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SYED NOMANUL HAQ

*Center for Middle Eastern Studies, Harvard University*

# NAMES, NATURES AND THINGS

The Alchemist Jābir ibn Ḥayyān  
and his *Kitāb al-Aḥjār* (Book of Stones)

With a Foreword by

David E. Pingree  
*Brown University*

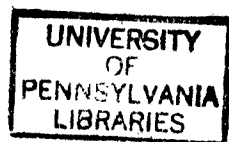


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This book is for Ammi Jan, my mother  
Who stands as a rock upon which I build my hopes

And for my father, Professor Maulana Muntakhabul Haq  
A scholarly giant and my ultimate source of inspiration

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A 15th-century European portrait of "Geber," typically identified with the Arabic Jābir ibn Ḥayyān

Codici Ashburnhamiani 1166

Courtesy Biblioteca Medicea Laurenziana, Florence

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## FOREWORD

It is indeed a great pleasure to be able to introduce to the scholarly world a new contribution to Jabirian studies. In it the author provides a critical edition of substantial parts of a key work, the *Kitāb al-Aḥjār ʿalā Raʿy Balīnās*, in the group of 144 treatises known as the *Kutub al-Mawāzīn* or “Books of Balances.” In it, as Dr. Haq meticulously expounds the theory, Jābir describes his ideas about the numerical and phonetic substructure of pure and compound materials, and about the ways to analyze these substructures by manipulating the consonants in the names of the materials in the Arabic language and, in principle at least, in other languages including the artificial.

Dr. Haq’s treatment of the *Kitāb al-Aḥjār* is preceded by a chapter in which he, following the lead of a few other scholars, raises serious questions about the conclusions concerning Jābir that Paul Kraus arrived at fifty years ago: that one individual did not write all of the nearly 3000 works that Arabic tradition allowed Kraus to attribute to Jābir, but that these texts were composed by the members of a school over several generations; and that the *corpus Jābirianum* does not date from the latter half of the second century Hijra/eighth century A.D., when Jābir is alleged to have been active, but from a period between 875 and 975 A.D. Some of Dr. Haq’s arguments are not convincing; e.g., it seems to me irrelevant to the question of whether or not one man could have composed all of the 3000 works that only some 500 can be individually named. One need only remark that the great collections of *One Hundred and Twelve Books*, of *Seventy Books*, and of *Five Hundred Books*, combined with the 144 *Kutub al-Mawāzīn* and the minor collections, already account for about 950 treatises. Certainly the corpus may have consisted of far fewer than 3000 items, as Kraus realized, since many of the known titles may belong to one or another of these large collections, but it must have contained at least 2000 treatises. Still, the arguments put forth by Dr. Haq in favor of taking seriously the historicity of Jābir as a disciple of the sixth Shīʿī Imām Jaʿfar al-Ṣādiq are compelling; and some of Kraus’ arguments in favor of his dating of the *corpus* are based upon very uncertain foundations.



Dr. Haq's solution is to regard the questions of the author or authors and of his or their dates as unanswerable. But there are some things that point to a date closer to 900 than to 800 A.D. For instance, "Jābir" wrote a book entitled *Kitāb al-Nawāmīs wa al-Radd 'alā Iḥlātun* (Kraus 1981), in which, as we know from citations in the *Kitāb al-Sumūm* and the *Kitāb al-Tajmī*, he attacked a magical tract, the *Kitāb al-Nawāmīs*, falsely ascribed to Plato. We have a Latin translation of this pseudo-Platonic work, the *Liber vacce*, from which it is clear that the author used Hunayn ibn Ishāq's translation of Galen's *On the Opinions of Plato and Hippocrates*, which was made in the 840's. Even in the *Kitāb al-Aḥjār* itself there are hints of a probable ninth century date—e.g., the geometrical definitions and vocabulary on ff. 78a-78b (published from the Paris manuscript by Kraus in his *Jābir ibn Ḥayyān. Textes choisis*, Paris-Le Caire 1935, pp. 184 and 186-187, but omitted from Haq's critical edition) and the discussion in section 35 of Dr. Haq's edited text of the Neoplatonic cosmology of the Ṣābians of Harrān. In both cases, while absolute proof is impossible, it seems to me more likely than not that these passages were written decades after 800 A.D. One possible solution to this problem is that advanced by P. Lory (*Ġābir ibn Ḥayyān. L'élaboration de l'élixir suprême*, Damas 1988, pp. 12-13): "... à un noyau primitif de textes alchimiques à caractère essentiellement technique, des commentateurs plus tardifs auraient ajouté des gloses et des explications doctrinales. L'ensemble aurait été repris et encadré par des notations bibliographiques attestant l'origine ḡabirienne et/ou ḡā'farienne de chaque texte, ainsi que sa place dans l'ensemble du Corpus."

The text itself of the *Kitāb al-Aḥjār* is preserved in five manuscripts. The present location of one of these that Kraus (*Jābir ibn Ḥayyān. Contribution à l'histoire des idées scientifiques dans l'Islam*, vol. I, Le Caire 1943, p. 180) had located in a bookstore in Damascus is unknown, and one of the two copies in Teheran is either a copy or a *gemellus* of the other. Kraus, in his publication of excerpts from this work (all of parts 1 and 2 and a part of part 4), used only the Paris manuscript. Dr. Haq has collated all three, and presents us with an authoritative critical edition of excerpts from all four parts (unfortunately he could not at this time achieve a critical edition of the whole treatise) including the third, in which he has discovered an early translation—or rather, an expanded paraphrase—of part of Aristotle's *Categories*. He is indeed to be

congratulated on this achievement, as on his successful effort to unravel and explain this obscure discourse on the Jabirian theory of balances.

Much remains to be done in the field of Jabirian studies, as in the larger field it opens into, of the sources and the development of "scientific" ideas in early Islam. I am delighted to be able to welcome a brilliant young scholar dedicated to improving and building on the foundations so ably laid by Paul Kraus.

November, 1992

David E. Pingree

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## AUTHOR'S PREFACE

This study, in its original version, constituted my doctoral dissertation which I presented some years ago to London University. Now that it is appearing in print, and thus places upon my shoulders a different kind of responsibility, it has been revised and extended. It seems to me that by making these changes and additions I have gained a wider audience. For now this work should be read with benefit not only by experts in the narrow specialty of the history of mediaeval science and medicine, but also by those whose interests lie in mediaeval philosophy, in the history of religion and in the general area of the intellectual history of Islam. By adding much explanatory material and presupposing very little on the part of the reader, I have also aimed at making this study accessible to students in these fields.

In a sense, this book may be regarded as consisting of two parts. The first chapter in which I have ventured to reexamine the notorious "Jābir-Problem" is an integral but self-contained part of the whole and can be read independently in its own right. The remaining bulk of the book may be considered its second part. This comprises of five chapters which together constitute a critical study of the *Kitāb al-Aḥjār 'alā Ra'y Balīnās* (Book of Stones According to the Opinion of Balīnās) attributed to the alchemist Jābir ibn Ḥayyān. Naturally, these latter chapters are not meant for reading in isolation from one another, nor will they make much sense if read in an order other than the one in which they appear.

But the two parts of the book are not mutually independent. Indeed, it is one of my fundamental messages to the reader that the vexed question of the authorship and dating of the Jabirian corpus, a feverishly debated issue dubbed "Jābir-Problem" by an earlier generation, is neither trivial nor irrelevant. Yielding profound methodological consequences, it is a question that determines in most fundamental ways our very approach to Jabirian writings. In search of a methodology, then, I begin by subjecting to a critical reexamination what is by now an orthodox scholarly position on this issue. This is the position based on the compelling thesis of Paul Kraus that the Jabirian corpus, with the possible exception of one treatise, was written not by a single individual

of the 2nd/8th century as tradition has it, but by several generations of a group of Shīʿī authors who lived no earlier than the latter half of the century that followed. Having tentatively concluded that this thesis is problematic, I have refrained from committing myself to the methodological imperatives it begets. But I have not dismissed Kraus' thesis; rather, in my approach to Jabirian writings, I have remained systematically indifferent to it.

With these methodological considerations I proceed with my study of the *Ahḡār*. Thus begins the second and main part of the book. Here, operating with the guidelines constructed in the first part, I identify certain fundamental notions of Jābir's system and examine how they function within the internal perspective of his cosmological, alchemical and philosophical doctrines as these latter are developed in the *Ahḡār*. Thus, I have reconstructed the doctrinal context of this treatise, expounded its central theme, and presented a critical edition of its thematically selected Arabic text. In the final chapter, I translate my edition in its entirety and provide extensive commentaries and textual notes. The contents of the excluded sections of the treatise appear in an appendix at the end of the book.

It will be seen that at the core of the *Ahḡār* lies a powerful idea of an ontological equivalence between language and physical reality. Language, we are told, did not merely depict the natural world, it was an embodiment of reality itself; indeed, language signified being. Therefore, an analysis of language was effectively an analysis of the objects of the world. To know a thing was to know its name. Thus develops our author an all-embracing theoretical system, providing his logical proofs, explicating the consequences of his claims, and applying his system to numerous actual cases. I do hope my account throws into sharp relief the enormous range of this system, its surprising logical coherence and its undeniable philosophical worth.

In the second part of the book I also announce and present a textual discovery of mine. I do so somewhat boastfully since this is the discovery of a hitherto unknown translation of the 8th discourse of Aristotle's *Categoriae*, a text of which only one mediaeval Arabic translation is known to us—namely that by Ishāq ibn Hunayn. The discovery now of another Arabic rendering should delight the scholars of Arabic Aristotle since here we have something rather promising. This text, which I found in the hitherto unstudied part of the *Ahḡār*, appears as an integral part of my critical edition in Chapter 5; in Chapter 6 it has been translated,

textually analyzed, and terminologically compared both with the text of Aristotle as well as that of Ishāq.

Let me now say a word concerning my criticism of Kraus. This criticism, no matter how animated it may appear, is not meant to belittle the grand scholarship of this erudite historian. Kraus was, I acknowledge, one of the most outstanding scholars of his field and his contributions to Jabirian studies are no less than monumental. To him I owe an enormous debt, for throughout this book I draw heavily upon his learned and rigorous works. Yet I do mean to point out the inherent dangers that lie in an uncritical espousal of his views. As I have demonstrated, such blind following sometimes obscures more than it illuminates. Indeed, I feel that my textual discovery of the Jabirian translation of Aristotle is a fruit of a critical stance toward Kraus. This is so because the existence of an Aristotle-like discourse in a text of Jābir would have hardly constituted a problem for a researcher unreservedly committed to Kraus' late dating of the Jabirian corpus.

Finally, I dare say that despite my painstaking efforts to verify my facts, and despite my numerous readings of the manuscript of this book, errors might still have gone unnoticed. I appeal to my readers to point these out. And now, as I look forward to criticisms and appraisals of this endeavor of mine, I wish to assure the experts that I am not unaware of the many shortcomings and imperfections of this work, nor do I place it before them without haunting trepidation, nay, even reluctance.

October 1992

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I wish to express my grateful thanks to Professor P. M. Rattansi of University College London for his inspiring supervision of this work in its formative phases. To Professors A. I. Sabra, Wolfhart Heinrichs, Frank Vogel, Roy Mottahedeh and William Graham, all belonging to Harvard University, I owe a very heavy debt of gratitude for all the expert guidance, encouragement and help they have variously and so readily offered me. Professor Everett Rowson of the University of Pennsylvania deserves my special thanks for his meticulous reading of some of my earliest editorial drafts of the text of the *Ahjár*.

I have already acknowledged my debt to the works of Kraus. But I draw upon the researches of many other scholars and this too must be acknowledged. My heaviest borrowings are from Richard Sorabji, Wilfred Madelung and F. W. Zimmermann. I thank them profusely.

Numerous friends and colleagues have stood beside me and assisted me throughout the different stages of my protracted scholarly struggles and to all of them I remain most grateful. Among them are Ester Vyhnaek and Kevin Smith of the School of Oriental and African Studies of London; Elaheh Kheirandish, al-Noor Dhanani, Michael Cooperson, Hassan Mneimneh, A.J. Hollmann, Kenneth Kreshtool, Stefano Lepre, Muhammad Yusuf Siddiq, Mohsin Saleh and Erik Jacobson of Harvard; Iftikhar Zaman of the Oxford Center for Islamic Studies; Erik Moore of Brown University; and Gloria Burke of the Weymouth Youth and Family Services. But these are only some of the names that readily spring to mind.

It was Professor Daud Rahbar of Boston University who had personally introduced me to Professor Robert Cohen, Editor of the *Boston Studies in the Philosophy of Science* series; and this was a gesture I shall always cherish. Indeed, to Professor Cohen I owe a very humble gratitude for all his affection, attention, and guidance that I have received ever since. I also thank Annie Kuipers of Kluwer Academic Publishers for being so considerate and patient.

The Executive Committee of the Center for Middle Eastern Studies at Harvard approved a small grant to cover some of the expenses incurred

in manuscript preparation. The enthusiastic generosity of the Committee is greatly appreciated.

It is no exaggeration to say that I could have hardly accomplished anything without the profound and perpetual sacrifices of the members of my family. Their uncompromising support and care, their unwavering trust in me, their dignified commitment to the legacy of scholarship in the family—all this has been crucial to my whole endeavor. Investing so much hope, how anxiously have my sisters Rafia Taj, Saleha Naz and Sabiha Qadri and my little nephew Asad Ahmed been waiting for the completion of this work!

## EXPLANATORY NOTES

### DATES

Dates have been specified both in the lunar Islamic calendar and the solar Christian calendar respectively, with a virgule separating the two. Thus, 1308/1890 = 1308 Hijra/1890 A.D.

### JABIRIAN WORKS

All Jabirian works have been identified by the numbers assigned to them in the bibliographic census conducted by Kraus in his [1942-3], I. Prefixed by the abbreviation "Kr," these numbers are specified immediately after the title of the work. Thus, "Book of the Seven, Kr 132" means that the named treatise has been assigned the number 132 in Kraus' census.

### CITATION OF PRIMARY WORKS

Unless otherwise noted, edited primary works are cited respectively by the pagination and lineation of the edited volume. Thus, Badawi ed. [1948], 11:13 = page 11, line 13 of Badawi's specified edition.

Unpublished classical texts have been cited respectively by the foliation and lineation of the specified manuscript. Thus, 11a42 = folio 11a, line 42. Sometimes foliation has been specified by prefixing the abbreviation "f".

Plato's texts have been cited in the standard manner of Cornford.

Aristotle's texts have been cited by the standard pagination and lineation of Bekker.

### CITATION OF SECONDARY WORKS

See Bibliographic Abbreviations.

## EDITED TEXT

"Edited Text" refers to the critical edition of the *Ahḡār* as it appears in Chapter 5 of this book. This text is printed with double pagination: one in sequence with the rest of the book, the other independent and typed in the Arabic script at the bottom of the page. It is the independent pagination which is referred to in citations.

## ADDENDA TO NOTES (CHAPTERS 2 AND 3)

Arabic quotations which form an integral part of some of the notes in Chapters 2 and 3 have been given in the "Addenda to Notes." These addenda are keyed to the notes to which they attach.

TRANSLATION, COMMENTARY AND TEXTUAL NOTES  
(CHAPTER 6)

For the purpose of analysis, the translation of the *Ahḡār* 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 Textual Notes," each section first receives a general commentary, followed by a narrower commentary on the subsection wherever this latter exists; after this appear specific textual notes. These notes have been numbered independently in each unit.

## NAMES, NATURES AND THINGS

## INTRODUCTION

*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 on alchemy after a discourse on religion before the principles of the latter have been fully established!"*

Jābir ibn Ḥayyān

Jābir ibn Ḥayyān<sup>1</sup> 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 labyrinth of alchemical writings have remained a matter of seriously conflicting opinions and speculations. The task of solving what came to be known as the "Jābir-Problem"<sup>2</sup> is further complicated by the remarkable paucity of critical studies of Jabirian treatises. As a result, much darkness looms over the actual substance and range of these writings and their historical and philosophical sources. In fact, since Paul Kraus' *magnum opus*, completed by 1943, these questions have largely been abandoned in a mist of controversy.<sup>3</sup>

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, barely 170 years after the supposed date of Jābir's death, the philosopher Abū Sulaymān al-Mantiqī in his *Ta'ālīq* considered Jabirian works apocryphal, the true author of which, he claims, is one al-Hasan ibn al-Nakad al-Mawṣilī whom he knew personally.<sup>4</sup> Later on, in the 8th/14th century, we see, for example, a critic of the history of Arabic literature, Jamāl al-Dīn ibn Nubāta al-Miṣrī, explicitly declaring that all writings attributed to Jābir are of doubtful authenticity.<sup>5</sup> And, in the earliest preserved biography of Jābir, its generally reliable author Ibn al-Nadīm (d. 344/955) records 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.<sup>6</sup>

But Ibn al-Nadīm himself belongs to the opposite side in this controversy, dismissing all doubts emphatically and categorically: "Jābir did exist," he writes in the *Fihrist*, "his case is certain and famous, his compositions being most important and numerous."<sup>7</sup> On the same side is Ibn Waḥshiyya (b. second half 3rd/9th century),<sup>8</sup> invoking the

authority of Jābir in his *Kanz al-Hikma* (Treasure of Wisdom)<sup>9</sup> and mentioning the Jabirian *Kitāb al-Sumūm* (Book of Poisons, Kr 2145) in his own work of the same title. "Jābir ibn Ḥayyān al-Šūfī[s] . . . book on poisons," we read in Ibn Waḥshiyya's *Sumūm*, "is a great work. . . . It is a wonder."<sup>10</sup>

Restricting ourselves to this earlier period, we have, likewise, the three major alchemists, al-Rāzī (d. 313/925),<sup>11</sup> al-Majrītī (fl. mid 4th/10th century)<sup>12</sup> and Ibn Umayl (d. c. 349/960);<sup>13</sup> the author Abū Ḥanīfa al-Dīnawarī (d. c. 282/895);<sup>14</sup> and the historians Ibn Tāhir al-Maḡdisī (fl. mid 4th/10th century)<sup>15</sup> and Šā'id al-Andalusī (d. 462/1070)<sup>16</sup>—all of whom in one way or another refer to 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 explanation.

Turning to our own times, we see that during the thousand years which separate us from Ibn al-Nadīm the whole Jābir 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 developed: are the Arabic Jābir 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 the Arabic works of Jābir.<sup>17</sup> 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,"<sup>18</sup> "King of the Arabs,"<sup>19</sup> "King of the Persians,"<sup>20</sup> and, in a rare incunabulum, even as "King of India."<sup>21</sup>

But with the publication in 1869 of Hermann Kopp's *Beiträge zur Geschichte der Chemie*,<sup>22</sup> the scholarly world realized that the identification of Geber with Jābir 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 Jābir were now faced by the Western scholars of Geber, and much worse: given the Jābir/Geber identity in the Latin tradition, the scions of Arabic historians can no longer resolve the Geber issue in isolation from the Jābir issue, nor, indeed, can the 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 JABIRIAN CORPUS: SCOPE AND PECULIARITIES

Unfortunately, all these problems are further compounded by the internal complications of the Jabirian corpus, a corpus that resists 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."<sup>23</sup> Thus, on the one hand, these writings deal with the theory and practice of chemical processes and procedures, classification of substances, medicine, pharmacology, astrology, theurgy, magic, the doctrine of specific property of things (*ʿilm al-Khawāṣṣ*), and the artificial generation of living beings;<sup>24</sup> 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 chiliastic cosmology of proto-Šīʿī gnosis constitutes the author's subject matter; here one finds discourses on the occultation of the Imām and his messianic return, on the unfolding of the Šīʿī hiero-history, and on the politically charged question of the leadership of the Muslim community.

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 Zosimus,<sup>25</sup> Democritus,<sup>26</sup> Hermes,<sup>27</sup> Agathodemon,<sup>28</sup> etc., but also cited therein Socrates<sup>29</sup> and Plato,<sup>30</sup> and quotations from all parts of Aristotle's works,<sup>31</sup> as well as from the commentaries of Alexander of Aphrodisias,<sup>32</sup> Themistius,<sup>33</sup> Simplicius<sup>34</sup> and Porphyry.<sup>35</sup> Galen is found to be extensively quoted,<sup>36</sup> and Archimedes and Euclid are not only referred to, but—like Socrates, Plato, Aristotle and Balīnās (Apollonius of Tyana), etc.—a separate treatise is devoted to each one of them.<sup>37</sup> In addition, the *Kitāb al-Hāṣil* (Book of the Result, Kr 323) preserves a long extract from the *Placita philosophorum* of ps-Plutarch.<sup>38</sup> And, of course, throughout the Jabirian corpus one comes across numerous references to the sixth Šīʿī Imām Jaʿfar al-Šādiq (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.<sup>39</sup>

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 Dhūʿl-Nūn al-Misrī (d. 245/859). But his style is often crude and uneven, frequently violating syntactical rules. More critical, however, is the problem of the technical terms in the corpus for which our standard lexicographic aids prove to be seriously inadequate. 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 Jaʿfar that these writings should never be allowed to fall into the hands of the unworthy or the irresponsible.<sup>40</sup> But quite unlike the ancient practice of using cover names and allegories, Jābir's "esotericism" consists in what he calls *tabdīd al-ʿilm*, 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, like so many pieces of a jigsaw puzzle, spread it all over the maze of a vast

corpus.<sup>41</sup> Therefore, no single treatise was complete by itself—by definition, each remained fragmentary.

The author always insists that the reader ought to refer to other 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.<sup>42</sup> Full of copious bibliographic references to its own works, the corpus also gives clear instructions as to the order in which its different writings are to be looked at; it even specifies the number of times each one of them should be read.<sup>43</sup> Strictly speaking, then, one needs to have before oneself the entire body of Jabirian writings if the whole truth of the author'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.<sup>44</sup> 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 one time counted among spirits<sup>45</sup> and, at another time, among metals;<sup>46</sup> substituting for it sometimes "glass" (*zujā*)<sup>47</sup> and sometimes the Chinese alloy *khārsīnī*.<sup>48</sup> 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 *Kitāb Ustūquss al-Uss* (Book of the Element of Foundation, Kr 6-9), "it is a spirit with spirits, and a soul with souls."<sup>49</sup> Similarly, in the *Kitāb al-Sabʿīn* (LXX Books, Kr 123-192), in the vein of a numerological speculation, a special status is accorded to the number 18; whereas in the *Kutub al-Mawāzīn* (Books of Balances, Kr 303-446) the number 17 is declared as the foundation of everything in the natural world.<sup>50</sup> These inconsistencies are not easy to explain—and yet the onus of explanation must remain on the historian.

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 whose monumental study of 1942-43 was a major breakthrough in Jabirian studies.<sup>51</sup> 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,<sup>52</sup> yet this does not reduce the validity of his work. In fact, so comprehensive and so learned 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 without recognizing his findings as a firmly established starting point.

After investigating at a grand scale the Jabirian corpus and the 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, to be found nowhere in our modern or classical sources, concerns the question of the authorship of corpus: with the possible exception of the *Kitāb al-Rahma al-Kabir* (Great Book of Mercy, Kr 5), says Kraus, these writings 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,<sup>53</sup> 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.<sup>54</sup>

The methodological implications of Kraus' thesis have a number of very attractive features: if many hands of many successive generations were involved in the production of the Jabirian corpus, then no longer do we need to undertake the difficult task of explaining all the troublesome gaps, 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.

From the point of view of the historian's relief, another favorable 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 (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.<sup>55</sup>

Given all these attractive features of Kraus' theory, it is small wonder that the bulk of modern-day scholars chooses to accept it. Thus, when Alfred Siggel learnt that in a discourse on the anatomy of the eye, the Jabirian text *Kitāb Ikhrāj mā fi'l-Quwwa ila'l-Fi'l* (Book of the Passage of Potentiality to Actuality, Kr 331) speaks of three moistures (*rutūbāt*) and seven layers (*ṭabaqāt*),<sup>56</sup> representing an advance over the belief of the Christian physician Yuhanna bar Māsawayh (b. 161/777), he disposed of it by saying that the *Ikhrāj* must be dependent on the works of Hunayn ibn Ishāq (d. 264/877).<sup>57</sup> 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 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.<sup>58</sup>

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 classical to its

mediaeval phase—that is, a transition from the times when the heritage of ancient learning had not been systematically appropriated, to an era of intense translation activity and burgeoning cultivation of natural sciences. Many questions pertaining to this transitional period still remain—questions concerning the role of the Harrānians, the dissemination of Hermetic ideas, the origins and assimilation of pseudo-Greek works, the nature and channels of Oriental influences, and so on.<sup>59</sup> Jabirian texts tell us something about all of these questions and can serve as a valuable source if they are not later compilations.

Again, if Jabirian treatises are not to be shunned as later apocrypha, they may well be recognized as comprehending a mine of information for the religious historian: the confused mess of eschatological speculations, the discourses on the metaphysics of Prophethood and Imāmate, the surveys of a heavy religio-political mêlée, the alphabetical symbolism, the pronouncement of prophecies—all these features of Jābir's religious writings reflect the turmoils of the proto-Shī'ī ethos in Islam. But to make use of Jābir as a major source in our search for the origins of sectarian Shī'ism, we must first critically reexamine Kraus' positive identification of the authorship and dating of the Jabirian corpus.

Indeed, an uncritical and thoroughgoing espousal of Kraus has sometimes led not only to futile exercises but also, embarrassingly, to erroneous generalizations. For example, in the vein of his unreserved support for Kraus' late dating of the Jabirian corpus, Plessner—a highly respectable scholar indeed—once declared that “Jābir *always* uses the scientific language as perfected by Hunayn ibn Ishāq and his pupils. . . .”<sup>60</sup> But this is false. Similarly, as I have shown elsewhere, a recent comparative study of the Jabirian corpus and the well-known *Rasā'il* (Epistles) of the Ikhwān al-Safā' (Brethren of Purity; established c. 373/983) turned out to be fruitless—another unfortunate result of a dogmatic acceptance of Kraus' thesis together with its far-reaching methodological implications.<sup>61</sup>

#### A PRELIMINARY CRITICISM OF KRAUS

It is evidently beyond the scope of the present work to attempt an exhaustive examination of the evidence and reasoning which constitute 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.

#### 1. On the Size and Unevenness of the 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”<sup>62</sup> 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-ilm* 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 2982 works.<sup>63</sup> 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.”<sup>64</sup> 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.”<sup>65</sup> These arguments appear to be sound too. But does the Jabirian corpus contain literally 2982 works? And precisely how large are these works? When we examine these questions, the whole picture changes drastically:

1. 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;<sup>66</sup> the number 532 in the census is followed by 553, and the interval from 533 to 552 is not accounted for;<sup>67</sup> no titles correspond to the numbers 554 to 629<sup>68</sup> or from 1751 to 1777;<sup>69</sup> 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—an abysmal drop from 2982!
2. 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-l-Ishrin*<sup>70</sup> (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-Ahjar*,

which is in four parts, appears as four works (Kr 307-310); to the three parts of the *Kitāb Uṣṭuquss al-Uss*, 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 2982 is not only inflated, it has also been arrived at through a very liberal method of enumeration.

3. 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 manuscript. This Paris manuscript also contains the *Kitāb al-Qādir* (Book of the Powerful, Kr 530) which occupies the second half of folio 66 and the first half of the following folio 67; in MS Teheran, Dānishgāh 491, the text of the *Qādir* begins on the first half of folio 141 and ends on that of 142. Again, in MS Paris 2606, for example, the lengths of the *Kitāb al-Wāhid al-Kabīr* (Great Book of the Unique, Kr 11) and the *Kitāb al-Wāhid al-Saghīr* (Small Book of the Unique, Kr 12) are, respectively, three folios, and two folios and a half (f. 92b - f. 94b, and f. 94b - f. 96a). Most of the treatises in the corpus are similarly very small.

