kraus was able to restitute 79 of its titles, out of which 44 are extant.¹

Manuscripts: Complete Text

1) MS Paris, Bibliothèque Nationale, Arabe 5099, f56b-62b; 72b-86b.²
   Dated 1023/1614.²²

2) MS Teheran, Dānishgāh 491, f85b-121b (= Teheran, Malik 6206).³
   11th/17th century.⁴

¹ Kraus [1942-3], I, pp75-99. Ibn al-Nadīm mentions only four titles of the collection.
² See illustration on p123 below.
²² The date appears on f62b.
³ According to Sezgin (IGAS), IV, p253), these are two different manuscripts. However, the microfilm of MS Malik 6206 received from Teheran revealed that it is identical with MS Dānishgāh 491. The two MSS differ only in foliation which has been inscribed by a modern hand in both cases.
⁴ Sezgin, loc. cit. See illustration on p124 below.
Manuscripts: Partial Text

1) MS Cairo, Tal‘at Khrūmā 218, f1a-25b.
   Contains "Part II" to "Part IV".5

2) Private Collection of al-Khanjī, pp188-190.
   Small fragment of "Part IV" = MS Paris 5099, f87b-89a.5a

Studies/Editions

As a treatise in its own right, the Ahjār has never been studied before. In fact, strictly speaking, there is no critical edition of the text either. Indeed, in his 1935 selection of Jabirian texts, Kraus had included a large part of the Ahjār,6 but this is more of a reproduction of the text than a critical edition - Kraus' text is based on a single manuscript (MS Paris 5099), and, reproducing some of the manuscript's obvious corruptions,7 it appears with minimal critical apparatus. In addition, Kraus' aim was to make available in a short volume an enormously wide range of Jabirian ideas, and therefore he had to exclude from his selections even those parts of some of the treatises which are of tremendous historical worth: thus, for example, despite its importance, Kraus entirely skipped the "Part III" of the Ahjār,8 besides leaving out the opening sections of the "Part IV".

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5 Judged by the style of the hand (the "Diwāni" variation of Nastā'īq), this manuscript seems to be of the same period as the other two. See illustration on p125 below.

5a Equivalence reported by Kraus, op. cit., p80. This small fragment, which proved practically unobtainable, has not been consulted in the present work.

6 Kraus ed [1935], pp126-205.

7 See, for example, critical notes to edited text 16: 6-7, 13. See also the relevant section in the "Commentary and Notes" below.

8 This is where the translation of the Categoricae appears.
The Present Edition

While the critical edition which follows does not include the entire text of the Ahjär either, a serious effort has been made to minimize the loss of substance. Thus, only those parts have been excluded which essentially consist in (a) repetitions, (b) illustrative numerical examples of the principles already discussed, (c) rhetorical flourishes, or (c) drastic digressions from the main theme of the work.

The present editorial selection, which represents some 70\% of the entire text, does, however, contain many sections of the Ahjär which are not included in Kraus' volume - that is, those sections which have received no textual treatment of any kind in the history of modern scholarship. The edited text has been translated in its entirety, and this is followed by an extensive commentary and textual notes.

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9 This is due mainly to the thesis length limitations imposed by the University of London.
لا يمكنني قراءة النص العربي من الصورة المتاحة.
MS Teheran Daneshgah 491, 186a

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ILLUSTRATION III

[Text content not legible due to image quality or handwriting style]
(B) A CRITICAL EDITION

SIGLA

= MS Paris 5099
= MS Teheran Dānishgāh 491
= MS Ṭalʿat Kīmyāʾ218
= Kraus ed [1935]
+ = Added in the MS
- = Missing from the MS
? = Reading uncertain
?? = Blank space in the MS indicating possible erasure
=g= Appearing in the margin of the MS
= Word(s) on the left of the virgule appearing above the line of the text
in the MS. Word(s) on the right quote(s) the line itself.

OTHER SYMBOLS

[[ ]] The contents of the double square brackets specify the folios and lines of
MS Paris 5099 which have not been included in the present selection.

... The three dots not followed by double square brackets indicate that a single
word from the text, or a short phrase or sentence, has been skipped in the
present edition.

[ ] Single square brackets contain editorial glosses.

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الجزء الأول من كتاب الأخبار على رأي بليـناس

بسم الله الرحمن الرحيم. الحمدلله على نواصي نعه وأياديه علينا ومضننا، وتتبعه بالصلاة على سيدنا محمد وآله وسلم.

وقد كنا نsted في غير كتاب من كتب الموازين بنك بليـناس خاصة في علم الموازين، والآن نحن بادرون بذكر مخالفات فيه ووافق.

قال بليـناس، أيول وأصف الحكمة التي أثبتت بها بعد خروج من السرب وأخذ الكتاب واللوج، إن الذي يعم الاشياز كلها الطبعات التي هي السبيطة لا الركبة، وإذا كان شيء عاما نحن لن يكون له كهيت. وقد أوضحا ذلك في غير شيء من كتابنا في هذا الفن.

ثم قال: والوزان التي تعتم النبات والحيوان والحجر هي على تناسب سبعة عشر، وليس الأخامير كذلك - وهذا أيضا قد بيناه في غير شيء من كتابنا.

ثم جعل كمياتها على مقد ذكرناه في كتاب التصريف، وهو واحد في الأول، وثلاثة في الثاني، وخمسة في الثالث، وثمانية في الرابع.

قال بليـناس، والذي أراه في الوزن بالصنعة هو من الأقوان في العشير وهو ثلاثة أرباع حبة، يعني أن مقدار الخمسة مقدار العشير، ثم أوجب ضرورة أن الرابعة الواحة درهم، وأن الثلاثة ستون درهما، وأن الثانية ثلاثة آلاف وستمئة درهم، وأن الدينة مضربة ثلاثة آلاف وستمئة في ستين فتكون مائة.

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1: على رأى بليـناس، الحكم لجابر عليه الرحمة ط 50 ما من ب ط
2: 9) تعمب ط 111: الأخامير كذلك + بل ما يكون منها كذلك ب
3: قال: هناك هب ط 58: أرباع أربع، أربع (ح) ب
4: 17: فتكون فب ط
ألف وستة عشر ألف درهم، وأنّ الدرجة مضروب مائتي ألف وستة عشر ألفًا
في ستين فتكون أثنتي عشر ألف ألف وتسعمائة وستين ألف درهم، وأنّ
المريضة مضروب أثنتي عشر ألف ألف وتسعمائة وستين ألفًا في ستين فتكون
المريضة الأولى من أيّ عناصر سبعمائة وسبعين ألف ألف وستمائة
ألف درهم.
وأن المريضة الثانية تكون ألفي ألف ألف وثلاثمائة وأثنتي وثلاثين ألف ألف
وشماناتي ألف درهم، وتكون درجة المريضة الثانية ثمانية وثلاثين ألف ألف
وشماناتي وثمانين ألف درهم، وتكون دقيقة المريضة الثانية ستمائتين ألف وثمانية
وأربعين ألف درهم، وتكون ثانية المريضة الثانية عشرة آلاف درهم وثمانية
درهم، وتكون ثالثة المريضة الثانية مائتي وثمانين، وتكون رابعة المريضة الثانية ثلاثة
درهم، وتكون خامسة المريضة الثانية حقيتين ورُبع حجية ويكون ثلاثة أَعْشُرْ... ونقول: إنّ الخامسة من المريضة الثالثة، على هذا المذهب، أَحَمْسَة عشراً أَرْبع
تّ، أو خمسة أَعْشُرْ، والرابعة من هذه المريضة خمسة دراهم، والثالثة منها
ثلاثمائة درهم، والثانية ثمانية عشر ألف درهم، والدقيقة ألف وثمانون
ألف درهم، والدرجة منها أَربعَة وستون ألف وثمانمائة ألف وثمانمائة ألف درهم.
والمريضة الثالثة تكون على هذا التدسي ... ثلاثة آلاف ألف وثمانمائة وثمانية

۲۳: فتكون فيكون ب ط ۲۳: فتكون فيكون ب ط ۶۰: وأنّannot ب ط
۷۷: تكون أيّون ب ط٪۸۷٪: درجة... درهم... درهم المريضة الثانية وثلاثين ألف ألف شمانات
وشماناتيّن ألّف درهم ب ۷۸: تكون أيّون ب ط ۹۰: تكون ثانيةً أيّون ب ط
۱۰۰: تكون ثالثًا أيّون ب ط، يكون ثلاثةً، تكون رابعة أيّون ب ط
۱۲۳/۱۲۳: خمسة... أَعْشُرْ، أَربعَة أَعْشُرْ ب ط ۱۲۳: والرابعة أو الرابعة ب ط
۱۶۱۶: درهم ب ۱۶: تكون أيّون ب ط
1 وثمانين ألف ألف درهم.
وأيضاً فإنَّ الخامسة من المرتبة الرابعة ثمانية أعمُّر أو ست حبات، والرابعة منها
ثمانية دراهم، والثالثة أربعمائة وثمانون درهماً، والثانية ثمانية وعشرون ألفاً
وشانئتان درهم، والدقيقة من المرتبة الرابعة ألف ألف وسبع اثمانين وثمانية
وعشرون ألف درهم، والدرجة منها مائتا ألف ألف وألف ألف وألف وستان.
والثمانية وألف وثمانون ألف درهم، والمرتبة الرابعة ستة آلاف ألف وثمانان.
وعشرون ألف وثمانان ألف درهم.
نقد وضع من سلّم بليغناس، عتام الله، ما وضح. فنستخرج الآن ما يحتاج إليه
من هذه الأوزان على رأيه في جميع الأشياء.
10 وعصر بليغناس: أن للحيوان ميزاناً وللنبات ميزاناً للحجر ميزاناً في الكون الأول
الذي خلقه الله عزّ وجلّ، وأن للحيوان ميزاناً غير الأول، (وكذلك للنبات)
وذلك للحجر، وأن هذا الثاني لنا فاعلم ذلك !
11 وزعيم أيضاً أنَّ الإكسير الأعظم خاصةً ميزاناً مفرداً... وذكر أن للطلسمات
موازين مختلطة على تمر خلقها أيضاً. ثم نصَّ على كل واحدٍ من هذه الموازين
بكلم مُجلب نحن شارحوه في هذه الكتب الأربعة على استقاءها كما وعدنا في
غير كتاب ومثبتون فيه غرضنا في الموازين التي علمناها نحن.
12 وينبغي أن نعلم أنَّ لما يقرأ كتبنا في الموازين قبل هذا الكتاب لم ينتج
بشيء من هذه الكتب الأربعة لأنها نشأتة بعضها ببعض، ونحن الآن سالكون في
13 الشرح كما وعدناك، إن شاء الله تعالى.
14 ثمانية شاون ب ط 14، خلفها خلفها ب ط 186، الأربعة ك
اذكر أن لكل حرف من الحروف الفارغة للحروف العربية، وذكر ذلك الحرف في الكتب الكبيرة التي تم ذكرها، نصاً أيضاً على الحروف.

2. كما علمنا في كتاب الحاضر، إذا توالى حرفان من شكل واحد، أحتسب بالأول من جنسه ومقداره من مرتبته، ونسبة الثانية منها إلى المقدار.

3. ويسير الذي هو خارج من حساب الجمل كتبتنا "أ" أو "ب"، وقد وحد الله العظيم علَّمَكَ هذا في كتابه "مئدة".

4. ثم قال، وندخل في اللغة العربية خاصة، فإن سائر الألسن لا ينبغي لعمل الموازين أن يعتمد فيها، ثم قال: وأنا ميزان الحوخار الأول، فعدل ما نصسته أنا عليه في "كتاب التدريس"، لا غير، ولست أحتاج أن أعطيه هذين، وأنا النبات.

5. كذلك والحجر مثله، فقد فرغنا منه وليس فيه كتابان ولا شبه ولا نخلطه عليه.

6. ونفتح بوكن آخر في شيء من الكتب كما أنع ذلك أبداً عن التدريس والتنفيس إلا من أجل الله تعال وودره.

7. فأنا ميزان الحوخار الثاني والباب والجرف فعل ما في صدر هذا الكتاب من العشير في الخامسة، وهو أنثى، إلى المرتبة الرابعة التي هي ستة آلاف ألف ألف.

8. ومائتان وعشرون ألف ألف وثمانية ألف...

9. والعملة التي لها أورادنا هذه الأحجار في هذه الكتاب وأفرادناها من سائر الكتب أن يبيناس يتول وهو الحق: إن في الحروف الواضحة على الأدوية وغيرها من...

10. لكل حرف يوجد واحد ب ط: 64 منها ب ط: 99 ليست ط...
الثلاثة الأجناس ما ينبغي عن باطنه ولا ينبغي عن ظاهره، وفيها ما هو بالعكس مثل أن ينبغي (عَنْ) في الظاهر ولا يدلاً على الباطن، وفيها ما يوجد جميع فيها، وفيها ما يدل على ما فيها وزيادة تحتاج إلى أن تُلقي ويرمس بها كما يحتاج الناقص إلى أن يتم ويرد.

ثم إنه يرى أن اسم الذهب كذلك في الحقيقة عند الميزان لأنه يدلاً على طبعين.

بل الحكم الصواب أن يكون اسم الذهب بما يوجد بائثر طابئه.

ثم إنه عاد وقال، وإنما قلت إنه ينبغي أن يسوى كل شيء على حقيقة ميزان عند العمل، لا عند المذكرة. وينبغي، عفان الله، أن تعلم أن الذي يستخرج في العالم لغة فهو إنسان عظيم، وهذا الذي يذكر هو إخراج لغة أخرى لا يعرفها جميع الناس لأنه ليس في الممارسة أن ينطق باسم من الأسماء على تحقيق أمره.

لا في القدرة بعد القدرة.

وينبغي أن تعلم أن استخراج الطابئ على الحروف كعَلَّمَانك في كتاب الصنوة.

لندلّك في الابتداء على طبع شيء لا على تحققته، وكذلك ما عَلَّمناك في كتاب الحاصل إلا أن الحاصل إجود تصحيحًا من الصنوة، وذلك لأن الصنوة كالرائحة من الأشياء والحاصل كذات الشيء التي بزوالها يزول العين.

فتعلم من هذا الكلام أن إخراج طبع الشيء في الظاهر غير منتغٍ به، وإلا فقد كتا ألقينا به. ولكن ينبغي، عفان الله، أن تزن كل شيء تزيد وزنه وتحرره من كل شيء في باطن وظاهره.

وأما وجه الإسقاط فإليك تحتاج الآن إلى ما في "كتاب التصريف" وغیره من تلك الكتب، وذلك أن ينبغي ضرورة أن يستم من كل شيء تحتاج إلى وزنه ما زاد على يبيته وما دخل للملل فير زيادة. فنعلم أن الذهب أصل إذا هو برء من ذلك، وصار هجاء النفخة "تفص" إذ الهاء إما دخلت للتأثيث ولا ذكر لها، ثم تزيد عليه بعد إستطاع ما فيه بحسب الحاجة إليه.

فأعلم يا أخي! أنه متي حصلت لك من الحروف واحدة مثل "ا" أو "ب" أو ما كان لك الكل على سبعة عشر... إلا أنك ينبغي أن تترد ما أخرجه لك الهجاء عما أخرجه لك الحدس لتطلب مثل ما أخرجه الحدس بالإضافة إلى الصورة ليصير لك الشكلان شكلًا واحدًا. قد، وحق سيدى، أوضحت لك ما كنت غنيًا عن الزيادة فيه شيئًا ثانياً، إلا أنني لست أرضى بذلك ذكر في اليوم ألف حيوان وألف شئ من النبات و ألف حجر، والله نشرد لنا ولك برحمة إله جواد كريم.

وإليك يا أخي! أن تعلم أن الزوايد منها ما يكون في أول الكلمة ومنها ما يكون في آخر الكلمة ومنها ما يكون في وسطها. وينبغي أن تعلم أن من الزوايد ما يحكمه الإعراب، فننفذي أن يطرح و لا يبتعد به مثل زيده وزيداً وزيد في الرفع والنصب والخفش أو الجر، و مثل الزيدان والزائدون في النثبة والجمع. فهذا يا أخي! لا تلتبت إليه و زده إلى واحد مثل زيده من الزيدين وعمرين من المشرعين وماجسيه.

أما تحتاج ب ط 65 تزيد عليه تزيد علة ب ط 66 أو الجزء والجزء، والجزء الط النثبة ب 77 تلتبت ب ط
وينبغي أن نتعلم أن من الزوايد ما إذا كان في أول الكلمة فهو زائد، فإذا صار في وسطها وآخرها صار أصلًا. وعكس ذلك مثل أن يكون الحرف في أخرى زائدة، فإذا صار في وسطها وأولها صار أصلًا أعني من نفس الكلمة. وكذلك ربما كان في الوسط أصلًا، فإذا صار في أولها أو آخرها جاز أن يكون زائدة وربما كان أصلًا. وينبغي أن نتعلم في الزوايد أنها عشرة وهي: الهمزة، واللام، والباء، والواو، والميم، والنون، والسين، والغلف، والهاء، وما كانت هذه الحروف تختلف مواضعها و مواقعها من الكلام احتجنا حينئذ إلى نصب المناسبة التي تتطلب عليها.

فنتول، والله عز وجل الاستعانة، إن أصول الكلام ثلاثة أُبَنيَّة وهي ثلاثي ورباعي وخماسي، وأنا الثلاثي فإنه ينتمي إلى إثني عشر مثلًا، منها عشرة مستحيلة، وواحد لم ينتمي على بنائه الحروف إلا واحد، وواحد مهمل لم يجيء قط على بنائه ولا يكون ذلك. فاما الأمثلة فمثل ذَّfel على مثل نَهْد، وعلى فُرُول

11 نحو جُنُب، وعلى فُنُول نحو ذُبَي، وعلى فُنُول نحو قَفْط، وعلى فُنُول نحو رَسَن، وعلى فنِّل نحو إيل، وعلى فنِّل نحو صَرْد، وعلى فنِّل نحو قَع، وعلى فنِّل نحو كَب، وعلى فنِّل نحو سَب، وهذه عشرة تكرار في الثلاثي، وأما المثال الذي جاء وأحدًا فعلي فنِّل، قالوا لدُونيَّة من حشرات فنِّل، فبالناء الذي لا يمكن أن يكون منه شيء فنِّل.

12 صار أصلًا صار صار أصلًا ط 5 عشرة ب 16 عشرا عشرة تكرارًا لهذه عشرة تكرارًا، هذة عشرة يكتر ب، هذا عشر يكتر ب بنائه ب ط 160، هذه عشرة تكرارًا هذه عشر تكرارًا، هذة عشرة يكتر ب، هذا عشر يكتر ب.
وأما الزوايد فله خمسة أشكال وهي تتسل نحو عَرْبَب، وعلى تتسل نحو بِرْعَب، وعلى تتسل نحو زِرْج، وعلى تتسل نحو هجرع، وعلى تتسل نحو تنتظر.
وأما الخمسة ذيكون على أربعة أشكال يكون على تتسل نحو ستَرَّجَال، وعلى تتسل نحو جَمْشَر، وعلى تتسل نحو جَرْدَال.
وليس غير هذه إلا الزوايد.
فأما تميز الزوايدة الذي يرد كل شيء إلى حَتَّة فالزوايد في العشر التي ذكرناها من قبل، أما اليم واللام فبخصوص بيها الإسم، واللام يصحبها الألف، وهم التحريف في "البَدَ" و"القَلَب" و"القَلَم" وما جانبه، وكل ما كان من الأسماء يحمل الجنس، وترزاز الالام بين التلم والقاف لذكر المار إليه (منا) الشيء الخائب وهي أول بالهزمة، وترزاز اللام أيضاً في الأروع بين اللام الثانية والمثل.
ليقع بها النجح و تكون فائضًا بين سكون اللام و كسر الذال، أما اليم فإنها ترزا في سكرين ويشتتضرب وما شاكر ذلك ولا حي لها في الفعل إلا في شيء شاذ
وهو تولهم مَحْرَق. وأما الهزمة والواو والياء والناة والتنوين والسين والألف والباء.
فالهزمة ترزا في أَحْجَدُ و أنْفَلُ أو هما (بما) إسماً (وا) في أَحْسَنَ وأكررٌ وهم فعلم، وإنما نبرك ذلك، و ليس مخصصاً تعليمية النحو، لأن (من) الأحجار والنباتات والحيوانات (ما يقع اسمه كالاسم) وما يقع اسمه كاسم الفعل.
فترنف الحروف التي هي زائدة في الأفعال وزائدة في الأسماء، أو زائدة

11، وهي: مثل ط على (نحو ب ط يهما) بها ب ط ١٣، تزازا يزاز ب ط ١٠، تزازا يزاز ب ط ١٢، حظ لها أن لها ط ١٣، محقق ب ط ١٠، والواو والياء والياء والواو ط ١٦ و الينباتات والمختار ب ط ١٦، فترنف فترنف ط
في الأعمال [و] أصلية في الأعمال، أو أصلية في الأعمال وزائدة في الأعمال ليحكَم
على كل شيء بحکمه، إن شاء الله تعالى.

والإيام تزداد في يُعقل وهو إسم وفي يَحْمِل وهو فعل، والواو تزداد في جوهر
وهو إسم وفي حَوْتَل وهو فعل. والتألاء تزداد في كَثِب وهو إسم وفي يَحْمِل.

وهو فعل. والالف تزداد في مُضَخِّر وهو إسم وفي يَحْمِل وهو فعل. والسين تزاَد
في مُضَخِّر وهو إسم وفي ضَارِب وهو فعل. واللهاء تزداد في ثَلَثة وهو إسم
للتألاء فينال تائهًا وفي إِرْبَیا وهو للوقف. فَأَعَرَف ذلك وآحكم على كل ما

9 جاءك منه... [[58-9-59]]

إذا تنا؛ إن الإيام حَدَه أنه تَأليف عَدَدٍ؟ ثم كان ذلك التَأليف إنما يكون

11 بحِركة وسكون، والمتحرك والساحن إذا آتنا في كلام أو إيام فآكر ما يكون
من الحركات أربعة متوالية في مثل قول أصحاب الروع فَمَكَّن وآكر ما

12 يجمع ساكان في مثل قولهم تَأليف وَالْف وَالْنَون ساكان، ولو لا البن
الذي في الأسْف وما أمكن ذلك وهو غير جائز إلا في حروف البن الثلاثة وهي

15 الواو واليء واللف والفر. فَأَعَرَف ذلك! ولا كان التَأليف العددى إنما يكون على
الساحن والمتحرك في النطق والسمع كان جملة أجزاء التَأليف العددى نسبةً

17 إثنان منها خَمِسيان وستة سباعية. فَأَكَل الخَمْسيان فقولهم فَعَلَون ونَفْلٌ،

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21 واليء تزداد واليء يُزال ب؛ اليء يُزال ط؛ والواو تزداد والواو يزداد ب ط

26 والسين تزداد والسين يُزال ب؛ والَف تزداد ب ؛ ضَارِب ضارب ط

77 تزداد يزداد ب ط ؛ تائحة ؛ تائحة ط ؛ تائحة إذا فلما ب ط
و хотя السنة السبعية ستتناول وتولهم كلاً من وستثنى وستقليلون وستقليلون وستقليلون
و ستقليلون. ثم يتولى من هذه أجزاء بالزيادة والتنصان حتى تكاد أن يكون إلى
ما نهاية له. فقولهم في حدّ الإيتاء، إنه عديدي، أنتج هذا كلّه.

وهو يحتاج إلى شيء آخر مثل أن يكون الإيتاء فرداً في المدد أو زوجا.
والزوج والفرد إلا أن يكون زوج زوج، أو زوج فرد، أو فرد فرد، أو فرد
زوج. والعدد الفرد يكون مثل الواحد وأخوه، والزوج مثل الاثنين وأخواته.

و زوج الزوج مثل الاثنين فإنها زوج السنة والأربعة والأكثين، وأما زوج الفرد
فمثل ستة من تسعة وأخواتها كأربعة من خمسة وما جرى هذا المجرى، وأما
فرد الفرد فالواحد من الثلاثة ومن الخمسة والسبعية والمائتا السبعية وما جرى مجراها،
وأما فرد الزوج فعكس زوج الفرد وذلك أن يكون الزوج شانة والفرد فيه سبعة
و خمسة وتائهة وواحداً وما جرى مجراها من الأعداد.

و يؤول عن ذلك كلّه أربع طرق من الموسيقى تكون نتيجة هذا الكلام كلّه.

وهو المتول عليه أنه تثليث الأول وثاني الثلثة والثلثة والثلثة. ثم إنهم ولدوا
كل واحد من هذه خنقاً نصارت ثانية وهي خنيفة ثلث الأول و خنيفة ثلث
الثاني و خنيفة الرمل و خنيفة الهزج. ثم جعل لكل واحد من هذه نسبة في
الأصحاب نكان خلف هذه في الأصحاب كخشى ذلك في الحلقة واللسان والشتمين.

إذ كان قد يحدث من هذه الطرق بالأصحاب ساكن ومتحرك كما حدث لنا

22: تكادا يكاد ب ط، فرداً في المدد أو زوجاً فرداً أو زوجا ط.
23: ولدوا ولدوا ط، ثلثاً تثليثاً الأثاثة ب ط.
في الحروف ساكن ومتحرك، فتأتي الألف الأولى المطلق وتأتي الأولى المسموم، وتأتي الأولى بالوضعي وتأتي الأولى الحمو، فستهو هذا الحمو محصورا، وربما تُرَّق بينهما بنترة يسرة فصارت ثانية في أربعة يكون أثنين وثلاثين طريقة، تأتي قولهم عدد تأليف ذو عدد هذا كله... [1158-17]

فأنا موازين الأجسام التي تدُخلت مثل أن يُخْلَى زجاج ويقبع على وزن ثلاث.

يعرف أحد غيرك وخطيبه لصاحب الميزان، فإن في قوة القدر في الميزان أن يكون للك كم في جزء من الزجاج ومكم في من الزجاج، وكذلك الفضة والذهب، والنحاس والنفضة، أو ثلاثة أسماء أو أربعة أو أربع وأربع أو أف، إن جاز أن يكون ذلك.