The *LXX Books* consist of 225 folios in MS Jārullāh 1554. Each folio has the dimension 19.5 cm × 13.5 cm, containing 15 lines per page. This means that, on the 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.<sup>71</sup> The *500 Books*, then, do 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.<sup>72</sup>

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 [extending over several generations of writers]."<sup>73</sup> The practice of *tabdīd al-ʿilm* 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 *tabdīd al-ʿilm* are called upon not only to assure us 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?"<sup>74</sup> 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 favor of a plurality of authors."<sup>75</sup>

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 fake without proposing that the whole collection is spurious."<sup>76</sup> 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 (*ʿamal*) can lead to nowhere unless theory (*ʿilm*, *qiyās*, *burhān*) has had its due."<sup>77</sup>

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 force.

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 *Kutub al-Mawāzīn* [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."<sup>78</sup> And further, "despite the

divergences, the teachings of the *KM* are the direct continuation of those of the *LXX Books*.<sup>79</sup> Again, this would mean that there is some degree of unity in the Jabirian corpus, and the differences between various groups of its writings are not great after all. Indeed, I have myself discovered in the present study that certain fundamental alchemical doctrines expressed in Jābir's *Aḥjār* already exist in an identical contextual setting in the *al-Raḥma al-Kabīr*—and this latter is the *earliest* extant work of the corpus, separated from the former by no less than 300 treatises according to Kraus' own counting. Therefore, ironic as it seems, the final word on this issue is none other than that of Kraus himself:

The *coherence* and *unity of thought* expressed therein [sc. in the Jabirian corpus] are astonishing.<sup>80</sup>

As for Kraus' speculative argument that the Jabirian practice 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,"<sup>81</sup> Kraus informs us that Jābir's use of this principle is no anomaly 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 for the Jabirian works when we don't do the same with the writings of Maimonides and Roger Bacon?

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 here reminded of Marjorie Grene who talks of what *prima facie* appears to be a "glaring contradiction at the root of Aristotle's thought,"<sup>82</sup> 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?

## 2. Jābir and the Shī'ī Imām Ja'far

Jābir's alleged relationship with the sixth Shī'ī 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.<sup>83</sup> 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 *Ma'dan al-Hikma* (Mine of Wisdom)<sup>84</sup> who is Jābir's critic and guide *par excellence*.<sup>85</sup>

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 dates too. Thus it is hardly surprising that, before presenting the constructive part of his thesis, Kraus addresses the question of the link between the two figures. His teacher Julius Ruska had already "eliminated Ja'far from the history of alchemy,"<sup>86</sup> 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:

1. 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 ḥaqqi sayyidi*" (By My Master . . .). In fact so numerous is this invocation that it practically functions in the texts as the conjunctions "however," "and so therefore," "thereby," "but," and the like.
2. In a very few cases does Jābir add the name Ja'far to this formula.<sup>87</sup> And the instances in which he specifies an actual encounter with the Imām are even fewer.<sup>88</sup>
3. It emerges from an examination of a good number of Jabirian texts<sup>89</sup> that all those writings concerning which an actual encounter with the Imām is reported belong to the earlier part of the corpus. To the best of our present knowledge of Jabirian writings, the last such work is the *Kitāb al-ʿAhd* (Book of the Pact) in which the author records a face-to-face conversation with Ja'far.<sup>90</sup> Now, in Kraus' census in which the works are enumerated in a chronological sequence, the *ʿAhd* occupies the numbers 1053-1055.<sup>91</sup> The last count in the census, as we have noted, is 2982. This means that when the text in question was written, only about 35% of the Jabirian corpus had been constituted.<sup>92</sup>
4. 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 Ja'far is alive at the time when the writing of these text is actually carried out. In fact, references to Ja'far in the *Kitāb al-Khawass al-Kabir* (Great Book of Properties, Kr 1900-1950), which is a later work, make it quite evident that the Imām has now died: (a) In the "Sixteenth Discourse" of the *al-Khawass*, Jābir relates a conversation with the Master (without naming him). But this report, which has been inserted totally out of context,<sup>93</sup> concerns a conversation about an *earlier* work, the *Kitāb al-Hāsil*,<sup>94</sup> to be sure, the topic of this conversation is not the work in which the encounter is being reported. (b) Talking about Ja'far in the "Seventeenth Discourse," Jābir says: "My Master often *used to say*" (*laqad kāna Sayyidi yaqūlu li kathīran*).<sup>95</sup> Note the use of the past continuous tense. (c) In the "Sixth Discourse" we find mentioned two Ja'fars—the Imām Ja'far al-Sādiq and the familiar Abbasid vizier Ja'far ibn Yahyā al-Barmakī.<sup>96</sup> The latter Ja'far—appearing in the work as a young child—was born in c. 150/767, two years after the death of the Imām. Obviously it would be absurd to assume that the author was trying to 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. . . ."<sup>97</sup> The author is talking about a time when his reputation had been established among the wider public, and this implies a passage of time.

5. Another possible evidence is to be found in the Cairo manuscript of the *al-Khawass* (*Tabi'iyāt*, 621). In the "Sixth Discourse" where the Imām is actually named, the manuscript adds the formula "*radiya Allāhu 'anhū*" (may God be pleased with him!) after "Sayyidi Ja'far" (my Master Ja'far).<sup>98</sup> Indeed, one cannot overrule the possibility that this standard prayer, which is always offered for the dead, is a spurious addition made by the scribe.<sup>99</sup> But at the same time one notes the absence of the formula from the manuscripts of *earlier* Jabirian writings.<sup>100</sup>

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 died

toward 200H.<sup>101</sup> When Ja'far died (about 147H) he [sc. Jābir] could scarcely have been more than 35." But since references to the Imām are found throughout the corpus, "*it is necessary to assume that all writings [of Jābir] were composed before the death of Ja'far, that is to say, in their author's youth.*"<sup>102</sup> (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 [that is, some 21 years after Ja'far's death], and particularly a treatise dedicated to Ja'far ibn Yahyā al-Barmakī born around 150/767?"<sup>103</sup>

Clearly, by virtue of the foregoing discussion, it is not at all difficult to refute the first argument of Kraus. A closer examination of the manner in which 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 argument ii, it stands on seriously problematic foundations.

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."<sup>104</sup> 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 anomalous 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 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-Nadīm.<sup>105</sup> Also, there is something highly suspicious about them: two of them are dedicated to figures totally unknown to historians—'Alī ibn Ishāq al-Barmakī and Mansūr ibn Aḥmad al-Barmakī (?).<sup>106</sup>

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-Nadīm's *Fihrist*, read "*Kitāb Uṣṭuquṣṣ al-Uss al-Awwal ila'l-Barāmika*" (The First Book of the Element of Foundation Dedicated to the Barmecides) and "*Kitāb Uṣṭuquṣṣ al-Uss al-Thānī 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,<sup>107</sup> and subsequently in 1979 Peter Ziris made them the subject of a critical edition.<sup>108</sup> It is most significant that neither Holmyard's text, nor any of the additional manuscripts studied by Ziris (MS Paris 5099, f. 194a - f. 194a, and Ms Berlin Or. Add. Oct. 2250), make any mention of the Barmecides.

The first title reads "*Kitāb Uṣṭuquṣṣ al-Uss 'alā Ra'y al-Falāsifa li Jābir ibn Ḥayyān wa huwa'l-Awwal min al-Thalātha*" (The Book of the Element of Foundation According to the Opinion of the Philosophers by Jābir ibn Ḥayyān. This is the First of the Three);<sup>109</sup> there are no references to the Persian family in the second title either, which appears as "*Kit. Uṣṭ. al-Uss 'alā Ra'y al-Diyāna wa huwa al-Thānī li Jābir*" (The Book of Elem. Found. According to Religious Opinion. This is the Second by Jābir).<sup>110</sup> One notes that Sezgin too gives the titles of these works without any mention of the Barmecides.<sup>111</sup> It is therefore an inescapable conclusion that Ibn al-Nadīm's titles are corrupt. Ziris, then, had ample justification for his explicit declaration that "they [sc. these titles] are incorrectly listed in . . . [the] *Fihrist*."<sup>112</sup>

In fact, there is yet another title in the *Fihrist* of Ibn al-Nadīm presented as the third book of the *Uṣṭuquṣṣ*, immediately following the above two. This reads "*Kitāb al-Kamāl huwa al-Thālith ilayhim*" (Book of Perfection. This is the Third Dedicated to Them [sc. Barmecides]).<sup>113</sup> Here Kraus himself, after examining the extant manuscripts, drops the reference to the Barmecides. In the manuscripts the title is restricted to "*Kitāb al-Kamāl*" (Kr 10), and Ibn al-Nadīm has evidently made another mistake in reporting that this work is the third part of the *Uṣṭuquṣṣ*.<sup>114</sup>

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 Kraus' objections.

Kraus' next argument for dismissing the Jābir-Ja'far relationship is of a historical nature, an argument which stems from his inability to find a

mention of Jābir in authentic Shī'ī sources. If Jābir was such an intimate disciple of Ja'far, then he should certainly have been referred to in the bio-bibliographic sources of the sect: "It is surprising," says Kraus, "that the figure of Jābir leaves no trace in the vast biographic literature of the Shī'ī imāmate, 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 Imām Ja'far, 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 [sc. Jābir] a place in their works if they had reason to believe in his existence."<sup>115</sup>

What is the evidence of Kraus? We find him citing three works. The *Kitāb Ma'rifat Akhbār al-Rijāl* (Book of the Understanding of Reports Concerning Distinguished People) of al-Kashshī (d. c. 340/951);<sup>116</sup> and two later compilations—*Kitāb Tanqīh al-Maqāl fī Ahwāl al-Rijāl* (Book of the Reexamination of the Accounts Concerning Distinguished People) of al-Māmaqānī,<sup>117</sup> and Muḥammad Muḥsin's *Kitāb al-Dharī'a ilā Taṣānīf al-Shī'a* (Source Book of Shī'ī Writings).<sup>118</sup> None of these, it is reported, mentions Jābir. But one wonders if Kraus has not been unusually hasty in making a sweeping generalization on the evidence just of three works. In fact, he may well be aware of the scantiness of his supporting data, since:

1. Kraus had regretted that he could not make use of al-Āmilī's *A'yān al-Shī'a* (Eminent Shī'ī Personalities), a modern encyclopedic work which draws upon, and quotes, numerous classical and mediaeval sources. Speaking highly of this compilation, Kraus had ruefully observed that "it has not yet reached beyond [the first] letter [of the Arabic alphabet] *alif*."<sup>119</sup> However, to the good fortune of a later generation, the *A'yān* did progress further in the meantime. Now, to be sure, not only is our alchemist mentioned in the encyclopedia, he receives a conspicuously extensive coverage.<sup>120</sup> The compiler al-Āmilī quotes, among several others sources, the Shī'ī astrologer 'Alī ibn Tāwūs al-Hillī (d. 664/1266) who in his *Faraj al-Humūm bi Ma'rifat 'Ilm al-Nujūm* (Relief from Anxiety through the Knowledge of Astrology) introduces Jābir as a historical companion of Ja'far al-Ṣādiq, and as one of those Shī'īs who were knowledgeable in the theory of astrology and skillful in its practice.<sup>121</sup> A similar testimony of 'AbdAllāh al-Yāfi'ī (d. 769/1367) is also cited; and this is to be found in Yāfi'ī's *Mir'at al-Janān* (Mirror of the



Heart).<sup>122</sup> As for the modern author of the encyclopedia, al-ʿĀmilī himself, he strongly sides with this opinion.<sup>123</sup>

2. But perhaps the authorities cited by al-ʿĀmilī 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 (*dāʿī*) of the 2nd/8th century, al-Mufaddal ibn ʿUmar, has left us a small body of reports of Jaʿfar's aphorisms, a compilation put together in a manner akin to *Hadīth* collection. In this short work, bearing the title *al-Hikam al-Jaʿfariyya* (Jaʿfarī Wisdom), the author twice presents Jābir in the company of Jaʿfar.<sup>124</sup> It should be noted that the historical personage al-Mufaddal was a student of the well-known *ghālī* (Shīʿī extremist), and for a while a companion of Jaʿfar, Abu'l-Khattāb (d. c. 135/755) who appears as the ultimate transmitter (*rāwī*) in the *Hikam*'s chain of authorities (*isnād*).<sup>125</sup> The two major heresiographers of Islam, al-Ashʿarī (d. 324/935) and al-Shahrastānī (d. 548/1153), both mention al-Mufaddal and say that after the death of the extremist Abu'l-Khattāb, the sect *Khattābiyya* was named after the former as *Mufaddaliyya*.<sup>126</sup> The work in question, the *Hikam*, is found in the *Majālis al-Muʾminīn* of Nūrallāh al-Shustarī (d. 1019/1610),<sup>127</sup> and there seems to be no pressing reason to doubt its authenticity. 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-Husayn and Abū ʿAtāb, sons of Bistām ibn Sābūr al-Zayyāt, both of whom, he says, wrote a number of works on therapeutic medicine.<sup>128</sup> The date of the death of al-Husayn is given in the sources as 401 Hijra (= 1010 A.D.).<sup>129</sup> To these two brothers a short work entitled *Tibb al-Aʾimma* (Medicine of the Imāms) is attributed<sup>130</sup>—another *Hadīth* 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.<sup>131</sup> al-ʿĀmilī does refer to this work, and, in addition, to another work by the same pair of authors entitled *Rawḍāt al-Jannāt* (Gardens of Paradise) which he quotes: "Abū Mūsā Jābir ibn Hayyān is among the most famous of the scientists. . . ." <sup>132</sup>

4. The rather well-known 5th/11th century Ismāʿīlī 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 Jaʿfar,"<sup>133</sup> the other three being Abu'l-Khattāb, al-Mufaddal ibn ʿUmar, and the historically important religio-political figure ʿAbdAllāh ibn Maymūn al-Qaddāh (d. c. 180/796).<sup>134</sup> Kraus is familiar with the *Dastūr*'s reference to Jābir, but commits this information to a footnote.<sup>135</sup>

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 Shīʿī sources, Kraus has been too hasty.

### 3. Religious Trends of the Corpus: Kraus' Late Dating

The emergence of the Ismāʿīlī movement from the breast of proto-Shīʿī 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.<sup>136</sup> What are the origins of the Ismāʿīliyya? Who was the founder of Ismāʿīlism?<sup>137</sup> 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.<sup>138</sup> 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 clung to the imāmate of his eldest son Ismāʿīl who, by the rule of nass,<sup>139</sup> had been designated by him as his successor but had predeceased him. Some of them maintained that Ismāʿīl had only receded into occultation and will reappear as the *Qāʾim* or *Mahdī*; others recognized Ismāʿīl's son Muhammad as the Imām. Yet others—who were to be the later *Ithnā ʿAsharī* (the twelver Shīʿīs)—first chose Jaʿfar's eldest surviving son ʿAbdAllāh as his successor; then, upon ʿAbdAllāh's hierless death a few weeks thereafter, proclaimed the imāmate of another son Mūsā al-Kāzim. 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.<sup>140</sup>

What happened in the intervening period is a blank spot, and so far historians have been able to fill it but only partially and tentatively: "Nothing is known about the history of Ismāʿīlī movement developing out of [its] nucleus until after the middle of the 3rd/9th century," wrote



Madelung not so long ago.<sup>141</sup> Given that our knowledge concerning the formative phase of the Ismāʿīliyya is, at best, fragmentary, 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.

In a nutshell, Kraus' reasoning runs as follows: Jabirian writings show Qarmaṭī-Ismāʿīlī tendencies and employ the esoteric vocabulary of this sect.<sup>142</sup> This provides a definite clue to the dating of the entire corpus. These writings, the argument proceeds, could not have been composed earlier than 270/883, because it was at this time that the Qarmaṭī appeared on the scene.<sup>143</sup> Therefore, given that the internal chronological sequence of the various constituent parts of the corpus had already been established, these writings could now be dated with sufficient accuracy.<sup>144</sup>

Two questions immediately arise: First, what degree of certainty can we attach to the claim that Jabirian texts do, indeed, display a Qarmaṭī character? And second, does our present knowledge of the origins of the Ismāʿīlī movement allow us definitively to declare that the technical vocabulary of the Qarmaṭī 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 "Ismāʿīlī trends,"<sup>145</sup> he himself wavers in his judgments drastically and frequently. Thus, sometimes Jabirian ideas are "contrary to the official doctrines of the Ismāʿīlīs";<sup>146</sup> sometimes, "he is close to the teachings of the Nusayrīs,"<sup>147</sup> but, then, he also "distinguishes himself from them."<sup>148</sup> There are times when he has the "tendency to surpass the teachings of Muslim gnostics,"<sup>149</sup> and occasions when he "compile[s] the list of heirarchical grades of Shīʿī gnosis" from the vocabulary of *different* sects."<sup>150</sup> Here we find Jābir expressing the aspirations of the Fatimids who named themselves after the Prophet's daughter Fāṭima;<sup>151</sup> there we see him in the condemned camp of the *Ghulāt* excluding the Prophet's son-in-law ʿAlī from the list of seven Imāms, and supporting the imāmate of Muḥammad ibn al-Ḥanafiyya, the son of ʿAlī, but *not* by Fāṭima!<sup>152</sup> 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 Ikhrāj ma fi'l-Quwwa ila'l-Fi'l*, he talks about two religious groups which, among others, fixed the number of Imāms to seven,<sup>153</sup>

but—contrary to what Kraus says<sup>154</sup>—Jābir does not approve of it; rather, he *forbids* the reader to share such views.<sup>155</sup> In the *Kitāb al-Khamsīn* (Fifty Books, Kr 1835-1874), Jābir has *six* Imāms.<sup>156</sup> But again, in the *Kitāb al-Ḥajar* (Book of the Stone, Kr 553) he refers to *seven* Imāms.<sup>157</sup> 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 Ismāʿīlī tendency. But in the *Ḥajar* where there is, indeed, a mention of seven Imāms, Jābir assigns to each one of them a different function, something that does not seem to be in harmony with the Ismāʿīlī 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."<sup>158</sup> This passage is in fact reminiscent of the late 1st/7th century *Wāqifi* doctrines of the sevens type whose role in the formation of Ismāʿīlī cosmology has been emphasized by Strothman.<sup>159</sup>

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*),<sup>160</sup> and this seems to have come directly from the teachings of the *ghālī* leader Abu'l-Khaṭṭāb whose followers had believed in reincarnation and even in the transmigration of the human soul into sub-human bodies.<sup>161</sup> Similarly, the gnostic symbolism of the three letters *Mīm*, *ʿAyn* and *Sīn*, Jābir's subject matter in the *Kitāb al-Mājid* (Book of the Glorious, Kr 706),<sup>162</sup> had crystallized in the pre-Ismāʿīlī *ghālī* groups of the 2nd/8th century.<sup>163</sup>

Let us now look at the second question, namely the question concerning the technical vocabulary of the Qarmaṭī-Ismāʿīlīs. It has been some time since Massignon had said that "an examination of the Qarmaṭian technical terms shows that this doctrine was formed *before* the end of the second century A.H. [8th century A.D.] in the Imāmī circles of Kūfa." And further, "the first clearly Qarmaṭian author is Abu'l-Khaṭṭāb. . . . In cosmogony he replaced the use of letters . . . by their corresponding numerical values. . . . After him Abū Shākir Maimūn al-Qaddāh<sup>164</sup> . . . gave definite dogmatic form to the Qarmaṭian doctrine of emanation."<sup>165</sup> Kraus is familiar with these observations of Massignon but dismisses them by his remark that "whatever the origins of the name of the Qarmaṭis, it is certain that they appeared on the scene around

270/885.”<sup>166</sup> 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 number of different angles.<sup>167</sup> An active participation in this controversy, or even a critical survey of different views, is obviously outside the narrow confines of the present work; therefore, I content myself 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,<sup>168</sup> Madelung points out the importance of al-Qāsim ibn Ibrāhīm al-Raṣṣī (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 Imām al-Raṣṣī gives much valuable information concerning the relationship of many 2nd/8th century groups with the Ismā‘īlīs.<sup>169</sup> A work actually written in the 2nd/8th century, the *Kitāb al-Ruḥd wa’l-Hidāya* (Book of Rectitude and Guidance), is also referred to by Madelung.<sup>170</sup> This book seems to have played an important role in the formation of early Ismā‘īli terminology. Later, in a work entitled “Bemerkungen zur imamatischen Firaq-Literatur”<sup>171</sup> Madelung examined “the relationship of the books on Shī‘ite sects by al-Nawbakhtī (d. c. 310/922) and Sa‘d ibn ‘Abd Allāh al Qummī (d. 301/914), suggesting that their source for the early [sectarian] developments is the lost *Kitāb Ikhtilāf al-Nās fi’l-Imāma* (Book of Controversy over the Question of Imāmate) of Hishām ibn al-Hakam (d. 179/795-6).”<sup>172</sup>

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.

#### 4. Citation of Greek Works in the 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 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 Khwārizmī who introduced the Indian [techniques of numerical] calculation, nor the school of Hunayn which definitively fixed the scientific terminology in the Arabic language.”<sup>173</sup> 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.”<sup>174</sup>

Sezgin’s generalizations notwithstanding, his opinion in the specific case of Jābir seems to be correct. Indeed, when the Jabirian quotations of Greek works are actually compared with their 3rd/9th-century Arabic translations, the alchemist turns out to be independent of the latter. What is more critical, we often find archaic terminology in Jābir’s citations, as well as striking inconsistencies in the translation of a given Greek term; we also see Greek passages rendered into Arabic without the use of technical language—all this may legitimately be taken to point to an early date.

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. Is this what Kraus did? To be sure, the question does arise, since an examination of Jābir’s direct Greek quotations, rare though they are, would once again render Kraus’ position problematic. But I must now turn to the evidence, beginning with my own textual discovery:

1. This is my discovery in Jābir’s *Ahḡār* of a hitherto unknown translation of Aristotle’s *Categoriae*, 8, 8b25-11a37—that is, a translation of Aristotle’s discourse on quality.<sup>175</sup> This Arabic rendering of the Greek text appears in the third part of the *Ahḡār*, a work that has never been published or studied before; therefore, it is hardly surprising that no modern scholar, including Kraus, seems to have identified it.

Indeed, in terms of its structure, language and terminology, the Jabirian rendering of the *Categoriae* has nothing in common with what has so far been accepted as the earliest Arabic translation of this work of Aristotle—namely the translation of Ishāq ibn Hunayn (d. 299/911). But the decisive feature of the discovered text is not its independence; rather it is its archaic nature. I have presented in Chapter 5 a critical edition of this entire text; in Chapter 6 it has been translated, analyzed, and compared both with the text of Aristotle and the translation of Ishāq. It will be seen that any suggestion to the effect that Jābir's *Categoriae* postdates the Hunayn 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-Kiyān*" (MS Paris 5099 f. 172b). Note the archaic character of the Arabic title: the term *kiyān* is an Arabicization of the Syriac *k'yānā* (= Gr. *phusis*), a term which had already been abandoned by the time the Hunayn school emerged, having been replaced by the word "*ṭabī'ī*" derived from an Arabic root.<sup>176</sup> 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 "tell-tale" sign—that is, a sign openly betraying the pre-Hunayn origin of a text.<sup>177</sup>

But the title changes in a later treatise. In the *Kitāb al-Baḥṭh* (Book of Research, Kr 1800) it becomes the standard "*Kitāb al-Samā' al-Ṭabī'ī*" (MS Jārallāh 1721, f. 15a) of Ishāq ibn Hunayn. But despite this identity of titles, Jābir's text shows no dependence on that of Ishāq, for

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

حتى أنه ليقول في صدر الميمر الأول من كتابه في السماع الطبيعي:

فأما الصورة فإنها أولى الأمر بأن يكون طبيعة الشيء وذاته ومعناه ...

He [sc. Aristotle] goes so 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 Ishāq ibn Hunayn,<sup>178</sup> nor do we find at the place

referred to by Jābir any mention of form in the standard critical editions of the Greek text. And once again, we read an archaic term, *mīmar* (chapter) which, like *kiyān*, happens to be of Syriac origin.<sup>179</sup> This stands in contrast to the later Arabic term "*maqāla*" of the Hunayn school.

But in the passage quoted, we also see a specific use of the term *ma'nā*. Note that *ma'nā* has here been placed in opposition to *dhāt* (essence), and, in the context, one would naturally consider it 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 *ma'nā* seems to betray affinities with the cosmological speculations of early *kalām*.<sup>180</sup> To be sure, the term in question is found to be used everywhere in the philosophical and scientific literature of Islam,<sup>181</sup> but, as a first observation, one notes that Jābir is here employing it to denote a concept which it denoted in the writings of the *mutakallimūn* (sing. *mutakallim*, practitioner of *kalām*) of the late 2nd/8th and early 3rd/9th centuries.<sup>182</sup> Indeed, we find *ma'nā* being feverishly and widely discussed in the *kalām* literature of this period, with al-Ash'ari in his *Maqālāt* tracing it all the way back to the 2nd/8th century figure Hishām ibn al-Hakam.<sup>183</sup> The *mutakallim* Ibrāhīm al-Nazzām (d. 221/836) wrote a whole work on *ma'nā*, entitled *Kitāb al-Ma'nā 'alā Mu'ammār* (Book of *Ma'nā* Against *Mu'ammār*),<sup>184</sup> and this *Mu'ammār* (d. 215/830) is another early *mutakallim* whose doctrine of *ma'nā* has been expounded by al-Khayyāt (d. after 300/910) in his *Kitāb al-Intisār*.<sup>185</sup> Given this climate, it does not seem surprising to find a *kalām* concept finding its way into the works of Jābir, and this is yet another indication that he was drawing upon traditions which antedate the *Bayt al-Hikma*.<sup>186</sup>

4. In the same Jabirian work, the *Baḥṭh* (f. 47a), we have another quotation from the eight 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:<sup>187</sup>

قال أرسطوطاليس: فقال في المير الثامن في كتابه في السماع الطبيعي:  
 ليت شعري هل حدثت الحركة ولم تكن قبل؟ وهل  
 ليت شعري كانت الحركة لم تزل أو كانت بعد أن لم  
 تفسد أيضاً فإذا لا يكون معه شيء أصلاً يتحرك؟  
 أم الحركة لم تحدث ولا تفسد، لكنها لم تزل فيما  
 مضى ولا تزال أبداً؟ وهذا أمر لا يزال له وليست  
 تغتر في الموجودات ...  
 ثانياً فقال إنها طريق من القوة إلى الفعل ...

5. Turning now to the works of Galen, we note that the title of his *De compositione medicamentorum secundum locos* appears in Jābir as "*Kitāb al-Mayāmir*" (Book of Chapters; "*mayāmir*" is the plural of the abandoned term "*mīmar*").<sup>188</sup> Against this, we have the literal rendering of Hunayn ibn Ishāq which reads *Kitāb al-Adwiya bi-hasab al-Mawādī* al-*Ālima*.<sup>189</sup> Evidently, the Jabirian translation is older.
6. Galen's *De elementis secundum Hippocratem* is cited by Jābir under the title "*Kitāb al-ʿAnāsir*,"<sup>190</sup> as opposed to Hunayn's *Kitāb fi'l-Ustūṣāt ʿalā Raʿy Buqrāt*.<sup>191</sup>
7. In another title there is a slight difference. In Jābir we find Galen's *De propriis placitis* referred to as "*mā Iʿtaqadahu Raʿyan*"<sup>192</sup> in Hunayn it is *fi mā Yaʿtaqiduhu Raʿyan*.<sup>193</sup>
8. As for the actual citations of Galen's texts, they are not being examined here. But we ought to acknowledge that this matter has already been investigated by Sezgin who testifies that Jābir's quotations do *not* generally agree with the translations preserved.<sup>194</sup> 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 *Bahth* (f. 131b - f. 132b). Kraus quotes this entire passage, but remains completely silent as to the source which may have been available to the author.<sup>195</sup> It should be noted that the comprehensive work on physical balances by al-Khāzinī (composed c. 514/1120) does contain the legend,<sup>196</sup> 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 "*tāj*" in Jābir, "*iklīl*" in Khāzinī, the king in question is Mālīqiyādūs (Domitian?) in the former, Hiero in the latter, and so on.<sup>197</sup> Obviously the two texts draw upon different sources. But this whole question needs further investigation.