إن هذا من الجليل على تنزيب الميزان وهو حسن جداً، ووثقت فإنه كالدليل على صحة هذا العلم، أعني علم الموازين، أُكْتَت صاعداً، بل التول كذلك.

وذلك إذا أردت أن تعرف وتكون انت صاحب الميزان حتى تخطلك الأجسام.

وغيرها فنتول ما في ذلك المخلط من كل حجر من المقدار فإنا على إسم

الشعاع فاستعمل ميزاناً على هيئة الأشكال ويكون بثلاثة عروى خارجية إلى فوق، 

وأعمل بهذه الكتب كعمل الموازين أعني من شرك بها الخيوط وما يحتاج إليه، 

ولكن الحديد الواسطة، التي فيها اللسان، في نهاية ما يكون من الاعتدال 

حتى لا يميل اللسان فيها أولاً، قبل نصب الخيوط عليها، إلى جبال من الحبات، 

ويمكن وزن الكتب واحداً، وسعتها واحدة، ومقدار ما يملؤها واحداً.
إذا فرغت من ذلك على هذا الشوط، لم يكن عليك كثير شيء. ثم شدد الميزان كما شدد سائر الموازين، ثم خذ إباؤه في ما يكون عائلاً نحو الشتر أو دونه أو إكثر كيف شئت، ثم ألماء ماء قد صلى أياماً من ذله وتذرها وما فيه كما تصنف البنكوات، ثم أعد إلى سبيكة ذهب آخر خالص نقي جيد، ويكون وزنها درهماً، وسبيكة نقية بيضاء بحالة صرفة ويكون وزنها درهماً، ويكون متدار السبيكتين واحداً. ثم ضع الذهب في إحدى المكنتين، والفضة في الأخرى. ثم ذلكل المكنتين في ذلك الماء الذي وصفنا إلى أن يغوص في الماء ويمثلنا من الماء، ثم أطرح الميزان فإنك تجد الكفنة التي فيها الذهب ترجح عن الكفنة التي فيها الفضة، وذالك لصغر جرم الذهب وانتشار الفضة، وذالك لا يكون إلا من البيوضة التي فيها. فأعرف الزيادة التي ينهاها بالمنجة وأعمل أن بينهما دانتاً ونصناً.

فعتى خلطت بذلك المئات الذهب الجيد قيراطاً واحداً فضةً أو دانتاً أو أكثر أو أقل ننص من متدار الحبات إزاء التباريط، إذ هي إنثاء عشر لكل قيراط.

أعرف ذلك! فهو، وحق سيدي (من) أمهات علم الفلسفة، وكذالك نقيس كل جوهرتين وثلاثة وأربعة وخمسة وما شئت من الكثرة والقلة.

4: تصنف ض خصص ب ط 5: صنف ب ط 5: اطررح ب ط 8: اطررح ب ط

+ اطررح ب ط 12: أحل + ينصرو ب ط + إثناء اثنين ب ط

12: نقيس إثناء ب ط 14: من أفي ب ط
مثل أن تعرف النسبة التي بين الذهب والنحاس، والفضة والنحاس، والذهب والرصاص، والفضة والرصاص، والنحاس والنحاس، الذهب والرصاص، وملك أن يُعرف ما بين الذهب والفضة والنحاس المختصرين أو الفضة والنحاس والرصاص، وكذلك إن شئت واحداً، و إن شئت إثنيين أو ثلاثة أو ثلاثة أو
كيف أحببت...
قد كتبت لك في غير كتاب، إن كنت ترأى من كتاب يختلا، إن الحرفين إذا تكررتا سقط أحدهما، وإن المرتبة إذا كانت في دواء من الأدوية و كانت أولى أو ثانية أو ثالثة أو رابعة لم يكن في ذلك الدواء غير تلك المرتبة، إن كانت أولية أو ثانية أو ثالثة أو رابعة، وإن كانت ثالثة فتائمة، وإن كانت رابعة فتائمة، وإن تعلم ذلك فانا أسأله لك في الأدوية حتى تراه عيناً، وليس جائزاً فيما هو دون المرتبة أعني الدرج والدقات والثواب والثواب والثواب والثواب والثواب و...
[[٦٩ - ٦٩٦٧٦]]
الصورة في كل شيء سبعة عشر، وإذا وجدت في حيوان أو نبات أو حجر خمسة فقد بقت لك إثنا عشر، ثم ليس يخلو من أن يكون الدواء فيه طبيع واحد، أو طبيعان أو ثلاثة أو أربعة و ليس غيره. وإن كان فيه طبع واحد وزعت الإثني عشر على الطبيعين، وإن كان على الثلاثة الباقية، وإن كان من طبعين وزعت الإثني عشر على طبيعين، وإن كان على ثلاثة جعلت الإثني عشر من طبع واحد بعد أن يستخرج من الإثني عشر ما يتناول ذلك الجزء الذي من الدواء من الطبيع الباقية أعني التي قد خلا الدواء منها، فأعلم ذلك!...
الجزء الثاني من كتاب الأحجار على رأي بليناس

بسم الله الرحمن الرحيم، الحمدلله الذي اصطفى مهدداً نبياً، وانتخب له علياً ولياً، وصل الله على صفوته من خلقه وعلى له وسلَّم.

أما بعد فإنه قد تقدم قبل كتابنا هذا عدد كتاب في علم الموازين قد استوفينا في كل واحد منها صدرا صالحا من علم الموازين، ولم يكن بليناس قد خالفنا في بعض الفروع والأسوأ ولم يجز أن لا نذكر لنا خلافنا في الذي خالف فيه الأوزان بالصنبات، وقد ذكرناها في جزء آخر لهذا الجزء، وقد كنا وعدها في غير كتاب أنا ذكر الأحجار وصور الطبقات لها مع الميزان حتى لا يخفى على المحبة ما يتطلب من ذلك...

إن الخروج التي عليها مدار الكلام كله قد استوفينا لك وموضعا من العدد الزائد والنافص من المراتب إلى الخواسم، وأنه قد ذكرنا لنا إيشاو وزن كل حرف على ما ذكرناه من رأينا ورأي بليناس بالصنبات، وقد ذكرناه لنا إيضاحاً شدّة حاجتنا في العلوم الدقيقة والتأثيرات الطويلة إلى التأديب بالصنبات على ما ذكره بليناس وفوقنا حاجتنا إلى ذلك في نقل الأجسام ونفكها.

وأما نحن فقالنا: إن للحيوان ميزاناً، وهو أن جعله الربة الأزلية عشرة دراهم، ثم أضفناها لما فوقها ونفقناها لما تحتها، ثم جعلنا لك النبات في

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سبع، فأضننا نبنا هونه وجرننا نبنا تحته، وجعلنا الحجر في خمسة وثيئاه
في الذي نتفر ونتمسان إلى ما تحته عند الحاجة، وإن ذلك هو رأينا واعتادنا
في ظاهر الصناعة وليس يؤخر على التحقيق كما عمل بليناس.
فأما بليناس فإنه جعل الحكم في الثلاثة الأجناس واحداً واحتف بالذي
ذكره ستراف فوافق: إذا كان محصول الأجناس أنها تحت الطياب فمن البيون إذن
أن لا خلاف بينه، هذا هو كلام ستراف. وجعل المرتبة الأولى في سبعمائة وسبعة
وسبعين ألف ألف وستمائة ألف درهم، وذلك أن هذا الرجل، اعنى بليناس,
احتاج إلى تجزئة الخامسة فجعلها في عشر، ثم علاها إلى فوق حتى بلغت إلى
مابلنت إلى ستة ذكرنها في الكتاب الأول من هذه الكتب...
إسمع ما قال ستراف...!
وذلك أنه جعل الأوزان كلها تخرج من درهم واحد ودانتي في الأول، فقال:
إذا نجعل المرتبة الأولى درهماً ودانتاً، والمرتبة الثانية ثلاثة دراهم ونصفاً،
والثالثة خمسة دراهم وخمسة دوناً، والرابعة تسع دراهم ودانتين، وجعل
الدرجة الأولى نصف درهم، والدرجة الثانية درهماً ونصفاً، والدرجة الثالثة
درهمين ونصفاً، والدرجة الرابعة أربعة دراهم.

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44: في ذلك بذلك ب ط ق ١٦٧٧: سبعمائة وسبعة... سبعمائة ألف ألف وسبعة...
ب ط ق ك ١٧: ذلك أن قال ان ذلك ان (ح) ب، قال ان ط ق
١٩: مثلاً فيما مما (ح) ب، فيما ط ق في الكتب... الكتاب ٢٩ ب
11: تخرج ب ط ١٢: خمسة دراهم وخمسة دوناً ستة دراهم غير
دانت ب ط ق ك ١٤: درهماً ونصفاً درهم ونصف (ح) ب، درهم ونصف ط ق
1. نجعل الدنيا من المرتبة الأولى دانتين ونصناً، والدقيئة من المرتبة الثانية درهماً ورباعاً، والدقيئة من المرتبة الثالثة درهماً وثلاتاً ونصفًا، والدقيئة من المرتبة الرابعة ثلاثة دراهم وثلثًا. ونجعل الثانية من المرتبة الأولى دانتين، والدقيئة من المرتبة الثانية درهماً، والدقيئة من المرتبة الثالثة درهماً وأربعة أواناً، والدقيئة من المرتبة الرابعة درهماً وأربعة أواناً. ونجعل الثالثة من المرتبة الأولى دانتين ونصناً، ومن المرتبة الثانية أربعة أواناً ونصناً، ومن المرتبة الثالثة أربعة أواناً ونصناً، ومن المرتبة الرابعة أربعة أواناً.

2. فأنظر، عافاك الله، إلى لطف هذا الرجل في العلم ومخلله منه وحسن تثاؤسه.

3. وأعلم أيضاً أنه أطرح النسبة من الستين، والعفة في ذلك أنه زعم أن نولنا إن المرتبة ستون درجة إناها هو إصلاح، ولو أردنا أن نجعل كل شيء أفضل منه بواحد أو بأكثر، والذي تحته كذلك، ما كننا إلا كما جعلنا النسبة من الستين.

4. وذلك إننا جعل من الستين ليقرب الحساب ولئلا ما يقع فيه من الكسور.

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1 وقد جعلنا لهذه الأوزان مثالًاً يعمل عليه في سائر ما يحتاج إليه، ومن أسوق أمرالأوزان في كتابي هذا على تلك الأوزان أعني على ما قد ذكرناه عن سترات، فإن أحببت أن تعمل عليه داءمل، وإن أحببت أن تعمل على ما ذكره بليغاس داءمل، فلاهما واحد، وإن أحببت على رأينا داءمل به، وهو مخالف لهما لأنه

5 شيء بالترتيب.

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6/4: وهو مخالف لهما...بالترتيب يوهو مخالف لها...بالترتيب ب...ط...

؟ صحيح ق
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1 ... (1147 - 1327هـ) ونحن نحتاج الآن أن نوريك ذلك بالأشكال في موانين الأخجار الذاتية التي الحاجة إليها مائدة في أول الصناعة في الذهب والفضة والنحاس والحديد والرصاص - لتعلم حقيقة حروف هذه الإشاعات كلها.

2 فينّى أولاً أن تعلم أن كل شيء من هذه الأخبارات سبعة عشر قوة، وهو إذا أن يكون أحمر أو أبيض. فإن كان أبيض ففيه من الحرارة المرتبة أولاً، وفие من البرودة ثلاث مراتب أولة، وفيه من البيوسة خمس مراتب أولة، ومن الرطوبة

3 شان مراتب أولة. وإن كان أحمر فيعكس ذلك، وهو أن يكون من البرودة

4 المرتبة أولة، ومن الحرارة ثلاثة مراتب أولة، ومن البيوسة شان مراتب أولة، ومن الرطوبة خمس مراتب أولة، ومتحمل التردد في الكيمياء، وفي هذا

5 الموضوع على الصنعة أعني لهذا السبعة عشر - أن المرتبة الأولة إذا من الحرارة أو البرودة، وما هو ما "ب" درهم ودانيك كما تلقى في ذلك أولاً. والثلاث المراتب الأولى - وهي مئام مرتبتين ثانية وهم "أ" أو "ب" أيضاً- إذا ثلاثة

6 دراهم ونصف من مجموع ثلاث مراتب أولة، أو مرتبتين ثانية في نفسها واحدة

7 وهي ثلاثة دراهم ونصف. ولذلك في وزن الفاعلين أربعة دراهم وأربعة دونياتين، والوزن في البيوسة أو الرطوبة، وهم "ج" إذا مجموع شان مراتب أولة

8 وهي تسعة دراهم ودانيتين، و إذا مرتبتين واحدة رابعة وهي تسعة دراهم وثلاث.

باشتكا: كلب طاق 5: ثلاثي ب طاق 10: عشر أن عشرات ب

11: الثلاثا والثلاثي ب طاق 12: المرتبة الأولى مراتب أولى ق

12: أولئك الأولي ق 14: لذلك كذلك ب طاق

15: الوزن في حالة والاتين من ب طاق 15: إذا واما ب طاق
1: البيت أو الروطية في المرتبة الثالثة، وهما أيضاً "نح"، وذلك إذاً
مجمع خمس مراتب أولية نتكون خمسة دراهم وخمسة دولار، وإذا مرتبة
واحدة ثالثة وهي خمسة دراهم وخمسة دولار... فذلك مجموع السبعة عشر في
الأحمر في كل شيء في العالم على اليرق الصحيح في الدخل والجليل في الثلاثة
الأجناس وفي الغرائب وغيرها من سائر العجب تسعة عشر درهماً وخمسة
دولار، وكذلك هو في الأبيض، في ينبغي أن يعلم لذلك.
7: فأما وضع اللفظ في الأبيض والأحمر فإنا هو في زيادة البرودة في البحاص
وتصن الحرارة (أين؟) يعكس ذلك في الأحمر، زيادة البيت أو الروطية في الأحمر
وتيسح الروطية فيه وعكس ذلك في الباص، فأظهره! وي ينبغي ترتيب
وزن شيء من الأشياء كلها أن تعرف ما فيه بمثابة الوجبة أو نظر كم بلغ
ذلك وأنه من الدراهم (إلى) التي هي مبلغ السبعة عشر.
11: وعلى هذا المثال ينبغي أن يوزن كل شيء في العالم. فاما مساحة الحرارة فيه
للروطية فإنه الصغير الأحمر، لو لا ذلك، فهى البيت أو الروطية بكثرة الروطية إذ كان
مقدار البيت أو الروطية أكثر من مقدار الروطية كثيراً، وكذلك عكس الكلام في الأبيض،
6: فإنه لا ما مساحة البيت أو الروطية للبرودة فيه لفترة الروطية البيت أو الروطية. ومنعى المساحة أي

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6: البيت أو الروطية... المرتبة الثالثة، خمس مراتب بيسوس وخمس مراتب بيسوس ب ط ق:
ذلك! وذاك ب ط ق 2: فتكون ب ط ق 1: خمس ف مب ط ق
2: وذاك ب ط ق 2: دولار ب ط ق 2: ذلك ب ط ق 8، زيادة الأحمر ب 1:
9: البياص! الأبيض ب 10: فيها ب ط ق 1: للروطية ب ط ق;
الروطية للروطية ب ط ق 15: المساحة المسافة ب ط ق

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1. أنها تكون بالقرب منها لا حيث المباينة أعني في تتاثبها أو بعد الذي هو بين المحيط والمركز. ولو لا هذه المسامنة حتى تغلب في الأحمر الحرارة كما لا بد من وتكون البيوضة أيضاً غالباً لخرج مختلثة كثير ما تهلل كذلك. ولا يمكن الأعدل مختلثة كما أنه لم يكن أيضاً دائماً وجب أن يكون هو الشيء الذي بين الجمع، وهو مثل الأجسام الثلاثة التي هي الذهب والنفثة والنحاس. في متناول اللين والصلاية أعني من الحجارة. أما من غير الحجر فنا حسب ما يجعل.

2. لياذاً الأعدل، فإنه يحتاج إلى بحث والسير. وذلك أن كل حيوان وأعضاء جامدة فالأعدل هو الذهري، وإن كانت كلها ذاتية فأعدل (لها) أن تكون ذاتية وإن كانت لينة كانت كذلك. وكذلك إن كانت بغير ذلك من الأوصاف (ما) كانت المبولة كمثلها... وما كان كل عضو منها فائزاً بنفسه كان أيضاً كل واحد منها أعدل في ذاته. فمن البيتين الواضح أن ليس الذهبي أيضاً أعدل الأجسام وإنما صيروه أهل الصناعة أعدلها لأنهم انتفوا به، وكذلك لو انتفوا بالنحاس أو الرصاص لصيروه الأعدل وسافروا تدابيرهم إليه، فلا ضرورة الآن إنما هو أعدل لوضع المفهمة لا غير.

3. في ينبغي أن يُحكَم فيما قلنا، وذلك أثنا احتجت أن تنطلل الذي هي أعدل إلى غير الأعدل، وذلك أنا لو فقدنا النحاس البينج وجدنا من النفثة والذهبي فوق.

4. المسامنة المساوِئة ب طبّ ط (السبر) -- ق. 25: أن كل حيوان، أن كل الحيوان ب ط، إن كان كل الحيوان في بل تكون كلها ف. لذنها لبيئة ب ط

5. المبولة المبولة في 21: بنفسها ب طب 16: فوق / فوق (ح) ب، ١٤٨
الحالة وكانت الضرورة داعيةً إلى النحاس والذهب هو الأعدل والناحاس هو
المشرب لاحظنا أن نقل الذهب الذي هو الأعدل إلى النحاس الذي هو
المشرب نوجب ضرورةً ذلك. كذلك نقول: أنه ليس الشر بأعدل إلا للورق لأن المنحة بالثرث أكثر منه بالورق. ولكن ينبغي أن يُطّل كل شيء حته من
الأرزان لينتقل بعضها إلى بعض. إن شاء الله تعالى.
فلتأخذ الآن أمر ميزان الإكسر بالحروف كما ذكرنا في كتاب ميدان المثل.
إن شاء الله تعالى. فنقول: وب圩 الاستعارة: إنما قدّمت من الثلاثات ما قد أُلمى عن
أن يعلم الإكسر ما هو. وذلك أن المعلوم في ذلك هو أن أصل السبعة عشر
ينقسم إلى تسعين: إذن أحمر أو أبيض. و إن كان أحمر غلب الحارِليباس.
وإن كان أبيض غلب البارد، الرطب. وإن جملة ذلك بالصيغة تسمى عشر درهماً.
وخمسة دونائيق على الرأي الصحيح الذي لا نقد فيه. فنستم مثلت مثلات تدل
على السبعة عشر تتدّمت أو تأخذت تتأقثت أو تزيزت فينفّنف أن تعلم أن الأصل
فيها واحد. لأن الحرارة أين كانت فهي حرارة، والبرودة أين كانت فهي برودة.
وكلذك في الرطوبة والبيعة، وذلك لأنه لا ينال ولا واحد من كل هذه على
الآخر. مثلاً ذلك أن " لا ينال ولا على واحد من "ب" ولا "ج" ولا "د".
وكلذك "ب" لا ينال ولا على واحد من "ا ج د"، وكذلك "ج" لا ينال ولا
على واحد من "اب د"، وكذلك "د" لا ينال ولا على واحد من "اب ج".
فوجد بعض الفرق الذي نريد أن نوريك. فإن أردت أن بعض " ينفد فيصير
إلى "ب" وكذلك إلى "ج" و "د" على أنه تجعل "اب ج د" من الثواني التي

17: ما مما ب ط 80 أصل ب ط ب ط 00: الرطب - ب ط 12/8/1018
149
1. هي النار والهواء والماء والأرض تشعر أن بعض هذه المركيبات يستحيل. وتد
استنفنا ذلك في "كتاب التصريف"، فقد وضع الطريق نشأ عليه،
إن شاء الله تعالى...

ولتأخذ فيما بدأنا به من ميزان الجسد فنقول: والله التوفيق! ينبط، عافاك الله،
أن تعلم أن هذه الأحجار مختلطة ولو لا ذلك لكان كلها شيئاً واحداً، فهذا
من قريب. وإن فيها يزيد على سبع عشر ونفيها ما ينقص عنها وفيها ما
يساويها. وإذا درست شيئاً من الأشياء فوجدت مساوياً لسبعة عشر فلا تزيد فيه
شيئاً ولا تنقص منه شيئاً، وهذا يكاد أن يكون من باب المنتظ من شدة
عشرة. وإذا وجدت شيئاً يزيد على سبع عشر فاقتضى على تناسب إلى أن يبلغ
إلى سبع عشر، فإن يتناسب ويستقيم ويكون كمثل ذلك العصر الذي لا يكاد
أن يوجد. فآلم ذلك وآلم به. وإذا وجدت شيئاً ينقص في الميزان عن سبعة
عشر فنعته لكون كمثل ذلك الشيء العصر الذي فئنا أنه ليس يكاد أن يوجد.

وآلم به فإنه الوجه. إن شاء الله...

وهذا، عافاك الله، فلا بد أن يزيد أو ينقص. فنقد حصل في الذهب
لهبت أنه من الزوائد. وينبغي أيضاً أن تعلم معيق قولاً زائد أو ناقص وإن
كانت قد فئنا أنه عند سبع عشر فيما تتقدم، وذلك إنما هو عافاك الله، عند
الإكسير. فمتى أراد مرد أن يصير الذهب مثل الإكسير نقص من كل واحد
من عناصره بحسب ما يجب إلى أن يبيث في الذهب سبعة عشر وزنها تسع عشر

ملاحظات:
1. بإسلام توحيد: -ق: عافاك الله -ق: ب ط ق -ق 9: يبلغ ب ط ق
2. يتناول: يناسب ب ط ق; العسراء العشر ب ط ق 11: إن -ق;
3. فاعلم... به -ق: وجدت في 12: العسراء العشر ط 12: إن... تعال -ق
4. 15: معنى: + ان ب ط ق
1. درهماً وخمسة دونياتر ويشرح الباطن.

وذلك إن أراد مريد أن ينقل الذهب إلى النحاسية عرف وزن النحاس أولاً ثم عرف وزن الذهب و أيهما زاد على الآخر، إن زاد الذهب يُنصح إلى أن يبلغ إلى مقدار النحاس، وإن زاد النحاس زيد في الذهب إلى أن يصير إلى حد النحاس، وقد يجب أن الذهب أزيد من النحاس... ويا ليت شعري! كيف يُمَتّ ذلك! و أَنت لا تعترف بالحدود ولا تنفع عليها... (786 - 789) أَلأَبَدَّ.

5. اختلف الناس في وزن الفتيني خلأ متتاوأ، وذلك أن منهم من قال: نزنه على أن اسم الفتيني و قال أصحاب الرواية: لا بل هو الرصاص إذ أخوه اسم الأسترب، وقالت الطائفة البندقية: لا بل نزنه على زاوس لأنه أعدل في طبعه وهو معناء. وقالت الطائفة فيناخورس: هو المشترى ويبيع المشترى، لا نزنه إلا على اسم المشترى لأنه صاحبه ومدبره ومكوّنه وليس له اسم غيره، وأما ستراء نحكم على زاوس وهو مقارب الحق، وقالت بينائها: هو التصدير ووزنه منه ولا اسم له غيره. وقالت المشانبة: نزنه على تولنا حار رطب لأنه لا اسم له يدل على طبعه. ولست أختار أنى في هذه الأوزان كلها مثل تولنا زاوس، فإن عدلنا عليه.

6. فحار رطب، والذى أذكره في شكله إنا هو على زاوس لأن تولنا فلعي يدل على غير اسمه، فأعرف ذلك!... (786 - 808). "
الجزء الثالث من كتاب الأحجار على رأي بليناس

بسم الله الرحمن الرحيم، سبحان المبدع العبد الفعال لما يريد، التقدير على كل شيء، فتبارك الله وسلام على محمد وع妃ه وعليهما السلام.

ولقد تقدم لنا قبل كتابنا هذا كتابان في معرفة موازين الأحجار، ونحن ذاكران على كتابنا هذه صورة أخلاط الأحجار والحيوان ببعض بعض في طريق المهنة ووجه تشييعها إذ كان همًا لذلك تقدم في الكتابين الأولين، أعني الأول والثاني، فنقول..; الأشياء التي يكون منها الإكسير لايخلو إذا أن يكون حجارة صرف، أو حيوان محض، أو نبات فقط، أو نبات ونبات، أو حجر ونبات، أو حجر وحيوان، أو حيوان ونبات ؛ فقد صارت الأشكال، التي يحدث من تركيب الأدوية الإكسير، سيئة، و لكل واحد منهاحكم.

1: كتاب موازين ط 12: أو حجر ونبات ؛ أو حجر وحيوان ط
1 و إن كان بخاطرها ت╭ت من الإجابة إلى العمل، نعلم أن
الحرارة، و "ب"، "البردة، و "ج" للبيئة، و "د" للطروحة، وأن "ا لا
يخلو في الشيء المركب من أن يكون على أربعة أحياء، إذ المرتب أربعة، وكذلك
"ب"، وكذلك "ج"، وكذلك "د"، وأوزانها أربعة، من أن يكون درهم
ودائج، أو ثلاثة دراهم ونصف، أو خمسة دراهم ونصف دواينيق، أو سبعة
درهم ودانتين كما علّمناك أولًا...
7 فأعتمد إلى حجارتك التي تريد تدبيرها وجمعها بال المهنة والتشميع، فانك تجد وزنها:
إن كانت إكسيرًا، تسعة عشر درهمًا وخمسة دواينيق؛ وإن كانت في غير إكسير,
واكثر وأقل على حسب ما في ذلك الحجر من الطبع. فاعمله! 
8 والوجه واحد في جمعها أعني للتشميع. فذٌن فيها، إن كانت حرارة في المرتبة
الأولى، خامسةٌ من المرتبة الأولى؛ وإن كانت حاررتها في المرتبة الثانية، خامسة
من المرتبة الثانية؛ وإن كانت حرارتها في المرتبة الثالثة، خامسةٌ من المرتبة الثالثة؛
9 وإن كانت حرارتها في المرتبة الرابعة، خامسةٌ من المرتبة الرابعة.
والخامسة من المرتبة الأولى تيبراط، ومن المرتبة الثانية دائج ونصف، ومن الثالثة
10 دانتين ونصف، ومن الرابعة أربعة دواينيق، هذا واجب في الأشياء الحجرية
المحسن ما كان الواجب في تشيعها بزيادة الحرارة.
11 أربعة دوانيق ب طلق
فإنّا إن كان الوجه تزبيد البرودة، فالحكم في البرودة مثل حكم في الحرارة كما وصفنا سواء، وكذا إن كان الوجه تزبيد الرطوبة والبيوضة... وذلك إنّك تنظر إلى أكثر ما في ذلك الشيء، الذي تزيد تركيبه، من الحرارة هو أم من البرودة أو من البيوضة أو من الرطوبة، فتزيد فيه—from جنس الأغلب في تلك الأحجار الخمسة، كما تذكّر أن لا يشيع شيء إلا إذا كان من جنسه عليه، فأعظم ذلك وقت عليه سائر ما يأتيك من وجوه التدابير في الأدوية التي هي من الحجارة فقط.