The evidence just presented is neither exhaustive nor foolproof,<sup>198</sup> but it seems sufficient to point to the problematic nature of Kraus' position.

### 5. *The Sirr of Balinās: 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-Khalīqa wa Sanʿat al-Ṭabīʿa* (Book of the Secret of Creation and the Art of Nature) falsely attributed to Apollonius of Tyana (in Arabic, Balinās, Balinūs, Baliniūs, etc.).<sup>199</sup> Also known as the *Kitāb al-ʿIlal* (Book of Causes), this text has exercised scholars for nearly two centuries.<sup>200</sup> While the *Sirr* still continues to puzzle historians, certain facts about it have been conclusively established by Ruska,<sup>201</sup> Plessner,<sup>202</sup> and, above all, Kraus himself:<sup>203</sup> (i) The *Sirr* shares with the Syriac *Book of Treasures* (Ar. *Kitāb al-Dhakhāʿir*) of Job of Edessa (Ayyūb al-Ruhāwī, d. 220/835) a *problemata physica* source; (ii) its longer version (and this is the version used by Kraus) includes extracts from the book *De natura hominis* (Ar. *Kitāb fi Ṭabīʿat al-Insān*) of Nemesius of Emesa (composed c. 400 A.D.); (iii) it shares some material with the Arabic Hermetic treatise *Istimātis*;<sup>204</sup> and (iv) it contains the first occurrence of the *tabula smaragdina* (Ar. *al-lawh al-zumurrud*) which is also found in the *Secretum secretorum* (Ar. *Sirr al-Asrār*) of ps-Aristotle.<sup>205</sup>

When was the *Sirr* written? In his pursuit of this recalcitrant question, Kraus carried out an incisive study of Jābir's debt to the ps-Apollonius literature, finally bringing to light a passage in a writing of the Ismāʿīlī agent Abū Hātim al-Rāzī (d. 322/933) wherein, he confidently felt, lay the answer.<sup>206</sup> In his *Kitāb Aʿlām al-Nubuwwa* (Book of the Signs of Prophethood), Kraus announced, Abū Hātim reports a debate between himself and the alchemist Abū Bakr ibn Zakariyya al-Rāzī during which the former is asked about the author of the *Sirr*. According to the report, Abū Hātim replied that the text was apocryphal, written only during the time of the Abbasid Caliph al-Maʾmūn (198/813 to 218/833).<sup>207</sup> Kraus thought that this dating was acceptable because other indications were apt to confirm it.<sup>208</sup> Now he had found a *terminus post quem* for the Jabirian corpus.

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 (i) the Arabic translation of Nemesius' *De natura hominis*, and (ii) the compilation of the Hermetic treatise *Istimātis*. But neither task has been accomplished. Concerning the first task, one notes that 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.<sup>209</sup> This means that we have to presuppose an earlier translation—none has so far been discovered. But more serious is the problem concerning the second task: *Istīmātis* still remains undated.<sup>210</sup>

A significant progress toward 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.<sup>211</sup> 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 had access only to the longer version B, and the text which Abū Hātim refers to is also, in Weisser's view, the same version B.<sup>212</sup>

Weisser's conclusions have not gone unchallenged.<sup>213</sup> 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.

#### THE PRESENT WORK: METHODOLOGICAL INDIFFERENCE

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."<sup>214</sup> It now seems that Ruska's sense of triumph was much too premature. Even the monumental work of Kraus turns out to be a humbling exercise; for it only throws into sharp relief the fact that we know so little about the contents of the Jabirian texts on the one hand, and about the 2nd/8th century religious and intellectual history of Islam on the other, that any solution proposed at this stage is bound to remain highly precarious.

Kraus' thesis, I shall submit, 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 forces upon us the moral that it is a better strategy for the moment to place in abeyance the

question of the authorship and dating of the corpus, and to invest our energies, rather, into critical studies of Jābir's writings themselves. And, at the same time, to investigate further the scientific, philosophical and religious climate of Islam in the century in which the alchemist allegedly lived.<sup>215</sup>

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, 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.<sup>216</sup>

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.<sup>217</sup> Our deficient knowledge of Jabirian writings introduces gaps in our understanding of Geber, and ultimately, of the Chemical Revolution. The pages that follow constitute a modest step toward supplying this deficiency.

But the question of the authorship and dating of the Jabirian corpus is neither trivial nor irrelevant. It is non-trivial because to take a position on this question is to take a methodological position, a position that governs in most fundamental ways the historian's very approach to Jabirian writings. And, to be sure, a position must be taken since one cannot study these writings in the emptiness of a historical vacuum—hence the relevance of the vexed question. But what is Jābir's historical milieu? Given that this issue remains unresolved, the present work takes what may be called a position of methodological 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 its 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 in the Islamic Near East. 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 a methodological indifference is thereby maintained.

This indifference also functions as a protective device. For even if—to consider the extreme case—every bit of my criticism of Kraus is dismissed by scholars, such dismissal cannot by itself provide grounds for discarding the main body of this work. Should such eventuality befall me, all I shall need to do is ask the reader to skip this introduction.

## NOTES

<sup>1</sup> In the Jabirian treatises which have either been published or read by me in manuscripts, as well as in the traditional biographies, the patronymic part of the author's name (*kunya*) appears frequently as Abū Mūsa, but sometimes also as Abū 'AbdAllāh. Often attached to it is the epithet al-Ṣūfi, the tribal name (*nisba*) al-Azdī and names indicating Jābir's place of origin al-Kūfi or al-Ṭūsī. Ibn Khallikān (d. 681/1282) reports in his *Biographical Dictionary* that Jābir was from Ṭarsūs (see de Slane tr. [1842-71], I, p. 300) and this is confirmed by another standard source, the *Kashf al-Zunūn* of Ḥajjī Khalifa (d. 1069/1658). However, this latter biographer—according to whom Jābir died in 160/777—calls him al-Ṭarsūsī at one place, but at another place says that Jābir was from Ṭarsūs and is called al-Ṭūsī (!) (see Flügel ed. [1835-1858], p. 34 and p. 79). Ibn al-Nadīm, who in naming Jābir wavers between both *kunyas*, Abū Mūsa and Abū 'AbdAllāh, mentions the belief that Jābir was originally from Khurāsān (see Flügel ed. [1871], pp. 354-358). For a discussion of this last account see below.

<sup>2</sup> This coinage seems to be due to J. Ruska writing in the 1920's and later. The "Jābir-Problem" essentially consisted in a positive identification of the author(s) of the texts attributed to Jābir.

<sup>3</sup> It is somewhat ironic that this powerful work of Kraus (Kraus [1942-3]) has been followed by a period of relative indifference. The past fifty years have seen only one edition of what is no more than a tiny proportion of a vast corpus, namely the one-volume Lory ed. [1988] which contains 14 small Jabirian texts, 10 of which were translated into French in the earlier Lory tr. [1983]. No English translation of any Jabirian text has been published since Kraus, but we have in addition a handful of two texts rendered into German, and one into French (Siggel tr. [1958], Rex tr. [1975], and Corbin tr. [1950] respectively). Zirnis' edition and English translation of another text (Zirnis ed. and tr. [1979]) never appeared in print. See "Modern Editions and Translations of Jabirian Texts" in the appendices below.

<sup>4</sup> The *Ta'ālīq* is quoted by Abū Ḥayyān al-Tawḥīdī (see al-Shabībī [1923], p. 7).

<sup>5</sup> In his commentary on the *Risāla* of Ibn Zaydūn, *Kitāb Sarḥ al-'Uyūn fī Sharḥ Risālat Ibn Zaydūn* (Ibrāhīm ed. [1383/1964]). Jābir is mentioned in the work being commented upon. Cf. *Kitāb al-Ghayth al-Mujṣam* of Khalīl al-Ṣafādī (d. 764/1363), Cairo ed. [1305/1887], p. 242.

<sup>6</sup> See Arabic text in Flügel ed. [1871], 355:11-21.

<sup>7</sup> *Ibid.*, 355:18.

<sup>8</sup> On the question of the authenticity of his writings, see Levey [1966].

<sup>9</sup> MS Leiden 1267 f. 15; f. 26.

<sup>10</sup> Tr. Levey [1966], p. 22.

<sup>11</sup> 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 Ḥusain [1927], p. 385). Kraus in his [1942-3] has discussed the relationship between the two alchemists (II, pp. LX-LXII), but as opposed to the picture he draws, one notes that the evidence of Stapleton, Azo and Ḥusain 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.*, pp. 335-340).

<sup>12</sup> See his *Rutbat al-Hakīm*, MS Cairo, *Ṭabī‘iyyāt* 12, f. 198. 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].

<sup>13</sup> Ibn Umayl in his *Kitāb Mā’ al-Waraqī* refers to two Jabirian treatises belonging to the *Kutub al-Mi’a wa’l-Ithnā ‘Ashara* (CXII Books, Kr 6-122), namely the *Kitāb al-Khālīs* (Book of the Pure, Kr 48) and *Kitāb al-Mujarradāt* (Book of Abstractions, Kr 63-64). Ibn Umayl’s text has been edited by Stapleton, ‘Ali and Ḥusain in their [1933] (see p. 93 and p. 97).

<sup>14</sup> Holmyard [1927] had brought to light a passage from the *Kitāb al-Akhhbār al-Tiwāl* of Abū Ḥanifa al-Dīnawarī (d. c. 282/895) where a Shī‘ī druggist (‘attār) by the name of Ḥayyān is mentioned. According to al-Dīnawarī, this Ḥayyān al-‘Attār was intensely active as a secret Shī‘ī agent (dā‘ī) working for the Abbasid cause in Khurāsān. He also knew Yaqtīn to whose son ‘Alī, Jābir has dedicated a book and a poem (Kr 111 and Kr 1143). al-Dīnawarī reports that in 107/725 Ḥayyān was put to death with other Shī‘ī agents by the Umayyad governor of Khurāsān (see Guirgass’ edition of the *Akhhbār* in Abū Ḥanifa al-Dīnawarī [1888], pp. 334-337. Ḥayyān appears as a Shī‘ī agent also in Ṭabarī, see De Goeje *et al.* ed. [1879-1901], II, p. 1488). 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.

<sup>15</sup> Maqdisī’s testimony exists in his *Kitāb Bad’ wa’l-Ta’rikh* (composed c. 355/966). See Huart ed. [1899-1919], II, p. 236.

<sup>16</sup> *Ṭabaqāt al-Umam*, Cheikho ed. [1912], p. 61.

<sup>17</sup> Schmieder [1832] and Hoefer [1842-3] are probably the last historians who identified Geber with Jābir. Cf. Newman [1991].

<sup>18</sup> Russell [1678].

<sup>19</sup> In the 1842 Danzig edition of the *Summa perfectionis*.

<sup>20</sup> MS Bodleian, Western 19039, entitled *Liber practicus Geberis . . . de investigatione perfecta magisterii*. See Holmyard [1925].

<sup>21</sup> *Liber qui flos naturarum vocatur*, 1473. This is reported in Holmyard [1925].

<sup>22</sup> Kopp [1869].

<sup>23</sup> Kraus [Plessner] *s.v.* “Djābir ibn Ḥayyān” [EI<sup>2</sup>], II, p. 358.

<sup>24</sup> Jābir talks about the possibility of an artificial language in the *Kitāb al-Aḥjār*. See below (Chapter 3; Edited Text, 19:12-15).

<sup>25</sup> For example, in the *Kitāb al-Hajar* (Book of the Stone, Kr 553), Holmyard ed. [1928], 19:12; cf. *ibid.* 18:4, 23:2.

<sup>26</sup> *Mujarradāt*, MS Jārullāh 1641, f. 248b, etc. Democritus is also one of those philosophers to each of whom Jābir devotes a separate *musahḥahāt* (Emendations) treatise. Thus, *Kitāb Musahḥahāt Dhimaqrātīs* (Book of Emendations of Democritus, Kr 210).

<sup>27</sup> For example, in the *Hajar*, Holmyard ed. [1928], 18:17; *Kitāb Uṣṭuquṣ al-Uṣṣ*, *idem*, 90:10; etc.

<sup>28</sup> Referred to, for example, in the *Kitāb al-Qarār* (Book of Stability, Kr 172). See Kraus [1942-3], II, p. 44, n. 4.

<sup>29</sup> Socrates is held in high esteem by Jābir: In the *Kitāb al-Tajmī‘* (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 *musahḥahāt* treatise (Kr 204).

<sup>30</sup> A *musahḥahāt* treatise has been devoted to him (Kr 205). While Plato is mentioned elsewhere too, it seems that Jābir does not know any of his genuine works. The *Timaeus* he quotes in the *musahḥahāt* has little in common with the text as we know it. (See Sezgin [GAS], IV, 161 ff.).

<sup>31</sup> For a detailed discussion of the Jabirian references to Aristotle, see below. Jābir has written a *musahḥahāt* work for him too.

<sup>32</sup> In the later work, the *Kitāb al-Baḥṭh* (Book of the Research, Kr 1800), MS Jārullāh 1721, f. 11a.

<sup>33</sup> *Ibid.*, f. 48a.

<sup>34</sup> In the *Kitāb al-Sirr al-Maknūn* (Book of the Hidden Secret, Kr 389-391), MS Paris 5099, f. 46b-f. 56b.

<sup>35</sup> In the *Tajmī‘*, Kraus ed. [1935], 349:9.

<sup>36</sup> The following Galenic works are cited:

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

ii) *De compositione medicamentorum secundum locos* in the *Kitāb al-Tajmī‘*, *ibid.*, 374:11.



iii) *De simplicium medicamentorum temperamentis et facultatibus* in the *Kitāb al-Hāsil* (Book of the Result, Kr 323), MS Paris 5099, f. 115a.

iv) *De elementis secundum Hippocratem* in the *LXX Books* (Kr 180), MS Jārullāh 1554, f. 196a.

v) *De usu partium* in the *LXX Books* (Kr 139), *ibid.*, f. 81a.

vi) *De facultatibus naturalibus* in the *Kitāb al-Baḥṭh*, MS Jārullāh, f. 21a; f. 31a.

<sup>37</sup> For a fuller discussion of Balinās see below. In the corpus we have a Jabirian commentary on Euclid, entitled *Kitāb Sharḥ Uqlidis* (Kr 2813), but this is not extant. The book dedicated to Archimedes bears the title *Sharḥ Kitāb Wazn al-Tāj li Arshamīdis* (Commentary on the Book of the Weight of the Crown by Archimedes, Kr 2821); for Jābir's account of the latter, see below.

<sup>38</sup> MS Paris 5099, f. 116a - f. 116b; MS Jārullāh 1641, f. 117a - f. 119a. Text quoted in Kraus [1942-3], II, pp. 332-337.

<sup>39</sup> In the *Hāsil* Jābir says: "I have composed this book and my Master has called it the Book of the Result" (MS Paris 5099, f. 95b). Again, in the *Kitāb al-Mājid* (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.

<sup>40</sup> "By God," says Jābir in the *Kitāb al-Khawass al-Kabir* (The Great Book of Properties, Kr 1900-1970), "my Master disapproved of my having written this book [sc. *Hāsil*], saying: By God, O Jābir, if I did not know that nobody will have access to it without meriting it, . . . 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).

<sup>41</sup> "My books are numerous and knowledge is dispersed among them" (*al-Khawass al-Kabir*, qu. Kraus [1942-3], I, p. XXVII, n. 1).

<sup>42</sup> 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-Mizān al-Ṣaghir* (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).

<sup>43</sup> According to the *Kitāb Maydān al-Aql* (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], 209:3 ff.). Further, the *Kitāb al-Afādil* (Book of the Excellents, Kr 313) should be read after all the others

(*ibid.*, 209:9). In the *Aḥjār* one reads (MS Paris 5099, f. 59a): "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." (It should be noted that there are three additional texts in the Jabirian corpus bearing the title *Kitāb al-Hudūd*, Kr 181; Kr 780; Kr 2745).

<sup>44</sup> 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-Mājid*, MS Paris 5099, f. 67b; text in Kraus ed. [1935], 115:10-13).

<sup>45</sup> For example, in the *Kitāb al-Ghasl* (Book of Washing, Kr 183), MS Jārullāh 1554, f. 202 (see Kraus [1942-3], II, p. 21; Stapleton, Azo and Ḥusain [1927]).

<sup>46</sup> For example, in the *Kitāb al-Manāfiʿ* (Book of Utilities, Kr 159), *ibid.*, f. 137

<sup>47</sup> For example, in the *Ghasl*, *ibid.*, f. 202; von Lipmann [1919], I, p. 377 identifies this substance as yellow amber.

<sup>48</sup> For example in the *al-Khawass al-Kabir*, qu. Kraus [1942-3], II, 19, n. 11. A *Kitāb al-Khārṣinī* (Kr 953) is part of the *Kitāb al-Ajsād al-Sabʿa* (Book of the Seven Metals, Kr 947-953). For a discussion of this alloy see Needham [1980], p. 429 ff.

<sup>49</sup> *Uṣṭuquṣ al-Uss*, Holmyard ed. [1928], 67:16-17.

<sup>50</sup> In the *Kitāb al-Iḥāṭa* (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-tabāʾiʿ* (the partisans of the natures) 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, f. 81a). This appears to be inconsistent with his doctrine of the number 17 found in the *Kutub al-Mawāzīn*. For an extensive discussion of the latter see below, Chapter 2 ff.

<sup>51</sup> 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-Kabir* (The Great Book of Mercy, Kr 5),
- ii) *Kutub al-Miʿa wa-l-Iṭhnā ʿAshara* (CXII Books, Kr 6-122),
- iii) *Kitāb al-Sabʿin* (LXX Books, Kr 123-192),
- iv) *Kutub al-Mawāzīn* (Books of Balances, Kr 303-446),
- v) *Kitāb al-Khams Miʿa* (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-Muṣaḥḥahāt* (Books of Emendations, Kr 203-212; see nn. 25, 28-30 above), as well as most of the collections listed by Ibn al-Nadīm, seem to date, in Kraus' view, from the time of the LXX or at least before the *Mawāzīn*. The *al-Ajsād al-Sab'a* follow the 500. Kraus places the *Bahīth* and the *al-Khawass al-Kabīr* after the *Mawāzīn* in that order. The *Kitāb al-Khamsīn* (50 Books) came after these, etc. See Kraus [1942-3], I, pp. XXXIII-XXXV.

<sup>52</sup> 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 I am 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], pp. 65-66). From Fuat Sezgin comes perhaps the most powerful, organized and rigorous offensive against Kraus (Sezgin [GAS], IV, p. 132 ff.).

<sup>53</sup> 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). See "Modern Editions and Translations of Jabirian Texts" in the appendices below.

<sup>54</sup> Kraus [1942-3], I, pp. XXVII-LXV.

<sup>55</sup> 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.

<sup>56</sup> Kraus ed. [1935], 57:3-11; cf. Rex tr. [1975], p. 41.

<sup>57</sup> Siggel tr. [1958], p. 2.

<sup>58</sup> Plessner [1965]; [1972].

<sup>59</sup> For a glimpse of the importance, persistence and complications of this question see Kraye, Ryan and Schmitt eds. [1986].

<sup>60</sup> Plessner [1972], p. 212 (emphasis added).

<sup>61</sup> I am referring to Marquet [1988] in which Kraus' positive identification of the authorship of the Jabirian corpus functions as the very foundation of, and justification for, a comparative study of the *Rasā'il* and the Jabirian texts. This led Marquet to the claim that these texts are quoted in the *Rasā'il* as well as to the sensational hypothesis that the two bodies of writings have some authors in

common. But, as I have argued (Haq [1992]), Marquet's conclusions cannot survive a closer examination.

<sup>62</sup> Plessner s.v. "Jābir ibn Ḥayyān" [DSB], VII, p. 39.

<sup>63</sup> Kraus [1942-3], I, pp. 3-171.

<sup>64</sup> *Ibid.*, p. XXXIII.

<sup>65</sup> *Ibid.*, p. XLVIII.

<sup>66</sup> *Ibid.*, p. 105.

<sup>67</sup> *Ibid.*, p. 106.

<sup>68</sup> *Ibid.*, pp. 106-107.

<sup>69</sup> *Ibid.*, p. 142.

<sup>70</sup> This is how the title of this work appears in Sezgin [GAS], IV, pp. 73; 254; 256. Kraus' reading of the title is *Kitāb al-Jumal al-Ishrūn*.

<sup>71</sup> 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 unlikely to prove radically inaccurate.

<sup>72</sup> It is to the credit of Joseph Needham that he was able to recognize the inflatedness of Kraus' enumeration (Needham [1980], p. 392, note g).

<sup>73</sup> Kraus [1942-3], I, p. XXXV.

<sup>74</sup> *Ibid.*, p. XXXIV.

<sup>75</sup> *Ibid.*, p. XXXV (emphasis added).

<sup>76</sup> Kraus [1930], p. 24.

<sup>77</sup> *Loc. cit.* (emphasis added).

<sup>78</sup> Kraus [1942-3], I, p. LVII.

<sup>79</sup> *Loc. cit.*

<sup>80</sup> *Ibid.*, II, p. 135.

<sup>81</sup> *Ibid.*, I, p. XXXI.

<sup>82</sup> Grene [1963], p. 23.

<sup>83</sup> Ibn Khallikān mentions Jābir in the section devoted to Ja'far (see n. 1 above). The alchemist Jildakī (d. 743/1342) in his *Kitāb al-Burhān fī Asrār 'Ilm al-Mizān* says: "It is thanks to Imām Ja'far al-Ṣādiq that he [sc. Jābir] became Imām himself" (qu. Holmyard [1925], p. 442).

<sup>84</sup> *Kitāb Ikhrāj*, Kraus ed. [1935], 72:9.

<sup>85</sup> "Due to the knowledge he has implanted in me I derive from him as a son derives from his father" *Kitāb al-Rāhib* (Book of the Monk, Kr 630), Kraus ed. [1935], 528:5-6. (See n. 39 above).

<sup>86</sup> Ruska [1929] (The citation is from the reprint [1937], p. 310).

<sup>87</sup> In the 25 Jabirian treatises published in Kraus ed. [1935], and 11 in 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.

<sup>88</sup> 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-Hāsil* (iv) *Kitāb Nār al-Hajar* (v) *Kitāb al-Rahma al-Ṣaghīr* (vi) *Kitāb al-ʿAhd* (Book of the Pact, Kr 1053-1055) (vii) *Kitāb al-Khawass al-Kabīr*. For the last two see below.

<sup>89</sup> These include all the texts published, totalling 57, and some additional 50 treatises which I have examined in manuscripts.

<sup>90</sup> See Arabic text in Kraus [1942-3], I, p. XXVI, n. 3.

<sup>91</sup> Kraus [1942-3], I, p. 133. (Note that there is another text in the corpus bearing the same title—this latter belongs to the *LXX Books*, Kr 131).

<sup>92</sup> 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 n. 51 above).

<sup>93</sup> See n. 42 above.

<sup>94</sup> See n. 40 above. The text appears in Kraus ed. [1935], 311: 2-9.

<sup>95</sup> *Ibid.*, 312:5.

<sup>96</sup> *Ibid.*, 303-305.

<sup>97</sup> *Ibid.*, 303:4-5.

<sup>98</sup> *Ibid.*, 305, n. 8.

<sup>99</sup> The manuscript in question is dated 1280 Hijra.

<sup>100</sup> This statement must be viewed as tentative due to our limited and in many cases indirect knowledge of the Jabirian manuscripts.

<sup>101</sup> Holmyard had based his calculations essentially on the testimonies of Abū Hanīfa al-Dīnawarī (see n. 14 above) and of the alchemists ps-Majrītī and Jildakī (see Holmyard [1924]; [1925]; [1927]).

<sup>102</sup> Kraus [1942-3], I, pp. XLVII-XLVIII (emphasis added).

<sup>103</sup> *Loc. cit.*

<sup>104</sup> *Ibid.*, p. XXXIV.

<sup>105</sup> Flügel ed. [1871], 355:27-28.

<sup>106</sup> Cf. Fück [1951], p. 130.

<sup>107</sup> Holmyard ed. [1928].

<sup>108</sup> Ziris [1971].

<sup>109</sup> Holmyard, *op. cit.*, p. 61; Ziris, *op. cit.*, p. 25.

<sup>110</sup> Holmyard, *op. cit.*, p. 79; Ziris, *loc. cit.*

<sup>111</sup> Sezgin [GAS], IV, p. 233.

<sup>112</sup> Ziris, *op. cit.*, p. 22.

<sup>113</sup> Flügel, *loc. cit.*

<sup>114</sup> There does exist a third part of this work (Kr 8; Holmyard, *op. cit.*, p. 99 ff.; Ziris, *op. cit.*, tr. p. 74 ff.), as well as a commentary (*Tafīr*, Kr 9; Holmyard, *op. cit.*, p. 115 ff.; Ziris, *op. cit.*, tr. p. 92 ff.). Again, neither of them refers to the Barmecides, and both of them are missing from the *Fihrist*.

<sup>115</sup> Kraus [1942-3], I, p. XLVI.

<sup>116</sup> The name appears as "al-Kashī" in Kraus (*ibid.*, p. XLVI, n. 2), but Sezgin's reading is "al-Kashshī" (Sezgin [GAS], I, p. 185). Cf. al-Najāshī [Teheran, n.d.], p. 288. Kraus refers to the Bombay ed. [1317/1899].

<sup>117</sup> Kraus cites (*ibid.*, p. XLVI, n. 2) the Najaf lith. ed. [1349/1927].

<sup>118</sup> Muḥsin [1357/1938], see Kraus, *loc. cit.*

<sup>119</sup> Kraus, *loc. cit.* The *A'yān* had reached its 12th volume at the time when Kraus was writing.

<sup>120</sup> al-ʿĀmīlī devoted 26 pages to Jābir (al-ʿĀmīlī [1940], XV, pp. 115-140).

<sup>121</sup> al-ʿĀmīlī, *op. cit.*, p. 117 (does not give dates). See Brockelmann [GALS], I, pp. 911-913. For a good account of Ibn Tāwūs see Āl Yāsīn [1965]. The title of the work appears in Sezgin ([GAS], VII, p. 17, p. 26) as *Faraj al-Humūm fī Maʿrifat Nahj al-Ḥalāl min ʿIlm al-Nujūm*.

<sup>122</sup> al-ʿĀmīlī, *loc. cit.*; al-Yāfīʿī's work is available in a modern edition (al-Yāfīʿī [1388/1919]).

<sup>123</sup> He has separate sections on the questions of Jābir's Shīʿism and of his relationship with Ja'far (*ibid.*, p. 125; p. 127).

<sup>124</sup> The alchemist's name appears as "Jābir ibn Ḥayyān" on p. 27 and p. 42 of Arif Tamir's ed. [1957].

<sup>125</sup> See Lewis s.v. "Abu'l Khattāb," [EI<sup>2</sup>], I, p. 134; Qāḍī al-Nuʿmān, *Daʿāʾim al-Islām*, Fyzee ed. [1951], I, p. 62 ff.

- <sup>126</sup> al-Ash'ari, *Maqālāt al-Islāmiyyīn*, Ritter ed. [1963], p. 13; al-Shahrastānī, *Milāl wa al-Nihāl*, Badrān ed. [1951], I, pp. 343-346.
- <sup>127</sup> Sezgin [GAS], I, p. 530; Brockelmann [GALS], II, p. 607.
- <sup>128</sup> al-Najāshī, *op. cit.*, p. 30.
- <sup>129</sup> See Sezgin [GAS], III, p. 295.
- <sup>130</sup> Mahdī al-Khurāsān ed. [1358/1965].
- <sup>131</sup> *Ibid.*, p. 70. Transliterated without short vowels, the name appears in print as "JĀBR ʾBN ḤSĀN ʾLṢŪFĪ," but the *nasab* here is undoubtedly "Ibn Hayyān" since (i) elsewhere, Jābir's name appears without this error (see below), (ii) given the orthographic peculiarities of the Arabic script, a medial *yā*ʾ can easily be mistaken for a medial *sīn*, especially in manuscripts without diacritics, (iii) the epithet al-Ṣūfī frequently appears in the sources as an integral part of Jābir's name, and (iv) no figure by the name of J. ibn ḤSĀN is known to historians.
- <sup>132</sup> al-ʿĀmīlī, *op. cit.*, p. 117.
- <sup>133</sup> MS Paris Or. 5968 f. 333. See Qazwīnī's edition of Juwaynī's Persian work, *Tarikh-e-Jahān Ghushā* (composed 658/1259), Juwaynī [1937], III, p. 323.
- <sup>134</sup> See Stern *s.v.* "ʿAbd Allāh b. Maymūn" [EI<sup>2</sup>], I, 48.
- <sup>135</sup> Kraus [1942-3], I, p. XL, n. 7.
- <sup>136</sup> For example, Ivanow [1955] and Madelung (*s.v.* "Khattābiyya" [EI<sup>2</sup>], IV, p. 1133ff.) tend to minimize the importance of certain early Shīʿī groupings of the 2nd/8th century for the formation of Qarmatī and Fatimid Ismāʿīlism. Others such as Massignon (*s.v.* "Karmatians" [EI<sup>1</sup>], IV, p. 767ff), Strothman (*s.v.* "Sabʿiyya" [EI<sup>1</sup>], IV, p. 23ff.), Lewis [1940], Stern *op. cit.*, and Halm [1978] acknowledge some link between various sectarian currents of the 2nd/8th century and the earliest speculations of the Ismāʿīliyya. (I am grateful to Douglas Crew for his guiding thoughts on this matter).
- <sup>137</sup> This question is the subject matter of Ivanow [1957].
- <sup>138</sup> To get some idea of the obscurity surrounding these questions see Madelung [1985].
- <sup>139</sup> In the Shīʿī context, *naṣṣ* denotes the Imām's explicit designation of a successor; thus, such power of knowledge and understanding is conferred upon the successor as no one else has.
- <sup>140</sup> See Madelung *s.v.* "Ismāʿīliyya" [EI<sup>2</sup>], IV, p. 198ff.
- <sup>141</sup> Madelung, *op. cit.*, p. 198.
- <sup>142</sup> Kraus [1942-3], I, pp. XLVII-LVII. Jābir uses the terms *kūnī qadar*. Cf. Halm [1978].

- <sup>143</sup> *Ibid.*, I, p. XLIX. He gets his date from Ṭabarī, III, *s.a.* 278 Hijra. But Madelung ([EI<sup>2</sup>], IV, p. 198) gives an earlier date.
- <sup>144</sup> See n. 51 above.
- <sup>145</sup> The very title of Kraus' section is "The Ismāʿīlī Trends of the Corpus" (Kraus [1942-3], p. XLVII).
- <sup>146</sup> *Ibid.*, p. LII (emphasis added).
- <sup>147</sup> *Ibid.*, p. LIII (emphasis added).
- <sup>148</sup> *Loc. cit.*
- <sup>149</sup> *Loc. cit.* (emphasis added).
- <sup>150</sup> *Loc. cit.* (emphasis added).
- <sup>151</sup> *Ibid.*, p. L.
- <sup>152</sup> *Ibid.*, p. LII; see Hodgson *s.v.* "Ghulār" [EI<sup>2</sup>], II, p. 1093 ff. This interpretation of Kraus, namely that Jābir supports the imāmate of Muḥammad ibn al-Ḥanafīyya, has, however, been challenged by Sezgin in [GAS], IV, p. 200.
- <sup>153</sup> *madh'hab al-mīm wa'l-ʿayn* (Kraus ed. [1935], 36:16. See n. 141 below).
- <sup>154</sup> Kraus [1942-3], I, p. LII.
- <sup>155</sup> After expounding the beliefs of these groups Jābir says: *lā tatawahhamna . . . mimman yaqūlu bi-shayʿin min hādhihi'l-madhāhib* (Kraus ed. [1935], 37:2-3). This was pointed out by Sezgin ([GAS], IV, p. 196).
- <sup>156</sup> Kraus ed. [1935], 439:14-17.
- <sup>157</sup> Holmyard ed. [1928], 23:8-11.
- <sup>158</sup> *Ibid.*, 23:5-8. Again, this was also brought into focus by Sezgin in [GAS], IV, pp. 199-200. (Note an error in Sezgin p. 199, line 24; p. 199, n. 7; p. 200, n. 1: Read *Hajar* for *Bayān*).
- <sup>159</sup> *Op. cit.*
- <sup>160</sup> For example, in the *Kitāb al-Bayān* (Book of Explication, Kr 14-15), Holmyard ed. [1928], 11:13. See also Kraus [1942-3], II, p. 119, p. 123.
- <sup>161</sup> See Hodgson, *op. cit.*
- <sup>162</sup> Corbin ed [1950].
- <sup>163</sup> These are the first letters of the words which name the Prophet, his son-in-law and his celebrated Persian companion—"Muḥammad," "ʿAlī," and "Salmān." The proto-Shīʿī gnostics had elevated these personages from the arena of history to that of metaphysics, designating them by the three letters as the three hypostases of divinity and its manifestations on earth. See Massignon [1934] and Corbin [1983].

- <sup>164</sup> He is the author of a *Kitāb al-Mizān* (Book of Balance). See Ibn Athir's *Kāmil*, Tornberg ed. [1965-66], VIII, 2; Massignon [1921] p. 330.
- <sup>165</sup> Massignon *s.v.* "Karmāṭians," [EI<sup>1</sup>], IV, p. 770 (emphasis added).
- <sup>166</sup> Kraus [1942-3], I, p. XLIX.
- <sup>167</sup> One can mention, for example, recent works by Richard Frank [1965], and Juynboll ed. [1982].
- <sup>168</sup> Madelung [1961]. This was further developed in his [1965].
- <sup>169</sup> al-Rassī states that Ismā'īlis were called "al-Mubārakiyya." He also relates the former with the Khattābiyya (See Sezgin [GAS], I, p. 561).
- <sup>170</sup> *Op. cit.*, p. 52.
- <sup>171</sup> Madelung [1967].
- <sup>172</sup> This is Madelung's own account in the preface to his [1985], p. X.
- <sup>173</sup> Kraus [1942-3], I, p. XLVIII.
- <sup>174</sup> Sezgin [GAS], IV, p. 170.
- <sup>175</sup> Edited Text, 30:1-33:17.
- <sup>176</sup> Other archaic terminology is also found in Jābir—for example, in the *Kitāb al-Ṣafwa* (Book of the Elite, Kr 384) the term used for the Aristotelian quality moisture is "*nadāwa*" (MS Paris 5099, f. 117a). Likewise we have in Jābir an occurrence of the word "*māl*" for a quadrilateral (cf. Kraus [1942-3], II, pp. 62-66, p. 178).
- <sup>177</sup> Peters [1968], p. 32.
- <sup>178</sup> Badawi ed. [1964].
- <sup>179</sup> See Klamroth [1886], p. 631.
- <sup>180</sup> *Kalām* is still sometimes 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.* "Mu'tazila" [ER], X, p. 220.
- <sup>181</sup> The term *ma'nā*, rendered by mediaeval Latin translators as "*intentio*," 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, pp. 70-73). It should be noted that Jābir applies this term in other contexts too (see n. 61, Chapter 3 below).
- <sup>182</sup> For the *kalām* doctrine of *ma'nā*, see especially Frank [1967] and Daiber [1975].
- <sup>183</sup> Ritter ed. [1963], p. 369, p. 345.

- <sup>184</sup> Ibn al-Nadīm, *Fihrist*, Tajaddud ed. [1971], 206:16. (This is missing from the text of Flügel [1871]).
- <sup>185</sup> Nader tr. [1957], p. 15. Cf. Daiber [1975], p. 78 ff.
- <sup>186</sup> We have noted also that Jābir talks about, and expresses a preference for, *aṣḥāb al-tabā'i'* (the partisans of the natures). This was a pre-Hunayn epithet which was applied to, among others, a group of early *mutakallimūn*. See al-Ash'arī, *op. cit.*; Kraus [1942-3], II, p. 166.
- <sup>187</sup> Badawi ed. [1964], 801:11-15.
- <sup>188</sup> *Tajmīr*, Kraus ed [1935], 374:11.
- <sup>189</sup> Bergstraesser [1925], no. 79.
- <sup>190</sup> In the *Kitāb al-Ikhrilāt* (Book of Mixing, Kr 180), qu. Kraus [1942-3], II, p. 326.
- <sup>191</sup> Bergstraesser *op. cit.*, no. 11.
- <sup>192</sup> In the *Baḥth*, qu. Kraus [1942-3], II, p. 329, n. 7.
- <sup>193</sup> Bergstraesser, *op. cit.*, no. 113.
- <sup>194</sup> Sezgin [GAS], IV, p. 172; III, p. 71 ff.
- <sup>195</sup> Kraus [1942-3], II, pp. 330-331.
- <sup>196</sup> This work, entitled *Kitāb Mizān al-Hikma* (Book of the Balance of Wisdom), has been thoroughly studied by Khanikoff [1860].
- <sup>197</sup> See Khāzini's text in Khanikoff, *op. cit.*, pp. 12-13.
- <sup>198</sup> For example, the notorious question of Jābir's familiarity with the Arabic translation of ps-Plutarch's *Placita philosophorum* has not been investigated here. But again, the question of the dating of this translation is not quite settled yet: Sezgin ([GAS], IV, pp. 186-188) still calls into question the belief that Qusātā ibn Lūqā (d. c. 300/912) was the first to render the Greek text into Arabic; and Sezgin does so despite the learned study of Daiber [1980]. In fairness, however, a consideration of this question does not seem necessary for the point of the argument.
- <sup>199</sup> For a fuller discussion of Balinās see commentary on the Edited Text, Chapter 5 below.
- <sup>200</sup> The inaugurator of modern researches into the *Sirr* was Silvestre de Sacy (see his [1799]).
- <sup>201</sup> Ruska [1926].
- <sup>202</sup> Plessner [1927]; [1931].
- <sup>203</sup> Kraus [1936]; [1942-3], II, pp. 270-303. The summary that follows is largely that of Zimmermann [1981].

<sup>204</sup> Cf. Burnett [1986].

<sup>205</sup> The *Tabula* appears in Jābir's third *Ustuquss al-Uss* and in the *Kitāb al-Hayy* (Book of the Living One, Kr 133). Cf. Manzalaoui [1974]; Ullmann [1972], p. 171.

<sup>206</sup> Kraus [1942-3], II, p. 270 ff.

<sup>207</sup> *Ibid.*, p. 275 (Kraus translates the passage in n. 2).

<sup>208</sup> *Ibid.*, I, p. LVIII.

<sup>209</sup> Weisser [1979], Arabic Section, p. 13; Weisser [1980], pp. 54; 64; 68.

<sup>210</sup> See, for example, Zimmermann [1981], p. 440.

<sup>211</sup> Weisser [1979].

<sup>212</sup> Weisser [1979], Arabic Section, pp. 12-18; Weisser [1980], pp. 1-70.

<sup>213</sup> Zimmermann, *op. cit.*, pp. 439-440.

<sup>214</sup> Ruska [1929] (the citation is from the reprint [1937], p. 310).

<sup>215</sup> This is what Netton has successfully done with the analogous case of the *Rasā'il* of the Ikwān al-Ṣafā' (see Netton [1982]).

<sup>216</sup> 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” (p. 85, 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], p. 497, emphasis added).

<sup>217</sup> 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* = *Kitāb al-Rahma al-Kabīr*, Darmstaedter ed. [1925], and *Liber de septuaginta* = *LXX Books*, 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:

i) *Kitāb al-Mawāzīn* = *Liber de ponderibus artis* in Borellius [1654], p. 103. This has not been investigated.

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-Nadīm 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 (consonantal) title, one was published by Berthelot [1893], III; the other by Holmyard himself, ed.

[1928], p. 161. 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 *500 Books* (Kr 454); whereas the latter, i.e., the *Kitāb al-Malik* (Kr 1985) is grouped among those individual treatises of the Jabirian corpus which chronologically come toward 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 text. This whole matter remains uninvestigated.

iii) *Kitāb al-Mujarradāt* (Book of Abstractions, Kr 63-64) = *Liber Denudatorum* quoted in *De aluminibus et salibus* of ps-al-Rāzī. This has been verified by Ruska [1935].

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, p. 42.

v) *Kitāb Khamsat 'Ashara* (Fifteen Books, Kr 137) = *Liber XV* ascribed to Geber in the Trinity College Cambridge Latin MS 1363 f. 137v - f. 140v. This equivalence has been recognized by Kraus *ibid.*, p. 48, but no further studies have been conducted.

vi) *Kitāb Musabḥahāt Suqrāt*, (Book of Emendations of Socrates, Kr 204) = *Ad laudem Socratis dixit Geber*, Bodleian MS Ashmole 1416, f. 148. Holmyard was somewhat doubtful about this equivalence. The Arabic text is no longer extant, but Jildakī's *Nihāyat al-Talab* (End of the Search) contains an extract in Cairo MS Ṭabī'iyāt 114, f. 47. However, the manuscripts remain uninvestigated.

vii) *Kitāb al-Uṣūl* (Book of Roots, Kr 412-413) = *Liber radicum*. With my assistance, this was actually discovered and verified in 1985 by William Newman (see Newman [1985a]).

THE DOCTRINAL 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 A.D.) made it a philosophical orthodoxy that Plato and Aristotle were in agreement.<sup>1</sup> 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.<sup>2</sup>

In the hands of the Neoplatonists, Aristotle underwent a drastic transformation. Thus, for example, his (prime) matter,<sup>3</sup> which he had defined negatively<sup>4</sup> as an abstraction that can only be arrived at by thinking away forms,<sup>5</sup> became extension (*diastêma*) in Simplicius (wrote after 529 A.D.).<sup>6</sup> In John Philoponus (Ar. Yahyā al-Nahwī, d. 570's A.D.), it became "the three dimensional."<sup>7</sup> This had the anti-Aristotelian effect of making matter, the "first subject" (*hupokeimenon prôton*)<sup>8</sup> of properties in bodies, *concrete* and *knowable*. For Aristotle it was neither concrete nor knowable in itself: matter was known only by analogy.<sup>9</sup>

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*);<sup>10</sup> 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.<sup>11</sup> 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. In this way he bridged the gap between Plato and Aristotle much in the Porphyrian spirit. But all these observations must now be examined in detail.

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-Tabī'ī*) and the *Categoriae* (*Kitāb al-Maqūlāt/ al-Qāṭighūriyā*) we already know.<sup>12</sup> But Jābir also refers to several other components of the *Organon*,<sup>13</sup> and mentions, quotes, or paraphrases, *inter alia*, the *De coelo et mundo* (*Kitāb al-Samā' wa'l-Ālam*),<sup>14</sup> the *De phaenomenis meteorologicis* (*Kitāb al-Āthār al-ʿUlwiyya*),<sup>15</sup> the *De generatione et corruptione* (*Kitāb al-Kawn wa'l-Fasād*),<sup>16</sup> and the *Metaphysica* (*Fī mā Ba'd al-Tabī'a*).<sup>17</sup> He also knows several works of the greatest proponent of Aristotelianism, Alexander of Aphrodisias (*fl.* c. 205 A.D.),<sup>18</sup> besides referring to his commentary on Aristotle's *Topica* (*Ṭubīqā*).<sup>19</sup>

The independent Aristotelian commentator Themistius (*fl.* late 340's-384/5 A.D.) is known to Jābir too. "Aristotle says in his *Physica* that form is the completion and perfection of motion (*tamām al-ḥaraka wa kamālūhā*)," writes Jābir in the *Kitāb al-Baḥth*, "—this is what Alexander had reported in his *Risāla* (Epistle). The same was reported by Themistius in his commentary on the *Physica*."<sup>20</sup> The latter's commentary on the *Metaphysica* is also cited: "As for Themistius, he censured the philosophers in his *Risāla* on the 'Book A' of the *Metaphysica*. . . ."<sup>21</sup>

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-Tajmī'* (Book of Concentration, Kr 398) he quotes this pagan Neoplatonist frequently and extensively.<sup>22</sup> But it is not clear if Jābir had access to any of his genuine texts, or if he did, which ones. In the *Tajmī'*, a *Kitāb al-Tawlidāt* (Book of [Artificial] Generation) of Porphyry is cited,<sup>23</sup> 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*.<sup>24</sup> Porphyry also appears in the Jabirian corpus as an alchemical authority along with such figures as Zosimus, Hermes, Pythagoras, Democritus, Aristotle, etc.<sup>25</sup> In the *Kitāb al-Sirr 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.<sup>26</sup> The same is true of Simplicius, he too is referred to in an alchemical context.<sup>27</sup> 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 al-Shaykh al-Yūnānī, d. 260 A.D.). Likewise, the name of Proclus (d. 485 A.D.) 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 forms 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 Hellenized Syriac intellectual culture.<sup>28</sup> In fact, there exists in Arabic a whole series of early fragments ascribed to the founder of Neoplatonism, Plotinus,<sup>29</sup> and it so happens that "the Greek work whose impact was most decisive on Arabic philosophical thought [*sc. falsafā*]"<sup>30</sup> is an apocryphal text derived from this same 'Shaykh.'

This is the well-known *Theologia Aristotelis* (*Uthūlūjiyā*) 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.<sup>31</sup> The *Theologia* has been described as the epitome of Neoplatonism as it strove in Hellenistic times to blend all the elements generated during the period of greater activity,<sup>32</sup> 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,<sup>33</sup> 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 *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."<sup>34</sup> Further, "every substance seems to signify a certain 'this' . . ."<sup>35</sup> The idea is again elaborated in the *Metaphysica*: "Substance . . . is not predicated of a subject, but everything else is predicated of it."<sup>36</sup> Thus, Socrates is a substance, this one here, an *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 *esse per aliud*, accidents of the substance Socrates.<sup>37</sup>

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"<sup>38</sup> by accepting a form, becoming differentiated and individualized. And this ultimate or first subject (*hupokeimenon prôton*) is matter (*hylê*).<sup>39</sup> 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 anything, 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 to be special characteristics of substance.<sup>40</sup>

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 (color, taste, smell, length, 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, 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."<sup>41</sup>

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."<sup>42</sup> Jābir declared it "nonsense."<sup>43</sup> Like Descartes' mind, there was no language to talk about matter, except by analogy. And there were internal problems too. Prime matter was imperceptible,<sup>44</sup> 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.<sup>45</sup> Small wonder that Philoponus dispensed with it as something useless and impossible, and replaced it with three dimensional extension.<sup>46</sup>

So bothersome was the idea of prime matter for Jābir that in the *Alhijār* 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, exists only in the imagination, and it is impossible to visualize it as a defined entity. . .

Now all this is nonsense!<sup>47</sup>

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 indirect demonstration.<sup>48</sup>

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's *jawhar* has the attributes both of Aristotle's matter, as well as his substance.

On the one hand, the Jabirian substance was simple (*basīṭ*) and unique (*wāḥid*), 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 it, and everything returns to it.<sup>49</sup> This is how the Most High Creator, our Lord, has made it and placed it in everything. Everything reverts to it.<sup>50</sup>

Indeed, substance (*jawhar*) is what some people called *hayūlā* (*hūlā*):

It is the *jawhar* from which arises . . . the constitutive frame of this world. A group of people calls it *hayūlā*.<sup>51</sup>

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-basīṭ*), called *hayūlā*.<sup>52</sup>

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

[They say that] the first . . . stage [in the formation of bodies] is *tina*.<sup>53</sup> . . . [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 *hayūlā* is one and the same.<sup>54</sup>

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. While he uses different terms to denote the same entity, 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-ʿAql*), and Soul (*al-Nafs*).<sup>55</sup> 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."<sup>56</sup> In fact, this Supreme Sphere, which is identified with the Ether,<sup>57</sup> and which forms the boundary between the three hypostases and the natural world, is the World of Substance (*ʿĀlam al-Jawhar*).<sup>58</sup>

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

As for substance, God protect you, it is the thing by which the interstices are filled (*al-mamlūʿ bihi al-khalāf*). 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-habāʿ*), and its color is somewhat white. And when the sun radiates on it, it becomes inflamed and visible. Thus you ought to know that it is the mass (*jirm*) 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 stones.<sup>59</sup>

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

Substance is diffused dust (*al-habāʿ al-manthūr*). . . .<sup>60</sup>

With their corpuscularian suggestions, these assertions of Jābir 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 Jābir is here prompted by the same considerations which had led Simplicius to identify Aristotle's first subject with extension. In fact, at one place Jābir does, indeed, visualize substance as empty space.<sup>61</sup> 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.<sup>62</sup> Evidently, Jābir lacks the philosophical sophistication of Simplicius; he 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 (*hylē*), each intermediate step has something of those on each side of it.<sup>63</sup> 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;<sup>64</sup> but at the same time it had certain features of corporeal bodies, for it had parts (*mu'allaf*),<sup>65</sup> it took part in motion,<sup>66</sup> and was subject to time and space.<sup>67</sup>

The idea of *habā'* (dust) is particularly interesting here. What is *habā'*?<sup>68</sup> Fakhr al-Dīn al-Rāzī tells us that it is "like the cloud of tiny particles (*ghubār*) which enters a small opening with the ray of the sun,"<sup>69</sup> and, Jābir explains, "it manifests itself to you (*bayyinun laka*) when the sun shines on it."<sup>70</sup> One gets the impression that Jābir 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. . . .<sup>71</sup>

Moreover, sheer visibility does not endow corporeality. In explaining the generation of everything from the One, Plotinus had used the metaphor of light,<sup>72</sup> conceived strictly as an incorporeal entity.<sup>73</sup> Light was visible, but it was not corporeal; it made other things visible, but this was not an instance of material causation. Jābir's notion of the Luminous Sphere, his idea of substance becoming visible and acquiring a color when the sun shines over it—all this is reminiscent of a Plotinian spirit.

Jābir's *jawhar*, as it existed in the 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 identification 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 called this first subject the form, differentia, essence, or essential attribute of body.<sup>74</sup> Indeed, if the three dimensional extension is "the *essence* of body, then he [sc. Philoponus] is turning it into *substance*."<sup>75</sup> As a matter of fact, he explicitly calls it substance: "The substance of the body is nothing other than the indefinite three dimensional."<sup>76</sup> Moreover, in the *contra Proclum* Philoponus goes as far as to say that his indefinite three dimensional can be called *body*.<sup>77</sup>

#### THE FOUR NATURES (TABĀ'IR)

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."<sup>78</sup> 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 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-Ānāsir al-Basā'ir*)—significantly, the term 'simple elements' here denotes not the Empedoclean bodies but

the four qualities hot, cold, moist and dry.<sup>79</sup> The Supreme Sphere is represented by a circle; the World of Simple Elements is a smaller concentric circle inside it.<sup>80</sup> Like substance, these qualities—or rather, the simple elements—were incorporeal; but they were concrete, differentiated, and independently existing entities.<sup>81</sup>

As Kraus points out, the idea of the *Kitāb al-Taṣrīf* (Book of Morphology, Kr 404) 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 *Timaeus* 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.”<sup>82</sup> 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 primary bodies, 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 manifest themselves below the sphere of the planets? How does the intelligible turn 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*,<sup>83</sup> *shawq*,<sup>84</sup> *tawqān*<sup>85</sup>) of the Soul which endowed substance with formative power. At some stage in the complex hierarchy of concentric spheres beneath the Supreme Luminous Sphere, the Soul imparted to substance also a geometric form, a figure which was necessarily spherical. This spherical substance due to the Desire 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 *Kitāb Maydān al-ʿAql* (Book of the Arena of the Intellect, Kr 362):

First, we visualize a region of space which is empty (*buʿdam mā lā shayʿa fih*).

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].<sup>86</sup>

In Jābir’s cosmology, a whole series of spheres are conceived as lying in a complex hierarchy under the Supreme Sphere, extending all the way

down to the celestial world.<sup>87</sup> Inside the concentric spheres representing the worlds of the four qualities, the *Taṣrīf* places another sphere which after some hesitation is called void (*khalāʾ*).<sup>88</sup> And this void is the place where, according to the *Kitāb al-Mizān al-Ṣaghīr* (Small Book of Balance, Kr 369), substance becomes differentiated (in *ḥaṣṣ*),<sup>89</sup> and it is here that the qualities attach to it.

This process has been described more fully in the *Maydān al-ʿAql*.<sup>90</sup> Thus, substance according to the desire of the Soul passes through void into the world of elementary qualities and is charged with different quantities of hot, cold, dry and moist. The manner in which substance mingles with qualities is similar to that of “paste” (*ʿajīn*)<sup>91</sup> 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 the objects of the natural world ultimately arose out of the attachment of the qualities to substance. The variety of things in our world was reducible to the variety of ways 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 the four elementary qualities.

The four qualities were the *first simple elements* (*al-ʿanāsīr al-basāʾit/al-basāʾit al-uwal*) of all bodies. These were uncompounded entities (*mufradāt*) out of which the first compound elements (*al-murakkabāt*), Air, Water, Earth and Fire were formed,<sup>92</sup> which latter he sometimes calls “second elements” (*ʿanāsīr thawānin*).<sup>93</sup> 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.<sup>94</sup> 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.<sup>95</sup>

Jābir has drifted far away from Aristotle. To be sure, as Kraus has observed, he avoids designating the four qualities by the Aristotelian appellations, *dunamis* (*quwā*, sing. *quwwa*) or *poiôtês* (*kayfiyyāt*, sing. *kayfiyya*).<sup>96</sup> He calls them “principles” (*uṣūl*, sing. *ʾaṣl*),<sup>97</sup> “bases” (*arkān*, sing. *rukn*),<sup>98</sup> “first simples,” “first elements”—but most frequently he refers to them by the term “natures” (*ṭabāʾiʿ*, sing. *ṭabʿ*),<sup>99</sup> and sometimes explicitly distinguishes them from *kayfiyyāt*.<sup>100</sup> 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.<sup>101</sup> But this did not mean the inherence of accidents in a material substratum. Substance unites with (*ta'allāqa*) the natures;<sup>102</sup> it sticks to (*aliqa*) them,<sup>103</sup> clings to (*tashabbatha*) them<sup>104</sup> and mixes (*imtazaja*) with them.<sup>105</sup> While, on the other hand, the natures attach or cling to one another;<sup>106</sup> they enter into a mixture<sup>107</sup> and become mingled (*ikhtalata*).<sup>108</sup> Finally, the natures are composed in or with substance,<sup>109</sup> they are implanted in substance;<sup>110</sup> the natures attack substance,<sup>111</sup> and act upon it<sup>112</sup>—they shape it,<sup>113</sup> embrace it,<sup>114</sup> and compress it.<sup>115</sup>

By conferring on the qualities this independence and corporeality, Jābir has assigned to them the role of true elements. The primitive bodies of the natural world were not the four Empedoclean 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. . . ."<sup>116</sup> This meant that when, say, Fire is deprived of hot, always the contrary quality, i.e. cold, appeared. Fire which was hot and dry thus became Earth which was cold and dry.<sup>117</sup> 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.<sup>118</sup>

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.<sup>119</sup>

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. . . ."<sup>120</sup> Otherwise, the union of two things which are neither visible, nor actually existing, would produce nothing. The suggestion to deprive the natures or substance completely of weight was absurd.