فأما إن كان الأكسيمر من حيوان فقط زيدت نهه، إن أردت تشيعي وإن أردت أن تقبله من شيء إلى شيء، جعلت من أحد الأربعة الفائقة أيضا رابعة. إن كانت في المراتب الأولى، فرابعة من المراتب الأول، وبلغها دانق؛ وإن كانت من المراتب الثواني، كانت رابعة من المراتب الثواني، وبلغها نصف درهم؛ وإن كانت من المراتب الثواني، فرابعة من المراتب الثواني، وبلغها خمسة دوناتق؛ وإن كانت من المراتب الدوابب، فرابعة من المراتب الروابع، وبلغها درهمين ودانتين. فأعلم ذلك!...

وإن كان الأكسيمر، التي تريد تشيعي أو نتله من حال إلى حال أخرى، من النبات وحده، عرفت أيضًا الأغلب فيه من الأربعة. ثمّ زيدت فيه ثالثة من أخذها، وذلك إنّه إن كانت من الأول فثلاثة من المراتب الأول، وبلغها دانق.

لا - ب 6: يأتيك تيلك/ماتك/سمنك (ح) ب التدابير في 1110: كانت من المراتب الثواني. كانت من المراتب الثاني 6 11: كانت... المراتب الثواني!-ق.

113: كانت ب 15: تزيد تتراد ب، يراد ط.
1. ونصف؛ وإن كانت من المراتب الثلاث، فنسبة من المراتب الثلاث، ومبلغها أربع
دوانيَّة ونصف؛ وإن كانت من المراتب الثلاث، فنسبة من المراتب الثلاث، وإن
2. كانت من المراتب الرابعة، نسبة من المراتب الرابعة، ومبلغ الثالثة من المرتبة
الثالثة درهم وربع، ومبلغ الثالثة من المرتبة الرابعة درهمين... [[٧٨٠٥ - ٧٨١٢].

الكَيْفَةُ حال ما الشيء الكَيْفُ أعني بعض الحال، والأحوال منها بالنَّعم كمشى
عبدُ الله إذا كان ماضياً، والأحوال التي بالنَّعم منها سريعة الزوال، كالتيام،
والتعود، والخجل، والغضب، وما أشبه ذلك من الأشياء الموجدة بالنَّعم
السريعة الزوال؛ ومنها بطينية الزوال كالهندسة، والطب، والموسيقى، إذا كان
موجوداً للشخص بالنَّعم، ومنها بالقوة كمشي عبد الله، فإن الحيوان نبات
بالقوة، غير نبات بالنَّعم، وكذلك الحجر بالإضافة إلى الحيوان والنبات،
وقدانتها الهندسة إذا لم يكن متنبَّياً لها.

والذي بالقوة إنّما أن يكون الشيء من نفته، وهو كثولنا لعبد الله صريحاً إذا
كان له ذلك أن يفعل في تهيئة، وإنما إنفعاله في ذاته كما تتولى للحجر صلب
تريد أن ليس يتفرق أجزاءه بشهولة وللحسب رخص أو إنه ينقطع أجزاءه بسهولة.
والأشياء السريعة الزوال لا يكاد يكفيَّ. أعني يوصف الشيء بها، عند التقول
لا أرا ما نصي من إِنفَّ لِ веществ ٤ مَصْرَعٍ، أو لا مَن إِسْوَدٍ مِن شَفَر ٥ مسوداً،

٣٥: الخجل أ الحجر ط، الحجل ب؛ الأشياء ۶ من الأحوال (ح) ب ۱۲ لعبد الله
عبد الله ط ق ۱۵؛ يكفي (ح) ب؛ ويُوصف ط ق زرع ب ط ق؛ مصنف ب؛ مسوداً مسود ط
۱۶: زرع ب ط ق؛ مصنف ب؛ مسوداً مسود ط
وأتنا بطلنة الزوال فقد يكيف بها الشيء، فإنا نستنى من قد إصفر لونه من مزاجه... وهذا، أعني العسرة الزوال، هي التي يجب أن يتال لها كيفيات لأن الجوهر مكيف بها.

وقد يكون في النفس أيضا كيفيات سهلة الزوال، كالحزن الحادث من سبب ما سريع التنضي، أو الفرح؛ والبطء الزوال، كالحزن من استعداد الزاج لذلك، أو الفرح. وبين أن الحال نفي هذه أيضا كالحال في الأول، لابد لا نصف من حزن وقتاً يسيراً لعله بأنه حزين، ولا من طرب كذلك بأنه طروب. بل نصف بذلك الكائن لهما، وذلك دائم أو في الأمر الأكثر، والشكل والختلة والإستمتاع والإنحناء وما أشبه ذلك كيفيات، وذلك لأنها يتال لكل واحد منهما كيف الشيء، فلا تقد نطول في شيء أنه مثلك، أو مربع، أو مستقيم، أو منحنى، والتخلل والتكاثف والخشونة والملوسة، وما أشبهها قد يظن بها أنها من كيفيات دافق أن لا يكون منها وذلك بأنها أخرى أن يكون متكافف لما تثارت أجزاؤها بعضها من بعض، ومتخلل لما تباعدت، وليست كانت أجزاؤها موضوعة على التساوي والإستمتاع لا يعلو بعض وينخفض بعض، وخشين بخلاف ذلك.

ولعله أن يكون الكينية ضروب أخرى، والذي نذكره منها في هذه وهي إما في المحسوسات للعين، كالأشكال والألوان، وإما في الشم، كالاعراق؛ وإما في الزوال طق 46 الفرح طك 47 مكيفً يكتفف.
والكيفية أن فيها مخادع كالعدل والجور، والبيض والصودر، وما أشبه ذلك.
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صحّة أكثر متاً لهذا، وكذلك في المدّة والكتابة وسائر الحالات. فالأسماء من هذه الكيفيات نمّى جدًا شكلًا صالحة للزيادة والنقصان، لأنّه قد يقال أن هذا أبلغ من البلاغة، وهذا أعدل من هذا وأصح في المدة والصحّة. وليس أيضاً كل مسمى من كيفية صالحة للزيادة والنقصان، فإنّ المثل مسمى من كيفيته التي هو التثليث والمربع، مسمى من كيفيته التي هو التثليث والمربع غير مقصود، وليس يتبان الزيد والنقصان، لأنه ليس مثلّ؟ أكثر تثليثاً من مثلث، ولا مربع أكثر تربيعاً من مربع، لأنّ المثلث ينال عليها الثلث بالسعيّة، وكذلك الدورات والمربعات... وليس ينال فيما تئيل عليها الحدّ بالسعيّة أقلّ وأكثر في ذلك الحد، ولا أيضاً على ما لم يتل على حدّ واحد...
والكيفية جميعًا ظلها وحدها أن ينال فيها شبيه وغير شبيه، فإنه لا يكون هذا
شيئاً بهذا شيء غير كفيته...[[858 : 26 - 86 ب]]

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٤: مسمى ينال ق ٥: التثليث: المثلث/التثليث (ح) ب: المربع، لمربع ط، التثليث ق
٦: وكذلك... المربعات) -ق ١٦٨٨: على ما... غير كفيته -ق
الجزء الرابع من كتاب الأحجار على رأي بليناس

بسم الله الرحمن الرحيم، الحمد لله رب العالمين وصل على سيدنا محمد وآله وآله

4: الكتاب على آخرهم لمزيدا أن نبرين في هذه المنزلة مسألة الأرواح، و ما جرى مجرى
الأرواح على مثل الأشكال التي قد كن بها إشكال الأجسام عليها في المنزلة
الثانية، وأن يذكرنا هذا الجزء كيف الوجه في تزبيد ما نقص، ونقص ما زاد.

ونحن بادران من موضعا هذا وجه العمل في الأرواح، تألون ذلك بمعرفة التزييد
والتنقيص، ويكون ذلك مطلع هذا الكتاب، وهو آخر هذه الكتب الأربعة.

10: فنقول إن الأرواح مخلقة للأجسام في النار لا من جهة اللون والصلاة والسماك وغير
ذلك، فإن الأرواح جميعاً أو أكثرها قد تكون ألوانها كألوان الأجسام: حمراء,
بيضة، وسوداء وغير ذلك. وقد تكون الأرواح كالأجسام في السماك إذ كل
الأرواح ينسبك في النار إنسبا الأجسام، ويجري جريانها، وقد تكون بعض
الأرواح في صلاة الأجسام، وبعض الأجسام برخاوة بعض الأرواح، و إننا ننصنا
على أرواح الأجسام دون غيرها لما ينفع أن نعلم أن الصنعة لا تكون إلا من روح
وجسم، ولا تكون إلا من الثلاثة الأجسام، لأنه لا موجود غيرها.

15: لما كان ب 5 بينا بينا بينا بينا (ح) ب، بينا ط ق 9 للأجسام الأجسام ق
10: تكون ب ط ق 11، تكون ب ط ق 12: تكون ب ط ق;
جريانها مجريها ب 12: و بعض الأجسام ماهو ب، 49 ماهو ط
15: تكون ب ط ق
1. نأتي الحيوان فإنه إذا تطور خرج منه روحان وجسمان. فدهنه وذاؤه روحان، وصنعه وأرضه جسمان... وكذلك النبات، لهذا سائر ما فيها. والقول في الحجارة فعل حسب ما يتطر منهما، وما لا يتطر. فما تطر كان التول فيه كذلك. وما لم يتطر فهو على نوعين: إما متصاعدًا أو غير متصاعد. فأنا متصاعد.

5. انتصر تكسين - نصاعد روح وراية جسم. ونتحر التكسيد فينتمي أيضا تكسين. تقسم مائي وتقسم متكلّس، فاتئ المائي نحوض، وأنا المتكلّس نجصم. وينتمي هذا المائي الآخر تكسين: تقسم فرار و تقسم غير فرار، فأنا الفرار من النار نحوض، وأنا غير فرار، وإن كان ماء، نجصم. فهذا جميع ما ينتمي عليه أسور الطبعان كلها في الصمعة... وند ذكرنا ذلك بعينه في كتاب الكامل من المائة واثنى عشرة...

11. نأتي نقل الأجسام من حالة إلى حالة إذا أدن منها أو أرفع تنه هذا الكلام باطن وظاهر، إذ كذلك باطن وظاهر في حقيقته، إذ كان كل شيء كل منها مدروّاً، ومنها ما ظاهر موجود وما باطن موجود، وفي باتنة القائدة. وعكس هذا الكلام كالأسرب ظاهره رصاص منتحن، وهو موجود للأناس جميعاً، وباطنه ذهب وفخة وهو معدوم، فإذا خرج ذلك صار الظاهر والباطن موجودين.

15. وعلى ذلك ميزان النار وميزان جائر الأجسام، وميزان طبعان الكواكب وأباعدها ونقلها ونقلها، وميزان عرفنا به الفلك، كما عرفنا ميزانهم هذا طبع ذوات الطبعان. ومن قرأ كتابنا المعروف بالمنتهى وكتاب الشمس إطلع على أكثر هذه...

5. تقسيم، تق 6 تقسم مائي، متئ تق 12، إذلك ذلك ظاهر، إذلك ذلك... ظاهر، تق 14 وعكس هذا الكلام، وعكس هذا الكلام وعكس هذا الكلام ط 16 الأجسام، وميزان الأجسام تق 17 نظلاً... تقسم.
باب في ترتيب تعليم المتعلم

5 ينبغى أن تنهم أولاً من الصناعة شيئاً بسيطاً. وهو أن تعلم ما يحتوي وما يلقي وما ينفد وما يجلب وكأن ذلك على طريق الميزان. وهذا ينفع لك واضح في غير كتاب من كتبنا هذه. وتعد استديونا كثيراً من ذى في "الحاصل" وفي "كتاب التصريف" و"الميزان" و"الملة" و"اثنى عشر" في كتابنا المعروف.

6 بكتاب "الأصابع".

وينبغى أن تعلم المناصر الأول والثاني والثالث والرابع، والأعمال وكينياتها، كالنار، وأخواتها وهي الثانية، والثالثة للأرمنة، والرابعة كالمهاب الطود والصفر، وتنظر كيف تقبل طبعك، وكيف تصرفت فيه، وكيف نتائج تزودتك له. فإن كنت

11 قد رأيت عقلك تقبل فيه شيئاً وتصربته فيه بأشياء فينفيه أن تدديترة أولاً، وبخاصة إن وقع إليه "شرح كتاب أسطئطاس الأسئ". وإن كنت تجاوزت هذه

15 المئزة فبخ لك!

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نارتحل الآن إلى أحوال الفلسفة وأراهن في أصول الطبعات وتركيباتها. وتأخذ نى
شيئ من الكلام وعلم المنطق والحساب والهندسة نائلاً، بحسب ما يسهل عليك
تصور المستقبل إذا طالت عليك، و إنه كنت قد شدت من ذلك شيئاً قديماً فهو
سهل عليك وأجود.

فتصرف الآن، إن أحببت، في علم الطبعان أو غيره، وإن أردت علم الطبعان
فلتدرس من طبعات الأحجار والخواص نائلاً، ثم تنقل جملة واحدة إلى الموازين،
فتعرف من جميع نتائج الموازين نقطةً (نقطةً) مثل ميزان النار وميزان الموسيقى
و موازين الأجسام. وتقدم ذكراً من ذلك نقطة في غير كتاب وبخاصة في

كتاب الصحوة. فإن ملته مع علم الطبعان إلى علم الصنوغة فلتدرس
كتاب المخاريق لنكون حذراً من وتوقع الآثات وتلف المال ووقوع الجيلة عليك
ثم تتدرَب في كتاب الموازين. وأن تتعلم كيف الوجه في تركيب هذه الأشياء
وما سببه، و Quad 1 أن نبتغ أن تكون في هذا الوقت متكافلاً جيداً الحسن.
فإن ملته لن يفزع من كتاب السمعة وهو يعوزه شيء من الموازين، وإذا تدرَب
بها ركب ما يريده.

ويعوزه الآن تحصيف الأبواب لا غير. وهذا مأخوذ من نثر الكتب مثل التشريع
والنصوص والسائح والحلقات والعقودات، و مثل ما ذكره الناس على قديم الأيام

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وأكثروا فيه السرايا على طريق التجادير للشيء الأعظم، وسوتوط التعب هو في الموازين لا غير كما ذكرت، فأنهم ذلك الطريق إن أردت الغرب أو ما أردت على حسب شهودكم. وأعمل على أنها صنعة تنجب إلى دربة، بل هي أعظم من كل صناعة لأنها غير موجودة في الحسن وإنما هي شيء ثائر في العقل. فشت طالت دراستها كانت سريعة في التركيب على تذر ذلك، و منهم تصر كان على حسبه.

ولعل أن شرفة الموازين عمل الروس من غير أشياء مدبرة من التركيب والاكاسير، والميزان إذاً ينتج بعد المازحة من الأجسام مع الأحجام، أو الأرواح مع الأجسام، أو الأجسام مع الأحجام، أو الأرواح مع الأجسام، أو الأحجار والأجسام والأرواح، فالميزان ينتج بعد هذا الاختلاط، وإن كانت الأرواح الأجسام والأجسام ذاتها بحالها وزنها بعد اختلاطها وعند ما فيها من جملة الطبعان وعلمت اختلاطها، ولكن تأكيد الإبدال معروف فإن كانت مثلاً هي ناتجة، وإن كانت فوقه أو دونه زبدت فيه من الطبعان أو نقصت منه نخرج بحاله الأخير سبعة شرقة...  

وللناس في هذا أحوال يمكن أن لحظ في الموازين وعمل على أن الأصل في الأشياء كلها الطبعان، فإنهم من قال: إن شيك في العالم queda قبل شيء، فإن جماعة من الصناعين و أثبتهم يذهبون إلى أن بناء العالم بعضه أسفل في الموجود.

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من بعض، لا على أنه أسس في الترتيب والتنظيم، لكن على أن بعض أسس من بعض في المقدمة والأحوال. وذلك أن رأيت منهم من يزعم أن أول شيء خلق في الهيكل الأدنى ثلاثة العقود والمعمل، فصار الهيكل جسمًا ساطعًا له ثلاثة أقدام. ثم خلفت فيه الكيفيات الأربع التي هي الحرارة والبرودة والرطوبة والبيوة، فكانت منه طبقات الأشياء وأركان الخليفة. ثم تركبت هذه الطبقات الأربع واستزج بعضها بعضًا، فكانت منها جميع الأشياء والأشياء الموجودة في هذا العالم.

فتبيني أن يقال لهم: إنكم قد ترتقيتم في عدد من مراتب مجهولات كلها غير معقولات حتى محتى وجود العالم ما هو به...

نتولل والله التوفيق.

إن أول تلك المراتب طينة، لم تزل ليس بجسم، ولا توصف بشيء مما توصف به الأجسام. وزعمت أنها شبه الأشياء ومنصورة البرايا، وتأخرت هذه الطينة في الوجود، وإحضارها بالنيل بينن غير معقول، والمرتبة الثانية أنكم ذكرتم أنه لما حدثت في هذه الطينة الأدنى ثلاثة صارت جسمًا، غير موصوف بشيء من حرّ 15 أو برد أو رطب أو أبيض أو لون أو رائحة أو حركة أو سكن، لأن هذه كلها كيفيات والكيفيات لم تحدث فيها في هذا الوقت، وهذا شيء غير معقول.

23: اللددة الماء ط 17 ساذجاً سادجاً ب ق 15 أركانًا: إن كان ب 46 جميع الأشياء! جميع هذه الأشياء والأشياء ق 77؛ هذا ب ط 8؛ مراتب المراتب ب ط 11؛ المراتب الراشان ب، المراتب ان ط تزل ب ط ق 12/11؛ ماتا توصف بها ولا يوصف بها ق 12؛ إحضاراً اختيار ط، اختيار ك، لأنه إن ط ق 14؛ مارت سام ب ط 15/14: الأدنى... طعم... غ. 15: أو رائحة أو حركة أو سكن؛ ورائحة وحركة وسكن ق.
1. ثم زعمتم أنه حدث فيها بعد هذه المرتبة الثانية الكيفيات الأربع التي هي الحرارة، والبرد والرطب والياض، فكانت منها الأربعة التي هي النار والهواء واللامة والأرض.

2. ومن البين أنه غير معقول وجود هذه الطبقات الأربع في حال من الأحوال على غير هذه النظم والترتيب الذي هي به الآن موجودة في العالم، من أن الأرض في وسط الفلك، واللامة فوق الأرض، والهواء فوق اللامة، النار فوق الهواء، وكل طبيعة من هذه الطبقات الأربع غالبًا ضدًا من الطبقات، ويستحيل اللفرب إلى الغالب، والشجر والحيوان موجودان معها ومستمرون منها ومستحيلان إليها، فطمعن هذه المراتب المقدمة ومنها وهي كلها غير محسوس، والعالم من خطر بالها.

3. حدود الأشياء لا من شيء كان أيسر وأسهل في وجه منه تصفحون، أو أخبرونا عن الشيء الذي خلقت منه النار من الهيكل هل كان يجوز أن يخلق منته الوان؟ فإن تالوا تامًا ألفاً، فذلك لأن كل شيء ركز منه شيء فهو هيكل لا تركب منه. ومن قولهم إنّ نطفة الإنسان هيكل الإنسان، ونقطة الحمار هيكل الحمار.

4. الحمار، ويزعمون أنه محال أن تقبل نطفة الإنسان صورة الحمار لأنها ليست هيكلًا لها، وكذلك محال أن تقبل نطفة الحمار صورة الإنسان، فنجب على هذا التناقض أن يكون الشيء الذي يتقبل صورة النار هو هيكل لها، محال أن يقبل صورة الماء لأن يكون هيكلًا له.

5. هذا! هذه ط ط في العالم ففي هذا العالم ٦٥٦ غالبًا يقارب ٩٠ لا إلا طق.; كان! وكان ١٠: منه من ق ١١: منه شيء من شيء ١٢: نطفة الإنسان صورة الحمار صورة الإنسان نطفة الحمار ب طق ١٤/١٢: لأنها... الإنسان}--
1. فإن تألفوا; إنّا نجد الماء يسهل فيه نتيجة من الجموح الحامل لكيفيات وحالته هو الحامل لكيفيات النار وحالاتها، فإنا على الأول جاز على الثاني.

2. وإنما تبديت أعراضه في ذلك الليالي القديم واحد و هو حامل لكيفيات النار وحالاتها وحالاتها إن هي حدثت فيه.

3. فتلئ; إنّا لمّا في حالة ليس يسهل فيه نتيجة فيسيح ناراً، لكنه يستحيل أولاً بخاراً ثم يصير هواء ثم يسهل الهواء فيسيح ناراً. و لو أن تألفاً يتول إنّا الماء يسهل هواء

4. فيسيح ناراً كان قد أحل بما يعتنق.

5. وليس هكذا قولكم في الهيكل البسيط الذي لم يزل. لأنكم لا تقولون إنّا الشيء الذي منه يخلق الماء في البتبى إنّا كان يجوز أن يخلق منه النار على سبيل الإستحالات التي ذكرناها، و لكن قلتم; كان يجوز أن يكون الهيكل الذي استحولت عليه طبيعة الماء وحالته تستحول على بدلاً منها طبيعة النار وحالاتها

6. بغير استحالات متسعة فيها بين الماء والنار، و هذا خلاف المثلول.

7. وإن زعموا أنّ الهيكل القديم قبّل أن يكتب ببالصور ويحدث فيه الطبع كأن شيءًا إنّا قوته أن يقبل بها في البتبى حالات النار و كيفياتها، ومنها شيء إنّا قوته أن يقبل بها حالات الماء و كيفياتها، و كذلك في الأرض و الهواء كان بهذا

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1. ناريّاً هواء ب طق ؛ كيفياته الكيفيات ب طق ٢٨١ الحامل .-.د ق
2. كيفيات النار) الكيفيات النار ب ق، الكيفيات؟ النار ؛ طق فاما ب طق
3. ناريّاً فذلكا ب طق ٢٤ حالات) حالاتها ق ٦ ب ثم يسهل الهواء ؛-.د ق
4. طق فذلكا فذلكا ب طق ٢٤ حالات) حالاتها ق ٦ ب ثم يسهل الهواء ؛-.د ق
5. فيسيح) ناريّاً فذلكا ب طق ؛ يعتن لا ينقل ب طق ٨ تول Goa طق ؛
6. البسيطة ب طق تقولون ب ؛ سبيل) هذه ق ١٠ اسحصالات
7. استحالة ق ؛ ذكرناها) ذكرنا ب طق ؛ الذي ب طق ١٣ ؛ بالصور الصور
8. طق ١٥٩٤ في البتبى... حالات) -.د ق
القول قد أثبتوا للخليفة أربعة عناصر لم تزل قديمةٌ وهي مختلَفات التقوى، وبطل تولهم إنّ العنصر الأول واحد ليس بمختلف.
ويسألون: هل يجوز انحلال الأشياء إلى الهيول التقديم كما تركب منها؟ فإن قالوا لا يجوز هذا، قيل: وَلَمْ يَجْزِيَ! فإن قالوا: إن ذلك بطلان الأشياء ورجوع إلى ما لم يزل عليه من أنه بسيط لا تركيب فيه، فقالا: وما الذي يضركم من أن تقولوا إن الأشياء ستعود إلى ما لم يزل عليه من أنه بسيط يزل وهيولي بسيط لا تركيب فيه ويبطل هذا العالم؟
ويتال لهم: إن قوامًا كثيرًا من الفلاسفة زعموا أن هذه الطبائع الأربعة التي هي أركان الخليفة وعناصر الأشياء، أعني النار والهواء والماء والأرض، بعضها في بعض بالثورة، وأحالوا قول من زعم أن هذه الطبائع الأربعة كانت موجودةً في غير أنفسها، وأنها وفيرة ما هو مركب منها، فقالوا: ليس المモン من الموجود إلا هذه.
فإن وُجِدَتُ مدعَ أن هذه الطبائع الأربعة إنما توجد بالثورة في غير أنفسها وفي غير ما هو مركب منها، فإن كتب على دعوات بيرمان، و إنه لم يقترب على ذلك أبداً، إذ مأخالف هذا القول وخرج عن هذا النمذج والترتيب فهو كلام على غير المモン.
ومنه يُستدلُّ به على نسء تولهم أن من مبدئات اليتين وعلوم الإضطراب عند الفلاسفة أنه يستحيل أن يكون جوهر موجود عُلَى من الأفعال كلها الطبيعية

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CHAPTER V
TRANSLATION, COMMENTARY AND NOTES

Note

For the purpose of commentary, the translated text has been divided into a number of sections and subsections, and each section has been treated as a separate, though not independent, unit. Thus, in the "Commentary and Notes", each unit first receives a general commentary, after which follow specific textual notes. These notes have been numbered independently in each unit.
(A) TRANSLATION OF THE EDITED TEXT

1:1 The First Part of the Book of Stones According to
the Opinion of Balînâs

[1]

1:2 In the name of God, the Compassionate, the Merciful
Praise be to God for perpetually bestowing upon us His gifts and favours,
and for His benevolence.
After this follow our prayers for our lord Muḥammad and his family.
Peace be upon them!

1:4 In several books belonging to the Books of Balances, we had promised you
an account of the views of Balînâs, particularly with regard to the Science of
Balance. Accordingly, we now proceed at once with an exposition of those aspects
of his doctrine which are in agreement [with our views] and those which are not.

[2]

1:6 Balînâs said: "To expound the wisdom which was dispensed to me after my
exit from the cave and taking hold of the Book and the Tablet,¹ I declare:²
That which belongs in common to all things is the natures. These natures are simple
not compound. And if something is common to all things, it would be absurd to
suppose that it does not possess quantity."

1:8 This we have already elucidated in a number of books on this Art.³
He went on to say: "The weights which are common to all animals, plants, and stones conform to the proportion of 17. As for the elixirs, they are not like this." Again, we have already explained this in several books of ours.

Then Balīnās determined the quantities of these weights - [and this is] in accordance with what we have already set forth in the Book of Morphology, namely: 1 in the First [Degree of intensity], 3 in the Second, 5 in the Third, and 8 in the Fourth.

Balīnās said: "As for the effective weight [of the natures], I believe that its lower limit is the 'ashīr, that is, ¾ ḥabba." By this he means that the fifth [in the First Degree of intensity] has the value of 1 'ashīr. Then he arrived at the necessary conclusion that the fourth is one dirham [abbr. dir.], the third 60 dir., and the second 3,600 [= 60^2] dir.; the minute is the product of 3,600 and 60, so that it becomes 216,000 [= 60^3] dir.; the grade is the product of 216,000 and 60, thus it is 12,960,000 [= 60^4] dir.; and [finally], the degree is the product of 12,960,000 and 60, so that the degree in the First Degree [of intensity] of any nature is 777,600,000 [= 60^5] dir.

Likewise, [the degree in] the Second Degree [of intensity] is 2,332,800,000 [= 3 x 60^5] dir., the grade in the Second Degree is 38,880,000 [= 3 x 60^4] dir., the minute in the Second Degree is 648,000 [= 3 x 60^3] dir., the second in the Second Degree is 10,800 [= 3 x 60^2] dir., the third in the Second Degree is 180 [=3 x 60] dir., the fourth in the Second Degree is 3 dir., and [finally], the fifth in the Second Degree is 2 1/2 ḥabbas, that is, 3 [= 3/4 x 3] 'ashīrs...
To continue: the fifth in the Third Degree is, according to the doctrine of Balīnās, 15/4 \(= 5 \times 3/4\) ḥabbas, or 5 'ashīrṣ; the fourth in this Degree is 5 \(= 5 \times 1\) dir., the third 300 \(= 5 \times 60\) dir., the second 18,000 \(= 5 \times 60^2\) dir., and the minute 1,080,000 \(= 5 \times 60^3\) dir. The grade in this [Degree] is 64, 800, 000 \(= 5 \times 60^4\), and, following this pattern ..., the degree in third Degree is 3, 888, 000, 000 \(= 5 \times 60^5\) dir.

Similarly, the fifth in the Fourth Degree is 8 'ashīrṣ or 6 \(= 8 \times 3/4\) ḥabbas, the fourth 8 \(= 8 \times 1\) dir., the third 480 \(= 8 \times 60\) dir., and the second 28, 800 \(= 8 \times 60^2\) dir. The minute in the Fourth Degree is 1, 728, 000 \(= 8 \times 60^3\) dir.; the grade in this Degree is 103, 680, 000 \(= 8 \times 60^4\) dir., and [finally], the degree in the Fourth Degree is 6, 220, 800, 000 \(= 8 \times 60^5\) dir.

So, God protect you, certain ideas of Balīnās have been sufficiently elucidated. Let us now work out how, according to his views, these weights are applied to all things.

[4]

Balīnās claimed that animals, plants and stones each possess a characteristic Balance which was created in the First Generation by God, may He be glorified and exalted. Further, he said that animals have a Balance besides the First, and likewise [plants] and stones, and that the generation of this Second Balance depends on us. So know that!

He also claimed that the Supreme Elixir in particular has a Balance of its own ... And as for theurgical works, he believed that they possess different Balances according to their characteristic diversity.
Then, in broad outline, Baṭīnās specified each of these Balances which we shall thoroughly explicate in the course of these four books as we have repeatedly promised elsewhere. Also, we shall establish our objectives concerning those Balances which we have ourselves discovered.

You ought to know that anyone who has not read our prior writings on the subject of Balances will derive from the present four books no benefit at all, for all these are intimately interdependent. However, we now proceed with our explication as we have promised you, God the Most High willing!

Know, may God protect you, that after attributing a Balance to all things we have enumerated, and after having spoken of the quantitative values which we have mentioned, Baṭīnās also made a pronouncement on the letters which is in conformity with what we have [ourselves] taught you in the Book of the Result.

Next, he said: "When two letters of the same figure follow each other in one word, only the first is taken into account considering its type and the value characteristic of its Degree. To the second is ascribed a minimal value which does not enter into the computation made with the letters of the alphabet. An example is "’’" or "’’’. By God the Great, this I have already taught you in the Book of the Arena of the Intellect.

After that, he said: "Let us consider the Arabic language in particular. For it is obvious that the practitioner of Balance need take into account no other language."

Concerning the First Balance of animals, [what] Baṭīnās then said is in accordance with, and nothing more than, what I have myself set forth in the Book of Morphology, so I need not repeat it here1. The same applies to [the First
Balance of plants and stones. So we are done with it, and there is no obscurity nor doubt in it, nor do we present to you a confused account.

4:11 And [yet], as always, we deliberately abrogate in one book what we say in another. The purpose is to baffle and lead into error everyone except those whom God loves and provides for!

4:13 With regard to [the weights governed by] the Second Balance of animals, plants and stones, they range - as we have said in the beginning of this book - from [the maximum to the minimum, that is from] 1 'āshār which is value of the fifth [in the First Degree], being the minimum, to 6, 220, 800, 000 dir. which is the value of the [degree in the] Fourth Degree, [being the maximum] ...²

[6]

4:16 The reason why we are furnishing an account of stones in these [four] books, setting these books apart from all other writings, is that Baḻīnās said, and it is the truth, that among the letters which occur in drugs and in other things belonging to the three kingdoms of nature, there are those which signify the internal [natures], but not the ones which are external; those which do the opposite, in that they signify the external [natures], but not the internal; those in which all of them [sc. internal as well as external] are found; and those which signify [not only] all that is in the thing, [but also] the excesses which need to be discarded and thrown away - just as one needs to augment and complete what is deficient ...¹

5:2 Further, Baḻīnās believed that the name of gold truly conforms to the Balance, for it signifies two natures. Nay, the correct judgment in this case is that the name of the gold is that which is necessitated by all [four of] its natures ...²
5:7 Balīnās continued: "I only say that all things ought to be named according to the reality of their Balance, with a view to practical applications, not verbal usage. And, may God protect you, it behooves you to know that whoever in this world discovers a new language, he is a great man!"

5:9 And this which Balīnās mentions is the bringing forth of another language of which mankind in general does not know, for precise application of names is not a matter of common knowledge. Such knowledge is found but only in exceedingly rare cases.

5:12 In order to discover the natures by means of letters, you ought to follow what we taught you in the Book of the Elite, so that we lead you at the initial stages not into the precise determination of things, but into their nature. And this is also what we taught you in the Book of the Result, except that, for the purposes of learning, the Result is better than the Elite. This is so because the Elite is like the aroma which emanates from things, whereas the Result is like their essence: the absence of the latter is the absence of the source.3

5:16 Thus, these accounts make it known that the extraction of the mere external nature of an object is of no use - if we do this, we have practically let the thing slip away from our hands. Rather, you must, may God protect you, weigh everything whose weight you desire and attain it, away from everything else,4 in the interior of the thing, and in its exterior.

6:1 As for the different ways of the removal of excesses, you need at this point what is set forth in the Book of Morphology and elsewhere in these [four] books, namely that you must necessarily remove from all things whose weight you desire what is added to its primitive structure, and what has entered into this structure due to reasons other than additions.5 It is known that the name of gold, '(al-) DhāHaB, is
free from additions; and the spelling of the name of silver, $\text{fidda}$, becomes $\text{FD}$, for the $\text{hā'}$ enters in it for the sake of feminine designation, and it does not admit of masculine gender. Thus, after removing the additions from the name of silver, you ought to augment it according to the need.

6:6 O brother! know that when you obtain only one letter, like "*" or "b" or whatever else you obtain, you must make the total conform to 17 ..., but with one proviso: you ought to separate the result obtained through the analysis of letters from that obtained by means of conjecture. You try to work out the latter in relation to the form, so that the two figures form one unique figure.

6:9 By my Master! I have already explained to you that which you need not augment, in it there is a third thing - but I am not happy with it unless you make in one day one thousand animals, one thousand plants, and one thousand stones. God is our Guide, may His blessings be upon you. Indeed, He is Generous and Kind.

[A]

6:13 My brother! you ought to know that additions to the primitive root of a word may be in the form of prefixes, suffixes or infixes. You ought to know, further, that some of these additions are represented by inflexions, and should therefore be discarded and disregarded: for example, $Z\text{a}Y\text{DUN}$, $Z\text{a}Y\text{DAN}$ and $Z\text{a}Y\text{DIN}$, [which are the inflected forms of the primitive noun $Z\text{a}Y\text{D}$] in the nominative, accusative and genetive cases [respectively]; and $Z\text{a}Y\text{DAN}$ and $Z\text{a}Y\text{DUN}$ in the dual and the plural forms. So, my brother, pay no attention to this, and restore the word to its singular primitive core, such as $Z\text{a}Y\text{D}$ from $Z\text{a}Y\text{DAYN}$, and 'UMâR from 'UMâRAYN, and so on.
It behooves you to know that some letters are such that if they appear at the beginning of word, they are additions to the primitive root, while these same letters function as radicals when they occur in the middle of the word or at its end. On the contrary, the final letter of a word may be an addition to the root, whereas this same letter, when it is medial or initial in a word, may be a radical, that is, an essential part of the primitive core. Similarly, a medial letter may be a radical, while as an initial or final letter it may either be an adjunct or a radical. And there are, you ought to know, ten letters which function as adjuncts: hamza, lām, yā’, wāw, mīm, tā’, nūn, sīn, alif, and ḥā’. But, then, these letters keep changing their places of occurrence and their positions in words, whence we need to establish morphological paradigms which govern these changes.

So, seeking assistance from God, may He be exalted and glorified, we proceed: The basic units of speech consist in three structures, namely: triliteral, quadriliteral, and quinqueliteral. As for the triliteral, they are divided into twelve paradigms. Out of these, ten are in use; while one is the basis only for one word; and one exists only in theory, nothing is ever built on it, and it is practically non-existent. Concerning these paradigms, one of them is FA‘L, exemplified in fahd, and [nine others are these]: FI‘L, such as ẖiml; FU‘UL, such as dubur; FU‘L, such as ‘unq; FA‘AL, such as rasan; FI‘IL, such as ibil; FU‘AL, such as surad; FI‘AL, such as qima‘; FA‘IL, such as kabid; and FA‘UL, such as sabu‘. So these are ten paradigms into which the triliteral structure multiplies. As for the
paradigm which generates only a unique example, it is FU’IL: the insect duwaybba is called du’il. Finally, the structure on which nothing could possibly be based is FI’UL.

8:1 As for the quadriliteral structure, it has five morphological paradigms, namely: FA’ALAL, such as ‘aqrab; FU’ULUL, such as burqu‘; FI’LLIL, such as zibrij; FI’LAL, such as hijra‘; and FI’ALL, such as qimār.

8:3 The quinqueliteral is divided into four paradigms, they exist in accordance with: FA’ALLAL, such as safarjal; FA’LALIL, such as jahmarish; FU’ALLAL, [such as...?; and FI’LALL], such as jirdahl.

[D]

8:5 All else is nothing but adjuncts to the primary core. As for the recognition of these additions so that everything is restored to its true structure, there are, as we have mentioned above, ten [letters which function as] adjuncts. Among these, mim and lām are specific to nouns: lām is accompanied by alif, and [the addition of] these two are meant for definition, as in AL-‘abd, AL-ghulām, AL-dawā‘, and the like. And all nouns admit of a gender. The letter lām is added also between alif and kāf in order to specify the grammatical third person alluded to, although it is more appropriate with the hamza. Similarly, [a third] lām is added between the second lām and dhāl in alladhi. This is done in order that it [sc. the third lām] can carry the a-vowel, and that a distance is introduced between the vowelessness of the [second] lām and the i-vowel of the dhāl.

8:10 As for mim, it is added in [such nouns as] makrum and mustadrab, and in others like these. This letter is not endowed to verbs except very rarely - such as [its occurrence in] the verb makhraqa. With regard to hamza, wāw, yā‘, tā‘, nūn,
sin, alif, and há'. hamza is added in Ahmad, and in Afdal, [these two] being nouns; and in ahsana, and in akrama, and these are verbs.

8:15 To be sure, our purpose is not to teach you grammar. In fact, we are showing you all this only because in [the appellations applied to] stones, plants and animals, [some have the form of a primitive noun], others have the form of a verbal noun. Thus, we show you those letters which occur [a] as additions to [the primitive root] of verbs, as well as to [the primitive core] of nouns; or [b] as additions to nouns, but as radicals of verbs; or [c] as primary elements of nouns, but as additions to verbs. We do so in order that you apply these rules to all things in general, God willing!

8:17

9:3 The letter yā' is added in the word ya‘malu, and this is a noun; and in yadrību, and this is a verb. Wāw is added in jawharun, and this is a noun; and in hawqala, and this is a verb. The letter ǧā is added in the word tandrūb, this being a noun, and in tadrību which is a verb. [Similarly], nūn is added in narjisun, and this is a noun; and in nadribu which is a verb. The letter ǧāl is added in mustadrabun which is a noun; and in istadraba, and this is a verb. The letter sin is added in muḍaribun which is a noun; and in mustadrabun which is a noun; and in istadraba, and this is a verb. The letter alif is added in muḍaribun which is a noun; and in dārab which is a verb. [Finally], há' is added in qa’imatuN, and this is for feminine designation - thus, [in the apocopate form], the word is [pronounced] qa’ima. Há’ is added also in irmih, and this is for [phonetic] pause. So know [these rules], and apply them in dealing with all such paradigms you come across.
When we say that rhythm is defined as a numerical composition, then [we explain it by saying that] this composition exists by virtue of [sequences of] motion and rest. And as for the moving and quiescent [letters] when they are composed in speech or in rhythm, the maximum number of moving letters that can cluster in a row is four - metricians exemplify it by the paradigm, \textit{FA'ALATAN}; and the maximum number of quiescent letters that can cluster in a row is [two] represented by their paradigm \textit{FÄ'ILÄN} - here the letter \textit{alif} and the letter \textit{nun} are quiescent. This [latter] would have been impossible were it not for the softness which is in \textit{alif}. Such clustering of quiescent letters is inadmissible except in the case of soft letters, and these are three: \textit{wāw}, \textit{yā'}, and \textit{alif}. So know that!\textsuperscript{1}

Since, in speech and hearing, numerical composition [= rhythm] is based solely on motion and rest, the total number of metrical feet is eight: two of them are quinary, the remaining six septenary. As for the quinary, they are \textit{FA'ULUN} and \textit{FÄ'ILUN}. And as for the six septenary ones, they are \textit{MAFÄ'İLUN}, \textit{FÄ'ILATUN}, \textit{MUSTAFÄ'İLUN}, \textit{MUTAFÄ'İLUN}, \textit{MUFÄ'ALATUN}, and \textit{MAF'ULATUN}. Then, from these, practically unlimited number of feet are generated through additions and subtractions. So it is their doctrine concerning the definition of rhythm, namely that it is governed by numbers, which has yielded all these elaborations.

Here we need something else, for rhythm, when viewed in terms of numbers, may either be odd or even. Now, even and odd numbers are of different types: even-even, even-odd, odd-odd, or odd-even.

Odd numbers are 1 and its sisters;\textsuperscript{1} even numbers are 2 and its sisters.\textsuperscript{2}
The even-even number is like 8: it arises out of the pairing of 6, of 4, and of 2.3

As for the even-odd numbers, they are [the even numbers] like 6 which is contained in [an odd number] 9; or the sisters of 6, like [the even number] 4 contained in [the odd number] 5, and so on.4

As for the odd-odd, it is the number 1 contained in 3, 5, 7, 9, and in numbers like these.5

The odd-even numbers are the opposite of the even-odd: they are [the odd numbers contained in even numbers] such as the numbers 7, 5, 3, and 1 which are contained in the even number 8.6

From all this arise the four musical modes,1 being the final result of all the above numerical considerations, namely: the [rhythmic] modes called the "first heavy",2 the "second heavy",3 the ramal,4 and the hazaj.5 Then, from each of these, four light modes are generated, giving altogether eight [rhythmic] modes. These latter are: the "first light heavy",6 the "second light heavy",7 the rapid ramal,8 and the rapid hazaj.9 Finally, a relationship is established between each one of these and [the melodic modes called] the asābi*.10

The variations in these [melodic] modes, which are produced by fingers, bear a parallel in the variations produced [in speech] by the throat, tongue, and lips: for just as these asābi* give rise to motion and rest, we obtain motion and rest in letters too.11

So they call [these combined modes]: the "first heavy freed",12 the "first heavy tightened",13 the "first heavy middle",14 and the "first heavy carried"15 (while this "carried" is also called "restricted", perhaps the two [are not quite the
same but separated by a short percussion). In this way, each of the eight [rhythmic modes] is combined with each of the four [melodic modes], and this makes a total of 32 modes.

11:4 All this is yielded by their doctrine that [music is] governed by numbers, that is, it is a composition of numbers ...

[11]

11:5 Concerning the Balances of those bodies which are mixed together:

[A]

Take, for example, glass\(^1\) mixed with mercury in some proportion of weight known to nobody except you, and you give it to the practitioner of Balance.

11:6 [You will find that] this expert has the capability of determining for you precisely how much of glass the mixture contains, and how much of mercury. The same is true of mixtures of silver and gold, or of copper and silver, or mixtures of three, four, ten, or even a thousand bodies if such a thing is in practice possible.

11:9 So we say:

The determination of the quantitative composition of mixed bodies is [carried out by means of] a technique which closely approximates the Balance, and it is a splendid technique! Nay, if you were to say that it serves as a demonstration of the faultlessness of this Science, I mean the Science of Balances, you would be speaking the truth, for indeed such is the case. Now, if you wish to know this technique and become an expert of Balance yourself so that when you are given a mixture of bodies and other [solid] substances, you are able to say what substances in what quantities this mixture contains, then in the name of God -
Make use of a balance constructed in the manner of the diagrams. This balance is set up by means of three strings going upwards [to the steel beam]: attach two scales to these strings in the usual manner of balance construction, I mean by tying the strings and doing whatever else is needed. Ensure that the middle steel carriage which contains the tongue is located with utmost precision at the centre of the beam, so that prior to the tying of the strings the tongue lowers in neither direction even by a single habba. Similarly, ensure that the weights of the two scales are equal, that they have equal capacity, and that the quantities of the liquids they hold are likewise equal.

Once you have accomplished all this according to the specified conditions, not much remains to be done.

Suspend this balance like ordinary balances. Next, take two vessels with a small depth of the order of a single hand-measure, or less, or more, or however much you wish. Now fill these vessels with water which has already been distilled for several days so that all its impurities and dirt have been removed, the [container] in which this water is kept should have been washed as thoroughly as one washes drinking cups. Having done this, get hold of an ingot of pure, clean, fine gold weighing 1 dirham, and an ingot of white, unadulterated, pure silver weighing also 1 dirham so that both ingots are equal in weight. Place the gold in one of the scales of the balance, and the silver in the other. Next, immerse the scales in the above-mentioned water until they are totally dipped and submerged. Now, note the balance: you will find that the scale carrying the gold has lowered as compared to the one carrying the silver, and this is due to the smallness of the volume of gold and the largeness of that of silver. This [relative heaviness of gold] results from
nothing but the nature dry which it contains. Finally, using counterpoise find out
the difference of weight between them, and work out that it is 1 1/2 dānaq. Note
that when you mix to this weight of pure gold roughly 1 qirāt or 1 dānaq of silver
the former will drop in weight in the ratio of ḡabbas to qirāts, since there are
12 ḡabbas to each qirāt.\(^3\)

12:13 So know this, for it is, by my Master, a fountainhead of the science
of philosophers!

12:14 You determine in this manner each one of any two mixed substances, or of any
three, four, or five, or however many you will. For instance, you familiarize
yourself with the ratio that exits between gold and copper, silver and copper, gold
and lead, silver and lead, and copper, silver, gold and lead. Likewise, you find out
the ratio which exists between gold, silver and copper when they are mixed together
or between silver, copper and lead. But you can do this by taking one body at a
time, or two bodies at a time, or three, or however many you will ...

[12]

13:6 We have repeatedly pointed out to you (you will recall this if you have read
any of our books) that if a letter is duplicated in a word, one of them is to be
dropped. [Thus], if in some drug a degree of one of the natures is found - be this
degree in the First [Degree of intensity], in the Second, in the Third, or in the
Fourth - there are in this drug no degrees other than this. And if this degree is in the
First [Degree of intensity], then it is the First; if it in the Second, then it is the
Second; if it is in the Third, then it is the Third; if it is in the Fourth, then it is the
Fourth.

13:9 In order that you learn all this, I shall give you several examples of drugs so that
you see it for yourself. But such a thing is not admissible in the case of units lower than the degree, I mean grades, minutes, seconds, thirds, fourths and fifths ...

[13]

14:1 The form in everything is [the number] 17.

If you find in any animal, plant or stone only 5 [parts], you are left with 12. Now, in the [deficient] drug there will always be only one nature, two natures, or three, or [all] four. There is no other [possible outcome of the analysis of letters]. Now, if

14:3 the drug has only one nature, you distribute the 12 [parts] among the remaining three; and if it [is one of those drugs which] possess two natures, distribute the 12 [parts] among the other two. But if has three natures, compensate for the 12 [missing parts] by means of the one remaining nature, after having deduced that it serves to supply the deficiency of the other natures of the drug.

So know that! ...
The Second Part of the Book of Stones According to
the opinion of Bārīnās

[14]

In the name of God, the Compassionate, the Merciful

Praise be to God Who chose Muḥammad as Prophet and selected ‘Alī as
his Trustee.

God's blessings be upon those whom he has chosen, and upon their families.

May God grant them salvation!

[15]

Now we turn to our main point.

Prior to this book of ours we have written numerous others on the subject of the
Science of Balance, and in each one of these books we have provided a lucid and
rigorous explication of the various aspects of this Science.

Since Baḥnas disagreed with us in some fundamental principles as well as in some
matters of detail, it would be wrong not to specify these disagreements.

[Among] the matter[s] in which he disagreed with us is the question of the effective
weights [of the natures]. We mentioned these weights in the first part of this book.

We also promised in several books that we shall present an account of stones, and
of the forms which the natures take in the Balance, so that nothing concerning these
matters remains hidden from the earnest seeker ...

We have thoroughly explicated to you those letters on which language
entirely depends, specifying instances, from degrees to fifths, when these letters are
numerically excessive or deficient. Likewise, we have given you an account of the
effective weights of all letters as we have them and as Baḥnas has them.
In addition, we have mentioned to you that in the exact sciences, and in
dealing with subtle natural processes, we stand in grave need of [a knowledge of] effective Balances as it is expounded by Baţiına, and that our need for this kind of knowledge is not so great when we deal with locomotion of bodies and their decompositions.²

[16]

As for us, we say: Animals have a Balance to which we assign a weight of 10 dirhams in the First Degree [of intensity]. For the higher Degrees we increase this value, just as for the subdivisions of a Degree we decrease it. Next, we assign to plants a weight of 7 dirhams [in the corresponding Degree], and, again, increase it for the higher Degrees and give smaller values to the subdivisions. [Finally], to stones we assign a [corresponding] weight of 5 dirhams, increasing it for the higher degrees and decreasing it for the subdivisions according to the need. This is our view and belief concerning the manifest aspects of the Art. It does not violate the principles of true judgment, like the work of Baţiına.

As for Baţiına, he made the governing rules identical for all three kingdoms of nature and invoked the authority of Socrates in support, saying, "if all three kingdoms of nature arise out of the natures, then it is clear that, consequently, there is no difference between them with respect to Balance- these are the words of Socrates." Baţiına assigned a weight of 77,600,000 dirhams¹ to [the degree in] the First Degree [of intensity]. And since this man, I mean Baţiına, needed the fifth as the [smallest] subdivision [of a Degree], he assigned to it a weight of 1 ‘ashīr.² He then increased this weight [for the] higher [subdivisions] till it reached where it
reached. These quantities have been specified in our account of Balīnās in the first part of this book ...

[17]

16:10  Now listen to what Socrates had to say! ...

Making the weights such that they are all derived from 1 dirham and 1 dānaq in the First [Degree of intensity], he said: "We make the [degree] in the First Degree [of intensity] 1 dirham and 1 dānaq, in the Second Degree 3 1/2 dirhams, in the Third 5 dirhams and 5 dānaqs,¹ and in the Fourth 9 dirhams and 2 dānaqs.

16:13  "We make the grade in the First Degree [of intensity] 1/2 dirham, in the Second Degree 1 1/2 dirhams, in the Third 2 1/2 dirhams, and in the Fourth 4 dirhams.

We make the minute in the First Degree [of intensity] 2 1/2 dānaqs, in the Second Degree 1 1/4 dirhams, in the Third 2 dirhams and 1 qirāt, and in the Fourth 3 1/3 dirham.

17:1  "We make the second in the First Degree 2 dānaqs, in the Second 1 dirhams, in the Third 1 dirhams and 4 dānaqs, and in the Fourth 2 dirhams and 4 dānaqs.

We make the third in the First Degree 1 1/2 dānaqs, in the Second 4 1/2 dānaqs, in the Third 1 1/4 dirham, and in the Fourth 2 dirhams.

17:7  "We make the fourth in the First Degree 1 dānaq, in the Second 1/2 dirham, in the Third 5 dānaqs, and in the Fourth 1 dirhams and 2 dānaqs.