We have now effectively entered into the original aspects of Jābir's thought, for neither the hypostasizing of the qualities, nor is their corporeality certified anywhere in the standard Greek tradition. Kraus suggested that the idea of qualities as bodies is an indirect borrowing from the Stoics<sup>121</sup> for whom, as we know, corporeality was the hallmark of existence.<sup>122</sup> 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."<sup>123</sup> 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.<sup>124</sup>

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."<sup>125</sup> Thus the qualities cannot be *corporeal* substances. "I do not see," declares Sorabji, "that the view owes anything to the Stoics as Kraus suggests."<sup>126</sup>

Indeed, 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.<sup>127</sup> "Listen to what I say to you!" commands ps-Apollonius, "all things are from the four natures (*ṭabā'ī*) namely hot, cold, moist (*al-līn*) 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, it breaks up and its parts become different from one another. . . ."<sup>128</sup> 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."<sup>129</sup> The term *ṭabāʾiʿ*, 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* (*ʿanāsir murakkaba*) made of hot, cold, moist and dry. The four qualities should be viewed as substances (*ʿuṣiyas*), wrote the Syriac author of the *Book of Treasures*,<sup>130</sup> these are not accidents (*gesdī*) or properties *belonging to* a substance.<sup>131</sup> In another work of Job of Edessa, the *Kitāb al-Tafsīr* (Book of Interpretation) which is quoted in Maqdisi's *Kitāb Badʾ wa al-Taʾrīkh* (Book of Origins and History, comp. 355/966), certain assertions are almost identical to Jābir's. "The principles (*mabādīʿ* = Gr. *archai*) of all things," we read, "are isolate elements (*al-ʿanāsir al-mufrada*), namely, hot (*harr*), cold (*bard*), moist (*balla*) and dry (*yubs*). By the combination (*tarkīb*) of these, the compound elements (*al-ʿanāsir al-murakkaba*), namely Air, Water [etc] . . . are formed."<sup>132</sup> These assertions could well have come out of a Jabirian text.

The eclecticism of Jābir is now 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 substratum (*ḥāmīl*);<sup>133</sup> for those who accept accidents alone to the exclusion of bodies;<sup>134</sup> as well as for those who say, on the contrary, that the accident is invisible, and that all things are, rather, bodies.<sup>135</sup>

#### 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 possess weights, then they should in principle be amenable to quantitative treatment. Indeed, the four Jabirian 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 A.D., Jābir's quantification of his *ṭabāʾiʿ* 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 the mathematization of medicine in general, and that of pharmacy in particular: the *Aphorismi de gradibus* composed at Montpellier around 1300 A.D.,<sup>136</sup> and the *Icokedron*, a Mertonian work postdating the former by a few years.<sup>137</sup> 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.<sup>138</sup> And, most important from our point of view, both the *Aphorismi* and *Icokedron* have been found to be dependent on the *Fi Maʿrifat Quwā al-Adwiyat al-Murakkaba* (On the Knowledge of the Intensity of Compound Medicines, Lat. *Quia primos*) of the well-known and the earliest Arab philosopher (sc. *faylasūf*), al-Kindī (d. c. 257/870).<sup>139</sup>

What are the salient features of all these attempts?<sup>140</sup> 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 three kingdoms of the natural world. Jābir further distinguishes himself from his three counterparts by replacing Galen's classification scheme with a more sophisticated computational system claimed to be founded upon universal theoretical principles, rather than upon the empirical generalizations of medical experience.<sup>141</sup>

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.<sup>142</sup>

But in Jābir too we find a conceptual distinction 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.

And, finally, through one quantitative mathematical formula or another, all four authors—Jābir, al-Kindī, Arnald and Walter—relate the intensive qualities of bodies with their extensive characteristics. The specific relationship proposed by al-Kindī, and which was accepted 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.<sup>143</sup> As for Jābir's system, it will presently be our subject for a detailed study, but in the meantime 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 quantificationist 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.<sup>144</sup> 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 'fourfold' schema which had brought the four Hippocratic humors, the elementary qualities, and the Empedoclean elements into common accord.<sup>145</sup> 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.<sup>146</sup>

This was a classification in terms of the opposing pair of primary qualities: a medicine was determined either to be 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.<sup>147</sup> 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.<sup>148</sup> 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.<sup>149</sup> 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 sugar (*al-sukkar*) is not the same as the hot in aniseed (*al-anisūn*). Nor is it the same as the hot which is in colocynth (*shahm al-hanzal*), nor the same as the hot in euphorbia (*farbiyūn*)."<sup>150</sup> 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 one *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, ½ *dir.* of colocynth = 2 *dir.* of dodder of Crete

(*al-afṭhimūn al-igritī*) = 3 *dir.* of *ḥabb al-nīl*,<sup>151</sup> etc. These drugs, then, did not have equal strengths: to classify them all under the third degree of hot was unsystematic and arbitrary.<sup>152</sup>

Next, Jābir attacks the physician's classification on rational grounds. The knowledge of Galen's four degrees of intensity (*taxeis*) of each quality in a thing rested exclusively on the senses. But the testimony of the senses could not be trusted. Colors and smells are not reliable guides to the constitution of a body, writes Jābir in the *Baḥth*: one color 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.<sup>153</sup>

Jābir 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 A.D., 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."<sup>154</sup> 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 'Alī ibn 'Abbās al-Majūsī (Lat. Haly Abbas)<sup>155</sup> 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."<sup>156</sup> For Jābir there is no cause for such despair. He simply rejects empiricism in favor 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 (*auwal al-martaba*), a maximum (*ākhir*), and a mean (*wasat*) value of intensities, the precision of the result is hardly improved.<sup>157</sup> 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 (*daqīqa*),<sup>158</sup> a minute into seconds (*thāniya*), a second into thirds (*thālitha*), a third into fourths (*rābi'a*), and, finally, a fourth into fifths (*khāmisā*).<sup>159</sup> Since all natural bodies contained all the four qualities, there were now 4 (qualities) × 4 (degrees) × 7 (subdivisions) = 112 different positions,<sup>160</sup> 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 *Aḥjār*, the units of his Balinās follow a geometric progression with 60 as its base. Thus, 60 fifths = 1 fourth; 60 fourths = 1 third [= 60<sup>2</sup> fifths]; 60 thirds = 1 second [= 60<sup>3</sup> fifths]; 60 seconds = 1 minute [= 60<sup>4</sup> fifths], etc.<sup>161</sup>

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 (*ʿilm al-Mizān*) makes an entry. This was a universal science *par excellence*, a divine science (*ʿilm lāhūtī*)<sup>162</sup> whose aim was to reduce all facts of human knowledge to a system of quantity and measure.<sup>163</sup> 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,"<sup>164</sup> and "it is by means of this principle that man is able to make sense of the world."<sup>165</sup>

The principle of Balance was truly cosmic in its range. On the one hand it governed the sublunar world (*ajnās thalāthā*),<sup>166</sup> 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.<sup>167</sup> The principle of Balance was the Supreme Principle (*Qāʿida ʿUẓma*) of the world.<sup>168</sup> In the natural world, to give merely an outline of Jābir's doctrine, all bodies contained the four qualities in a specific, immutable, and noble proportion which was governed by the Supreme Principle.<sup>169</sup> This proportion was 1 : 3 : 5 : 8 whose sum 17 (=1+3+5+8) was the foundation (*qāʿida*) of the entire Science of Balance. Thus, if in a body the qualities 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.<sup>170</sup> In fact, he can even change inanimate objects into living beings.<sup>171</sup> 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-Mawāzīn* (Books of Balances). The *Ahḡār*, which occupies a central position in this collection, is the subject of a detailed textual examination in the chapters that follow.

## NOTES

<sup>1</sup> Muslim philosophers in general espoused this orthodoxy, with al-Fārābī devoting to it a whole treatise, namely *Kitāb al-Jam' bayna Ra'yay al-ḡakīmayn Aflātūn al-Ilāhī wa Aristūṭālīs* (Harmony between the Views of the Two Philosophers, Plato the Divine and Aristotle). See Walzer *s.v.* "al-Fārābī," [EI<sup>2</sup>], II, p. 778; Mahdi [1962].

<sup>2</sup> 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 Transoxiana had come within the expanding fold of Islam. And on the Western side, 'Abd al-Raḡmān I had inaugurated his Andalusian Umayyad dynasty in the 3rd decade of the 2nd/middle 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 Ḥarrān (class. Carrhae), Kraus had identified the Ṣābians 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. (Kraus [1942-3], II, p. 305 ff.) Cf. Pingree [1973].

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.

<sup>3</sup> The expression *Protē hulē* (primary matter) is very rarely used by Aristotle. See Ross [1923], p. 73, p. 168.

<sup>4</sup> "Apophasei dēloutai," Aristotle *Metaph.* 10.8, 1058a 23.

<sup>5</sup> See below.

<sup>6</sup> Simplicius in *Phys.* 229, 6; 230, 19-20, 26-7; 623, 18-19; etc. See Sorabji [1988], p. 7.



<sup>7</sup> "The thing in bodies which is independent (*authupostatōn*) [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.*, p. 29).

<sup>8</sup> Arist. *Metaph.* 7.3, 1029a 2-7.

<sup>9</sup> "Agnōstōs kath' hautēn" (Arist. *ibid.*, 7.10, 1036a 9-10).

<sup>10</sup> Arist. *ibid.*, 7.3, 1029a28.

<sup>11</sup> Arist. *Phys.* 1.1, 190a-b; 191b.

<sup>12</sup> See Chapter 1 above.

<sup>13</sup> In the *al-Mawāzīn al-Ṣaghīr*, for example, Jābir refers to the *Categoriae*, *De interpretatione*, *Analytica priora*, *Analytica posteriora*, and the *Topica*. See Berthelot ed. [1898], III, p. 107 ff.

<sup>14</sup> For example, in the *Baḥth*, qu. Kraus [1942-3], II, p. 322, n. 1.

<sup>15</sup> *Baḥth*, qu. Kraus, *ibid.*, p. 323.

<sup>16</sup> For example in the *Kitāb al-Taṣrīf*, Kraus ed. [1935], pp. 394-7. (Note that there are in the Jabirian corpus two texts bearing this title, Kr 404 and Kr 112; the latter, belonging to the *CXII Books*, is not extant).

<sup>17</sup> *Baḥth*, MS Jārullāh 1721, f. 31a; f. 36a; f. 80a. See Kraus [1942-3], II, p. 323.

<sup>18</sup> In the *Baḥth* he mentions the *Kitāb al-Nafs* (Book of the Soul); a *Kitāb/Maqāla fi'l-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-Muḥarrik al-Awwal* (Book of the Prime Mover) which the Arabic tradition attributed to Alexander (see Pines [1937], p. 73); and a *Risāla* (Epistle) without a particular title. See Kraus [1942-3], II, pp. 324-5.

<sup>19</sup> *Baḥth*, MS Jārullāh 1721, f. 38b. See Kraus, *ibid.*, p. 320, n. 2.

<sup>20</sup> *Baḥth*, f. 166a, qu. Kraus p. 321, n. 2.

<sup>21</sup> *Baḥth*, f. 48a, qu. *ibid.*, p. 323, n. 8.

<sup>22</sup> Kraus ed. [1935], 361:17; 362:12; 363:3; 364:3; 373:3; etc.

<sup>23</sup> *Ibid.*, 364:3-4.

<sup>24</sup> Porphyry's correspondence with Anebon leaves many traces in the Arabic tradition. For example, Ibn al-Nadīm, Flügel ed. [1871], 300:17; al-Mas'ūdī, *Kitāb al-Tanbīh*, Carre de Vaux tr. [1896], p. 222. Cf. Kraus [1942-3], II, p. 127 ff. and Sezgin [GAS], IV, p. 163.

<sup>25</sup> For example in the *Mujarradāt*, MS Jārullāh f. 247b; *Kitāb al-Nuḥās* (Book of Copper, Kr 949), MS Paris 5099, f. 35a. See Kraus [1942-3], II, p. 30, p. 114.

<sup>26</sup> Kraus ed. [1935], pp. 333-340.

<sup>27</sup> In the *al-Sirr al-Maknūn*. See Kraus [1942-3], I, p. 94.

<sup>28</sup> See Wright [1894]; Duval [1899]. It is now generally accepted that the Arabic translation of Porphyry's *Eisagōgē* was the first entry of Aristotle into the Muslim world (see Peters [1968], p. 11). The MS Beirut, Univ. St. Joseph 338, names Ibn al-Muqaffa' (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 Jahm ibn Ṣafwān, an early *mutakallim* who died in 129/746. (But see Zimmermann [1986] in which Frank's conclusions have been challenged).

<sup>29</sup> See Rosenthal [1952]; [1953]; [1955]; Badawi, ed. [1955].

<sup>30</sup> Fakhry [1983], p. 19.

<sup>31</sup> Zimmermann, *op. cit.*, p. 113, p. 134.

<sup>32</sup> See Duhem [1953-59], IV, p. 325.

<sup>33</sup> The latest extensive (and highly incisive) examination of this question is due to Zimmermann, *op. cit.*

<sup>34</sup> Arist. *Categ.* 5, 2a11-15.

<sup>35</sup> Arist. *Categ.* 5, 3b10-13.

<sup>36</sup> Arist. *Metaph.* 7.3, 1029a8-9.

<sup>37</sup> Arist. *Phys.* 1.7, 190a-b; 8, 191b. Here I acknowledge my debt to Dijksterhuis [1961].

<sup>38</sup> "Horizomenon," Arist. *Metaph.* 7.3, 1029a17.

<sup>39</sup> Arist. *Metaph.* 7.3, 1029a2 (see below).

<sup>40</sup> Arist. *Metaph.* 7.3, 1029a6-29.

<sup>41</sup> Sorabji, *op. cit.*, p. 5.

<sup>42</sup> Plotinus 6.3.8 (34-7), qu. Sorabji, *op. cit.*, p. 45.

<sup>43</sup> This comes from the *Aḥjār*. See a fuller quotation in the immediately following paragraph.

<sup>44</sup> Arist. *Gen. et Corr.* 2.5, 332a35.

<sup>45</sup> 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].

<sup>46</sup> See Sorabji, *op. cit.*, p. 25.

<sup>47</sup> Edited Text, 39:9-40:1.

<sup>48</sup> Edited Text, 43:6-8.

<sup>49</sup> In the *Aḥjār*, Jābir criticizes the Sābians 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, 42:9-11).

<sup>50</sup> *al-Mizān al-Ṣaghīr*, Kraus ed. [1935], 428:8-10. See Arabic text in the addenda below.

<sup>51</sup> *Taṣrīf*, Kraus ed. [1935], 407:14-15. See Arabic text in the addenda below.

<sup>52</sup> *Sabʿīn*, *ibid.*, 482:5-6. See Arabic text in the addenda below.

<sup>53</sup> Literally 'clay.' This term is sometimes employed by Muslim atomists (see Pines [1936], p. 39; al-Jāhīz, *Kitāb al-Hayawān*, VII, 5, 'Abd al-Salām Hārūn ed. [1938-42]). al-Maḥdīsi says that "*jawhar* is called *ṭīna*, *mādda*, *hayūla*, *juzʿ* . . ." (Huart ed. [1899-1919], I, 39). Kraus gives a highly learned account in his [1942-3], II, p. 171, n. 1.

<sup>54</sup> Edited Text, 39:9 ff.

<sup>55</sup> A detailed account appears in the *Taṣrīf*, Kraus ed. [1935], 392-424.

<sup>56</sup> *Ibid.*, 412:14-15. See Arabic text in the addenda below.

<sup>57</sup> *Ibid.*, 413:11.

<sup>58</sup> *Ibid.*, 408.

<sup>59</sup> *al-Mizān al-Ṣaghīr*, Kraus ed. [1935], 429:3-9. See Arabic text in the addenda below.

<sup>60</sup> *Taṣrīf*, *ibid.*, 407:14. Jābir here quotes a verse of the Qurʾān in which this phrase occurs (*Sūra al-Furqān*, 23).

<sup>61</sup> Plato had introduced the idea of the 'Receptacle' in *Timeaus* 48e-53c, which he identified with space (*khōra*). He viewed space as a receptacle which received 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 does refer to Plato's *Timaeus*, and we have in Arabic a text entitled "*Naql Aflātūn*" (Transmission of Plato, MS Berlin 5031) in which *hulʿ* (*hayūlā*) is explicitly identified with space (*al-Makān*): "In the *Timaeus* he [sc. Plato] said that *hayūlā* and *balad* (lit. geographical space) are one and the same thing. And since *hayūlā* is *balad*, and *balad* is space (*al-Makān*), 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 addenda below. For an excellent account of Simplicius see Sorabji, *op. cit.*, pp. 3-21. For Jābir's (analogical?) identification of *jawhar* with empty space see below.

<sup>62</sup> Simplicius (*in Phys.*) calls matter an extremely diffuse material dimension (qu. Sorabji, *op. cit.*, p. 34; see also p. 17 and p. 21). Matter was an "indefinite diffusion" (*Khusis aoristos*). It was also a source of stretching, diffusion and indefiniteness. (Simplic. *in Phys.* 537, 22-538, 14; extensive quotations are to be found in Sorabji, *op. cit.*, pp. 3-21).

<sup>63</sup> See Deussen [1911-1915], II, i, p. 497; Inge [1929], I, p. 189; II, p. 70; Whittaker [1918], pp. 54 ff.; 94.

<sup>64</sup> *Taṣrīf*, Kraus ed. [1935], 412:7-12. See Arabic text in the addenda below.

<sup>65</sup> *Ibid.*, 412:16-413:1. See Arabic text in the addenda below.

<sup>66</sup> *al-Mizān al-Ṣaghīr*, *ibid.*, 427:9-10. See Arabic text in the addenda below.

<sup>67</sup> *Taṣrīf*, *ibid.*, 408:2-3. See Arabic text in the addenda below.

<sup>68</sup> For a comprehensive discussion of this term, see Kraus [1942-3], II, p. 154, n. 4.

<sup>69</sup> *Mafātīḥ al-Ghayb* [1308/1890], VI, p. 314. This was pointed out by Kraus, *loc. cit.*

<sup>70</sup> "*Huwa bayyinun laka idhā ṭalaʿat ʿalayhiʾsh-shams.*" (*Sabʿīn*, Kraus ed. [1935], 482:6-7).

<sup>71</sup> *al-Mizān al-Ṣaghīr*, Kraus ed. [1935], 429:9-10. See Arabic text in the addenda below.

<sup>72</sup> *Enneads*, V, 1:6. (Henry and Schwyzer ed. [1951-73]).

<sup>73</sup> *Ibid.*, IV, 5:6-7; cf. Wallis [1972], p. 61.

<sup>74</sup> Philoponus, *contra Proclum* 405, 24-7; 423, 14-424; 424, 24; 425, 5-6; 427, 8.

<sup>75</sup> Sorabji, *op. cit.*, p. 28 (emphasis in the source).

<sup>76</sup> *Ibid.*, qu. p. 29.

<sup>77</sup> *Ibid.*, see the long list of textual references on p. 27, n. 29.

<sup>78</sup> Kraus [1942-3], II, p. 151.

<sup>79</sup> *Taṣrīf*, Kraus ed. [1935], 392-424.

<sup>80</sup> "Let us, then, visualize inside the Circle of Substance another Circle whose size is unknown. This latter is the Circle of Simple Elements (*dāʾiratuʾl-ʿanāʾiriʾl-basāʾiʿ*), namely hot, cold, dry and moist." (*Ibid.*, 408:5-6).

<sup>81</sup> For an extensive and rigorous account of Jābir's World of Simple Elements, see Kraus [1942-3], II, pp. 135 ff.

<sup>82</sup> *Tim.* 51b8.

<sup>83</sup> *Kitāb Maydān al-ʿAql*, Kraus ed. [1935], 211:3; 212:4; 213:10, 11.

<sup>84</sup> *Ibid.*, 211:15; 213:11.

- <sup>85</sup> *Ibid.*, 212:2.
- <sup>86</sup> *Ibid.*, 207:6-8. See Arabic text in the addenda below.
- <sup>87</sup> See particularly *Taṣrīf*, *ibid.*, 392 ff.; *al-Mizān al-Ṣaḡhīr*, *ibid.*, 425 ff.
- <sup>88</sup> *Ibid.*, 411:16; 412:1.
- <sup>89</sup> *Ibid.*, 453:2.
- <sup>90</sup> *Ibid.*, 211:14 ff.
- <sup>91</sup> This is reminiscent of the *ekmageion* of *Timaeus* 50c.
- <sup>92</sup> • “The simple elements, namely hot, cold, dry and moist.” (See n. 80 above).  
• “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, Intelligence and Substance. And the examples of compounds are Fire, Air, Water and Earth. . . .” (*Taṣrīf*, Kraus ed. [1935], 412:11-13). See Arabic text in the addenda below.  
• “The simples are hot, cold, moist and dry out of which Fire, Air, Water and Earth are formed.” (*al-Mizān al-Ṣaḡhīr*, *ibid.*, 425:6-7). See Arabic text in the addenda below.
- <sup>93</sup> “These elements, namely Fire, Air, Water and Earth are seconds to the firsts [sc. to hot, cold, etc.].” (*Sabʿīn*, *ibid.*, 482:13-14).
- <sup>94</sup> *Sabʿīn*, *ibid.*, 482:14-16.
- <sup>95</sup> “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-Mizān al-Ṣaḡhīr*, *ibid.*, 426:12-14).
- <sup>96</sup> In Jabirian writings *quwwa* never denotes an elementary quality—in fact, this is the term Jābir uses to designate the intensity of the four qualities in different bodies (see below). *Kayfiyya* for quality is extremely rare (see Edited Text, 39:2-3).
- <sup>97</sup> See n. 52 above.
- <sup>98</sup> “The four mutually dissimilar contrary *arkān* (*al-mutaḍāda al-mutaḥāyina*) are hot, cold, moist (*nadāwa*) and dry.” (*Ṣafwa*, MS Paris 5099, f. 117a).
- <sup>99</sup> To be found throughout the corpus.
- <sup>100</sup> See n. 170 below.
- <sup>101</sup> For example, see *Sabʿīn*, Kraus ed. [1935], 462:7.
- <sup>102</sup> *Maydān al-Aql*, *ibid.*, 207:8; *al-Mizān al-Ṣaḡhīr*, *ibid.*, 454:17; 455:1.
- <sup>103</sup> *Maydān*, *ibid.*, 207:8; 208:4.
- <sup>104</sup> *Maydān*, *ibid.*, 207:15.

- <sup>105</sup> *Maydān*, *ibid.*, 208:13.
- <sup>106</sup> *Sabʿīn*, *ibid.*, 462:9; *al-Mizān*, *ibid.*, 438:9.
- <sup>107</sup> *Sabʿīn*, *ibid.*, 463:7.
- <sup>108</sup> *Sabʿīn*, *ibid.*, 460:3; 463:7.
- <sup>109</sup> “*Famā tarrakaba min hādhihiʿl-ʿanāsiri fi hādhaʿl-jawhari waʿn-hamala ʿalayh. . . .*” (*Sabʿīn*, *ibid.*, 482:12); “*tarkibuʿt-ṭabāʿiʿi waʿl-jawhar*” (*al-Mizān*, *ibid.*, 451:17).
- <sup>110</sup> “*Turkabuʿt-ṭabāʿiʿu ʿalāʿl-jawhar*” (*al-Mizān*, *ibid.*, 455:6).
- <sup>111</sup> “*Hamalaʿt-ṭabāʿiʿu ʿalāʿl-jawhar*” (Occurs frequently in the *al-Mizān*).
- <sup>112</sup> “*al-muʿaththirā*” (*Sabʿīn*, Kraus ed. [1935], 482:9).
- <sup>113</sup> “*Taʿtawiruhu*” (*al-Mizān*, *ibid.*, 444:14).
- <sup>114</sup> “*aṭ-ṭabāʿiʿu taḥṣiru . . . ʿl-jawāhir.*” (*al-Mizān*, *ibid.*, 444:13).
- <sup>115</sup> “*Tuḡjammiʿuʿl-jawhar*” (*al-Mizān*, *ibid.*, 454:2).
- <sup>116</sup> *Gen. et Corr.*, 2.3, 331a3-6.
- <sup>117</sup> *Ibid.*, *passim*.
- <sup>118</sup> *Sabʿīn*, Kraus ed. [1935], 473:3-5. See Arabic text in the addenda below.
- <sup>119</sup> *Sabʿīn*, *ibid.*, 474:10-11. See Arabic text in the addenda below. (Here, once again, we note Jābir’s corpuscularian tendencies).
- <sup>120</sup> *Ibid.*, 432:4-8. See Arabic text in the addenda below.
- <sup>121</sup> Kraus [1942-3], II, p. 168 ff.
- <sup>122</sup> See Long and Sedley [1987], p.162, p.163.
- <sup>123</sup> Kraus, *op. cit.*, p. 168.
- <sup>124</sup> See Sorabji, *op. cit.*, p. VIII.
- <sup>125</sup> *Ibid.*, pp. 89-90.
- <sup>126</sup> *Ibid.*, p. 56, n. 54. 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.
- <sup>127</sup> We met these authors in Chapter 1 above.
- <sup>128</sup> *Sirr*, Weisser ed. [1979], 3:3-11.
- <sup>129</sup> *Ibid.*, 186:11; 187:1.

<sup>130</sup> Mingana ed. [1935], Discourse I, Chap. I (emphasis added).

<sup>131</sup> *Ibid.*, Chap. 3 (emphasis added).

<sup>132</sup> Ed. Huart [1899-1919], I, p. 140.

<sup>133</sup> Jābir seems to be referring here to an interpretation of Plato's *Theaetetus* that properties need no subject—that bodies are just a bundle (*hathroisma, sundromē*) of properties (see "Bodies as Bundles of Properties" in Sorabji [1988]). This question is taken up also by Plutarch (*Stoicorum veterum fragmenta*, 2.126, von Arnim ed. [1903-24]).

<sup>134</sup> 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]).

<sup>135</sup> *al-Mizān*, MS Paris 5099, f. 123a. Again, such views are attributed to some early *mutakallims* such as al-Nazzām (see al-Ash'arī, Ritter ed. [1963]). In fact it seems that in all three cases (natures without substratum, reduction of bodies to accidents, and denial of accidents) Jābir may well be referring to the debates in the early *kalām* cosmology. A reading of the *Maqālāt* tends to support this view. *Kalām* cosmology has been discussed by van Ess, *op. cit.*

<sup>136</sup> McVaugh [1967]; [1969]; [1975].

<sup>137</sup> Skabelund and Thomas [1969].

<sup>138</sup> Natural philosophers at the beginning of the 14th century A.D. 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], p. 56). 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. 143 below).