17:9  "Finally, we make the fifth in the First Degree 1 qirāt, in the Second 1 1/2 dānaqs, in the Third 2 1/2 dānaqs, and in the Fourth 4 dānaqs."

[18]

17:11  May God protect you, just look at the erudition of this man, his stature in science, and the quality of his judgments!

17:12  Note, likewise, that he discarded the sexagesimal system [adopted by Balīnās], and the reason for this is his view that it is only a convention to say that one degree

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equals 60 grades, [and one grade equals 60 minutes, and one minute equals 60 seconds, etc].

17:13 And if we had wanted to place one or more steps higher everything that is above a given thing, or if we had wanted to place likewise everything that is below a given thing, then we would have been in no other position that to adopt the sexagesimal system.¹

17:15 But the sexagesimal system is used only because it makes calculations easy and gives rise to fewer fractions ...

18:1 We have already presented above an illustrative model of the weights [which follow a sexagesimal geometric progression], a model according to which all concrete cases are worked out. In this book of mine, however, I shall set forth the pattern of weights according to the doctrine of Socrates as we have reported it.

18:3 Now if you wish to follow the doctrine Socrates, go ahead; and if you wish to follow the ideas of Balinä, do so, for both of them are the same. But if you wish to follow our opinion, then follow us. Our opinion is different from both of them, for it is a closer approximation [of the truth].
19: Sub- Ist IIInd IIIrd IVth Hot Cold Dry Moist
  1 : 3 : 5 : 8

  dīnaq  dīnaq  dīnaq  dīnaq

<table>
<thead>
<tr>
<th>Degree</th>
<th>7</th>
<th>21</th>
<th>35</th>
<th>56</th>
<th>alif</th>
<th>bā’</th>
<th>jīm</th>
<th>dāl</th>
</tr>
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<tr>
<td>Grade</td>
<td>3</td>
<td>9</td>
<td>15</td>
<td>24</td>
<td>ḥā’</td>
<td>wāw</td>
<td>zā’</td>
<td>ḥa’</td>
</tr>
<tr>
<td>Minute</td>
<td>2+1/2</td>
<td>7+1/2</td>
<td>12+1/2</td>
<td>20</td>
<td>ẓā’</td>
<td>yā’</td>
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<td>lām</td>
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<td>10</td>
<td>16</td>
<td>mīm</td>
<td>nūn</td>
<td>sīn</td>
<td>‘ayn</td>
</tr>
<tr>
<td>Third</td>
<td>1+1/2</td>
<td>4+1/2</td>
<td>7+1/2</td>
<td>12</td>
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<td>ṣād</td>
<td>qāf</td>
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<td>1</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>shīn</td>
<td>ẓā’</td>
<td>thā’</td>
<td>khā’</td>
</tr>
<tr>
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<td>ḍād</td>
<td>Ḿā’</td>
<td>ghayn</td>
</tr>
</tbody>
</table>

[20]

20:1 At this point we need to show you by means of tables present to you a
set of tables the Balances of fusible stones. These fusible stones, which are the
first and foremost needs of the Art, are gold, silver, copper, iron, lead, and tin.

[We are presenting these illustrations] so that you learn the reality of the letters
[occurring in the names] of all these bodies.

20:4 You ought to know first that all of these stones have 17 powers. Now,
these stones are either red or white. If they are white, they possesses hot in the First
Degree [of intensity]. They possesses 3 times as much cold, 5 times as much dry,
and 8 times as much moist.

20:7 It is the opposite if they are red, possessing cold in the First Degree [of intensity],
with 3 times as much hot, 8 times as much dry, and 5 times as much moist.
The quantitative magnitudes obtained (in the present context, these are the measured weights, I mean those which make up the total of 17):

In the First Degree [of intensity] exists either hot or cold (and these two are signified by] the letters alif or bā') weighing 1 dirham and 1 dānaq, as we have already said at the very outset. Now, 3 times the value of the First Degree (and here we reach the Second Degree which is likewise signified by alif or bā') is 3 1/2 dirhams. [This can be viewed] either as 3 times the value of the First Degree or as the value of the Second Degree in its own right. Thus, the total weight of the two active natures is [{1 dir. and 1 dān.} + {3 1/2 dir. = 3 dir. and 3 dān.} =] 4 dirhams and 4 dānaqs.

The weight of dry or moist [in the Fourth Degree], being [signified by] the letters jīm or dāl respectively, is 9 dirhams and 2 dānaqs. [This can be viewed] either as 8 times the value of the First Degree or as an independent value of the Fourth Degree itself.

And as for the weight of dry or moist [in the Third Degree], and these are likewise [signified by] the letters jīm or dāl respectively, it is 5 dirhams and 5 dānaqs. [Again, this can be viewed] either as 5 times the value of the First Degree or as an independent value of the Third Degree itself ...

In this way, the total of 17 in all red things of the natural world is [represented by] 19 dirhams and 5 dānaqs [= 17 x 7 dān.]. This is the figure arrived at according to the precise Balance as it exists in incorporeal objects, in the material objects belonging to the three kingdoms of nature, and in the higher bodies. Similar is the case of [the corresponding figure in] the white. It behooves you to know this.
As for the difference between the white and the red, it lies in the excess of cold and shortage of hot in the white, the case of the red being the opposite, and in the excess of dry and shortage of moist in the red, the case of the white being the opposite. So know that!

When you desire the weight of a given thing, you ought to find out, [first], what its letters necessitate, and then work out what it adds up to. [Finally], adjust your result so that it reaches a value which is related to 17. You ought to weigh all things according to this model.

When in a natural object the nature hot is on the opposite side of moist, then we have an instance of the colour red. Had this not been the case, the dry due to its preponderence would have torn the moist apart, since [in red stones] the quantity of dry is enormously greater than that of moist.

Reverse is the case of the white, for if [in white stones] dry had not been on the opposite side of cold, the moist would have overpowered the dry. The meaning of this kind of spatial opposition between the natures is that they are close to each other, but, in being face-to-face, they do not stand against each other in conflict, nor are they cut off from each other by distance such as that which exists between the circumference of a circle and its centre.

Again, had spatial opposition not existed between the natures and, consequently, the hot in red [stones] had overpowered [the cold], as it is inevitable, and similarly the dry had overpowered [the moist], then the body in question would have exploded. The same is true of all things which are artificially produced.
When a thing in equilibrium exists in an integral state, and it is not a liquid, then among all things it necessarily has the most equitable characteristics. An example of this among stones is the case of the three bodies, gold, silver, and copper, when viewed in terms of the quantities of their softness and hardness. As for the things other than stones, they are in some manner placed in equilibrium likewise.

But this matter calls for further examination and research. This is so because, [for example], the parts of all animals exist in an integral solid state, in which case being in equilibrium would mean being in an integral solid state.

But if all of these parts happened to be fusible, then being in equilibrium would mean being fusible; and if they happened to be soft, the characterization of equilibrium would change likewise. The same holds true of other attributes, and also of those which arise out of the action of animals ...

Since all parts of an animal have their own proper constitution, in themselves they are all equally in equilibrium.

It is now abundantly clear that gold is not the most equilibrated metal: if the practitioners of the Art make it such, it is only because they derive worldly benefits out of it. Were they in a position to derive a similar benefit out of copper or lead, they would have made these latter the most equilibrated ones, directing their operations to them. So one reaches the inescapable conclusion that gold is distinguished only from the point of view of its utility.

You ought to follow what we are saying, for you might need to transform an equilibrated object into one which is [allegedly] unequilibrated. This situation
can arise if we were utterly to run out of copper, while facing a glut of silver and
gold, and a need for copper. If gold were to be in equilibrium and copper were to
be, in comparison, unstable, then we would need to transform the equilibrated
gold into the unequilibrated copper, for this would be demanded by necessity. But
we say: The fruit of a tree is no more in equilibrium than its leaves even though the
fruit yields more benefit than the leaves. Nay, one ought to give all things their due
weight, for they interchange,¹ God willing! ...

[24]

Let us now consider the matters which concern the Balance of Letters in the
elixir, just as we did in the Book of the Arena of the Intellect. God willing!
So we proceed, seeking support from God: Some of our earlier discourses have
already rendered it unnecessary to define the elixir, for it is now known that the
fundamental governing principle of the elixir is 17.

The elixir is divided into two kinds: red and white.
If the elixir is red, it has a preponderance of hot and dry; and if it white,
its has a preponderance of cold and moist.

The total effective weight of the elixir is 19 dirhams and 5 dānaqs
[= 17 x 7 dān.], a result arrived at on the basis of a sound and faultless
document.
Whenever we give examples [of natural objects], they all lead to the same principle of 17, [even] if [in practice] we arrive at a number which is higher or lower. Thus, it behooves you to know that the governing principle of all [natural objects] is 17, for the nature hot remains hot no matter where it happens to be, and the nature cold, wherever it exists, remains cold, and the same applies to moist and dry. This is so because the appellation applied to one nature is not applied to any other.

For example, the appellation "alif" is applied to no other letter, be it bā', jīm, or dāl. Similarly, the appellation "bā'" is applied to none of the other three letters, alif, jīm, or dāl; and the appellation "jīm" is applied to none of the letters from among alif, bā', and dāl; and finally, the appellation "dāl" is likewise applied to no other letter from among alif, bā', and jīm.

If you wish, you can make a given "alif" degenerate into a "bā'", or into a "jīm" or a "dāl", provided you derive these letters from the Second Elements, namely, Fire, Air, Water, and Earth. Upon my life! some of these compounds undergo transmutation.

We have meticulously explicated all this in the Book of Morphology, so the method has already been clarified:

Pursue it! God the Most High willing!
Let us now return to what we began to say concerning the Balance of metals.

So we say, our success depending on God: You ought to know, may God protect you, that metals differ from one another, for otherwise all of them would have been one and the same thing. Indeed, it seems proper [that they are diverse]. Among these metals there are those which [in their Balance of Letters] exceed 17, others which fall short of it, yet others [whose Balance] equals 17.

If, when analyzing a thing, you find that it equals 17, don't add anything, and don't subtract anything. However, this is a very rare case. If you find a thing whose [Balance] is greater than 17, subtract it in proportion till it reaches 17.

Propotionalized and regularized, it will correspond to this thing [sc. the elixir] which is so rare that it is practically non-existent. So know that, and proceed accordingly! If, on the other hand, you find a thing whose Balance is less than 17, complete it so that it becomes like that rare thing which is, as we said, practically non-existent. Proceed in this manner, for this is the way!

God willing ...

So, God protect you, [in practice the Balance of] everything either exceeds [17] or falls short [of it] - this is inevitable. Thus, one obtains the result that gold is one of those metals which happen to be excessive [in their Balance]. Indeed, it behooves you to know the meaning of excessive and deficient, even though we have so far spoken of that which precisely conforms to 17, and, God protect you, such can only be the case of elixir...
So when the adept seeks to transform gold into elixir, he reduces [the weight of] each of its natures in such a way that this gold is left only with 17, whence the total weight of the natures becomes 19 dirhams and 5 dānaqs [= 17 x 7 dān.], the rest is discarded.

Similarly, if the adept seeks to transform gold into copper, he finds out, first, the total weight of [the natures in] copper, then he finds out the total weight [of the natures in] gold. Next, he compares the two weights to know which one is greater. If [the weight that is obtained from] gold is the greater of the two, he reduces it till it drops to the value [obtained from] copper. If, on the other hand, copper exceeds gold, he augments [the weights of the natures] in gold till it conforms to the definition of copper. However, gold necessarily exceeds copper...

I wish I knew how you will accomplish all this if you are not familiar with the Ḥudūd, and if you have not pondered over it! ...

People are seriously divided over the question of the weight of tin. Thus, some of them say, "we determine its weight according to its name 'al-qalaT'". But the Stoics say, "no, its name is, rather, 'al-rasas' since its sibling is called 'al-usrub'". "No", say the followers of Empedocles, "we determine its weight, rather, according to the appellation 'zawus', for its nature is most equilibrated, and that is what the word means".
But the followers of Pythagoras say, "its name is, in fact, 'al-mushtari'.\(^1\) for it has the nature of this celestial body. We determine its weight in accordance with no appellation except 'al-mushtari', for it is al-mushtari which governs it, guides it, and brings it forth. Nay, this is its only name." As for Socrates, he judged in favour of 'zāwus', and he is close to the truth. Balīnās said, "its name is 'qasādır' in which lies its weight; it has no other name."

The Peripatetics say, "we determine its weight according to our description 'hot and moist', for it has no name signifying its nature."

From among these [differing approaches to] weighing [the metal in question], none merits our choice the way 'zāwus' does, and if we were to substitute for it, we [would leave the metal without a proper name and] opt for the description 'hot and moist'. Thus, that which we have illustrated in the figure\(^2\) is worked out according to the name 'zāwus', for 'al-qala'T signifies something else...So know that!...
The Third Part of the Book of Stones According to
the Opinion of Balinas

In the name of God, the Compassionate, the Merciful

Praise the Creator and the Raiser of the Dead!
The One Who acts according to His intentions, and is Powerful over everything -
the Subjugator of all subjugators.
The One Who causes the acts of all things
without a parallel, without a teacher -
not out of passion, nor under compulsion:
Nay, He acts as He wills!
He is Magnanimous, Kind, Mighty, Wise!
So praise be to God, the Best of Creators!

God's blessings be upon Muḥammad, the master of all messengers,
the Imām of the first ones and the last ones.
All prayers be for him, according to what he merits,
and for his noble family.
May God grant them all salvation!

Two books have preceded before this one, dealing with the science of the
Balances of stones. In the present book we shall specify, proceeding in a natural
way, the forms which stones, plants and animals take upon combining with one
another. Further, according to the commitment we made in the first two books
(I mean the first book and the second book), we shall talk about the procedure for the creation of these bodies.

26:10 So we say...: The things from which the elixir is made will always be [one of the following]: [i] pure stones, [ii] animal [substances] exclusively, [iii] only plants, [iv] animal [substances] and plants, [v] stones and plants, [vi] stones and animal [substances], and [vii] animal [substances] and plants and stones.

26:12 This makes a total of seven figures which occur in the pharmaceutical composition of the elixir, with each one of them having its own governing principles.

27:1 [A]

And if in response to an operation, some of them happen to differ from the others, [we know the reason why] for it is known that alif is for hot, bāʾ is for cold, jīm is for dry, and dāl is for moist. And, of course, the possibility remains for alif to exist in four different positions in the [name of a] compounded thing, since the Degrees of intensity are four. The same applies to bāʾ, jīm and dāl. And as we taught you in the beginning, the weights of these four positions of alif have correspondingly four different values, namely: 1 dirham and 1 dānaq [= 7 dān.], 3 1/2 dirhams [= 21 dān.], 5 dirhams and 5 dānaqs [= 35 dān.], or 7 dirhams and 2 dānaqs [= 56 dān.]...
So turn to the stone you wish to operate upon, and [whose natures] you want to augment by means of an appropriate method of ceration. You find out its weight. If it happens to be an elixir, its weight will be [exactly] 19 dirhams and 5 dans = 17 x 7 dan.

But if it is something other than elixir, it will weigh either more or less, depending upon the quantity of the natures in the stone under consideration. So know that!

Augmentation, I mean ceration, is carried out in the same manner [in all stones]. Thus, if the stone possesses hot in the First Degree, add a fifth in the First Degree; if it possesses hot in the Second Degree, add a fifth in the Second Degree; if it possesses hot in the Third Degree, add a fifth in the Third Degree; [finally], if it possesses hot in the Fourth Degree, add a fifth in the Fourth Degree.

The weight of the fifth in the First Degree is 1 qirat = 1/2 dan., in the Second Degree 1 1/2 dans, in the Third Degree 2 1/2 dans, and in the Fourth Degree 4 dans.

So in the case of things composed of stones only, this is what is necessary for carrying out ceration by means of hot-augmentation.

As for the procedure of cold-augmentation, the rules for this are exactly the same as those of hot which we have just described. The same applies to the procedures of the augmentation of moist and dry ... In other words, you find out which from among hot, cold, dry and moist is preponderant in the thing you want to operate upon. Then, you add a fifth to the most dominant nature in these stones. As we have said, a thing is not cerated except by means of [an augmentation of] its
characteristically predominant nature. So know this procedure, and follow it in the operations you need to perform on drugs made out of stones only.

Concerning the elixir made out of animal [substances] only:

If you wish either to create it, or to transform it from one thing to another, you add a fourth to that nature which is likewise the predominant of the four. If this nature is in the First Degree of intensity, you add a fourth in the First Degree, in which case the weight of the fourth is 1 dānaq; if the predominant nature is in the Second Degree, you add a fourth in the Second Degree, here the fourth reaches a weight of 1/2 dirham (= 3 dān); if this nature is in the Third Degree, add a fourth in the Third Degree, the weight of the fourth here being 5 dānaqs; and, finally, if this predominant nature is in the fourth degree, you add a fourth in the Fourth Degree, where the fourth attains a weight of 2 dirhams and 2 dānaqs (= 8 dān).

So know that!

And if the elixir which you want to create or transform ... happens to be made exclusively out of plants, you find out likewise the most dominant of its four natures and add to it a third. If its most dominant nature is in the First Degree of intensity, you add a third in the First Degree, the weight of the third in this case being 1 1/2 dānaqs; if this nature is in the Second Degree, you add a third in the Second Degree, here the weight of the third is 4 1/2 dānaqs; if this nature is in the Third Degree, you add a third in the Third Degree; and, finally, if it happens to be in the Fourth Degree, you add a third in the Fourth Degree. The weight of the third in the Third Degree is 1 1/4 dirhams (= 7 1/2 dān), and in the Fourth Degree it is 2 dirhams (= 12 dān) ...
Quality is a certain condition of the qualified thing, I mean the condition by virtue of which the thing is qualified. Among these conditions are those which exist in actuality, such as the walking of ‘AbdAllāh when he is, in fact, walking.

Further, among such actually existing conditions are [a] those which change or disappear quickly, for example standing, sitting, being in a state of embarrassment or anger, and the like - these actually existing conditions do not last long; and [b] those which [are more stable and] do not change or disappear quickly, such as [the knowledge of] geometry, medicine, or music when [such knowledge] is actually present in an individual.

And among the conditions are those which exist in potentiality, as walking is to ‘AbdAllāh. Thus, animals are plants in potentiality, in actuality they are not, and the same applies to stones in relation to plants and animals. Similar is the case of the acquisition of [the knowledge of] geometry when it is unacquired in actuality.

Further, potential conditions exist either [a] as a capacity in a thing, such as falling on the ground is to ‘AbdAllāh when he has the capacity to do so, or [b] as a natural affection, such as our saying that a given stone is hard, meaning that it cannot be divided easily, or that wood is soft, meaning that it can be broken apart without difficulty.

Things are rarely said to be qualified - I mean characterized - by those conditions which change or disappear quickly. Thus, we do not call pallid the one who turns yellow out of fright, nor swarthy the one who turns black due to a journey [in the heat of the sun].

As for the conditions which last longer, things might be said to be qualified by them. Thus we call yellow that which acquires this colour as part of its natural
make-up ...

30:2 And these, I mean the conditions which do not disappear easily, are the ones which ought necessarily to be called qualities, since the essential nature of a thing is qualified by them.

30:4 Similarly there might be in the soul either [a] easily disappearing conditions, such as sadness or happiness arising out of a certain specific reason and passing away quickly, or [b] longer lasting conditions, such as sadness or happiness arising out of one's innate disposition for it. Obviously the latter is identical in appearance to the former. However, we do not characterize as sad one who is sad for a short period of time, nor happy one who is happy briefly. Rather we do so when these are part of [somebody's] essential nature, whence stable or preponderant.

30:8 Shape, external form, straightness, curvedness, and the like are also qualities, for each one of these are said to qualify things. Thus, we might say of a thing that it is a triangle or a square, or that it is straight or curved.

30:11 Rareness, denseness, roughness, smoothness and the like might be thought of as qualities; they seem however not to belong to qualities. This is so because a thing is dense when its parts are close together, rare when they are separated from one another; smooth because its parts lie uniformly on a straight line - none being above or below another, and rough when they are otherwise.

30:16 Qualities are possibly of other kinds too. Among these other kinds which we shall mention are [a] those which are perceived by the eye, like shapes and colours; [b] those which are perceived by the sense of smell, like perfumes; [c] those which are perceived by the sense of taste, like the savour of food; [d] those which are perceived by the sense of touch, like hot or cold; [e] those which exist in the intellect, like knowledge and ignorance; [f] those which lie in the
capacity of things, like the ability or inability to do something - and these exist either actually or potentially; [g] those which are stable; [h] those which are unstable; [i] those which are active; and [j] those which are passive.

Qualified things are named after their quality. Thus in most cases things are named paronymously - such as kitāb from kitābā, tājir from tijāra, ḍā'ir from jawr, 'ādīl from 'ādīl. Yet this may not be so in all cases, either because the quality in question exists in potentiality, or due to the fact that language lacks a name for it.

There is contrariety in regard to qualification. For example, justice is contrary to injustice and whiteness to blackness, and so on. Similarly, there is contrariety in regard to qualified things. For example, just is contrary to unjust and white to black.

But, [on the other hand], there is no contrary to red or yellow or such colours. Likewise, there is no contray to triangle and circle.

Further, when one of a pair of contraries is a qualification, the other too will be a qualification. This is clear if one examines the other categories. For example, justice is contrary to injustice and justice is a qualification, then injustice too is a qualification. For none of the other categories fits injustice, neither quantity, nor relation, place, time, nor any other category except quaification.

Qualifications admit of a more and a less; for it may be said that this whiteness is more than that, or that this thing is whiter than that - not in all cases though, but in most. Thus it might be questioned whether it is permissible to call one justice more a justice than another, or one health more a health than another.

Some people say that it is not permissible, though they say that one person has health less than another, justice less than another, and similarly with writing and other conditions. So, as for things spoken of in virtue of these, they unquestionably
admit of a more and a less, for it may well be said that this man is more eloquent than that, this man is more just than that, or that this man is better with regard to justice and health.

However, not all things spoken of in virtue of a quality admit of a more and a less. For example, the triangle is spoken of in virtue of the quality of triangularity, and the square in virtue of the quality of squreness: these two do not admit of a more and a less. For one triangle does not exceed another in respect of triangularity, and one square does possess more squreness than another. All triangles are equally triangles, and the same applies to circles and squares. Things which equally admit a particular definition are not said to be more or less with respect to this definition...

And those which do not fall under a given definition likewise do not admit of a more and a less [with respect to this definition] ...

It is in virtue of qualities only that things are called similar or dissimilar; a thing is not similar to another except in virtue of its quality ...
In the name of God, the Compassionate, the Merciful

Praise be to the Lord of the worlds!

May God’s blessings be upon our Master Muḥammad and all his family.

The one who recalls what we said in the first, second and third parts of this book would know that we have promised to explicate in this [final] part the Balances of spirits and of those substances which function as spirits. We shall accomplish this by means of illustrative figures following the pattern on which we constructed in the second part the figures for bodies. We have also promised that in this part we shall spell out how one goes about augmenting what is deficient, and suppressing what is excessive.

At this point in time we turn at once to operations involving spirits. Immediately following this, we shall familiarize ourselves with augmentation and suppression, and this will mark the end of these four books.

So we say: In fire, spirits are unlike bodies - but not with respect to colour, hardness or casting. For all spirits, or [at least] most of them, may have the same colours as those of bodies - red, white, black, etc; and, in terms of casting, spirits may be similar to bodies, since all spirits undergo casting in fire the way bodies do, behaving in the same manner. Finally, in terms of hardness some spirits may function like bodies, just as in terms of softness certain bodies may function as some spirits.
As for animal [substances], when distilled they yield two spirits and two bodies: the oil and the water which come out of them are spirits, whereas the tincture and the earth which they yield are bodies. The same applies to plants. Concerning stones, the situation depends on whether or no they lend themselves to distillation. If they do, then the same applies to them too.

But if they do not lend themselves to distillation, they are divided into two types: those which vaporize, and those which do not. Those which do vaporize yield two kinds of substances: what vaporizes from them is spirit, and what is left as residue is body. And those which do not evaporate divide likewise into two kinds: the aqueous kind, and the calcined kind. The former is spirit, the latter body. The aqueous kind, in its turn, divides further into two kinds: the kind that flees, and the kind that does. As for the one that flees from fire, it is spirit; and that which does not, even though it is water, is body.

So this is the complete alchemical classification of the matters relating to all natures, and this is exactly what we have already mentioned in the Book of the Complete belonging to the CXII.

As for the transformation of bodies from one condition into another higher or lower condition, it is according to our doctrine [an interchange between] the exterior and the interior, for in reality this is what exterior and interior are. The reason is that all the constituents of all things follow a circular pattern of change.

The exterior of a body is manifest, whereas its interior is latent, and it is the latter in which lies the benefit. For example, lead in its exterior is foul-smelling lead, and it is manifest to all people. But in its interior it is gold, and this is hidden.
However, if this latter is extracted out, then both the interior and the exterior of lead will become manifest.

Thus there is the Balance of Fire, and the Balance of the rest of the bodies. There are Balances of the natures of stars, their distances, acts and movements. There is also the Balance by means of which one knows the Sphere, just as one learns through the Balance that the essential characteristics of things arise out of the natures.

Those who have read our book known as The End Attained¹ and our Book of the Sun² are acquainted with most of these Balances, even with the Balance of the Soul and the Balance of the Intelligence, after which there is no end. And since all of these are intangible, it would not be difficult for such readers to measure the Balance of animals, plants and animals, for these exist in nature and are tangible ...

Chapter on the Curriculum for the Training of the Disciple

First you ought to understand a simple thing concerning the Art. That is, you familiarize yourself with the substances which are reddened, whitened, coagulated, dissolved, softened, and dehydrated.¹ Further, you ought to know that all these processes are carried out by the method of Balance. This has been explained to you in the lucid accounts given in many books of ours: [for example],
the Balance, and in a book belonging to the CXII known as the Book of Tinctures.

35:10 Then, you ought to know the First, Second, Third and the Fourth elements, [their] accidents and their qualities. For example, [you ought to know that] Fire and its sisters are the Second Elements, durations of time are the Third, and black and yellow compounds are the Fourth elements.

35:12 You see how your personal nature accepts all this, how you handle this, and how the results suit your natural disposition. If you already see that your mind has rejected one specific thing while you are [comfortably] handling several others, you ought first to persist in reading. You should particularly read the Commentary on the Book of the Element Foundation, if it has reached you.

35:14 But if you have already moved beyond this stage, congratulations!!

36:1 Having accomplished this, move up to the sayings of philosophers and their doctrines concerning the natures and their combinations. Pick up a modicum of kalām, logic, arithmetic and geometry. To some extent this will render your conceptual grasp of problems easy when they exercise you.

36:3 But if you are already somewhat trained in these disciplines, the task will be simpler for you, and this would be a more favourable situation.

36:5 Next, depending on your choice, you handle the science of the natures, or some other discipline. If you prefer the science of the natures, you study aspects of the natures of stones and the [science of the] specific properties of things.

36:6 Then you move in a single leap to the Balances. Thus, you familiarize yourself step by step with all aspects of various kinds of Balances, such as the Balance of Fire, of music, and the Balances of metals. Some of these we have already mentioned in several books, particularly in the Book of the Elite.
And if along with the science of the natures you are inclined towards the knowledge of the craft, you study the Book of Trickeries so that you can be on your guards against the occurrence of calamities, loss of wealth, and frauds.

The next step now is to become skilled in matters presented in the Book of the Balance. You should know in what manner and for what reason these things are combined.

Now, we have already told you that by this time you ought to have become accomplished and quick-witted.

If [the disciple] does not finish my book, the Seven he will remain deficient in his knowledge of the Balances. If, on the contrary, he is trained in it, he will be in a position to construct whatever he wishes.

All that the disciple needs now is the expertise for the handling of alchemical operations. Restituted from accounts scattered in a large body of alchemical writings, these are operations such as ceration, waterings, pulverization, dissolutions, and coagulations. Another example is that of the elixir about which people have been talking since ancient times. But the ancients have wrapped in ever deeper mysteries the method of operations relating to the Supreme Thing. Now, as we have already told you, this difficulty is overcome by nothing other than the method of the Balances. So know this method, if you intend to achieve a close approximation of the ideal elixir, or whatever you intend according to your desire. Proceed with the understanding that this is an art which demands skills, nay, it is the greatest of all arts for it concerns an ideal entity which exists only in the mind. Thus the more one occupies oneself with prolonged studies, the quicker it will be to achieve a synthesis of the elixir. But the one who makes only a brief study, his achievement will be slower in the same proportion.
37:6 Know that the fruit of the Balances are the higher operations performed without employing the products of syntheses and elixirs. [Know further that] the Balance comes about only after the mixing of bodies with bodies, spirits with bodies, metals with bodies, spirits with spirits, stones with spirits, or stones with bodies and spirits: the Balance comes about after these substances are mixed [in these specified ways].

37:9 Even if spirits, bodies and metals are in an impure state, weigh them after they are mixed together. Familiarize yourself with all of their constituent natures and know their equilibrium. The Canon of Equilibrium is known to you - if they conform to it, they are perfect. But if they are [quantitatively] higher or lower [than 17], suppress or augment the natures accordingly whence one would obtain from them exactly 17 parts...

[35]

37:14 People hold diverse views concerning these [sc. cosmological] issues. Among them are those who give due consideration to the Balances and proceed with the assumption that the principle of everything is the natures. And among them are those who say that in the natural world one thing was created before another.

37:16 So, a group of Šābians and their followers believe that some fundamental building blocks of the natural world have, over others, a priority in existence. But this priority, [they say], is not with regard to arrangement or organization, rather it is a temporal and qualitative prority. Thus I have seen one of them claiming that the first thing which was created in matter is the three dimensions - length, breadth and depth - whence matter became a three-dimensional primitive body. Next, [according to this claim], the four qualities - namely, hot cold moist and dry - were created in
it. From this arose the natures of things and the elements of creation. Finally, [so the claim goes], the four natures mixed with one another to form compounds, and out of these arose all individuals and all undifferentiated forms existing in this world.

38:8 To those [holding such views] it ought to be said: You have introduced several unknowable stages [in your account of the creation of the natural world] - none of them makes sense! You even go as far as to explain the existence of the world [in terms of these stages], whatever they may be.

[A]

38:10 So we say [to them], our success depending on God:

[According to you], the first of these stages [of creation] is τίνα which is indestructible. [You believe that] it is not a body, nor is it predicated of anything that is predicated of a body. It is, you claim, the undifferentiated form of things and the element of created objects. The picture of this τίνα, [you tell us], exists [only] in the imagination, and it is impossible to visualize it as a defined entity.

38:13 You say that the second stage arrives when the three dimensions come to pass in this τίνα whence it becomes a body. This body, [you say], is not predicated of any of [the four natures], hot, cold, moist and dry, nor is it predicated of any colour, taste, smell, or of motion or rest. For, [according to you], all these are qualities, and at this stage qualities do not come to pass in it.

Now [all] this is nonsense!

39:1 Then you claim that after this second stage the four qualities¹ come to pass in this body, namely the qualities hot, cold, moist and dry. From these arise the four [elementary bodies], Fire, Air, Water and Earth. But quite obviously it makes
no sense to suppose that these four natures exist in any state or condition not
defined by the organization and arrangement in which they are now found in the
natural world. Thus, Earth is in the middle of the Sphere, Water is above Earth, Air
above Water, and Fire above Air. Further, each of the four natures tends to
overpower its contrary, with the subdued transforming into the triumphant. Plants
and animals exist along with these natures, deriving from them, and transforming
[back] into them. Now the aforedescribed stages [of creation] proffered by you are
all intangible. But, as compared to what you describe, it is easier and less
demanding on one's imagination to visualize that thing arise but not out of a single
[abstract] entity.

[\textendash\textendash]

Or [let us ask them that] they tell us if is it possible for Water to be created
from the same prime matter as the one from which Fire is created. If they yes, they
lapse into inconsistencies. For a given thing which gives rise to something else is
the prime matter of the latter. As they say, the sperm of man is the prime matter of
man, and the sperm of donkey the prime matter of donkey. Thus they deem it
absurd to suppose that the sperm of man admits the form of a donkey, since the
former is not the prime matter of the latter, just as it equally absurd to suppose that
the sperm of donkey admits the form of a man. It is therefore necessary according
to this reasoning that the thing which admits the form of Fire is the prime matter of
Fire, and being such it cannot possibly admit the form of Water.
If they say:

We see Water undergoing transformation and thus turning into Fire.

[In this process], the substance which was the carrier first of the qualities and characteristics of Water is the carrier now of the qualities and characteristics of Fire.

Thus whatever is essentially true of the former is essentially true also of the latter: it is only the accidents of the substance which have changed. Therefore, the eternal prime matter is one and the same - it is the carrier of the qualities and dispositions of Water if they come to pass in it, and those of Fire if these latter come to pass in it.

Then in reply we say:

Water does not transform in a single stroke into Fire. Rather it transforms first into vapours and then becomes Air. Next, Air undergoes transformation and, [finally], turns into Fire. If someone says that Water transforms, first, into Air and then, transforms into Fire, he is indeed speaking of a transformation [process] which makes [perfect] sense.

Further, your doctrine concerning the simple, indestructible prime matter is not consistent with this, for you do not say that it is only by way of aforementioned transmutations that Fire is created out of the thing from which, in the first instance, Water is created. Rather you say, "it is possible that the prime matter which is overtaken by the nature and characteristics of Water is subsequently overtaken instead by the natures and characteristics of Fire." And, according to you, this takes place without the intermediary of the transformations that lie between Water and Fire. This makes no sense!
They claim that prior to acquiring forms and before the occurrence in it of the natures, the eternal prime matter is endowed with the potentiality only of accepting in the first instance the characteristics and qualities of Fire. But that there is a kind of prime matter which is endowed with the potentiality only of accepting the characteristics and qualities of Water, and that the same goes for Earth and Air. It is through this doctrine that they demonstrate the creation of the four eternally indestructible elements which possess different capabilities. But, then, this refutes their affirmation that the First Element is unique and does not admit of diversity.

[D]

They are asked: "Is it admissible that things return to the eternal prime matter the way they arose out of it?" If they say, "no, it is not admissible", one might ask, "but why not?" If they say, "this is annihilation of things, for then things will be returning to something which is simple, not admitting of combination", then we respond, "and what harm do you see in saying that things will return to that which happens to be indestructible on account of its being an eternal cause. And, further, what harm do you see in saying that while prime matter is simple and it possesses no combinations, it will annihilate the world?"
It [ought to be] said to them: A majority of philosophers believe that the four natures, which are the fundamental principles of creation and are the elements of the primary bodies (I mean Fire, Air, Water and Earth), potentially exist in one another. Thus those people lapse in inconsistencies who say that the four natures exist in something other than themselves, and that they exist in something other than what arises out of them. Such people declare it inconceivable that things can exist in any other way. So if someone alleges that these four natures are only to be found existing potentially in something other than themselves, and in something other than what arises out of them, let him bring a proof of his hypothesis.

[Indeed], he will never be able to do so, for it is irrational [to espouse a hypothesis] which stands in disagreement with this doctrine [sc. the doctrine of the philosophers] and contravenes the organization and arrangement [of which we have spoken]!

The incorrectness of their affirmation is deduced from what the philosophers consider as an indubitable premise and an item of necessary knowledge, namely: It is absurd to suppose that a substance can exist without any natural or fabricated acts, so that this substance has no act either in itself or in anything else.
[Yet] this is [precisely] the nature which these people declare as eternal, claiming that it is the element of things, and that the prime matter which arises out of it is indestructible and is devoid of all natural and fabricated acts. And this is the theory which is dismissed by the philosophers who deny the existence of such an entity. To support [their idea of] a substance devoid of all acts, they [sc. the upholders of this theory] have been able neither to offer a proof of what they claim, nor to establish it by an indirect demonstration.

[G]

Since the case is other than all this, the natures are [to be understood] according to what we elucidated for you in all the preceding books, namely that the natures are the fundamental principle [of the natural world], and that they are subject to the acts of the Creator, may His praise be exalted! And from this you become familiar with the method of attaining [the knowledge of] the Natural Balance, nay, you even become an expert of all compounds that are constituted out of the natures, able to distinguish goodness from corruption.

[36]

After accomplishing all this, the disciple moves to the task of verbal and written discourse so that his skills reach perfection. If, [following this], his insight in the Art matches his insight in the Science, and if in applications he possesses a refinement of quality, he is to be called a perfect philosopher!

This ultimately brings us to an end, being the final stage required in the training of the disciple whence the disciple meets our definition and description of him. At this time he is among those people who are closest to us!
Now, without delay, we shall present the figures which illustrate Balances, followed by a figure [illustrating] augmentation and suppression. This is the conclusion of the book, God the Most High willing!...
Jābir opens his discourse in the usual traditional manner. One notes that there is nothing particularly Shi'ī or specifically Ismā'īli about his religious locutions here. No prayers have been offered for 'Aūlī, or for any other Imāms.

The most important feature of this opening section, however, is the way our author refers to Balīnās. Indeed, this personage has been mentioned repeatedly throughout the Jabirian corpus (see below), but here for the first time we hear about him in connection with the Science of Balance. This is puzzling, for there is no trace of such a discipline in whatever we so far know of the writings attributed to Balīnās. But we must first identify him.

Since the researches of Silvestre de Sacy (see particularly his [1799]), it has been known that Balīnās is the Arabicization of Apollonius (it exists in other forms too, such as Balīnūs, Abūlūniyūs, Afūlūniyūs, 'lūsūs, Abūlūs, etc. See Plessner, s.v. "Balīnūs", [El²], I, p994). In the Islamic tradition, two persons named Apollonius are known: the well-known mathematician Apollonius of Perge (d c 200 BC), and the 1st century AD Neopythagorean sage Apollonius of Tyana. While one finds in the Arabic sources considerable confusion between these two figures (Plessner, op. cit.), it is evident, as we shall presently see, that Jābir's Balīnās is the latter Apollonius.

There exist at least eight Arabic titles attributed to Apollonius of Tyana (for general surveys of Arabic Apollonius literature see Ruska [1926]; Plessner, op. cit.; idem, [1927], [1931]; Kraus [1942-3], pp270-303), but the most important from our point of view is the work entitled Kitāb Ṣirr al-Khalaqa wa Ṣan'at al-Ṭabi'a which is now available in a critical edition (Weisser [1979]). Also known as the Kitāb al-Dirr, the Ṣirr seems to have had a direct influence on the ideas of Jābir (see "Introduction" and "Reconstruction of the Context" above). Now, as we have discussed in the "Introduction" above, the text in question has not been conclusively dated, but this much is certain: it has nothing to do with the historical Apollonius of Tyana, so here we must speak of a pseudo Apollonius.
The phrase "sirr al-khaUqa wa san'at al-Tab'a" occurs in the Jabirian corpus more than once (for example in the LXX. Kraus ed [1935], 481:6; al-Sirr al-Maknūn, ibid., 339:1-2; al-Mizān al-Saghīr, ibid., 442:15), while in his Bahth Jābīr refers to a Sirr al-Ṭab’a of Bağnās (MS Jārūlah 1721, f44) by which he clearly means the same work for he quotes from it a famous aphorism which is indeed to be found in the Sirr text as we know it today.

And this leads us to an important feature of the Sirr. To the best of our present knowledge, this work is the ultimate source of that highly enigmatic but equally influential collection of aphorisms, the Tabula Smaragdina, which had remained much in vogue in the later Middle Ages and post Renaissance periods. It was first printed in 1541 AD in the anonymous De Alchemia of Nuremberg, and often soon afterwards (Ruska [1926]).

The Tabula, which is the al-lawḥ al-zumurrud of the Sirr (Weisser ed [1979] pp524-525), has been quoted in its entirety in Jābīr’s Uṣṭuqṣs al-Uṣṣ (Holmyard ed [1928], 90:9-16), and partially elsewhere (Hayv. Bahthl). However, neither the Tabula, nor any other parts of the Sirr show any trace of Jābīr’s Science of Balance. Further, there is in that work no discussion about the natures being measurable and the harmony of the world resting on their quantitative relationships. Did Jābīr had available to him some other work of Bağnās?

This is a question that needs further painstaking research. However, as a cursory remark one may point out that three works seem to be good candidates for consideration as Jābīr’s sources:

(a) Attributed to Bağnās is a treatise entitled Kitāb al-Filāḥa (The Book of Agriculture) and it has been observed that Jābīr’s Khawāṣṣ shows some significant dependence on this work (Sezgin, [GAS], IV, p163).
(b) The alchemist al-Jildālī in his Sharḥ al-Shams al-Akbar (Commentary on the Supreme Sun) mentions a Kitāb al-Sab’ā (Book of the Seven) of Bağnās, on the first part of which he claims to have written a commentary (MS Berlin 4188. See Kraus [1942-3], II, p297, n4). Kraus suspected an influence of this work on Jābīr’s Science of Balance (ibid., pp297-298).
(c) In the confused Arabic Bağnās literature, there is also a Kitāb al-Miftāḥ al-Hikmā (The Key to Wisdom) which has been attributed to a pupil of Apollonius, the famous Artefius. This work, discovered by Levi Della Vida, is extant in Latin under the title Clavis sapientiae (Levi Della Vida [1938]). Sezgin suspects that
Artefius may well have been the author of other works of the Balīnās corpus (Sezgin, op. cit., p167).

[2]

Here we read that Balīnās is in agreement with Jābir's idea that (a) all things are reducible to the four natures, (b) these natures possess quantities, and (c) these quantities exist in all things in the proportion 1 : 3 : 5 : 8, thus conforming to the number 17 (= 1+3+5+8).

In the preceding chapters we have already discussed the importance of 17 in the Jabirian system. As to why this particular number is chosen by our author, it is a question which has remained a subject of speculative investigation on the part of modern scholars. It puzzled Kraus, who devoted to it an immensely learned disquisition in his [1942-3] (II, pp199-223), recalling the Timeaus and Pythagoras, looking for connections with the Music of the Spheres, and alluding to 17 consonants in the Greek alphabet. However he did not claim to have solved the problem of Jābir's sources in this matter.

In the fifties, Stapleton suggested that the mysterious Jabirian numbers can all be derived from the magic square of 3 (Stapleton[1953], [1957], [1958]). A magic square is an arrangement of numbers in the form of a square or some other matrix such that every column, every row, and each of the diagonals adds up to the same number. Stapleton considered the simplest case and applied to it what he called gnomic analysis to explain not only the number 17 of Jābir, but also its Jabirian elements 1, 3, 5 and 8:

\[
\begin{array}{ccc}
4 & 9 & 2 \\
3 & 5 & 7 \\
8 & 1 & 6 \\
\end{array}
\]

Divided in this way, the gnomon's total is 28 (sum of the numbers enclosed by heavy lines, 4+9+2+7+6), while the numbers in the remaining compartments add up to 17 and have Jābir's 1, 3, 5 and 8.

Stapleton traced this magic square ultimately to ancient China where, he tells us, it is found "possibly [as early as] 1000 BC as the ground plan of the Ming-Tang- the Ducal (and, later, Imperial) Temple of Mystic Enlightenment" ([1953], p36). And further, writes
Stapleton, "this Magic Square was known in Europe to Theodorus, a pupil of...Porphyry." (p37).

Finally, in the early eighties, Needham reopened this question, but only to reinforce Stapleton's conclusions (Needham [1980], V, iv, pp461-464). Gladly recognizing what he saw as Jābir's connection with Chinese thought, Needham gave a strong support to Stapleton's generalization that there has been "a cardinal influence [of] Chinese cosmism upon Arabic protochemistry and alchemy." (p462).

The mystery of the Jabirian numbers rests at this juncture. But insofar as the question of specific sources is a fruitful one, there seems to be no reason to deny Stapleton the credit of providing a convincing historical explanation of Jābir's 17. In fact, the explanation is particularly convincing in view of the fact that the above magic square does, indeed, appear in one of the Jabirian texts: this is the Kitāb al-Mawāzin al-Ṣaghīr (The Small Book of Balances, Kr 980, Berthelot ed [1893], III, p118). It is rather remarkable that in his painstaking effort to explain Jābir's mysterious number, Kraus made no use of this feature of the al-Mawāzin!

Textual Notes

1 This is one of the several legendary accounts of the discovery of the writings attributed to Hermes. Some accounts, such as that of Abū Ma'shar (d 273/886), have it that in order to preserve revealed wisdom, Hermes had left inscriptions on the walls of temples and caves which were subsequently discovered by sages. Hermes had himself received his knowledge, so a legend goes, from a book written on sapphire tablets delivered to him by an angel. (For a general survey of Arabic Hermetica see Plessner [1954]; Affifi [1951]; for specific accounts in the Arabic tradition see Scott [1936], IV, pp248-276; Massignon's "Appendix" to Festugière [1944]).

2 This entire quotation of Jābir (namely, "To expound the wisdom...I declare"), comes practically verbatim from the Sīr of Bālinta where one reads, "aṣīṭū 'alā ithri kitābī hādhā wa aṣīṭu'lhikmat'l-latī uyyidū bihā..." (Weisser ed [1979], 1:3-4). Indeed, the legend of the cave in which Hermes revealed his Tablet to Bālinta is also found in the Sīr (Weisser ed [1979], 5-7).

3 The Art = alchemy.

4 In other words, elixirs vary according to the objects to which they are applied (see below).

The contents of this section can be presented neatly in the form of the following table:
<table>
<thead>
<tr>
<th>Degree</th>
<th>1st Deg.</th>
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<td>Third</td>
<td>60° dir.</td>
<td>3x60° dir.</td>
<td>5x60° dir.</td>
<td>8x60° dir.</td>
</tr>
<tr>
<td>Fourth</td>
<td>1 dir. = 3 dir.</td>
<td>5 dir.</td>
<td>8 dir.</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>1 'ashîr</td>
<td>3 'ashîr</td>
<td>5 'ashîr</td>
<td>8 'ashîr</td>
</tr>
</tbody>
</table>

Textual Notes

1 Sanja is the term used for standard weights used as counterpoise in balances. Thus, "al-wazn bi'l-sanja" would mean the measured weight, or the effective weight.

2 It should be noted that Jabir uses the term "degree" in two different senses: (a) in the Galenic sense of taxeis, and (b) as the largest subdivision of (a) which latter seems to have been borrowed from geometry. To distinguish the two, the 'd' in (a) has been capitalized, thus "the degree in the First Degree, the degree in the Second Degree" etc.

[4]

It has been pointed out in the preceding chapters that Jabir believes in the artificial generation not only of plants and animals but also of human beings. His Tajmî is devoted to this very subject, a work in which he gives actual laboratory procedures for carrying out such generation.

Here the author tells us about two kinds of Balances: a Balance created by God, the First Balance, and a Balance which can be created by man, the Second Balance. In the al-Mizan al-Saghîr, we read: "There are two sorts of creation, a First, and a Second. The Second is represented by Art and resembles the First." (Kraus ed [1935], 449:4).

And what is the difference between divine creation and artificial generation? In the former case, Jabir explains, the natures are brought into relation with substance in one instant (daf'atan wâhidatan), whereas in the latter case, man is able to unite the natures with substance only in successive steps (daf'ât), bit by bit, over a period of time (ibid., 444:4-6).
We see Jābir reiterating his view that the artificial generation of organic and inorganic bodies is within human competence. It is interesting, however, that he attributes this belief to Baʿīnās.

Given our detailed exposition of Jābir’s Balance of Letters doctrine (see "Prefatory Note", the third chapter above), the contents of this section should present little difficulty (for the problem of repetition of letters in a given name, see especially the subsection "Application of the Balance of Letters" above).

We are told once again that Baʿīnās is in agreement with our author. But it is remarkably strange that to this Neopythagorean sage Jābir attributes the view that the practitioner of Balance need take into account no language other than Arabic! Does Jābir think that Baʿīnās is an Arab writer? An answer to this question might provide some important clues towards the identification of the pseudo literature available to our author.

There are two further points of interest in this passage. Jābir’s Baʿīnās says that everything ought to be named according to the reality of its Balance. But, then, this would trap our author in a circle: for, according to him, one discovers the Balance of things by their names - now we are told that to name a thing one needs to know its Balance!

Jābir creates for himself another embarrassment by making his sage talk about an unambiguous artificial language. This weakens his idea that language has a natural origin and is not a matter of convention (See the subsection "The Metaphysical Synthesis" in the "Prefatory Note" above).

Finally, one notes that Jābir’s peculiar brand of ‘esotericism’ making an appearance here. To baffle the unworthy reader, the author confesses, contradictions are deliberately introduced among the various parts of the corpus!

Textual Notes

1 The text 4:8-9 is somewhat ambiguous due to the author’s broken style.
2 See the table in [3] above.
See "Prefatory Note" above.

Textual Notes

1 If the weights of the natures in a thing did not conform to the proportion 1:3:5:8, one had to perform a conjecture: if these weights fell short, one guessed the missing magnitudes and made additions; if the weights were in excess, then, again by means of conjecture, "separations" had to be carried out.

2 This is strange, for "dhāḥāb" has only three letters: how can it signify four natures? One notes also that our author himself does not seem to agree with the view that the nature of gold "truly conforms to the Balance", for a little later we are told that gold is "excessive" (see [26] below).

3 Note the eulogy here.

4 It is not clear what the author means by "away from everything else".

5 Jābir very likely means inflections, feminine designations and plural forms.

6 Form = 17 (see [13] below).

7 Indeed, through the method of artificial generation, the adept could accomplish this (see [4] above).

[7]

Quite abruptly, all references to Baʿīnās have been suspended. Jābir now proceeds with his explication of morphology, and, in effect, writes a brief and lucid treatise on the idea of verbal roots and primitive nouns. We are taught how to restitute a word to its primitive core - this was, we recall, the first step towards determining the quantitative structure of a thing (see subsection "Application of the Balance of Letters" in the "Prefatory Note" above).

[A]

Here Jābir deals with the inflection of nouns, and explains it not by stating general principles, but, rather, by giving illustrative examples.

Textual Notes

1 Jābir specifies two terms for the genitive case, khaḍ and jarr. This betrays a terminological eclecticism, for the former term was used by the grammarians of Baghdad, the latter by those of Kūfa.
He moves on to an explanation of verbal roots, identifying the ten adjunct consonants which are used to form derivatives of the root. We are told, further, that these ten letters can also function as radicals - this is a standard morphological fact of the Arabic language.

It is interesting to note that Jābir had manufactured his own mnemonic phrase for these consonants, namely "al-yawm tansāhu". This phrase appears in the Ikhrāj, Kraus ed [1935], 11:15. (For the different mnemonic expressions of the grammarians, see Silvestre de Sacy [1831], I, p31).

In discussing the three classes of roots, Jābir is concerned not with verbs but with nouns, and, given his interest in names of things, this is understandable. He is here dealing with the different permutations of the three vowels (a, i, u) that are adjoined to the radicals and give rise to different paradigms. It is obviously due to Jābir's theoretical preoccupations that he concerns himself with vowels, for in his method of analysis of names, vowels play no role. Indeed, he is interested both in music and metrics, and in this way relates them to morphology.

Now Jābir explains how the ten adjunct consonants are added to the primitive core of a word. Here he deals with both nouns and verbs, giving a very clear account, and one finds nothing unusual about the examples given in the last paragraph (Jābir's illustrative nouns and verbs can all be found, for example, in Ibn Manẓūr's Lisān al-ʿArab).

Textual Notes

1 Indeed, lām is added in "dhākā" so that it becomes "dhālākā".
2 This is not clear.
3 The case Jābir has in mind is that of the relative pronoun for the dual, e.g., al-ḥdānī (masc. nom.) and al-ḥānī (masc. acc. and gen.) - these words are, indeed, spelt with three lāms, and the same applies to the feminine forms.
See "Prefatory Note" above. (For the grammarians' idea of 'motion' and 'rest', see n13b of that chapter).

Textual Notes

1 For an extensive study of Arabic phonetics see Bravmann [1934]. An excellent brief account is to be found in Fleisch, s.v. "Huruf al-Hijja", [EI²], III, p596ff.