<sup>139</sup> It was Marshall Clagett who first suspected a connection between Bradwardine's law and the system devised by Kindi to measure the qualitative intensity of compound medicines (Clagett [1959] 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-Bradwardine, to which Skabelund and Thomas added Walter of Odington as the link between Arnald and Bradwardine. Siggel has studied a 1759 A.D. Arabic version of Kindi's work (Siggel [1953]).

<sup>140</sup> 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 have presented a comprehensive account of Walter's *Iccedron*.

<sup>141</sup> See below.

<sup>142</sup> Skabelund and Thomas, *op. cit.*, *passim*. McVaugh [1967], *passim*; [1975], *passim*; [1969], p. 405.

<sup>143</sup> According to Kindi, 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 seems simply to have imported it into natural philosophy.

<sup>144</sup> Walter of Odington does refer to Geber (see Skabelund and Thomas [1969], p. 334).

<sup>145</sup> See Schöner [1964] p. 86 ff.

<sup>146</sup> McVaugh [1969], p. 399.

<sup>147</sup> 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]).

<sup>148</sup> Jābir develops this point in the *Baḥṭh*, MS Jārullāh 1721 (see quotations in Kraus [1942-3] *passim*).

<sup>149</sup> See quotations from the *Baḥṭh* in Kraus, *ibid.*, II, p. 191, nn. 2-3.

<sup>150</sup> *Baḥṭh* MS Jārullāh 1721, f. 126a. See Arabic text in the addenda below. For the identification of the Arabic names of drugs see especially Meyerhof and Sobhy [1932-40]; Siggel [1950].

<sup>151</sup> Seed of Pharbitis (Siggel [1950], p. 28).

<sup>152</sup> *Baḥṭh*, f. 100b.

<sup>153</sup> *Baḥṭh*, f. 99a. See Arabic text in the addenda below.

<sup>154</sup> McVaugh [1969], p. 28.

<sup>155</sup> Haly Abbas, whose dates are only vaguely known, was a personal physician to the Būyid Amīr 'Aḍud al-Dawla (338-372/949-82) in Baghdad. It is to this patron that he dedicated his *Liber regius*. (See Plessner [1974]).

<sup>156</sup> McVaugh [1969], p. 402.

<sup>157</sup> *Baḥṭh*, f. 99a. (qu. Kraus [1942-3], II, p. 191, n. 3).

<sup>158</sup> It is interesting that Walter of Odington also talks about degrees and minutes (Skabelund and Thomas [1969] p. 344).

<sup>159</sup> For example we read in the *al-Khawāṣṣ al-Kabīr*: "These seven subdivisions are called *martaba*, *daraja*, *daqīqa*, *thāniya*, *thālitha*, *rābi'a*, and *khāmisa*." (Kraus ed. [1935], 237:11-12).

<sup>160</sup> "Each of these [seven] subdivisions recur four times," (*al-Khawāṣṣ al-Kabīr*, *ibid.*, 237:12) "... and when 28 [= 7 × 4] is multiplied by 4, it becomes 112" (*Baḥṭh*, f. 125a). See Arabic text in the addenda below.

<sup>161</sup> Edited Text, 1:10-3:7.

<sup>162</sup> *Kitāb al-Khamsīn*, MS Shahid Ali Pasha 1277, f. 131a, qu. Kraus [1942-3], II, p. 188, n. 3.

<sup>163</sup> Kraus has provided us a meticulous general survey of Jābir's *Mizān*, *ibid.*, pp. 187-303.

<sup>164</sup> *Ahḡār*, MS Paris 5099, f. 60a20.

<sup>165</sup> *Baḥṭh*, f. 15b.

<sup>166</sup> *Ahḡār*, f. 59a7-f. 8.

<sup>167</sup> Edited Text, 35:15-36:1.

<sup>168</sup> In the *Ahḡār*, Jābir equates *al-Mizān* with *al-ḥadd* (definition) and then says: "Definition is the Supreme Principle." (MS Paris 5099, f. 60a).

<sup>169</sup> 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], p. 61).

<sup>170</sup> "First you should know," writes Jābir in the *Ikhrāj*, "that a thing is characterized by one nature or another (*bi ṭab'īm mā*) This nature is signified by a quality (*kayfiyya*). 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).

<sup>171</sup> This is Jābir's Science of Artificial Generation (*takwīn*) which is developed in the *Tajmīr*.

#### ADDENDA TO NOTES

(٥٠) الجوهر القابل لكل شيء، وهو الذي في كل شيء، ومنه كل شيء، وإليه يعود كل شيء.

كما خلقه بارئته تعالى ربنا ومولانا جعله في كل وكل إليه راجع.

(٥١) الجوهر ... الذي منه بنية هذا العالم وهو الذي يسميه قوم الهيولى.

(٥٢) أصل الأشياء أربع طبائع ولها أصل خامس وهو الجوهر البسيط المسمى الهيولى.

(٥٦) إن تلك الدائرة هي الفلك المنير الأعظم الذي يسمى الفلك الحاوي للعالم الذي نحن فيه.

(٥٩) فأما الجوهر، عافاك الله، فهو الشيء المملوء به الفلك وهو المشكل بكل صورة وفيه كل

شيء ومنه كل شيء يتركب وإليه ينحل كل شيء، وإن كنت لا تعلم ما هو من هذا القول

فهو الهباء ولونه إلى البياض ما هو، فإذا وقفت عليه الشمس انقذح وظهر. فينبغي أن تعلم أن ذلك هو نفس جرم الفلك المنير الأعظم، سبحانه خالقه وتقدس أساؤه، وهو الذي الجسم في سائر الموجودات الثلاثة التي هي الحيوان والنبات والحجر.

(٦١) وقال في كتاب طيماوس إن الهيولى والبلد لشيء واحد، فإن كانت الهيولى البلد والبلد هو المكان فلا محالة أن أفلاطن يريد بقوله ... إن العقل مكان للصور الطبيعية ... وإنما لا شكل للمكان ولا كيفية.

(٦٤) وينبغي أن يتصور بعد ذلك أنه يكون منه دائرة عظيمة لأن الأشياء إذا كانت أجزاءها وكلياتها واحدة، وذلك لا يكون إلا في البسائط ...

(٦٥) ولينتصور أنه مما كان بقصد وتأليف إذ قد كنا حصلنا أن ما كان مؤلفاً غير بسيط ...

(٦٦) وإنه بنفس حركته ما تولد بين الحرارة البرودة شيء لا هو حار ولا بارد.

(٦٧) ثم لتتصور أيضاً من جوانب هذه الدائرة داخلها أو خارجها أو قواعدها إما في حدود الدوائر أو غيره الزمان والمكان.

(٧١) وليس يمكن أحداً لسه ولا إذا مسه وجد له لساً، ولا يقدر أن يأخذ منه شيئاً بيده.

(٨٦) ونمثل أولاً بعداً ما لا شيء فيه، ثم نتصور أن جوهرأ قد أخذ صورة، فقد صار فيه شكل ما وهذا الشكل يكون أبداً مدوراً لا غير. ثم إن الامتزاج تعلق بإحدى الطبائع المفردات.

(٩٢) البسائط الأول [هو] المفردات لا المركبات، والبسائط المفردات كالحرارة وغيرها من اخواتها، والكنفس والعقل والجوهر؛ والمركبات كالنار والهواء والماء والأرض ...

[إن] المفردات هي الحرارة والبرودة الرطوبة واليبوسة التي تركبت النار والماء والهواء والأرض.

(١١٨) ووجه التدبير أن تلقى الماء في القرعة وتترك في القرعة شيئاً فيه يبس شديد قوى كالكبريت وما جانس، فإن الرطوبة نشفتها اليبوسة والحرارة ويحرق ما فيه من الرطوبة فتبقى البرودة مفردة.

(١١٩) وحد اليبوسة أن تكون صلبة كمدة ناشفة أو هباء لا جزء له، يقل بالجمع ويكثر بالتفريق.

(١٢٠) وقد وجب الآن على التحقيق أن للحرارة والبرودة والرطوبة واليبوسة أوزاناً، وأن للجوهر

وزناً لا بد من ذلك. وإلا فوجب أنا إذا جمعنا من لا يرى ولا يوجد ... ولا وزن لأحد منهم  
 لم يكن منه شيء .  
 (١٥٠) فإننا نعلم ضرورة أن الحرارة التي في السكر ليست الحرارة التي في الإنيسون ولا الحرارة  
 التي في شحم الحنظل ولا الحرارة التي في الفريون .  
 (١٥٣) ... وذلك لأن الروائح والألوان لا تصدق، أما الألوان فلأن اللون الواحد قد يقسمه  
 البارد والحر والرطب واليابس فلا يكون في ذلك دليل ولا علامة ألبتة. وأما الروائح فلأنها  
 تفسد وتتشابه وأمثال ذلك. وأما الطعوم فإنها السبب والمفتاح الموصل إلى طبيعة الشيء  
 لا غير ذلك. وهذا أيضاً قد يفسد على القوم من قبل أحوال الأشياء التي لا طعوم لها ألبتة  
 كالذهب والفضة وأشياء كثيرة جداً مثل هذه .  
 (١٦٠) وإن كل واحد يتكرر أربع مرات ...  
 وذلك يكون من مضروب ثمانية وعشرين في أربعة ومبلغ ذلك مائة واثنى عشر .

# NAMES, NATURES AND THINGS: A PREFATORY NOTE ON THE CENTRAL THEME OF THE *KITĀB AL-AḤJĀR*

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,<sup>1</sup> "beyond which there is no end" (*lā nihāya ba'd dhālik*).<sup>2</sup>

As a methodological thesis, Jābir's Balance was the 'way' (*ṭarīq*)<sup>3</sup> 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 (*muḥīd*), and all of them served the aim of attaining scientific knowledge, the best of all Balances was the Balance of Letters (*Mizān al-ḥurūf*):

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!<sup>4</sup>

This 'most perfect Balance' which is also called the Balance of Articulation (*Mizān al-Hijā*)<sup>5</sup> and the Balance of Utterance (*Mizān Lafẓī*),<sup>6</sup> is further characterized elsewhere:

A group of people says that the knowledge of matters relating to the four natures (*ahwāl al-ṭabā'ir*),<sup>7</sup> as well as an understanding of the qualities (*kayfiyyāt*),<sup>7</sup> 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 daqīq*)<sup>8</sup> through which one reaches an understanding of the real characteristics of natural objects (*ḥaqā'iq ahwāl al-mawjūdāt*).<sup>9</sup>

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 *Mizan al-Ḥurūf*, Jābir attempts a grand philosophical synthesis in which his four natures systematically and coherently relate to phonetics and morphology on the one hand, and to prosody and musical harmony on the other. From all this emerges the ontological counterpart of his reductionist thesis: we have seen that in Jābir's physics all explanations of the natural world were reduced to an explanation of the four natures—now he proposes an ontological equivalence between the natures and the alphabetical characters, characters which portrayed the elements of articulated speech. The *Kitāb al-Aḥjār* is devoted to an elaboration of this very thesis.<sup>10</sup>

Let us begin by isolating Jābir'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-Taṣrif* (Book of Morphology),

how letters are copied upon the natures (*wudi'at 'alā al-ṭabā'i'*) and how the natures are copied upon letters, and how the letters and natures interchange (*tunqalu*)<sup>11</sup>

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 the natures comprising the thing in whose name these letters occurred.<sup>12</sup> This letter-nature correspondence is stated categorically and forcefully:

A single isolated letter (*ḥarf*) cannot be pronounced.<sup>13</sup>

It is clear that we cannot speak by means of an isolated letter [*ḥarf* here meaning phoneme] unless we attach to it another letter [= phoneme]. 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!<sup>14</sup>

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.<sup>15</sup> 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 (*ḥarf al-nuṭq*) and a letter of rest (*ḥarf al-istirāḥa*), and this is required for vocal emission.<sup>16</sup>

So consequently, the combination of letters corresponds to the combination of the natures in all natural objects.<sup>17</sup>

The grammarians, writes Jābir in the *Taṣrif*, 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 (*basā'it* = *ṭabā'i'*) of bodies. Thus, grammar and physics follow homologous methodological procedures. This is the reason why he had called this work the "Book of Morphology,"<sup>18</sup> for:

there can be no discourse (*kālām*) except through a composition of letters [= phonemes] (*ta'līf al-ḥurūf*), and a similar situation necessarily exists in the case of the natures . . . In fact, the morphology of the natures (*taṣrif al-ṭabā'i'*) bears a parallel in the morphology of letters (*taṣrif al-ḥurūf*).<sup>19</sup>

But the term "*ḥarf*," we pause here to note, seems to be appearing in two different senses—sometimes meaning 'letter of the alphabet'; at other times, 'primary phonetic unit' or 'phoneme.' To be sure, a considerable confusion would result out of this terminological duality, but there is no conceptual ambiguity here. For, as we shall soon see, *ḥarf* as phoneme (sound) and *ḥarf* as representation of phoneme (alphabetical characters) were unambiguously recognized as two ontologically distinct entities in the Jabirian metaphysics: the former considered to be universal and immutable; while the latter was a mere convention and therefore subject to improvement and change. We are told further that perfect representation of utterances which made up articulated speech (*nuṭq*) constituted an ideal, existing only in potentiality; writing was a human attempt to bring this ideal into 'actuality.' Thus alphabetical characters were no more than

a portrayal by means of lines (*tamthīl al-khutūt*), and [a process of] bringing it [sc. the enunciated word] from potentiality into actuality.<sup>20</sup>

Being a matter of convention, these portrayals, or 'signs' (*ashkāl*), could change and evolve; in fact they needed to:

If one were to replace . . . similar signs [of the Arabic script] by dissimilar signs people would be saved from corruption and mistakes of language. This is where the flaw of the inventor (*nāzim*) lies. [Such reform] is in effect possible not just in the nature of writing, but also in its power to evolve.<sup>21</sup>

Thus, the Arabic script was corrupted by flaws and imperfections. But if this is the case, how can something that is conventional and imperfect (alphabetical characters) signify in a unique way something that is natural and universal (the four natures)? Clearly, it seems that when Jābir claims an immutable relationship between the natures and the letters, he means *ideal* letters—not the ‘lines’ or ‘signs’ which constituted the actual characters of the Arabic script, but the ideal representations of utterances which existed only in potentiality. Yet, in practice, one had no choice but to operate with the actual letters of the alphabet which, though imperfect, were the closest approximations to the ideal. At the same time, as we just read, efforts must be made to minimize the flaws of the Arabic script in order that the accuracy of this approximation is improved.

It seems, then, that there are not two but three distinct senses in which the term “*ḥarf*” is employed by Jābir: (i) letter of the alphabet, (ii) primary element of speech (phoneme), and (iii) ideal representation of the primary elements of speech. Speaking in theoretical (and rigorous) Jabirian terms, there was an ontological equivalence between the natures and the *ideal* representations of the primary units of speech. But as an approximation for *practical* purposes, the natures were assumed to be equivalent to the *actual* letters of the Arabic alphabet; and this is what Jābir is mostly concerned with, for his interests lie more in applications than in theory. In order to make sense of Jābir, it is important to keep all this in mind; otherwise, his doctrine will appear to us—as it does to Kraus—not only internally inconsistent<sup>22</sup> but also contradictory.<sup>23</sup> But let us now proceed.

### THE QUANTIFICATION OF LANGUAGE

Going back to the passages just quoted, we see Jābir employing another 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, the *Aḥjār* tells us, is no more than a numerical composition (*taʿlīf ʿadadī*), and it is the same composition that occurs in speech.<sup>24</sup> 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 *Aḥjār*, 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.<sup>25</sup>

Phonetics is concerned with sounds and therefore its relationship with music was easily established. In the *Aḥjār*, 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. In fact there was a structural correspondence between the physical organs of 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 [= phonemes] may derive their vocal articulation from the natures. There are in the throat several sources of vocal emission of letters [= phonemes].<sup>26</sup>

As for the actual letters of the alphabet, and here the distinction between these and phonemes is categorically and unambiguously stated, they were designated figures for the denotation of *sounds*. Thus, we read in the *Kitāb al-Ḥudūd* that letters

are designated figures which by general agreement (*biʾl-muwādaʿa*) indicate articulated sounds. By convention, the ordered composition of these figures signifies meanings (*maʿānī*).<sup>27</sup>

And in this way, letters were related to meanings. 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 intended by the letters.<sup>28</sup>

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 which carried meaning (*bi-maʿnan taṭṭuḥu*), and those which did not (*bi-ghayr maʿnan*).<sup>29</sup> 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 *Aḥjār* that the maximum *number* of moving (vocalized) and quiescent (non vocalized) consonants that can cluster in a row is naturally fixed.<sup>30</sup> Elsewhere,<sup>31</sup> he



classifies the letters of the alphabet according exclusively to their phonetic value—there were some letters which were sonorous (*majhūra*), others which were ‘deaf’ (*al-ṣumm*),<sup>32</sup> yet others were *literae productionis* (*hurūf al-līn*), and so on.<sup>33</sup>

Morphology is treated by Jābir *as if* it were a branch of arithmetic—a science of numbers and their permutations.<sup>34</sup> Indeed, in the context of the Arabic language this does not seem 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.<sup>35</sup> Thus the Arabic language easily lent itself to a quantitative treatment—a feature fully exploited by Jābir.

In our text Jābir gives us a whole set of rules for restituting the root of a word (*radd ilā’l-ʾaṣl*) so that its structure exactly reproduced the structure of the thing it named. The task of the expert of Balance (*Ṣāhib al-Mizān*) 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 (*iʿrāb*), and of the verb (*taṣrif*), the article, and all other augmentations must be stripped away to extract the primitive core—this is what Jābir calls in the *Aḥjār* “*isqāt / iṭṭirāḥ al-zawāʾid*.”<sup>36</sup> 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.<sup>37</sup>

Again, in agreement with the grammarians, Jābir classifies Arabic roots according to the *number* of radicals. In the *Aḥjār* he distinguishes three types of roots: trilateral (*thulāthī*), quadrilateral (*rubāʿī*), and quinqueliteral (*khumāsī*).<sup>38</sup> He then gives different permutations of the vowels modifying the structure of a root, yielding 12 paradigms (*awzān*) of trilateral roots, 5 of quadrilateral, and 4 of quinqueliteral roots.<sup>39</sup> But this was a mathematical exercise constrained by semantic and phonetic conventions, for many more paradigms are possible if one treated the radicals, as well as the adjoining vowels and the *sukūn*,<sup>40</sup> as symbols of a formal arithmetic system. Indeed, this is precisely what Jābir does in his *Kitāb al-Ḥāsil*.

In the *Ḥāsil* 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. Conventionally, 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, *bāʾ*. In constructing the trilateral 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.<sup>41</sup> We are told that quadrilateral roots admitted of 24 different combinations ( $= 4 \times 3 \times 2 \times 1$ ), and quinqueliteral roots of 120 ( $= 5 \times 4 \times 3 \times 2 \times 1$ ).<sup>42</sup> 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 (*ʿilm al-ʿarūd*) based solely on quantitative considerations.<sup>43</sup> Classical Arabic verse is a ‘quantitative’ verse, in that its rhythm is attained 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.<sup>44</sup> The founder of the Arabic science of metrics, al-Khalil ibn 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 (*mutaḥarrik*) 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.<sup>45</sup>

This whole theory of Arabic metrics is not only known to Jābir, he reproduces it systematically and rigorously in the *Aḥjār*, finding yet another support for his Balance of Letters doctrine. Like al-Khalil, Jābir identifies 8 rhythmic feet—significantly, he calls them “parts of the numerical composition” (*ajzāʾ al-taʾlīf al-ʿadadī*)—whose recurrence in

definite distribution and sequence gave rise to all meters. Two of them were quinary feet (*khumāsiyya*), 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 meters.<sup>46</sup>

Jābir feels that music and metrics were evidently cognates. Small wonder, then, that in the *Aḥjār* he speaks of both of them in the same breath—in the same passage and in the same sentence, employing for 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 . . .<sup>47</sup>

Just as there were eight rhythmic feet in metrics, there were, we read in our text, eight rhythmic modes in music too.<sup>48</sup> And just as additions and separations (of syllables) gave rise to ever new meters, 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 strongly-worded expression to this effect is to be found in the *al-Sirr al-Maknūn* where Jābir declares that it is simply wrong (*khaṭā'*) 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."<sup>49</sup>

Among the members of this genus were the "wonders" (*ʿajā'ib*) of the motions of celestial bodies—these motions followed a numerical system (*al-nizām al-ta'liḥ*): "and by this I mean a musical system."<sup>50</sup> But more than that, the individual soul too was a harmony of numbers. In the *al-Sirr 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.<sup>51</sup>

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

Plato believed that the soul is rational substance (*jawhar ʿaqlī*) whose essential motion is governed by the harmony of numbers.<sup>52</sup>

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

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.<sup>53</sup>

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.<sup>54</sup>

## 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 (*naḥwīyyūn*, *aṣḥāb al-ʿarūd*, etc.)<sup>55</sup> 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 meaning and justification. "Some people consider me a fool," wrote Jābir in the *Tajmīʿ*, "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.<sup>56</sup>

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 ultimately reducible to primary elements—these elements were the primary units of speech represented by letters. Therefore, at the primitive level, (ideal) letters signified the natures. The ontological equivalence of letters and natures was thereby established.

This is how Jābir presents his logical argument:

I say: in a discourse Aristotle had said that in the world of generation and corruption man alone is endowed with the faculty of articulated speech (*nutq*).<sup>57</sup>

Articulated speech consists in [the ability of] discrimination and judgment (*tamyiz*), and discourse (*kalām*) consists in the ordering of letters [*hurūf* = phonemes]. It is through this ordering that a given language is arrived at.

But is it [sc. language] due to convention (*istilāh*), occurring by chance (*'alā mā jā'a wa ittafaqa*); or is it due to the natural intention of the soul (*qasd tabī'i nafsāni*)?

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 [= phonemes], which are the prime matter (*hayūlā*) of discourse, are an invention of the soul.<sup>58</sup>

In a more structured form, the argument can be put thus:

- I (a) Man alone is endowed with the faculty of speech
- (b) Man alone possesses soul (not stated but certainly presupposed)

Inferred hypothesis: Speech is an act of the soul

- II (a) All acts of the soul are substantial
- (b) Speech is an act of the soul

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. And even though in matters of specific details much in these sciences is false, yet, taken as a whole, these sciences are true.

Likewise, it is undeniable that discourse (*kalām*), and the composition of letters (*ta'lif al-hurūf*) and the design of their shapes (*'amal ashkālūhā*) are among the works of man (*min ta'lif al-insān*)—except that these come to pass by nature.

It is thus indubitable that discourse and the ordering of letters [= phonemes] are part of man's natural disposition (*lahu tab'um mā*). This is so because every naturally existing thing possesses a natural disposition (*tabī'a*), and man exists naturally.<sup>59</sup>

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 (*'ayn*), essence (*dhāt*), and reality (*ḥaqīqa*).
- Second in the ontological hierarchy is the *representation* of being in the intellect (*taṣawwur bi'l-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 not, and whether it is necessary or impossible, true or false.
- The third place is occupied by *enunciation* (*al-nuṭq*), 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 of lines, and a process of bringing the enunciated word from potentiality into actuality.<sup>60</sup>

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*).<sup>61</sup> 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* (*Bārīr Minyās*).<sup>62</sup>

All things are considered under four aspects. First, their substances (*'yān*), essences (*dhwār*), and realities (*ḥaqā'iq*). 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-nuṭq bihā*), and the knowledge of . . . (?)<sup>63</sup> the quiescent letters, *hamza* bearing letters, mobile letters, linking letters, and others.

Finally, putting them in writing (*al-katb bihā*). This is a portrayal by means of lines (*tamthil al-khuṭūṭ*), and [a process of] bringing it [sc. the enunciated word] from potentiality into actuality.<sup>64</sup>

There is no disagreement between philosophers, says Jābir, that each existing thing reflects the nature of a higher thing from which it

derives.<sup>65</sup> 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 (*dalla 'alā mā fi'l-lafẓi*), and that which is in enunciation signifies what is in the intellect (*mā fi'l-fikr*), and what is in the intellect signifies the quiddity of things (*māhiyat al-ashyā'*).<sup>66</sup>

#### APPLICATION OF THE BALANCE OF LETTERS

Jābir 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 stratagems. Yet, at the same time, we shall see him making some powerful and rich theoretical generalizations which are suggested solely by practical considerations.

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.<sup>67</sup> 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 *Ahjār* he constructs a table in which the letters are arranged according to the ABJAD scheme<sup>68</sup> 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, the table specifies the subdivision of the degree to which each letter corresponds.

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 of intensity; if it is

the second radical (such as in *kāfir*), 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 ( $= 1 + 3 + 5 + 8$ ).<sup>69</sup>

	Ist Deg.	IIInd Deg.	IIIrd Deg.	IVth Deg.	Hot	Cold	Dry	Moist
	1	3	5	8				
	<i>dān.</i>	<i>dān.</i>	<i>dān.</i>	<i>dān.</i>				
Degree	7	21	35	56	<i>alif</i>	<i>bā'</i>	<i>jīm</i>	<i>dāl</i>
Grade	3	9	15	24	<i>hā'</i>	<i>wāw</i>	<i>zā'</i>	<i>ḥā'</i>
Minute	2½	7½	12½	20	<i>ṭā'</i>	<i>yā'</i>	<i>kāf</i>	<i>lām</i>
Second	2	6	10	16	<i>mīm</i>	<i>nūn</i>	<i>sīn</i>	<i>'ayn</i>
Third	1½	4½	7½	12	<i>fā'</i>	<i>ṣād</i>	<i>qāf</i>	<i>rā'</i>
Fourth	1	3	5	8	<i>shīn</i>	<i>ṭā'</i>	<i>thā'</i>	<i>khā'</i>
Fifth	½	1½	2½	4	<i>dhāl</i>	<i>dād</i>	<i>zā'</i>	<i>ghayn</i>

The *Ahjār* 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' (*ittirāḥ*) was needed. Now, this name had four consonantal elements—*alif*, *sīn*, *rā'*, and *bā'*, 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 *dānaqs* [*dān.*]; by the same rule, the second letter *sīn* signified dry in the second degree whose weight in the table was given as 6 *dān.* Likewise, *rā'* corresponded to moist in third degree with a weight of 7½ *dān.*; and, finally, *bā'* was cold in the fourth degree, weighing 56 *dān.* Lead therefore was constituted out of 7 *dān.* of hot, 6 *dān.* of dry, 7½ *dān.* of moist, and 56 *dān.* of cold.

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.<sup>70</sup> There were other problems too, though of a relatively minor

magnitude—for example, the question of homonyms and synonyms had to 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 *Aḥjār* what clearly seems to be an ad-hoc hypothesis. The analysis of names (*ḥijāʿ*) only revealed the external or manifest (*ẓāhir*) nature of a thing. But there was in all things also a complementary inner or latent (*bāṭin*) nature—and this was a matter of intuition (*ḥads*). 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 the use of the ‘Socratic’ table through which one discovered the natures contained in the body and their weights—now the external nature of the body was fully determined.

Finally, the third step consisted in the uncovering of the latent complement of the external nature of the body—this was an intuitive exercise 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”<sup>71</sup> 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 suppressed the excess (*ittirāḥ*).