This is one of the most interesting passages in the whole text. We see an abrupt introduction of an account of different types of numbers. This is somewhat of a digression for the author makes no use of these ideas in what follows.

The terms used by Jābir all come from the Greeks. Thus,

\[
\begin{align*}
\text{fard} &= \text{peritton}, \\
\text{zawj} &= \text{artion}, \\
\text{zawj al-zawj} &= \text{artiakis artion}, \\
\text{fard al-fard} &= \text{perittakis peritton}, \\
\text{zawj al-fard} &= \text{perittakis artion}, \text{and} \\
\text{fard al-zawj} &= \text{artiakis peritton}.
\end{align*}
\]

All these terms appear in Euclid's Elements, Book VII (Heath tr [1956], Def. 7-10, pp277-278. The standard text of Euclid does not mention the last one on the above list, but see Heath's "Notes", p283 where he specifies a MS which does contain a definition of artiakis peritton). The same terms are found also in the other major source of Arabic science of numbers (ilm al-'adad), the Introduction to Arithmetic of the 2nd century AD Greek mathematician, Nicomachus of Gerasa (D'ooge tr [1926], Book I, especially chapters 7-11).

It is significant, however, that the formulation of Jābir's definitions is markedly different from those of Euclid, and this is the reason why the standard translations of Euclid's Greek terms, namely "odd-times odd", "even-times even", etc, have not been imitated here. Rather, the terms have been rendered "odd-odd", "even-even" etc, dropping
the word "times". As we proceed, it will become evident that the standard renderings make little sense in the Jabirian context. But one also notes that, despite the differences in the formulations of the two authors, Jābir seems to share with Euclid most of the concepts themselves.

On the other hand, Jābir's account has nothing whatsoever to do either with the text or the concepts of Nicomachus' Introduction. This places him in a distinct tradition: for we know that it is the Introduction which had served as the essential source, e.g., of the "Treatise on Numbers" of the Īḵwān al-Ṣafā' (Rasāʾīl, Zarkāī ed [1928], pp23-48. In fact, the "Treatise", which mentions Nicomachus at the very beginning, is largely a paraphrase of the Introduction, see Goldstein's translation of the former in his [1964]). Similarly, the well-known Mafāṭīḥ al-'Ulūm of the 4th/10th century author al-Kātib al-Khwārizmī also reproduces the definitions of Nicomachus (Khadevejam ed [1968], pp177-179). But, evidently, Jābir does not belong to this Arabic Nicomachus tradition. If anything, he is closer to Euclid (see below).

This feature of our text might throw some new light on the sticky question of the dating of the Jabirian corpus. For while the Arabic Euclid tradition is a very complex and unusually rich phenomenon (see Murdoch, s.v. "Euclid: Transmission of the Elements", [DSB], IV, p445; Busard, [1968], [1983]; De Young [1981]), it is definitively known that there are two ultimate sources of the Arabic tradition of the Elements: (a) the translation of Ḥājjāj ibn Yūsuf, first made during the reign of Hārūn al-Rashīd (170-194/786-809); and (b) that of Ishāq ibn Hunayn, which was revised by another famous translator Thābit ibn Qurra who died in 289/901 (Busard [1968], p1). Thus the first version of the Ḥājjāj translation happens to antedate the Ishāq-Thābit text by a period of the order of one century. Now, as we shall presently see, Jābir shows clear affinities with that Arabic Euclid tradition which incorporates some material from the older of the two texts.

The Introduction of Nicomachus, however, made its first appearance only in the latter half of the 3rd/9th century when the Thābit ibn Qurra, the same personage who had revised Ishāq's rendering of the Elements, translated it into Arabic (entitled Kitāb Madkhal ilā 'Ilm al-'Adad, this translation has been edited by Kutsch [1958]). Given the late arrival of the Introduction, it is no surprise that Jābir's ideas are totally independent of it.
1 Jabir defines odd numbers before defining even numbers. This reverses the order one finds in the Euclid's Elements (Def. 7 and 8, Heath tr [1956], II, p277). In fact it was a logical necessity for Euclid to define even numbers first, since he defines odd numbers in terms of even numbers. As for the rest of the definitions, Jabir follows the order of Euclid.

But perhaps the most significant feature of this definition of Jabir is his use of the term "wahid" for unit, rather than "wahda", for this is one of the identifying traits of the Arabic Euclid tradition which derives from, inter alia, the Hajjaj text (see De Young, op. cit., p565, 567). According to De Young (loc. cit.), the difference between the two terms hinges on whether the unit is considered odd or not. As we can see, Jabir does, indeed, consider the unit to be an odd number. Thus, we can legitimately place him in a pre-Ishaq-Thabit environment.

2 One would have thought that by 'sisters' Jābir means 'multiples', but, then, he used the same word in his definition of odd numbers where it had a different sense! This definition, like his first one, is totally dissimilar to what one reads in Euclid (Heath, loc. cit.).

3 Euclid's definition reads: "An even-times even number is that which is measured by an even number according to an even number." (Heath tr, loc. cit.). Jābir's example of 8 certainly satisfies this definition, for $8 = 2 \times 4$, or $4 \times 2$. But, then, to say that it arises also out of a pairing of 6 is to violate Euclid's definition.

Therefore it seems that Jābir views an even-even number as that which arises when an even number pairs with itself, or with another even number. Thus, $8 = 4 + 4$, $6 + 2$, $2 + 2 + 2 + 2$ (double pairing).

Obviously this is a worthless concept, for all even numbers except 2 satisfy this definition. (It is now clear why it is not appropriate to translate Jābir' s "zawj al-zawj" as "even-times even", unlike the case with Euclid).

4 Jābir's example of 6 will certainly satisfy Euclid's Def. 9, namely, "an even-times odd number is that which is measured by an even number according to an odd number." (Heath tr, op. cit., p278). For $6 = 2 \times 3$, and (given that the unit is considered an odd number by our author) also $6 \times 1$. However, it is not clear what Jābir means when he says that "6 is contained in 9", etc.

5 According to Euclid, "an odd-times odd number is that which is measured by an odd number according to an odd number." (Heath tr, loc. cit.). Jābir's examples all satisfy this definition, since

$$3 = 1 \times 3$$
$$5 = 1 \times 5$$
$$7 = 1 \times 7$$
$$9 = 1 \times 9, 3 \times 3.$$  

But what does he mean by saying that it is "the number 1 contained in 3, 5, 7, 9, and in numbers like these"? If he did not have 9 in his list, one would clearly see that he is talking about prime numbers.

6 Odd-even (or rather, "odd-times even") numbers are not mentioned in Nicomachus' Introduction (and hence not in the Rasa'il of the Ikhwān), nor are they found in all MSS of the Elements. Heath tells us (op. cit., p283) that in the MS in which such numbers are introduced, they are stated to be the ones which, when divided by an odd number, give an even number as a quotient. This would mean that any "even-times odd" number is also "odd-times even" number, since $6 = 2 \times 3 = 3 \times 2$, making the definition superfluous. Thus Heath considers this to be an interpolation.

Jābir's definition is obscure. He gives as examples 7, 5, 3 and 1: is he talking about prime numbers?

The musical modes mentioned by Jābir are all well-known in the Arabic tradition (see Wright [1978], pp250-254). We note that he uses the term Ṭariqa (pl. Ṭara'iq, Ṭuruq,
etc) to designate both rhythmic and melodic modes known more specifically as *iqā'āt* and *ašābī* respectively (al-Fārābī [1967], p1022ff; al-Kindī [1965], p26, qu. Farrmer [1967], p151; al-Mas'ūdī [1874], VIII, pp98-99; al-Ghazālī [1901], pp220-222. See notes below).

Looking at this section from the perspective of the history of Arabic musical theory, one finds in it nothing to suggest a post-2nd/8th century origin of our text. For all the terms used by Jābir appear not only in the writings of the first Arab philosopher (i.e. *faylasūf*) al-Kindī, it is also known that already the earliest musicians of Islam, Abū Uthmān ibn Mīšāh (d c 97/715) and his students, Ibn Surayj (d c 108/726), and Ibn Muḥrīz (d c 97/715), had between them formulated the rhythmic and melodic modes known to our author (see Lois al Faruqi [1981], pp101-102; Farmer, s.v. "Ibn Misdjah", [Ell], IX (Suppl.), p94; idem, s.v. "The Music of Islam" [NOHM], I, pp421-477; Wright [1966], etc).

**Textual Notes**

1. Here Jābir is talking about rhythmic modes.

2. One of the "famous rhythmic modes" (*al-*ka'b al-Mashhūrā) which are described, among others, by al-Fārābī in his *Kitāb al-Masūr al-Kabīr* ([1967], p1022ff). According to the classical accounts, the "first heavy" has three long percussions, sometimes equal in duration, but more often the third one being longer than the other two, e.g. 4 beat - 4 beat - 8 beat cycle in al-Fārābī [1967], p1045 ff. (See Lois al Faruqi [1981], p369).

3. According to al-Fārābī (op. cit., pp1038-1041), it had three slow percussions, forming an arithmetic progression: 4 - 6 - 8.

4. The invention of this mode is credited to Ibn Muhriz (Lois al Faruqi [1981], p276). al-Fārābī tells us that it consisted of a three-percussion cycle beginning with one long percussion, followed by two short ones ([1967], pp1033-1037). Similar descriptions are found in al-Kindī and Ibn Sīnā (Lois al Faruqi, loc. cit.). *Ramal* is also a poetic metre.

5. *Hazai* is a pre-Islamic Arabic term applied to one of the three kinds of singing in ancient Arabia (see al-Ind al-Farīd of Ibn 'Abd Rabbihi (d 329/940) [1887], p186; Farmer [1941], p25). But the term also designates a conjunct rhythmic mode of moderate tempo, i.e. one in which all percussions are of equal duration and follow one another at regular intervals. According to Ibn Sīnā, hazai designates any conjunct (muttaṣiḥ) rhythmic mode ([1930], p92). But al-Fārābī restricts the application of this term only to the conjunct (mutawāsīḥ) modes of moderate tempo ([1967], p453). Like *ramal*, *hazai* is also a poetic metre.

Lois al Faruqi adds that *hazai* "was thought to have been the first rhythmic mode introduced in the new genre of song of the [1st/7th century known as ghinā' al-mutqan."] ([1981], p94).

6. A three percussion cycle, two short followed by one longer (O.O.O... : 2 - 2 - 4). (See al-Fārābī [1967], p1048).

7. This rhythmic mode is described by Fārābī as a fast version of *thaqīl al-thānī* (OO.O... : 1 - 2 - 3) (al-Fārābī [1967], p1042ff. Cf Farmer [1943], p82).

8. The "rapid ramal" is described variously by authorities. Thus al-Kindī says that it designates a rhythmic mode of either two or three percussions (O.O.O... : 1 - 2 or O.O.O... : 1 - 1 - 1) (see Farmer [1943], p85). But according to al-Fārābī, the term was used for a rhythmic mode with two percussions, the first short, the second long (O.O.O... : 2 - 8) (al-Fārābī [1967], p1029, 1033). In contrast, Ibn Sīnā tells us that it is made of three percussions of two different lengths (O.O.O... : 2 - 1 - 2) (Ibn Sīnā [1935], p 209). Cf Lois al Faruqi [1974], pp134-135.
A conjunct rhythmic mode comprising a sequence of equal percussions performed at a tempo which allows only one percussion to be fitted between any two percussions (al-Farabi [1967], p451. See al-Faruqi [1981] p143).

"Asābi" literally means "fingers", and it is a term which designates the melodic modes known to have been organized into a system by the late 1st/7th century musician Ibn Misjah (described by Ibn al-Munajjim [d 300/912] in his Ristala fi'il-Mustafa [1976], pp853, 868 ff. See Lois al-Faruqi [1981] p20; Farmer [1957], p448; Wright [1978], p41. For Ibn Misjah see above.

These modes are called "fingers" because they are named after the finger or fret position used for producing their starting tones (see notes below). Wright ([1978], pp250-251) tells us that at one stage these melodic modes were, indeed, allied to rhythmic modes to produce a corpus of 36 Taqūq. This essentially verifies Jābir's claim.

See "Prefatory Note" above (for the phonetic terms 'motion' and 'rest' see n13b of that chapter).

Mutlaq, according to al-Farabi, designates the open string of a chordophone ([1967], p500). Jābir mentions it as one of the octave modes which were systematically described by later musical theorists such as 'Abd al-Qadir ibn Ghaybī (d 1435) (Lois al-Faruqi [1981], p216).

Again, mazmūm is described by Ibn Ghaybī as one of the six octave modes known collectively as the asābi (Lois al-Faruqi [1981], p180).

The term wustā signifies the use of the middle finger for producing the starting tone. (For a detailed account see Lois al-Faruqi, [1981], p389).

Mahmul is mentioned by Ibn Ghaybī as one of the asābi, i.e. one of the six octave modes (Lois al-Faruqi [1981], p164).

Somewhat side-stepping, Jābir now presents a pedagogical discourse on specific gravity and its practical applications in determining the constitution of alloys and other mixtures. Evidently, his essential source for all this is Archimedes. (For an account of Jābir's familiarity with Archimedes, see "Introduction" above).

In the Ikhraj (Kraus ed[1935], 92:8-9), Jābir distinguished between two kinds of Balances: the Balance of (gross) Weights (al-mizān al-waznī), and the Balance of the Natures (mizān al-tabā'ī'). The former measured the gross quantities of substances which enter into a mixture, while the latter determined the latent quantities of the natures in a simple body. We are being told in this section that that the former is a close approximation of the latter. Of course, in the determination of the quantitative structure of a simple body lay a truly divine science ("al-ilm al-lāhūrī", Khamsīn, qu. Kraus [1942-3], p188, n3), beyond the grasp of a common man (al-Sirr al-Maknūn, ibid., p188, n7). Here, however, Jābir concerns himself with gross quantities of metals in a given alloy - i.e., he is concerned with al-mizān al-waznī.
It is interesting to see how our author effectively undertakes a very tedious and challenging task: not only does the practitioner of Balance, we are told, have the expertise to determine (a) whether a given metal object consists of one metal or more, he is also able to (b) determine the precise constitution of an alloy, and to (c) measure accurately the weights of the constituents.

Now, task (a) is straightforward, thanks to Jābir’s knowledge of the hydrostatic balance, and his familiarity with the notion of specific gravity. (It is not clear, however, if our author knows what is called the Archimedian Principle, namely, the principle that the loss of weight suffered by a body in water = weight of the water displaced by the body).

But (b) and (c) are practically impossible tasks if one follows Jābir’s physical method, as opposed to chemical assaying. His method consists in taking a unit weight of each of the metals and finding out the loss of its weight in water when (a) it is unmixed, and (b) when it is mixed with other metals. From these observations one would compile a kind of 'ready reckener' of alloys and their precise constitutions. But, then, in principle, such a catalogue will have an infinite number of listings, for metals can be mixed together in innumerable proportions of weights and in all different combinations!

The only way one can save Jābir’s method is by assuming that metals could be mixed together only in a small and known number ways, and that their different proportions in alloys were not only finite, they were also known in advance.

Textual Notes

1 It has already been pointed out that in some parts of his corpus, our author includes "glass" in his list of metals. Von Lipmann identifies this substance as yellow amber (see "Introduction" above).

We have here a partial description of the construction of an equal-arm balance, and from the manner in which Jābir talks about it, one gets the impression that balance construction was a known art in his time: he mentions 'diagrams' without actually presenting them, and this could well mean that they were commonly known and he felt no need to reproduce them; similarly, we read phrases such as "usual manner of balance construction", "ordinary balances", and this betrays the same thing.
Indeed, we learn from external sources that since pre-Islamic times, Harrān was a place where many skilful mechanics were engaged in making balances, so accurate as to have become proverbial (see al-Maqdisī's al-Taqāsīm fī Maʿrifat al-Aqālīm, qu. Wiedemann, s.v. "al-Mizān" [EI1], V, p531; idem, "Zur Technik der Araber", Fisher[1970]). In the "Introduction" above, we have referred to the rich and extensive account of balances in al-Khāzīn's Mizān al-Ḥikma which indicates, once again, that already by the middle of 3rd/9th century the art of balance construction had reached in Islam a very high degree of sophistication. al-Khāzīn illustrates, e.g., the elaborate balance of the alchemist al-Rāzī (Khanikoff ed[1859], p86). It should be remarked that Jābir's balance looks like a crude one, and it is only through improvisation that it functions as a hydrostatic balance. He describes a similar balance also in the Bahth, MS Jarullah 1721, f133 (See Kraus ed [1935], p142, n12).

Textual Notes

1 The term 'tongue' designates the needle which functions as the pointer of an equal-arm balance. It is fixed at the centre of gravity of the steel beam and divides it into two equal arms. This tongue moves with respect to a carriage which is attached at right angles to the beam.
2 bankān = finān. The word is of Persian origin (see Kraus ed [1935], p142, n12).
3 Jābir seems to be stating an empirical law that in a silver-gold alloy, the weight of the silver in the alloy: loss of weight of the alloy in water = 1 : 1/12.

[12]

Jābir returns to his main theme, the Balance of Letters. He seems to believe that in drugs one nature dominates all others. We recall that in his subdivisions of a Degree, the highest unit is degree: only one nature in a drug, the author tells us, can exist in weights large enough to be measured in degrees. The remaining three natures were measurable only in the smaller subdivisions- grades, minutes, seconds etc.

[13]

Here once again the "Supreme Principle of Balance" is emphasized, namely that in all things the four natures exist in the proportion 1 : 3 : 5 : 8, conforming to 17. This number is now identified with form.
Jābir is here explaining the practical steps one ought to take in order to make the natures of a thing conform to 17. This matter has already been discussed in the "Prefatory Note" above (see especially the subsection "Application of the Balance of Letters").

[14]

The only point of interest in this beginning is its Shī‘I character: note the epithet "Wali" for ‘Alī. As we have remarked in the "Introduction" above, Jābir is not at all consistent in his sectarian sympathies, for in the beginning of the next part of our text he will show - and just as clearly - his non-Shī‘I leanings.

[15]

On the whole this section presents no major difficulty.

Textual Notes

1 That is, when the weights they signify do not exactly add up to 17 or its multiple.
2 It is not altogether clear what, in this context, the author means by decomposition of bodies.

[16]

The first paragraph of this section is highly obscure. There is no explanation as to how the author arrives at the numerical values for the natures in animals, plants and stones. Surely, by virtue of his own doctrine, these values depend on the names of these objects - how can he, then, give them a fixed precalculated value without regard to their specific names?

Textual Notes

1 One notes that all three manuscripts contain a numerical error here. But more surprising is the fact that Kraus too reproduces this mistake in his text (Kraus ed [1935], 159:12-13). See critical notes to the edited text 16:6-7 above where this error has been specified. Indeed, according to [3] above, the weight of the degree in the First Degree of intensity is 77,600,000 dirhams.
We can present these 'Socratic' values neatly in a tabular form. Thus:

<table>
<thead>
<tr>
<th>Degree</th>
<th>1st Deg.</th>
<th>2nd Deg.</th>
<th>3rd Deg.</th>
<th>4th Deg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide</td>
<td>1:</td>
<td>3:</td>
<td>5:</td>
<td>8:</td>
</tr>
<tr>
<td>danaq</td>
<td>7</td>
<td>21</td>
<td>35</td>
<td>56</td>
</tr>
<tr>
<td>Grade</td>
<td>3</td>
<td>3</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Minute</td>
<td>2+1/2</td>
<td>7+1/2</td>
<td>12+1/2</td>
<td>20</td>
</tr>
<tr>
<td>Second</td>
<td>2</td>
<td>6</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Third</td>
<td>1+1/2</td>
<td>4+1/2</td>
<td>7+1/2</td>
<td>12</td>
</tr>
<tr>
<td>Fourth</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Fifth</td>
<td>1/2</td>
<td>1+1/2</td>
<td>2+1/2</td>
<td>4</td>
</tr>
</tbody>
</table>

(Note that all the weights here are given in danaq. For Jabir's system of units see the note designated by an asterisk immediately following n60 in the "Prefatory Note" above).

While we see that Jabir's Socrates also believes in the proportion 1: 3 : 5 : 8, his values, unlike that of Ballinas, do not form a sexagesimal geometric progression (see below). In fact from the fifth to the grade, the 'Socratic' values constitute an arithmetic progression (thus in the First Degree we have: 0.5, 1, 1.5, 2, 2.5, 3), but this progression breaks down when we reach the values assigned to degrees.

Textual Notes

1 Again, all three manuscripts, as well the text of Kraus (ed [1935], 160:7), contain an error. See critical notes to the edited text 16:13 above.
Socrates is perhaps the only classical historical figure for whom Jābir has an unreserved admiration. He is always referred to with a great deal of respect, and he is always preferred over others, appearing throughout as an authority par excellence (see "Introduction", n28 above; see also [27] below). But Jābir's Socrates is without doubt a pseudo figure, for our author does not seem to know any of his genuine ideas. In fact, in the Tājmi' Socrates is presented as the pioneer of the Science of Artificial Generation! (Kraus ed [1935], 377ff). Similarly, the Kitāb al-Fīḍḍa (Book of Silver, Kr 948) records a historically impossible conversation between Socrates and Thales (Kraus [1942-3], I, p113).

In the last paragraph of this section, Jābir expresses indifference with respect to Balīnās and Socrates - follow whichever system takes your fancy, he says. Yet it is interesting that throughout the rest of the Ahiar, he follows 'Socrates', without, in fact, giving his own system of subdivisions of a degree.

Jābir's remarks concerning the sexagesimal system are also to be noted. In fact, a similar view is expressed by Theon of Alexandria (4th century AD) which has been cited by Thureau-Dangin in his work on the history of the sexagesimal system (Thureau-Dangin [1932]).

Textual Notes

1 In this paragraph, Jābir's expressions are exceedingly convoluted. Evidently, all he intends to say is that in developing a system of units, one has no choice but to adopt a sexagesimal progression. The reason? He explains immediately below that the sexagesimal system simplifies calculations.

Concerning this table see the remarks in the "Prefatory Note" (see especially n60 in that chapter, as well as the note that immediately follows). In fact, it is essentially the same as the 'Socratic' table given in [17] above which has here been related to the letters of the alphabet according to the ABJAD scheme (see "Prefatory Note", n59).
Jābir begins to talk about metals which he here calls fusible stones. More frequently, however, metals are referred to in the corpus by the appellation 'āsād' (sing. āsad). Further, here he names only six metals, elsewhere we find a list of seven; the contents of this list likewise keep changing (for a fuller discussion of this matter see Kraus [1942-3], II, pp18-30. See also the remarks concerning Jābir's classification of substances in the "Introduction" above).

We observe metals being classified according to colour. Red metals, we are taught, have a predominance of hot-dry (this corresponds to Aristotle's primary body Fire); in white metals, on the other hand, cold-moist dominate (corresponding to Aristotle's Water). (See "Prefatory Note" above).

It should be remarked that even though Jābir's specific red and white classification is original to him, colour has remained since ancient times a fundamental criterion for the classification of substances and has a fascinating chemical history (see Crosland[1962], pp30-32, 66-73). In one form or another, colour classification is found throughout Arabic alchemy (see, e.g., Stapleton, Azo and Husain [1927], p367, 385, 385).

Textual Notes

1 He does give the tables at the end of this second part of his book.
2 Note that throughout Jābir makes the natures conform to the proportion 1 : 3 : 5 : 8.

There is no obscurity in this passage if it is read in conjunction with the 'Socratic' table in section [19] of the translation above. Here the author gives the weights of the four natures as they existed in metals. These weights were represented by the letters alif, bā', jīm and dāl, i.e., by ABJAD. In practice, however, the names of the metals do not necessarily have these four letters, and this seems to be the reason why Jābir says that "this is the figure arrived at according to the precise balance"- i.e., how it ought to be, for, in practice, one had to make the total weight conform to 17. (See "Prefatory Note" above, particularly the subsection "Application of the Balance of Letters" where Jābir's idea of external/internal natures has been discussed).
Textual Notes

1 Like Aristotle, Jabir believes that hot and cold were active qualities, whereas dry and moist were passive (see Meteor., 4.1, 378b; Gen. et Corr., 1.6-7, 322b-324a; ibid., 2.2, 329b-330a).

2 That is, by adjusting the values through conjecture, the total weight was to be made a multiple of 17. The Arabic expression is somewhat awkward here, and has not been translated literally.

[22]

In effect, Jabir's here gives a clear expression to his belief in the corporeality of the four qualities in the natural world (see "Reconstructing the Context" above). Indeed, the question he is considering arises as a logical consequence of this belief: if all bodies contain all four natures, then all bodies contain a given nature as well as its contrary. Now if these contraries are of equal strength, how is it that they don't cancel each other out? And if they are of unequal strength, why doesn't the stronger neutralize the weaker?

Jabir provides what may be called a spatial explanation. The natures are placed in such a way that they don't come into contact with their contraries - and this prevents mutual destruction, or the neutralization of one by the other. This explanation makes perfect sense within the context of the Jabirian cosmology: the four natures are corporeal entities, so they must occupy a place.

[23]

The idea of place of the qualities now leads the author naturally to his concept of equilibrium. While this has already been examined in the "Prefatory Note" above (where Kraus' paraphrase of this passage has also been quoted), one might add here two further observations.

(a) From the standpoint of the science of mechanics, Jabir's concept of equilibrium is perfectly legitimate for, effectively, equilibrium is viewed by him as a balance of natural forces. At the macro level, one might say, he evidently identifies equilibrium with the state of rest (the phrase "and it is not a liquid" is an unmistakable evidence). And at the micro level, equilibrium is identified with being in an integral state - if this were not so, the object
would explode. Here, no doubt, Jābir has in mind some idea of balance of forces acting on the elementary constituents of a solid body.

(b) An account of equilibrium in a different context appears in Jābir's later work, the *al-Mawāżīn al-Ṣaghīr* where he says, "I have shown you by examples the necessity of equilibrium in the performance of the Great Work... You must know that this equilibrium is indispensable in the Science of Balance and the practice of the Work." (Berthelot ed [1893], III, 115:2-4). It should be noted that the *al-Mawāżīn al-Ṣaghīr* is different from the *al-Mīzān al-Ṣaghīr* which latter forms part of the *Books of Balances*. Due no doubt to the similarity of the two titles, Needham in his [1980] (V, iv, p477) confuses the two.

**Textual Notes**

1 That is, elements pass into one another - this is an assertion of Jābir's belief in transmutation.

[24]

The alchemists of Islam had classified elixirs into two group, red and white. The former was supposed to turn its subject into gold, the latter into silver (see Haschimi [962]). As a standard principle of classification, this idea had also found its way into the alchemical tradition of the Latin West. Thus, e.g., one reads in the *Speculum Alchemiae* of Roger Bacon that "the red elixir makes substances yellow infinitely and transmutes all metals into the purest gold" (qu. Crosland [1962], p31). Haschimi, op. cit., has discussed red and white elixirs in terms of ion exchange coatings on metals.

Jābir says that in red elixirs hot-dry dominate, in white cold-moist. But this is identical to his explanation of red and white *metals*. Moreover, the effective weight of the elixir (i.e. the total weight of its natures), he tells us, is 19 *dirhams* and 5 *dānaqs* (= 17 x 7 *dān*, a multiple of 17) - and this is precisely the effective weight he gave to the *metals* (see [20], [21] above). This means that elixirs are nothing but *ideal metals*. Indeed, already in the *al-Raḥma al-Kabīr*, which is Jābir's earliest extant work, he had categorically stated that "the red elixir is of the same nature as gold...The white elixir is of the same nature as silver." (Berthelot [1893], III, 150:15-17).
Elixirs were ideal metals because in practice no metal had precisely a weight of 17 x 7 dān., one had to augment (ziyāda) or suppress (nuqsān) their natures in order to make them conform to 17.

Here we have another expression of the idea that the quantitative structure of all things is ultimately identical (see the subsection "Application of the Balance of Letters" in the "Prefatory Note" above).

In the second paragraph, Jābir seems to maintain a difference between the letter and its name. In his ontology, they both exist as distinct entities attaching to each other in a natural, as opposed to conventional, way. What is for him conventional, however, is the actual physical figure that represents the letter, i.e., the Arabic script (See "Prefatory Note" above).

Textual Notes

1 In terms of Jābir's own system, this makes perfect sense, for it was not the four natures but the Empedoclean elements which passed into one another. The natures, being the First Elements, maintained their individual character - neither did they destroy one another, nor change into one another. They were given as such. Logically speaking, the First Elements had to have these features, they could not be analyzed (see [35] below).

Jābir now clearly identifies ideal metals with elixir. We also find a categorical statement here that elixirs are, indeed, ideal objects, for they are practically non-existent.

Once again, as in [23], our author expresses no romance for gold!

We are told that in order to transform a metal into elixir all one had to do is make the total weight of its natures precisely 17 x 7 dānaqs (see [24] above). Indeed, Jābir is remarkably consistent in this matter.
Quite courageously, the author contends with the embarrassing question of plurality of names of a given thing (see "Prefatory Note" above).

While this passage is somewhat obscure (for really Jābir gives no reason for choosing 'zāwus'), it is remarkably accurate in its survey of different appellations applied to the metal tin: qalā’ī, zāwus (= Zeus, identified with the planet Jupiter), and qasdīr (= Gr. kassiteros). For Jābir to make the Stoics say that "its (tin's) sibling is called 'usrub'" is to make a statement which is factually true also, for lead and tin were often distinguished as raṣās al-usrub, and raṣās al-qala’ī (for a detailed discussion of these names see Goltz [1972], especially pp243-245).

And here, once again, one notices Jābir's preference for Socrates! (See [18] above).

Textual Notes

1 The planet Jupiter.
2 At the end of this part of our text, the author does produce a table of calculation of the weights of the natures in tin: indeed, this has been worked out according to the appellation "Zāwus".

In sharp contrast to the opening words in the "Second Part", one finds a drastically non-Shi'I flavour to this opening: to call Muḥammad an Imām is to offend the entire system of the Shi'I eschatology and hiero-history!

From what we have so far read of Jābir, it is already quite clear that his concerns are not limited to the inanimate world of what he calls stones. Rather, his system claims to be applicable to all natural objects: not only to inorganic substances, but equally to plant and animal substances.
This is a distinguishing feature not only of Jābir, but of the Arabic alchemical tradition itself, for the interest of Hellenistic alchemists had never reached beyond the realm of the inanimate. (It is for this reason that Needham refuses to call them alchemists at all— they were, according to him, "Greek protochemists", that is, artisans, not philosophers. See Needham[1980], V, iv, passim). In contrast, the alchemists of Islam showed from the very beginning a sustained interest in medicine, in drugs, and in the phenomenon of life in general (an important study in this regard is that of Temkin[1953]). Not only did these alchemists apply their principles, operations and products to all three kingdoms of nature, most of them also drew their materials from all three realms (Ibn Umayl is an exception. See Ali, Stapleton and Husain [1933]). Thus, historians of alchemy are united in their observation that, not withstanding ancient China, it was the Arabs who introduced plant and animal substances into the repertoire of alchemy, and that this is one of their major contributions to that complex phenomenon which led to the emergence of modern science. From this point of view, Jābir's passage at hand is of outstanding historical significance.

Jābir's elixir, we note, can be made out of both organic and inorganic substances. Thus it is declared that elixirs are of seven types: three uncombined, three with constituents drawn from two of the natural realms in different combinations, and one made of substances taken from all three realms.

[A]

When read in conjunction with the table in section [19] of the translation above, this passage presents no difficulty. Our author is now applying his Supreme Principle to elixirs. Like everything else, elixirs possessed the four natures in the proportion 1 : 3 : 5 : 8. But as to which nature corresponded to which term in this proportion, this depended on the name of the elixir. We are reminded that depending upon its position, the letter alif can represent four different weights. These values have already been given by Jābir in his table in [19] (see the translated text above) which he here restates.

[B]

Ceration (tashmī = Gr. enkērōsis) is a standard process of chemical craft. As its etymology suggests, it is a process of softening a substance so that when dropped on a hot plate, it readily melts like wax, without evolution of fumes. As a technique, ceration is certainly known to Jābir for he mentions it in its usual sense in, e.g., the Kitab al-Lāhūt (Book of Divinity, Kr 123, MS Jārullāh 1554, f4b, see Kraus [1942-3], I, p45). The
alchemist Rāzi has in fact devoted a whole section to this process in his Kitab al-Asrār (Book of the Secrets, qu. Stapleton, Azo and Ḥusain[1927], p332), a work in which he invokes the authority of our author referring to him as "our master Jābir ibn Ḥayyān" (ibid., p385).

What is strange, however, is Jābir's identification of ceration with augmentation of the natures in a body. Surely, he is not speaking from the point of view of the actual techniques of ceration, for there is no explanation as to how one carries it out. All we are told is that the transformation of a stone (mineral substance) into elixir consists in two steps:

a) determination of the prepoderant nature in the stone, and
b) adding a 'fifth' to this nature (fifth, we recall, is Jābir's smallest subdivision of a Degree), whose four different numerical values are given from the table which appears under [19] of the translation above.

But how does one go about doing this?

[C]

The account of 'ceration' of animal substances was similar to the one preceding. To the dominant nature, one added a 'fourth'- this is the second smallest subdivision of the Degree.

Here one notes Jābir's peculiar use of the term 'elixir'. Clearly, in the present context, 'elixir' denotes any substance which is an object of alchemical operation. It is necessary to read the text in this way because, otherwise, Jābir's assertions concerning the transformation of the elixir from "one thing to another" would make no sense: in its usual meaning, elixir was not a patient but an agent of transformation!

Again, all the numerical values come from [19].

[D]

To 'cerate' a substances derived from plants, we are told, one added a 'third', the next higher subdivision of the Degree, to the prepoderant nature. The weights are all specified from [19].

Once again, 'elixir' = any substance to be operated upon.
Here the present work stumbles upon a discovery.

We have at hand an unknown Arabic version of Aristotle's *Categoriae*, 8, 8b25-11a37, and from the point of view of the transmission of Aristotle into the world of Islam, this discovery might be a very promising one. This is particularly so because Jābir's version of Aristotle's text is (a) totally and significantly dissimilar to that of Ishāq ibn Hunayn, (b) in terms of terminology, it is much cruder, and (c) at places it presents the original text in the form of adaptations and paraphrases especially suited to the needs of an audience not familiar with the Greek logical tradition. All these features converge to suggest an earlier dating for Jābir's version.

The third part of the Ḥājār has never been published or studied before. As a result, this Arabic reproduction of the *Categoriae* has hitherto remained hidden from the scholars of the Arabic Aristotle tradition who have the expertise to address the host of philosophical and historical questions it raises- does Jābir's text betray signs of a possible Syriac intermediary? What was the nature of the ultimate Greek original on which the present text is based? In the context of the Arabic Aristotle tradition, where do we place Jābir? Does his terminology reveal a distinct philosophical outlook?, and so on. In fact, we have at hand a whole research project which warrants a full separate study in its own right. But this challenging project cannot be undertaken in the present work.

What follows constitutes merely a first and somewhat crude step. Thus, beginning with a direct comparison of Jābir's text with a modern English translation of the *Categoriae*, a few initial observations have been made. This is supplemented by brief commentaries in which Jābir's terminologies have been contrasted with those of Ishāq.
By "quality" I mean that in virtue of which things are said to be qualified somehow (8b25).

It seems that we have here a crude literal translation. Note that there is in Aristotle no mention of conditions as yet. In contrast, Ishaq's translation is much more sophisticated and elegant: "wa usammā bi'l-kayfiyyati tilkal-lati laha yuqalu fil-ashkhasi kayfa hiya." (Badawi ed [1948], 29:25).

One kind of quality let us call states and conditions. A state differs from a condition in being more stable and lasting longer. Such are the branches of knowledge and the virtues. For knowledge seems to be something permanent and hard to change... (8b27-30). It is what are easily changed and quickly changing that we call conditions (8b35)...

Jābir's version has no terminology to render into Arabic the nuance between 'states' and 'conditions'. The term "ḥāl" has to perform both functions. Thus, rather than translating the two terms of Aristotle, our text explains them. In contrast, Ishaq does have the terminology, thus state = malaka, and condition = ḥāl (Badawi ed, 29:27). Note also Jābir's own illustrative examples.

Another kind of quality is that in virtue of which we call people boxers or runners or healthy or sickly- anything, in short, which they are called in virtue of a natural capacity or incapacity. For it is not because one is in some condition that one is called anything of this sort, but because one has a natural capacity for doing something easily... (9a13-18). Similarly with the hard and the soft: the hard is so called because it has the capacity not to be divided easily, the soft because it has an incapacity for this same thing (9a25-27). A third kind of quality consists of affective qualities and affections (9a28).

One notes that: (a) Jābir's version summarizes the original, (b) while adding its own illustrative examples, it reproduces Aristotle's example of "the hard and the and the soft", (c) it does not give a separate treatment to Aristotle's "affective qualities and affections", considering both of them as falling under "potentially existing qualities" (bi'l-quwwa). For Aristotle, as we see, these were "a third kind of quality".

...When such circumstances have their origin in affections that are hard to change and permanent they are called qualities. For if pallor or darkness have come about in the natural make-up they are called qualities (for in virtue of them we are said to be qualified); and if pallor or darkness have resulted from long illness or from sunburn, and do not easily give way...these too are called qualities...But those that result from something that easily disperses and quickly gives way are called affections; for people are not in virtue of them, said to be qualified somehow. Thus a man who reddens through shame is not called ruddy, nor one who pales in fright pallid...(9b20-32).

Here we have, more or less, a faithful translation. It is remarkable that, unlike the case with Ishaq, the rendering at hand is practically terminology-free (for Aristotle's "circumstances", e.g., Ishaq has the term
"'awārid" (Badawi ed, 32:20), our text manages without it. In the last sentence of Aristotle's passage, one reads the examples of reddening and paling, Jābir's text changes it to that of reddening and blackening. Ishaq, on the other hand, remains strictly faithful to the original (Badawi ed 32:30-33:2).

Similarly with regard to the soul also we speak of affective qualities and affections. Those which are present right from birth as a result of certain affections are called qualities...Similarly with any aberrations that are not natural but result from some other circumstances, and are hard to get rid of...such things, too, are qualities, for in virtue of them people are said to be qualified. But those which result from things that quickly subside are called affections, e.g. if a man in distress is bad tempered...(9a33-10a 7).

What we read in our text is a lucid paraphrase of the original.

A fourth kind of quality is shape and the external form of each thing, and in addition straightness and curvedness and anything like these. For in virtue of each of these a thing is said to be qualified somehow; because it is a triangle or square it is said to be qualified somehow, and because it is straight or curved...

We have for Aristotle's passage a faithful and clear translation.

'Rare' and 'dense' and 'rough' and 'smooth' might be thought to signify a qualification; they seem, however, to be foreign to the classification of qualification...For a thing is dense when its parts are close together, rare because they are separated from one another, smooth because its parts lie somehow on a straight line, rough because some stick up above others (10a16-24).

Again, Jābir gives a faithful translation.

Perhaps some other manner of quality might come to light, but we have made a pretty complete list of those most spoken of (10a26-27).

In contrast to the brief sentence of Aristotle, Jābir continues to give a long list of several other kinds of qualities none of which is to be found in the Minio-Paluello text.

Now in most cases, indeed in practically all, things are called paronymously, as pale man from paleness, the grammatical from grammar, the just from justice, and so on. But in some cases, because there are no names for the qualities, it is impossible for the things to be called paronymously from them. For example, the runner or the boxer, so called in virtue of a natural capacity, is not called paronymously from any quality...(10a28-10b 1).

One gets the impression from Jābir's text that the translator has clearly understood the meaning of Aristotle, for he substitutes the examples in the original by his own, and interprets the text in a legitimate manner. For example, he gives two reasons why things are not called paronymously: either there is no name for the quality, or the quality exists only in potentiality. The latter is not explicitly stated in Aristotle.
There is contrariety in regard to qualification. For example, justice is contrary to injustice and whiteness to blackness, and so on; also things said to be qualified in virtue of them—the unjust to the just and the white to the black. But this is not so in all cases; for there is no contrary to red or yellow or such colours though they are qualifications (10b 12-17).

To Aristotle's examples of red and yellow, Jābir's text has added circle and triangle to which there were likewise no contraries. Apart from this addition, Jābir has a faithful translation.

Further, if one of a pair of contraries is a qualification, the other too will be a qualification. This is clear if one examines other predicates. For example, if justice is contrary to injustice and justice is a qualification, then injustice too is a qualification. For none of the other predicates fits injustice, neither quality nor relative nor where nor in fact any other such predicate except qualification... (10b 18-25).

We note that Jābir's rendering is a faithful literal translation of this passage.

Qualifications admit of a more and a less; for one thing is called more pale or less pale than another, and more just that another. Moreover, it itself sustains increase... not in all cases though, but in most. It might be questioned whether one justice is called more a justice than another, and similarly for other conditions. For some people dispute about such cases. They utterly deny that one justice is called more or less a justice than another, or one health more or less a health, though they say that one person has health less than another, justice less than another and similarly with grammar and the other conditions. At any rate things spoken of in virtue of these admit of a more or less: one man is called more grammatical than another, juster, healthier, and so on (10b 26-11a 3).

With the exception of a change of colour in the first example (Aristotle has pale, our author has white), Jābir's text is a faithful translation of the original.

Triangle and square do not seem to admit of a more, nor does any other shape. For things which admit the definitiuon of triangle or circle are equally triangles or circles, while of things which do not admit it none will be called more that than another- a square is not more a circle than an oblong is, for neither admits the definition of circle. In short, unless both admit the definition of what is under discussion neither will be called more than the other. Thus not all qualifications admit of a more and a less (11a 5-14).

With some rearrangement (the last sentence of Aristotle's passage, e.g., here appears first), Jābir has, once again, a clear faithful rendering of the original.

...It is in virtue of qualities that things are called similar and dissimilar; a thing is not similar to another in virtue of anything but that in virtue of which it is qualified (11a 15-16).

Here we have another instance of a faithful translation.
As we have already observed in the "Introduction" (Chapter I) above, Jābir is somewhat inconsistent in his classification of substances. However, it should be noted that this inconsistency is not with regard to the principles of classification which remain thoroughly uniform throughout the corpus. These principles are clearly and systematically stated in the al-Khawaṣṣ al-Kabīr in which three kinds of substances are distinguished (qu. Kraus, II, [1942-3], pp18-20):

a) Spirits- those which completely volatalize in fire;
b) Metallic Bodies (ajsād) - those which are fusible, malleable, possess lustre, and produce a ringing sound; and
c) Bodies (ajsām)- mineral substances, not malleable, may be fusible, pulverizable.
   These are further subdivided into three groups:
   c1) containing some quantity of spirit (e.g. mica);
   c2) containing a very small quantity of spirit (e.g. shells); and
   c3) containing no spirit (e.g. onyx).

(For a detailed discussion of these principles see Kraus, op. cit., pp18-30).

Jābir is teaching us that the difference between spirits and bodies does not lie in their colour, hardness, or in the manner in which they undergo casting. Indeed, all natural substances, no matter from which of the three realms they are derived, contained both body as well as spirit. The question as to wherein lies the difference between bodies and spirits is taken up later in the text.

Textual Notes

1 At the end of the book Jābir does give illustrative calculations of the weights of the natures in spirits.
2 The point is repeated that if upon analysis of the name of the spirit the total weight of the natures is not found to be exactly 17 or its multiple, one augments/suppresses the natures.
3 Kr 71-73.
By now we are familiar with Jābir's idea of external/internal natures. We have here a categorical statement that transmutation of natural objects consists in a direct interchange between the external and internal natures. One notes the further assertion that the elements of all things follow a circular pattern of change, something which, in all probability, the author derives from Aristotle ("It is evident, therefore, that coming-to-be of simple bodies will be cyclical." Gen. et Corr., 2.4, 331b2-3).

See "Prefatory Note" above.

Textual Notes

1 Kr 373. This work belongs to the Books of Balances.
2 Kr 51. This is the title of a lost treatise which is part of of the CXII collection. There is also a Kitāb al-Mirrkh wa al-Shams (Book of Mars and the Sun) in the LXX collection (Kr 189).

Abruptly, Jābir introduces his curricular programme for the disciple. But he does more than that, for in the middle of his discussion, he digresses into a polemical attack against the doctrines of a group of people identified by him as the Şābiān. Somewhat ironically, it is in the course of this side-stepping that he reveals to us some of the most interesting and essential principles of his cosmology.

In this section Jābir specifies several stages in his training programme. His disciple was supposed to study the following subjects in the order given:

ii) Cosmology: the four classes of elements, their accidents and qualities.
iii) Philosophy: sayings and doctrines of philosophers.
iv) Kalam, Logic, Arithmetic and Geometry: selected topics.

v) (a) Science of the Natures (optional): specific properties of things
(b) Craft and Trickeries (optional): the Book of Trickeries.


viii) Alchemical Operations: ceration, coagulation etc; operations concerning elixirs.

Textual Notes

1 For a detailed account of these chemical processes see Stapleton, Azo and Husain [1927].
1 a See note 5 below.
2 Note the distinction Jabir maintains between tab* and kaviya.
3 See "Reconstruction of the Context" above.
4 Kr 1063. This work is not extant.
5 There are two works in the Jabirian corpus with this title, Kr 197 and Kr 366. Both are lost.
6 A Book of the Seven is part of the LXX (Kr 132). Also found in the corpus is a collection of seven books, one on each of the seven metals (gold, silver, copper, iron, tin, lead, and kharsim), and this is likewise referred to by the author as the Sab'a (Kr 947-953).
7 A fuller discussion of these operations is in Stapleton, Azo and Husain [1927].
8 Note the categorical statement that elixirs are only ideal substances and do not actually exist.

The contents of the first paragraph of this subsection are somewhat obscure. If everything has a Balance, why are we told now that the Balance comes about only after substances are mixed together? Again, the undermining of the products of elixirs goes against the drift of an alchemist: how is it that the "fruit of Balances are the...operations performed without employing the products of...elixirs"? The author gives no explanations.

The second paragraph is largely clear (for Jabir's Cannon of Equilibrium, see "Prefatory Note" above).

Coincidentally, it was by examining the cosmological foundations of Jabir's Balance that we had begun our substantive study of his natural scientific system ("Reconstructing the Context of Jabir's Kitāb al-Aḥjar", the second chapter above), and this is precisely the subject on which our author now brings his book to a close. Thus,
given that the cosmological discourse of this section has already been effectively and extensively discussed, it should now make an easy reading.

While no attempt has been made to reach a definitive identification of the group of people Jabir is here attacking, it should be remarked that their alleged views make them seem like some Hellenized philosophers who derive their ideas largely, though not exclusively, from Aristotle. We are told that they postulate a unique and eternal prime matter, and that they explain the constitution of the entire natural world as having come into being through a temporal cosmological process. During this temporal process, the prime matter progressively acquired, first, three dimensions, then, primary qualities, and, finally, gave rise to the four elementary bodies.

That Jabir is troubled by the idea of an abstract, imperceptible, unknowable and attributeless prime matter has already been examined at length in the "Reconstructing the Context" above. But here he brings into focus another fundamental feature of his cosmology. In fact, it is this feature which appears to be one of the most outstanding characteristics of his entire cosmological thought.

As we have already seen, Jabir himself believes in an incorporeal substance (jawhar) "which is in everything, and out of which everything arises". He also believes in some kind of a process whereby his substance becomes corporeal, attaches itself to the four qualities, and gives rise to the Empedoclean primary bodies (see "Reconstruction of the Context" above). But, then, this was not, according to Jabir, a temporal process. It was, rather, a description of the various hierarchical stages of the descent of material bodies. No building block of the natural world had a temporal priority over any of the others.

Thus, one stage of the world is not replaced by another. Rather, like the steps of a ladder, all stages exist together in a hierarchy of an ontological plurality. The elements, and the things which are constituted out of these elements, have both come into being at the same instant, created by a single act of God ("daff'atan wahidatatan" see [4] above). This position has been explicitly stated in [A] below (38:3-9).

In this way, Jabir distinguishes himself from his Šābians, and, indeed, from his Hellenistic predecessors in general.
This section has been quoted and discussed already in the "Reconstruction of the Context" above. (For the term ǧīna, see n 52 of that chapter). But here we particularly note Jābir's assertion that the elements of the material world (the four natures) and things which arise out of these elements (plants, animals and minerals) exist simultaneously. The world, we are told, did not evolve to its present state, it has always been arranged and organized in the same way. Of course this did not mean that the natural world was static. Jābir's four natures were capable of entering into an unlimited number of different combinations, giving rise to the vast diversity of objects in the world. These objects perpetually changed, transformed into one another, or returned to their elements by being resolved into the natures which constituted them. These processes marked the natural world.

Textual Notes

1 Note the very rare application of the term kavfiyat to primary qualities

Continuing with his polemical attack, Jābir now tries to beat his Šābiyān at their own game. He points out that in terms of their own theory, these philosophers cannot consistently maintain that their hayûla (= Gr. hulê) is a unique entity (for a discussion of the term hayûla, see "Reconstruction of the Context" above). Jābir demonstrates that if they are true to their own logic, these people will have to postulate as many hayûlas as there are elements!

One particular point of interest in this subsection is the way Jābir widens the concept of prime matter in order to give it a defined and concrete sense.

The argument dismissing the uniqueness of prime matter continues. Jābir's Šābiyān here appear close to Aristotle, talking of prime matter as the ultimate subject of properties in a body, itself admitting of no change but having the potentiality of accepting forms. But if prime matter had different potentialities, argues Jābir, then it cannot be unique for then it will admit of diversity in itself!

During the course of his argument, Jābir side-steps into matters of detail. He rejects the claim that Water transforms into Fire without first transforming into Air. Somewhat

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ironically, this idea of an intermediate stage in the process of "Water → Fire" transformation can legitimately be derived from Aristotle himself. We have already referred to Aristotle's statement that the four elements change into one another following a circular pattern ([32] above). The traditional schematic diagram of this circle has been reproduced below. Now, if we move in an anticlockwise direction starting with Water (cold and moist), the first stage of transformation is Air (hot and moist), involving the change only of one quality. Next, Air transforms into hot and dry Fire, again through the change only of one quality. This is perfectly consistent with, and is supported by, Aristotle's belief that elements having one quality in common (Air and Water) change quickly, whilst elements with no quality in common (Water and Fire) change slowly (Gen. et Corr., 4.2, 331a).

As we have already observed in [A] above and elsewhere (see Arabic quotation 58 in "Appendix to Chapter II"), Jabir believes that things ultimately resolve back, or return to their elements. He finds no difficulty in maintaining this doctrine, for if returning to constituent elements meant annihilation, so be it - the world was not going to last for ever anyway.

It is clear that Jabir is here attacking the abstract notion of the four natures, which, upon his account, the Sabians seem to espouse. To him such a notion is elusive. Thus, invoking the authority of the "majority of philosophers", Jabir claims that the four natures exist either potentially in one another, or they are found in the elements which they constitute. In other words, the natures had concrete existence, and to postulate that they exist in any other way was nonsense. Given the context, this "other way" evidently refers to the abstract way of his Sabians.
The doctrine that natures exist potentially in one another is a very interesting one, but it makes an appearance as an isolated thought, for Jabir neither elaborates on it here, nor does he bring it up anywhere else in his cosmological discourses. It is for this reason that a full philosophical commentary on this doctrine would be somewhat out of place.

**Textual Notes**

1 Jabir clearly means primary bodies by *ashya5*, for it is one of his firm beliefs that the four natures are the elements of the Empodoclean bodies (see "Reconstruction of the Context" above where this aspect of Jabir's cosmology has been discussed in detail).

[F]

This passage has already been quoted and discussed in the "Reconstruction of the Context" above.

[G]

Finally, Jabir declares what is the core principle of his entire system:
The four natures constitute the fundamental principle of the world.

[36]

After a long digression, Jabir now returns to the subject of his training programme. Much like the present-day practices, his disciple is required to present his ideas before an audience, both verbally and in writing. This was the final stage of training after which the disciple could, in principle, be called a philosopher.
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