We find a large number of concrete examples worked out by the author to illustrate this 3-step method. For instance, he takes silver (*ḥidda*) and shows how one determines its complete nature (manifest + latent):<sup>72</sup>

- The primitive elements of the name *ḥidda* were *F D* (the second *D* was a repetition and was therefore to be ‘thrown away’; the *tā marbūʿa* 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  $1\frac{1}{2}$  *dān*. *D* was  $1\frac{1}{2}$  *dān*. 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:

Nature	Analysis (Manifest)	Intuition (Latent)	Total
Hot	$F = 1\frac{1}{2}$ <i>dān</i> .	$5\frac{1}{2}$ <i>dān</i> .	7 <i>dān</i> .
Cold	$D = 1\frac{1}{2}$ <i>dān</i> .	$3\frac{1}{4}$ <i>dirhams</i>	$3\frac{1}{2}$ <i>dir.</i> (= $3 \times 7 = 21$ <i>dān</i> .)
Moist	—	5% <i>dir.</i>	5% <i>dir.</i> (= $5 \times 7 = 35$ <i>dān</i> .)
Dry	—	9% <i>dir.</i>	9% <i>dir.</i> (= $8 \times 7 = 56$ <i>dān</i> .)

Now, as we note, the four natures are in the proportion 1 : 3 : 5 : 8, and the final result does, indeed, conform 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 *Aḥjār*, but throughout the *Books of Balances*. Thus, for example, the number 17 is equated to form (*sūra*): “the form of all things is 17.”<sup>73</sup> Similarly, it is affirmed that all minerals (*aḥjār*) had 17 powers.<sup>74</sup> 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 *Aḥjār*, 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 explode, losing 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 disintegrate and pulverize (*la kharaja mutafattiṭan*). And this is the universal Canon of Equilibrium (*Qānūn li'l-Iʿtidāl*).<sup>75</sup>

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 (*aʿdal*) 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 distinguished only by its utility.*"<sup>76</sup> 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 are governed by the number 17. Every metal, writes Jābir in the *Sabʿīn*, 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.<sup>77</sup>

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 (*qalaʿī*) is latently silver.<sup>78</sup>

Similarly, in the *Ahḡār* 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.<sup>79</sup> 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, Jābir even specifies the location of the two complementary sets of natures in physical objects—thus, in the *Tajmīʿ* he tells us that external natures existed at the periphery (*muhīt*) of the body, and internal natures were located in the inside (*bātin*), that is, at the center.<sup>80</sup>

The classical idea of 'red' and 'white' metals is also smoothly and ingeniously incorporated 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.<sup>81</sup>

So we see that in the process of tackling a dangerous problem with his system, Jābir 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 method of intuition 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

intuition. 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.<sup>82</sup>

The question of homonyms and synonyms is addressed by Jābir on the grounds of the natural origin of language. In the *Ahḡār* he declares that two different names never designate the same thing, nor do two different things have the same name or the same definition.<sup>83</sup> In some treatises we see him painstakingly involved in etymologies in order to justify his views.<sup>84</sup> Our text carries a discussion on what is regarded as different appellations applied to the same metal, tin: *qalaʿī*, *raṣās*, *zāwus* and *mushtarī*. The author, invoking the authority of Socrates, decides in favor of *zāwus* as being the correct name of the substance in question.<sup>85</sup> 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 *Ahḡār* that one ought to consider not colloquial names (*ʿind al-mudhākara*) but names which are established from the point of view of the application of Balance (*ʿind al-ʿamal*), that is, names purged of corruptions.<sup>86</sup> And although this sage is quoted in the text as saying that the practitioner of Balance need consider no language except Arabic,<sup>87</sup> 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!<sup>88</sup>

## NOTES

<sup>1</sup> In the *Kitāb al-Khamsīn* (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 'Alī Pāshā 1277, f. 137b, qu. Kraus [1942-3], II, p. 187, n. 4). See Arabic text in the addenda below.

<sup>2</sup> Edited Text, 36:1 (see also 35:15-36:2).

<sup>3</sup> This term occurs throughout the *Kutub al-Mawāzīn*.

<sup>4</sup> *Khamsīn*, f. 131a, in Kraus, *op. cit.*, p. 188, n. 3. See Arabic text in the addenda below.

<sup>5</sup> In the *Kitāb al-Tajmī'* (Book of Concentration, Kr 398), MS Leiden 1265, f. 167a-b, qu. Kraus, *op. cit.*, p. 244.

<sup>6</sup> In the *al-Sirr al-Maknūn*, MS Paris 5099, f. 55a.

<sup>7</sup> Once again, we note, Jābir distinguishes between *ṭab'* (nature) and *kayfiyya* (quality).

<sup>8</sup> Early *kalām* writers seem to use the term *daqīq* (pl. *daqā'iq*), or *latīf* (pl. *latā'if*) to characterize cosmological questions, as opposed to questions of a purely theological nature. Thus, the *mu'tazilī* 'Abd al-Jabbār (d. 415/1025) writes in a cosmological context that his predecessor al-Nazzām used to discuss the *daqīq* of *kalām* with Hishām ibn al-Ḥakam (see Qādī 'Abd al-Jabbār's *Fadl al-I'tizāl*, Sayyid ed. [1974], p. 254). The term *latīf* occurs in al-Khayyāt's *Kitāb al-Inṣār* (Nader ed. [1957], p. 14-15).

<sup>9</sup> *Baḥth*, MS Jārullāh 1721, f. 110a, qu. Kraus, *op. cit.*, p. 223, n. 7. See Arabic text in the addenda below.

<sup>10</sup> The account which follows integrates material from a large number of Jabirian treatises other than the *Ahjar* itself. However, this is not so much of a statement of virtue as it is one of necessity, for the *Ahjar* seems to have been the subject of a ruthless application of Jābir's Principle of *tabdīd al-'ilm*. 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 see Chapter 1 above). To understand the *Ahjar* one has to do what the 8th/14th century alchemist al-Jildakī did, that is, to gather all the 'fragments' in order to complete the picture—Jildakī says in his *Kitāb al-Misbāh fi 'Ilm al-Miftāh* that in thirst of knowledge he travelled far and wide, visiting Byzantium, North Africa, Egypt, Iraq and Syria to collect more than one thousand books by Jābir (MS Paris 2165, f. 144a, qu. Kraus [1942-3], I, p. XXII, n. 6).

<sup>11</sup> MS Paris 5099, f. 144a. See Arabic text in the addenda below.

It is interesting to note here a significant difference between the views of Jābir and those of the Ikhwān al-Ṣafā'. Thus, in the very beginning of their *Rasā'il*, 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; in their preface they say that "the forms of numbers in individual souls corresponds to the forms of existing things in prime matter (*hayūlā*)" (Zirikli ed. [1928], I, p. 1)—in other words, existing things are in accordance with the nature of *numbers*.

But Jābir 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.

<sup>12</sup> The relationship between things and names which designate these things is one of the earliest and most highly developed questions discussed and debated by Muslim thinkers. al-Suyūṭī 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 *kalām*, the principles of jurisprudence (*uṣūl al-fiqh*), and philology (*luḡha*) (see al-Mawlā ed. [1949], I, p. 7 ff.). An examination of the relationship between utterance (*lafz*) 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 Maḥdī, "occupies the center of stage in the discussions of language in classical Islamic thought as it had done earlier in classical Greek thought" (Maḥdī, "Language and Logic in Classical Islam" in von Grunebaum ed. [1970], p. 52). As we shall presently see, Jābir too is led to the same inquiry, and, in arguing for his views, he leans heavily on the question as to whether language is natural or conventional.

<sup>13</sup> *Tasrif*, Kraus ed. [1935], 392:9. See Arabic text in the addenda below.

<sup>14</sup> *Hāṣil*, MS Paris 5099, f. 96a. See Arabic text in the addenda below.

<sup>15</sup> But if this is the case, how can Jābir justify his claim that individual natures can be *isolated* through alchemical procedures? Further: how can he, without contradicting himself, hold that each nature, as well as substance, has a weight? (For these views of Jābir see Chapter 2 above). But it seems that one can in principle exonerate him of holding contradictory views.

In the natural world, Jābir had taught us, the four natures do not exist freely in isolation from one another: the adept could isolate them, but he could not 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.

<sup>16</sup> Arab grammarians designate vowels by the term *ḥarakāt* (motions), whence a consonant that is followed by a vowel is said to be *mutaḥarrik* (moving, = Jābir's *ḥarf al-nuṭq*), and that which has no following vowel is called *sākin* (quiescent, or at rest, = Jābir's *ḥarf al-istrāḥa*). Hence the symbol which denotes vowellessness, *jazm*, is called *sukūn*. Our author makes his second element 'at rest' to indicate the apocopate form. (See Wright [1862], II, p. 255).

<sup>17</sup> *Hāsil*, f. 95 b. See Arabic text in the addenda below.

<sup>18</sup> Kraus ed. [1935], 393:4-6. See Arabic text in the addenda below.

<sup>19</sup> *Ibid.*, 393:13-15. See Arabic text in the addenda below.

The use of the term "*taṣrīf*" in a physical sense is also found in Shahrastānī's *Milāl*. Expounding the cosmological doctrines of the Ṣābians, he writes that they considered spiritual substances (*al-rūḥāniyyat*) to be those which had the power (*quwwa*) to "transform bodies and transmute physical masses" (*taṣrīf al-ajsām wa taqlīb al-ajrām*) (Badrān ed. [1955], II, 703:17-18). Also, spiritual substances were to the Ṣābians those which "act freely upon bodies, transforming them and transmuting them" (*tutaṣarrifu fi'l-ajsām taṣrifan wa taqliban*) (*Ibid.*, 703:5-6).

<sup>20</sup> *Taṣrīf*, MS Paris 5099, f. 140b. See Arabic text attached to n. 64 below.

<sup>21</sup> *Ikhrāj*, Kraus ed. [1935], 9:5-8. See Arabic text in the addenda below.

<sup>22</sup> Kraus [1942-3], II, p. 256, n. 5.

<sup>23</sup> See n. 58 below.

<sup>24</sup> Edited Text, 9:7.

<sup>25</sup> 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-lughā*) and the champions of what was 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-Sirāfi, 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-Tawḥīdī whose *al-Imtā' wa'l-Mu'ānasa* 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-jawharī*).

According to the grammarians, writes Jābir in the *Ikhrāj*, "ordered letters (*al-ḥurūf al-manzūma*) denote *ism* (noun), *fi'l* (verb) and *ḥarf* (particle). In contrast, the people of substantial discourse . . . believe that by convention

(*istilāḥ*) ordered letters denote three categories: either an *ism* (Gr. *onoma*) or a *kalima* (verb, Gr. *rhēma*), or a *qawl* (statement/proposition, 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).

<sup>26</sup> *al-Sirr al-Maknūn*, MS Paris 5099, f. 54a. See Arabic text in the addenda below.

<sup>27</sup> Kraus ed. [1935], 109:4-5. See Arabic text in the addenda below. Here 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 Abū Bakr ibn Zakariyyā al-Rāzī in his *Hāwī* (see Kraus [1942-3], II, p245, n. 3) and Bīrūnī in his *Kitāb al-Ṣaydala* (See Meyerhof [1932], p. 14), Jābir criticizes the Arabic script for its ambiguities and suggests radical reforms.

In contrast, the Ikhwān teach that the codification of the Arabic script is definitive (*Rasā'il*, Zirikli ed. [1928], III, p. 151ff.), and its inventor (*wādi'*) was divinely inspired (*Ibid.*, III, p. 357, where one reads the phrase *ḥikmat al-Būrī'*). The Arabic alphabet, they believe, can be reduced to eternal geometric figures (*Ibid.*, I, p. 28).

<sup>28</sup> *Hudūd*, Kraus ed. [1935], 109:6. See Arabic text in the addenda below.

<sup>29</sup> *Ikhrāj*, *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.

<sup>30</sup> Edited Text, 9:7-11.

<sup>31</sup> *Ikhrāj*, Kraus ed. [1935], 11:14; 13:9 ff.

<sup>32</sup> This term is used by the grammarians to designate trilateral verbs with identical second and third radical: *verbum mediae geminatae*.

<sup>33</sup> See Bravmann [1934].

<sup>34</sup> Note the emphasis here. Jābir does not say that morphology *is* a branch of arithmetic, nor that it can be reduced to numbers (cf. n. 11 above).

<sup>35</sup> This was already accomplished in the 2nd/8th century by Khalīl ibn Aḥmad in his *Kitāb al-Ayn*.

<sup>36</sup> Edited Text, *passim*.



- <sup>37</sup> See de Sacy [1831].
- <sup>38</sup> He recognizes biliteral (*ṭhunāʾī*) roots too, of which he gives in the *Baḥṭh* 6 paradigms (Ms Jārullāh 1721, f. 130b).
- <sup>39</sup> Edited text 7:6-8:3. This account is in full agreement with the grammarians (see, for example, al-Suyūṭī, *op. cit.*, II, *passim*).
- <sup>40</sup> See n. 16 above.
- <sup>41</sup> Kraus in his [1942-3], II, pp. 248-9 has reproduced many of these lists.
- <sup>42</sup> *Baḥṭh*, f. 131a, qu. Kraus, *ibid.*, p. 247, n. 1; p. 248, n. 1.
- <sup>43</sup> In the extended sense ‘*arūd*’ embraces not only the science of meter, 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 here.
- <sup>44</sup> Unlike the 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.
- <sup>45</sup> Weil s.v. “*Arūd*” [EI<sup>1</sup>], I, p. 667; Freytag [1830]; Jāhiz, *Bayān* Cairo ed. [1932].
- <sup>46</sup> Edited Text, 9:12-17.
- <sup>47</sup> *Ikhraj*, Kraus ed. [1935], 14:10. See Arabic text in the addenda below.
- <sup>48</sup> Edited Text, 10:8-10.
- <sup>49</sup> MS Paris 5099, f. 54b. See Arabic text in the addenda below.
- <sup>50</sup> *Baḥṭh*, MS Jārullāh, f. 145b. See Arabic text in the addenda below.
- <sup>51</sup> MS Paris 5099, f. 55b. See Arabic text in the addenda below.
- <sup>52</sup> *Hāsil*, MS Paris 5099, f. 115b. This comes verbatim from ps-Plutarch’s *Placita philosophorum* (Daiber ed. [1980], Arabic Text, 50:10-11).
- <sup>53</sup> *al-Sirr al-Maknūn*, MS Paris 5099, f. 55a. See Arabic text in the addenda below.
- <sup>54</sup> *Loc. cit.* See Arabic text in the addenda below.
- <sup>55</sup> Repeatedly throughout the *Books of Balances*.
- <sup>56</sup> MS Leiden 1265, f. 106b, qu. Kraus [1942-3], p. 252, n. 4. See Arabic text in the addenda below.
- <sup>57</sup> Gr. *logos* from which the word “logic,” *manṭiq* derives.
- <sup>58</sup> *Khamsin*, MS Shāhid ‘Alī Pāshā 1277, f. 132b, qu. Kraus [1942-3], II, p. 256, n. 4. See Arabic text in the addenda below. Kraus (*op. cit.*, p. 256, n. 5) finds Jābir clearly contradicting himself in the *Ikhraj* where he says: “meaning

(*maʿnā*) can be considered as if it were substance (*kaʿl-jawhar*), discourse (*kalām*) as if it were accident (*kaʿl-ʿarad*)” (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 these meanings.

<sup>59</sup> MS Paris 5099, f. 54a. See Arabic text in the addenda below.

<sup>60</sup> 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 *Baḥṭh* the author does refer both to the *De anima* (*Fī al-Nafs*; MS Jārullāh 1721, f. 104a, qu. Kraus [1942-3], II, p. 323, n. 2), and to the *De sensu et sensato* (*Fī l-Hiss waʿl-Maḥsūs*; *ibid.*, f. 31b, qu. Kraus, p. 323, n. 5).

<sup>61</sup> The translation of “*maʿāni*” as “meanings” is rather loose. Kraus equates this term with Greek *pragmata* (*ibid.*, p. 258, n. 5), and it occurs both in Avicenna’s *Nafs* and Averroes’ *Hiss waʿl-Maḥsūs* 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 *maʿnā*” (*op. cit.*, p. 167). Averroes says, “The *maʿnā* in memory is not the *maʿnā* in imagination (*takhayyul*)” (*op. cit.*, p. 38).

In the *Ikhraj*, as we saw, Jābir explains his “*maʿnā*” by stating its relationship with discourse (*kalām*) (see n. 58 above). Cf. Fārābī, *Iḥṣāʾ al-ʿUlūm*, Palencia ed. [1932], p. 22.

<sup>62</sup> Indeed, there is in the Jabirian corpus a text with this title, Kr 2583. However this work seems no longer extant.

<sup>63</sup> The word could not be deciphered in the manuscript.

<sup>64</sup> *Taṣrif*, MS Paris 5099, f. 140b. See Arabic text in the addenda below.

<sup>65</sup> *al-Sirr al-Maknūn*, MS Paris 5099, f. 54a, qu. Kraus [1942-3], p. 257, n. 3.

<sup>66</sup> *Khamsin*, MS Shāhid ‘Alī Pāshā, f. 134a. See Arabic text in the addenda below.

It is interesting to note the following passage in the first *Risālā* of the Ikhwān: “Enunciations signify meanings, meanings are the things named, and enunciations are names.” (Zirikli ed. [1928], I, p. 24).

<sup>67</sup> See Chapter 2 above.

<sup>68</sup> 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 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 Zirikli ed. [1928], I, pp. 23-48).

<sup>69</sup> In a strict sense, the table that follows is an adaptation of Jābir's table (see Edited Text, 18-19). This is so because: (i) Jābir does not use Indian numerals, all his numbers are expressed in words; (ii) he expresses his weights in three different units—*qīrāt*, *dānaq*, and *dirham*. In our table all weights are specified in the same unit (see the system of units below); and (iii) since each letter was to be reckoned four times, Jābir 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 *dānaqs* according to the following system used by Jābir:

1 <i>habba</i>	=	1½ <i>ashīrs</i>
5 <i>ashīrs</i>	=	1 <i>qīrāt</i>
2 <i>qīrāts</i>	=	1 <i>dānaq</i>
6 <i>dānaqs</i>	=	1 <i>dirham</i>

(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 in his [1958], p. 223, does not agree with that of Lory in the latter's [1983], p. 86.)

<sup>70</sup> 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 detailed discussion see Commentary in Chapter 5 below.

<sup>71</sup> MS Paris 5099, f. 59a.

<sup>72</sup> Edited Text, 6:2-4. (The actual calculation is to be found on f. 78a of MS Paris 5099).

<sup>73</sup> Edited Text, 13:3.

<sup>74</sup> Edited Text, 20:3-4.

<sup>75</sup> Edited Text, 38:11. A similar idea of equilibrium is found in other Jabirian texts too (see, for example, *al-Mawāzīn al-Ṣaḡīr*, Berthelot ed. [1893], III, 115:2-6).

<sup>76</sup> This is Kraus' paraphrase of the section of the *Ahḡār* dealing with the concept of equilibrium (Kraus [1942-3], II, p. 233, n. 2). Cf. Edited Text, 22:8-23:3.

<sup>77</sup> *LXX Books*, Kraus ed. [1935], 467:4-5; 468:15. See Arabic text in the addenda below.

<sup>78</sup> *Tajmīr*, Berthelot ed. [1893], III, 161:15. See Arabic text in the addenda below.

<sup>79</sup> Edited Text, 35:12-14.

<sup>80</sup> *Tajmīr*, Berthelot ed. [1893], III, 13-16.

<sup>81</sup> Edited Text, 20:4-8; 21:13-15.

<sup>82</sup> This division of the letters of a name into four groups does not, *prima facie*, follow any system. However, Kraus suspected that Jābir's scheme is governed by musical considerations (see Kraus [1942-3], p. 256, n. 2).

<sup>83</sup> MS Paris 5099, f. 59b; see also Edited Text, 24:10-11.

<sup>84</sup> In the *LXX Books* (MS Jārullāh 1554, f. 211b), for example, Jābir gives the etymology of the words *kibrīt* (sulphur), *zībaq* (mercury) and *zarnīkh* (arsenic). In the *Hāsil* he has a list of the names of metals in several different languages including Greek and Persian (Kraus ed. [1935], 535:11-537:15).

<sup>85</sup> Edited Text, 25:13-26:7. For a discussion of *zāwus* see Commentary and Textual Notes in Chapter 5 below.

<sup>86</sup> Edited Text, 5:6-7.

<sup>87</sup> Edited Text, 4:7-8. See Commentary in Chapter 5 below.

<sup>88</sup> Edited Text, 5:7-10.

#### ADDENDA TO NOTES

(١) الأشياء الطبيعية نحو الميزان والروحانية نحو السبب الأول .

(٤) والموازن تنقسم بحسب انقسام الموجودات وذلك أن ميزان العقل والنفس والطبيعة والصورة

والأفلاك والكواكب والطبائع الأربع والحيوان والنبات والحجر ميزان مفيد ، وأتمه ميزان

الحروف ...

(٩) وأما طائفة فقالت إن أحوال الطبائع وإدراك الكيفيات ... قد يمكن يعلم بطريق أقرب من

هذه من أسماء الأغذية والأدوية وأعضاء الحيوان وأجزاء النبات والحجارة والطريق الذي

سميناه ميزان الحروف وفيه علم دقيق يتوصل به إلى إدراك حقائق أحوال الموجودات .

(١١) وانظر إلى الحروف كيف وضعت على الطبائع وإلى الطبائع كيف وضعت على الحروف

وكيف تنقل الطبائع إلى الحروف والحروف إلى الطبائع .

(١٣) فإن الحرف الواحد لا ينطق به .

(١٤) وقد وضع أنا لا نقدر أن نتكلم بحرف أو نضيفه إلى حرف آخر ، كذلك لا يمكننا وزن طبع

واحد إلا بالإضافة إلى طبع آخر ليتبين ، فافهم هذا الأصل .

(١٧) وأن شيئاً واحداً لا يكون على أقل من عنصرين منها أو ثلاثة، ولا يكون على واحد فإن هذا باطل. ونمثل أن قولنا كلمة ما مثل «محمد» و«جعفر» ... لا يكون إلا بتراكيب الحروف، وقد تكون كلمة من حرفين وثلاثة أو أكثر من ذلك أو أقل، إلا أن كلمة لا تكون من حرف واحد، وإن هذا ممنوع أيضاً لأنه لا تكون كلمة أقل من حرفين: حرف النطق وحرف الاستراحة وتقتضى السكت. فقد وجب أن يكون تركيب الحروف كتراكيب الطبائع في سائر الموجودات.

(١٨) لأن ذلك الموضع من تأليف الحروف للنحويين يسمونه تصريفاً، وهذا الموضع من البسائط يسمونه الفلاسفة تصريفاً. فلم يجز أن يكون اسم الكتاب غير «تصريف».

(١٩) لا كلام إلا بتأليف الحروف لم يكن بد من أن يقع في الطبائع مثل ذلك، فحق أن يكون تصريف الطبائع كتصريف الحروف.

(٢١) ولو جعل مكان كل واحد من تلك الأشياء مثال غير المثال المشابه لأمن الناس من تصحيف الكلام والغلط. فهذا مما قصر ناطمه، وهو ممكن في الطبيعة والقوة معاً.

(٢٦) صَحَّ أن الحروف ... قد تكتسب من طبائع مخارجها في الصوت ... ومخارج الصوت كثيرة في الحلق.

(٢٧) وإن حدَّ الحروف أنها الأشكال الدالة بالمواضعة على الأصوات المقطعة تقطيعاً يدلّ بنظمه على المعاني بالمواظاة عليها.

(٢٨) وإن حدَّ المعاني أنها الصُور المقصود بالحرف.

(٤٧) وليس يمكن أحداً أن يعلم الموسيقى إلا بعد علم العروض والتصريف وعلم النغم والإيقاع وعلم الشعر.

(٤٩) وإن مثال الذي يقال إن الموسيقى تأليف ذو عدد وإن هذا خطأ في التعليم وإن كان حقاً، لأنه مثل قولنا «الحَيوان» الذي هو جنس تحته أشياء كثيرة ... وأيضاً ليس قولنا تأليف

ذو عدد في الموسيقى بأخص منه بعلم العروض الذي تؤلف أيضاً على ثمانين طرق.

(٥٠) وقد كنا قلنا فيما سبق أن القوم قد نظموا أفعال الكواكب لعجائب الأفعال من أجل مناسبات حركاتها للنظام التأليفي أعني النظام الموسيقى الذي فيه العجائب.

(٥١) تأليف ذو عدد ليس اسماً للنفس، لكنه حدُّ لها، والحدُّ محمول على الحامل.

(٥٣) إن العروض وصناعة اللحون والإيقاع هي النفس، وهي كذلك قَبِلَ أن هذه الصناعة إنما كانت عن النفس ولا تحمل إلا على ذي النفس.

(٥٤) فهذا الذي أنتج قولنا تأليف ذو عدد، وقولنا في المراتب والطبائع أنها تأليف ذو عدد.

(٥٦) وإني أكرر في كثير هذا البرهان على الحروف وقتاً بعد وقت لما أعلم أن قوماً يستجهلونني على وضع هذه الحروف على الطبائع ويقولون إن ذلك المحال من قَبِلَ ما يسرع إليه عقولهم من دفعه وعظمته في نفوسهم. فأما مَنْ دفع ذلك بغير برهان فنحن والناس جميعاً يستجهلونهم ويعنفونه على ذلك ... فأما مَنْ أخذ في دفع ذلك على طريق البرهان لا يكون في وجهين مختلفين واحداً إذ هو خلف لا يمكن.

(٥٨) وأقول إن كلام أرسطو أن الإنسان هو ناطق وحده في العالم الكون والفساد لا غير، ومعنى النطق التمييز، ومعنى الكلام نظم الحروف التي يؤم بها نحو لغة ما بتلك الترجمة، وهل ذلك بالاصطلاح على ما جاء واتفق؟ أو بقصد طبيعي نفسي؟ وهل ذلك عرض أو جوهر؟ فأقول: القول بأنها وضع واصطلاح وعرض خطأ، لأنه جوهر بالطبع لا بالوضع لكن بقصد نفسي لأن الأفعال النفسانية جوهرية كلها ... فالحروف التي هي الهيولى الكلام ابتداء نفسي.

(٥٩) وإذا كان قد ظهر أن لكل شيء موجود فعلاً ما فليعلم أن للإنسان خاصة أكثر الإفعال وأكبرها، فليعلم ضرورة أن عمله واستخراجه علم المنطق والنحو والهندسة والطب والنجوم وإن كان موضوع كثير منها باطلاً فإن جميع ذلك حق وغير مدافع أن الكلام وتأليف الحروف وعمل أشكالها من تأليف الإنسان إلا أنها قد وقعت بالطبع ... فغير شك إذن أن الكلام ونظم الحروف له طبع ما إذ كان موجود له طبيعة ما وهذا موجود.

(٦٤) وينبغي أن تعلم أن الهندسة والمنطق والموسيقى والحساب والصناعة والتوليدات وعلم جميع السفليات والعلويات ليست معاني فقط بل إنما معان قائمة في النفس ومعان يعبر عنها. وذلك قد أوضحناه في كتاب المنطق المسمى «بارير مينياس». وذلك أن الأشياء كلها تنقل على أربعة أوجه: الأول منها أعيان الأمور وذواتها وحقائقها، كالحجارة في ذاتها والبرودة في ذاتها وإن كانا غير موجودين لنا. ثم تصوّر ذلك بالعقل وهل له حقيقة أم لا، كالواجب والسالب والصدق والكذب. ثم النطق بها ومعرفة مواضع [؟؟؟] وهي الحروف السواكن

... وحروف الهزمة وحروف الحركات والوصول وغير ذلك. والكتَبُ بها وهو تمثيل الخطوط

وأخراج ذلك من القوة إلى الفعل .

(٦٦) إن الكتَبَ دلّ على ما في اللفظ، وما في اللفظ دلّ على ما الفكر، وما في الفكر دلّ على

ماهية الأشياء .

(٧٧) إن الأسرَبَ بارد يابس في ظاهره ... وهو حارّ رطب في باطنه ... وأما الذهب فحارّ رطب

في ظاهره، بارد يابس في باطنه .

(٧٨) الأسرَبُ ذهب الباطن، والقلمي فضّة في باطنه .

## THE TEXT OF THE *KITĀB AL-AḤJĀR*

... وحروف الهزمة وحروف الحركات والوصول وغير ذلك. والكتَبُ بها وهو تمثيل الخطوط

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## PRELIMINARY OBSERVATIONS

The *Ahjár*, whose full title is *Kitāb al-Ahjár ‘alā Ra’y Balīnās* (Book of Stones According to the Opinion of Balīnās, Kr 307-310), belongs to the Jabirian collection entitled *Kutub al-Mawāzīn* (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 (*al-Juz’ al-Awwal* / *al-Thānī* / *al-Thālith* / *al-Rābi‘*). As for the collection itself, Kraus was able to reconstitute 79 of its titles, out of which 44 are extant (see Kraus [1942-3], I, pp. 75-99). Ibn al-Nadīm mentions only four titles of this collection.

## MANUSCRIPTS

(1) MS Paris, Bibliothèque Nationale, Arabe 5099, f. 56b - f. 62b; f. 72b - f. 86b.

Copied in a clear *naskh* style (see Illustration I below), the manuscript is dated 1023 *Hijra* = 1614 A.D. The date appears on f. 62b.

Kraus points out that some three folios of this manuscript (f. 87b - f. 89a) containing a small fragment of *al-Juz’ al-Rābi‘* (The Fourth Part) are reproduced on pp. 188-190 of the Cairo al-Khānjī codex where it appears under the erroneous title *al-Sirr al-Maknūn* (Kraus, *op. cit.*, p. 80).

(2) MS Teheran, Dānishgāh 491, f. 85b - f. 121b. According to Sezgin ([GAS], IV, p. 253), this is an 11th/17th century manuscript (see Illustration II below).

(Note: Sezgin had reported (*loc. cit.*) that another independent manuscript of the *Ahjár* exists in Teheran, namely MS Malik 6206. But the microfilm of this document received from Malik revealed that it is identical with MS Dānishgāh 491. The two manuscripts differ only in foliation which has been inscribed by a modern hand in both cases).

(3) MS Cairo, Ṭal‘at Kimyā’ 218, f. 1a - f. 25b.

Does not contain *al-Juz’ al-Awwal* (The First Part) of the text.

Judged by the style of the scribe's hand (*dīwānī* variation of *nasta'liq*), this manuscript seems also to belong to the 11th/17th century (see Illustration III below).

#### 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 this text either. Indeed, in his familiar selection of Jabirian treatises, Kraus had included a large part of the *Ahjār* (Kraus ed. [1935], pp. 126-205), but in no way did he intend, or pretend, to offer a *critical* edition of this work. Rather, Kraus' primary aim was to collect a large number of texts in a short volume so that the reader has access to a sample of the enormously wide range of Jabirian ideas. Thus, in most cases, Kraus' texts are based on a single manuscript and they appear with minimal critical apparatus. Moreover, when it comes to making choices from within a given treatise, Kraus sometimes seems to operate without a clear principle of selection. But given his limited aim, this is understandable.

In the case of the *Ahjār*, Kraus had based his text solely on MS Paris 5099. He included in his volume the entire *al-Juz' al-Awwal* and *al-Juz' al-Thānī* (The Second Part), and a selection from *al-Juz' al-Rābi'*. The text's *al-Juz' al-Thālith* (The Third Part) was excluded totally (incidentally, it is this part in which I discovered a hitherto unknown translation of the eighth discourse of Aristotle's *Categoriae*). Thus, to be sure, Kraus has provided us a substantial selection of the *Ahjār*, but what he did not give us is a critical edition. Also, somewhat surprisingly, his text reproduces some of the obvious corruptions of the Paris manuscript: thus, for example, certain errors of numerical calculation, errors not at all difficult to catch, have gone unnoticed by him (see Edited Text, 15:8; 15:14; see also the corresponding translation and commentary below).

#### THE PRESENT EDITION

The critical edition of the *Kitāb al-Ahjār* which follows is based on all known manuscripts of this treatise. Indeed, it is to be ruefully acknowledged that this edition too contains only a selection of the *Ahjār*, rather than the entire text. But this is a strict thematic selection and includes a considerable portion of the work nonetheless. Thus, only those passages of the text have been excluded which consist in (a) drastic digressions

from the main theme of the work, (b) repetitions, (c) illustrative examples or applications of the principles already discussed, or (d) rhetorical flourishes. To minimize the loss of substance, a summary of the excluded sections is given in the appendices below.

It is important to note also that the present edition, besides being the first critical edition of a substantial part of the *Ahjār*, contains much text that is not included in Kraus' volume. Thus, the reader will here find many sizable sections of the *Ahjār* which have hitherto lain dormant in manuscripts, having received no textual treatment of any kind in the history of modern scholarship.

MS Dānishgāh 491

والمرتبة بعد ذلك في جلة مرتبة واحدة من احدى الطبعين  
 ولكن قد عرفت ذلك في الاستكمال التي تذكرها في الخبر الثاني في طالع  
 كتابنا هذا ونقول الآن في طرح الزوائد يقول تبيين من جميع ما تقدم  
 لنظم حقيقة ذلك كيف هو قد كما قلنا لك في غير كتابنا كنت فزت  
 تركت كتابنا لنحرفين اذا نكر واستطاع احدهما ان المرتبة اذا كان من  
 دون من الادوية وكانت اوله او ثانيا نيرة او ثلثا او رابعا لم يكن في ذلك  
 واما السلك في الادوية فيجوز ان يها فاوليس ذلك جازا فيها هو دون  
 المرتبة في الدج والدقايق والثواني والثالث والرابع والخماس  
 في السنين والاربعين قولنا هو فاربعون من عدل الامكان ونحرف  
 وذلك انه ليس فيه حرف يدل على مرتبة متكررة ولا فيهن الزوائد  
 يحتاج الى طرحه فكانه قد سلم والعلته فيكون انما هو تاسعا يحتاج  
 اليه من الضمايم وسئل قوله شادوان وسئل قولنا اساعد فان عدنا  
 الدواوين معلولين وما ايضا مختلفان في الاسارون وشادوان  
 وذلك انه متكرر في مراتب ولا في الاولى في اساعدنا فقرة ولا في  
 الثانية باعتبار الالف في ذلك دون ثمانية ولا في الثانية نيرة  
 يجب اسماها وهذا واسأل ما سئو فقلت على سبيل منه ههنا  
 في هذا الكتاب ينبغي ان يتخطى منها وبيان الى ما هي بجته مع ما  
 تركت وسئل قولنا اسعد فان لما فيها نيرة لا ثمانية وسئل هذه  
 رابعا بها ينبغي ان يتخطى منه وينبغي ان تغفل كل شيء او متبكر بها  
 واصلا ينبغي سمل اعملا ولت محابا انه جولد كوريلان ونقول في ذلك  
 بحسب ما يما يسلوه انشاء الله تعالى ينبغي ان تعلم ان الالف سالر  
 مالم بخله الالف ولا ما التعريف يحتاج الى تاسع وكذا في بخل من التاسع  
 فاما الالف فيسقط الالف في الالف الثانية ولا في ثمة وتنت هذه  
 الالف من حرف حساب الجمل وهذا الدج هو من باب الحساب في  
 صادة وبالف فان فاما دون المرتبة فيهن ان فون في ان في

MS Paris 5099

للا يدخل في بعض قصير وما يزيد تصلح الى باب الفساد وما يزيد في الفساد  
 وهذا خلف ما عرفت ان شاء الله تعالى وقد ثبت ان مرتبة سبع هي  
 شيلتها ليجل ايضا من ان يكون من احدى المراتب الاربعة فان كانت من الاولى حكمت  
 بالاولى وان كانت من الثانية حكمت بالثانية وان كانت من الثالثة حكمت  
 بالثالثة وان كانت من الاربعة حكمت بالاربعة وان مرتبة سبع هي  
 الثواني وليس يخلو من ان يكون دافين او درهم او درهم واربعة دوايق او درهمين  
 واربعة دوايق فاعط كل شيء حقه ولا تقل مستغلا ولا تستغل عاليا او اخفرك ذلك  
 وليس يخلو من ان يكون رابعا من ان يكون من احدى المراتب الاربعة ولا يخلو من  
 ان يكون دافق ونصف او اربعة دوايق ونصف او درهم ودافق ونصف او  
 درهمين فتزلهما بحسب ما يوجبهاها في العشاري والتساعي والثاني والتساعي  
 السداسي والخامس والرابع والثلاثين والثنائي والمفرد وينبغي ان يعلم ان فص  
 ق ر هي الثواني وقد وضع ان ش ت ث هي الرابع وانها ايضا تنقسم  
 على الاربعة المراتب ولا يخلو من ان يكون من احدى هذه الاربعة وانها ايضا لا يخلو من ان  
 من ان يكون دافق ونصف درهم او خمسة دوايق او درهمين فتزلهما على ما هما  
 بحسب ما تؤولسها تنصب الظنون ان شاء الله تعالى وقد بقي القسم السابع الذي لم يدر علم  
 الميراث وانما قصدنا في ذلك ان نشرح لك علم الميراث والصور التي قبل هذا الموضع  
 حتى لا يبقى عليك فيه شك والقسم السابع اذن على ما يوجه حكمه في طرقه وحروفه في العشر  
 هو من خمس طوع وانها ايضا تنقسم على المراتب الاربعة في الطالع الاربعة كما اتفقت  
 اخواتها ومن المعلوم الميراث ان في ض طوع ليس بعدوان يكون بالصيغة كل  
 واحد منها اما قيراطا او دافقا ونصف او دافقين ونصف واربعة دوايق  
 التي الذي تلزم به الموازين اعني انما يوجب الطبع هل هو قيراط او ما بعد هو الجها  
 ومعرفة الحكم في العشرة الامثلة اعني في العشاري كيف وقت فتقولات لا  
 من ص ك ر ذ س ج م ن ع فن المعلوم اليق ان الف متى لياها الى الخ  
 عن ان يكون درهم ودافق او ثلثة دراهم ونصف او خمسة دراهم وخمسة  
 دوايق او تسعة دراهم ودافقين واعني قولنا ليس يخلو ان كانت الالف في كلمة  
 يوجب المرتبة الاولى في درهم ودافق وان كانت في كلمة توجب المرتبة الثانية ثلثة

بعد ذلك

وما دونها في ذلك  
 ومن لم يدر في ذلك  
 لا يلزم في ذلك  
 ان تضع حرفا





## SIGLA

C	=	MS Cairo, Ṭalʿat Kīmyāʾ 218
H	=	Haq's Emendation
K	=	Kraus ed. [1935]
K\E	=	Emendation suggested by Kraus
P	=	MS Paris 5099
T	=	MS Teheran, Dānīshgāh 491
--	=	Missing from the MS
+	=	Added in the MS
?	=	Indecipherable
??	=	Blank space in the MS indicating possible erasure over time
... / ...	=	Word(s) on the left of the virgule appearing above the line or in the margin of the MS. Word(s) on the right quote(s) the corresponding part of the line itself
<...>	=	Haq's editorial gloss
[...]	=	Folio(s) and line(s) of MS Paris 5099 excluded from the selection
...	=	Omission of a word, a phrase or a relatively short passage

## الجزء الأول من كتاب الأحجار على رأي بليناس

- ٢ بسم الله الرحمن الرحيم . الحمد لله على تواصل نعمه وأياديه علينا ومننه ونتبعه بالصلوة على سيدنا محمد وآله والسلام .
- ٤ وقد كنّا نعدك في غير كتاب من كتب الموازين برأي بليناس خاصة في علم الموازين والآن فنحن بادرون بذكر ما خالف فيه ووافق .
- ٦ قال بليناس : أقولُ وأصفُ الحكمة التي أيدتُ بها بعد خروجي من السَّرَب وأخذ الكتاب واللوح . إن الذي يعمُ الأشياء كلها الطبائع التي هي البسيطة لا المركبة، وإذا
- ٨ كان الشيء عامّاً فمحال أن لا يكون له كمية — وقد أوضحنا ذلك في غير شيء من كتبنا في هذا الفن .
- ١٠ ثم قال: والأوزان التي تعمُ النبات والحيوان والحجر هي على تناسب سبعة عشر، وليس الأكاسير كذلك — وهذا أيضاً قد بينّاه في غير شيء من كتبنا .
- ١٢ ثم جعل كمّياتها على ما قد ذكرناه في «كتاب التصريف» وهو: واحد في الأول وثلاثة في الثاني وخمسة في الثالث وثمانية في الرابع .
- ١٤ قال بليناس: والذي أراه في الوزن بالصنجة هو من الأدون في العشير وهو ثلاثة أرباع حبة، يعني أن مقدار الخامسة مقدار العشير . ثم أوجب ضرورة أن الرابعة

١: بليناس] + الحكيم لجابر عليه الرحمة T ٥: ما [H من P, T, ما K\E ١٠: تعم]

يعم P, T ١١: الأكاسير كذلك] + بل ما يكون منها كذلك P, بل منها ما يكون كذلك K\E

١٤: قال] -- P: هو H هي P, T, هو K\E ١٥: أرباع] أرباع/أرباع P

- ١ الواحدة درهم، وأن الثالثة ستون درهماً، وأن الثانية ثلاثة آلاف وستمئة درهم، وأن الدقيقة مضروب ثلاثة آلاف وستمئة في ستين فتكون مائتي ألف وستة عشر درهم.
- ٣ وأن الدرجة مضروب مائتي ألف وستة عشر ألفاً في ستين فتكون اثني عشر ألف ألف وتسعمائة وستين ألف درهم، وأن المرتبة مضروب اثني عشر ألف ألف وتسعمائة وستين ألفاً في ستين فتكون المرتبة الأولى من أي عناصر سبعمائة وسبعة و سبعين ألف ألف وستمئة ألف درهم.
- ٧ وأن المرتبة الثانية تكون ألفي ألف ألف وثلاثمائة واثنين وثلاثين ألف ألف وثلاثمائة ألف درهم، وتكون درجة المرتبة الثانية ثمانية وثلاثين ألف ألف وثلاثمائة وثمانين ألف درهم، وتكون دقيقة المرتبة الثانية ستمائة ألف وثمانية وأربعين ألف درهم، وتكون ثانية المرتبة الثانية عشرة آلاف درهم وثلاثمائة درهم، وتكون ثالثة المرتبة الثانية مائة وثمانين «درهماً»، وتكون رابعة المرتبة الثانية ثلاثة دراهم، وتكون خامسة المرتبة الثانية حبتين ورُب حبة ويكون ثلاثة أعشر ...
- ١٣ ونقول: إن الخامسة من المرتبة الثالثة، على هذا المذهب، «خمسـة عشر» أربع حبة أو خمسة أعشر، والرابعة من هذه المرتبة خمسة دراهم، والثالثة منها ثلاثمائة درهم، والثانية ثمانية عشر ألف درهم، والدقيقة ألف ألف وثمانون ألف درهم، والدرجة منها

- ٢: فتكون [فيكون P, T ٣: فتكون [فيكون P, T ٥: فتكون [فيكون P, T ٧: وأن [H  
فكان [K, P, T تكون [يكون P, T ٨: تكون [H يكون P; وتكون درجة ... ثمانين ألف  
[يكون المرتبة الثانية وثلاثين ألف ألف وثلاثمائة وثمانين ألف T ٩: تكون [يكون  
P, T; وثمانمائة P, T ١٠: تكون ثالثة [يكون الثالثة P, يكون ثالثة T  
١٤/١٣: أربع حبة أو خمسة [أربع حبات وخمسة P, T ١٤: والرابعة [او الرابعة P, T

- ١ أربعة وستون ألف ألف وثمانمائة ألف درهم، والمرتبة الثالثة تكون على هذا القياس ...  
ثلاثة آلاف ألف ألف وثمانمائة وثمانية وثمانين ألف ألف درهم.
- ٣ وأيضاً فإن الخامسة من المرتبة الرابعة ثمانية أعشر أو ست حبات، والرابعة منها ثمانية دراهم، والثالثة أربعمائة وثمانون درهماً، والثانية ثمانية وعشرون ألفاً وثمانمائة درهم، والدقيقة من المرتبة الرابعة ألف ألف وسبعمائة وثمانية وعشرون ألف درهم، والدرجة منها مائة ألف ألف وثلاثة آلاف ألف وستمئة ألف وثمانون ألف درهم، والمرتبة الرابعة ستة آلاف ألف ألف ومائتان وعشرون ألف ألف وثمانمائة ألف درهم.
- ٧ فقد وضع من كلام بليناس، عافاك الله، ما وضع. فلنستخرج الآن ما يحتاج إليه من هذه الأوزان على رأيه في جميع الأشياء.
- ٩ زعم بليناس: أن للحيوان ميزاناً وللنبات ميزاناً وللحجر ميزاناً في الكون الأول الذي خلقه الله عز وجل، وأن للحيوان ميزاناً غير الأول «وكذلك للنبات» وكذلك للحجر، وأن هذا الثاني لنا فاعلم ذلك!
- ١٣ وزعم أيضاً أن للإكسير الأعظم خاصّة ميزاناً مفرداً ... وذكر أن للطلسمات موازين مختلفة على قدر خلفها أيضاً. ثم نصّ على كلّ واحدٍ من هذه الموازين بكلام مُجمل نحن شارحوه في هذه الكتب الأربعة على استقصاء كما وعدنا في غير كتاب ومثبتون فيه غرضنا في الموازين التي علمناها نحن.
- ١٧ وينبغي أن تعلم أن من لم يقرأ كتبنا في الموازين قبل هذا الكتاب لم ينتفع بشيء من هذه الكتب الأربعة لأنها مُنَاطة بعضها ببعض. ونحن الآن سالكون في الشرح كما وعدناك به، إن شاء الله تعالى.
- ١٩

٢: ثمانين [ثمانون P, T ١٤: خلفها [خلقها P, T

- ١ أعلم، عافاك الله، أنه لما ذكر أن لكل واحد من هذه الأشياء التي عدناها ميزاناً، وذكر ذلك المقدار في الكمية التي قد ذكرتها، نصّ أيضاً على الحروف كما علمناك في «كتاب الحاصل». ثم قال: إذا توالى حرفان من شكل واحد احتسب بالأول من جنسه ومقداره من مرتبته ونسب الثاني منهما إلى المقدار اليسير الذي هو خارج من حساب الجمل كقولنا «ا ا» أو «ب ب» — وقد والله العظيم علمتك هذا في «كتاب ميدان العقل».
- ٢ ثم قال: ولنطلب للسان العربي خاصة، فبين أن سائر الألسن لا ينبغي لعامل الموازين أن يعتد بها. ثم قال: وأمّا ميزان الحيوان الأول — فعلى ما نصصت أنا عليه في «كتاب التصريف» لا غير ولست أحتاج أن أعيد ههنا، وأمّا النيات فكذلك والحجر مثله. فقد فرغنا منه وليس فيه كتمان ولا شك ولا نخلطه عليك وننقذه بكلام آخر في شيء من الكتب كما أفعل ذلك أبداً عامداً للتدهيش والتغليب إلا لمن أحب الله تعالى وورقه.
- ٣ فأمّا ميزان الحيوان الثاني والنبات والحجر فعلى ما في صدر هذا الكتاب من العشير في الخامسة، وهو أقلها، إلى المرتبة الرابعة التي هي ستة آلاف ألف ألف ومائتان وعشرون ألف ألف وثمانمائة ألف «درهم»...
- ٤ والعلة التي لها أوردنا هذه الأحجار في هذه الكتب وأوردناها عن سائر الكتب أن بليسيناس يقول وهو الحق: إن في الحروف الواقعة على الأدوية وغيرها من الثلاثة الأجناس ما ينبت عن باطنه ولا ينبت عما في ظاهره، وفيها ما هو بالعكس مثل أن

١: [واحد] واحدة P, T, ٤: [منه] H منها K, P, T, ٩: [لست] [لست] T ١٣: [الثاني] النباتي P ١٨: [عما] P

- ١ ينبت: «عما» في الظاهر ولا يدل على الباطن، وفيها ما يوجد جميع فيها، وفيها يدل على ما فيها وزيادة محتاج إلى أن تلقى ويرمى بها كما يحتاج الناقص إلى أن يتم ويزيد...
- ٢ ثم إنه يرى أن اسم الذهب كذلك في الحقيقة عند الميزان لأنه يدل على طبعين — بل الحكيم جواب أن يكون اسم الذهب بما يوجب سائر طبائعه...
- ٣ ثم إنه عاد وقال: وإمّا قلت إنه ينبغي أن يسمى كل شيء على حقيقة ميزانه عند العمل، لا عند المذاكرة. ينبغي. عافاك 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 متعارف أن ينطق باسم من الأسماء على تحقيق أمره إلا في الندرة بعد الندرة.
- ٤ وينبغي أن تعلم أن استخراج الطبائع على الحروف كما علمناك في «كتاب الصفوة» لذلك في الابتداء على طبع شيء لا على تحقيقه، وكذلك ما علمناك في «كتاب الحاصل» إلا أن «الحاصل» أجود تحصيلاً من «الصفوة» وذلك لأن «الصفوة» كالرائحة من الأشياء و«الحاصل» كذات الشيء التي يزوالها يزول العين.
- ٥ فمعلوم من هذا الكلام أن إخراج طبع شيء في الظاهر غير منتفع به، وإلا فقد كنا ألقينا به. ولكن ينبغي، عافاك الله، أن ترن كل شيء تريد وزنه وتحززه عن كل شيء في ظاهره وباطنه.
- ٦ فأمّا وجه الإسقاط فإنك محتاج الآن إلى ما في «كتاب التصريف» وغيره من تلك

١: [جميع] H جميعاً K, P, T, ٧: [يستخرج] يستخرج P, T, ١٢: [كذلك] لذلك P, T

١٣: [وذلك لأن] ولذلك لان P, T

- ١ صار في وسطها وأوكها صار أصلاً أعني من نفس الكلمة. وكذلك ربما كان في الوسط أصلاً، فإذا صار في أوكها أو آخرها جاز أن يكون زائداً وربما كان أصلاً.
- ٢ وينبغي أن تعلم في زوائد أنها عشر، وهي: الهمزة واللام والياء والواو والميم والتاء والنون والسين والألف والهاء. ولما كانت هذه الحروف تختلف مواضعها ومواقعها من الكلام احتجنا حينئذ إلى نصب الأمثلة التي تنقلب عليها.
- فنقول، وبالله عز وجل الاستعانة، إن أصول الكلام ثلاثة أبنية وهي ثلاثي ورباعي وخماسي. وأمّا الثلاثي فإنه ينقسم إلى اثني عشر مثلاً، منها عشرة مستعملة، وواحد لم يسم على بنائه الحروف <إلا> واحد، وواحد مهمل لم يجيء قط على بنائه ولا يكون ذلك.

- فأما الأمثلة فمثل «فَعَلَ» على مثال «فَهَدَ» وعلى «فَعَلَ» نحو «حَمَلَ» وعلى «فُعِلَ» نحو «دَبَّرَ» وعلى «فُعِلَ» نحو «عُنُقَ» وعلى «فَعَلَ» نحو «رَسَنَ» وعلى «فَعِلَ» نحو «إِبِلَ» وعلى «فُعِلَ» نحو «صُرِدَ» وعلى «فَعَلَ» نحو «قِمَعَ» وعلى «فُعِلَ» نحو «كَبِدَ» وعلى «فُعِلَ» نحو «سَبَعَ» — فهذه عشر تكثر في الثلاثي. وأمّا المثال الذي جاء واحداً فعلى «فُعِلَ»، قالوا لدويبة من حشرات «دُبِلَ». فالبناء الذي لا يمكن أن يكون منه شيء «فِعِلَ».
- وأما الرباعي فله خمسة أمثلة وهي «فَعَّلَلَ» نحو «عَقَّرَبَ» وعلى «فُعَّلَّلَ» نحو «بُرُقَعَ» وعلى «فِعَّلَّلَ» نحو «هَجَّرَعَ» وعلى «فِعَّلَّلَ» نحو «قِمَطَرَ».

١: صار أصلاً] صار صار اصلاً T ٣: عشر] عشرة P, T ٨: يسم على بنائه] يسمى على بيانه P, T ١٣: فهذه عشر تكثر] فهذه عشر يكثر P، فهذا عشر يكثر T ١٦: وهي] + مثل T؛ وعلى] + نحو P, T

- ١ الكتب، وذلك أنه ينبغي ضرورة أن يسقط من كل شيء يحتاج إلى وزنه ما زاد على بنائه وما دخل للعلل بغير زيادة. فمعلوم أن الذهب أصل إذ هو بريء من ذلك، وصار هجاء الفضة «فض» إذ الهاء إذا دخلت للتأنيث ولا ذكر لها. ثم تزد عليه بعد إسقاطك ما فيه بحسب الحاجة إليه.
- ٥ فاعلم، يا أخي، أنه متى حصلت لك من الحروف واحدة مثل «ا» أو «ب» أو ما كان لك الكل على سبعة عشر ... إلا أنك ينبغي أن تفرد ما أخرجه لك الهجاء عما أخرجه لك الحدس لتطلب مثل ما أخرجه الحدس بالإضافة إلى الصورة ليصير لك الشكلا شكلاً واحداً. قد، وحق سيدي، أوضحت لك ما كنت غنياً عن الزيادة فيه
- ٧ شيئاً ثالثاً، إلا أنني لست أرضى بذلك دون أن تركب في اليوم ألف حيوان وألف شيء من النبات وألف حجر، والله المرشد لنا ولك برحمته إنه جواد كريم.
- ١١ وينبغي، يا أخي، أن تعلم أن الزوائد منها ما يكون في أول الكلمة، ومنها ما يكون في آخر الكلمة، ومنها ما يكون في وسطها. وينبغي أن تعلم أن من الزوائد ما يحكيه الإعراب. فينبغي أن يطرح ولا يعتد به، مثل «زَيْدٌ» و«زَيْدًا» و«زَيْدٍ» في الرفع والنصب والخفض أو الجر؛ ومثل «الزَيْدَانِ» و«الزَيْدُونَ» في التثنية والجمع. فهذا، يا أخي، لا تلتفت إليه وردّه إلى واحد مثل «زَيْدٌ» من «الزَيْدَيْنِ» و«عمر» من «العمرَيْنِ» وما جأنسه.
- ١٧ وينبغي أن تعلم أن من الزوائد ما إذا كان في أول الكلمة فهو زائد، فإذا صار في وسطها وآخرها صار أصلاً. وعكس ذلك مثل أن يكون الحرف في آخرها زائداً، فإذا

٣: تزد عليه] تريد علمه P, T ١٤: أو الجر] والجز T؛ التثنية] التسنية P

١ وأما الخماسي فيكون على أربعة أمثلة يكون على «فَعْلَل» نحو «سَفَرَجَل» وعلى «فَعْلَلَل» نحو «حَمَرَش» وعلى «فَعْلَلَلَل» نحو ... وعلى «فَعْلَلَلَلَل» نحو «جَرَجَل».

٢ وليس غير هذه إلا الزوائد. فأمّا تمييز الزوائد حتى يرد كل شيء إلى حقه فالزوائد في العشر التي ذكرناها من قبل. أما الميم واللام فمخصوص بهما الاسم، واللام يصحبها الألف وهما للتعريف في «العبد» و«الغلام» و«الدواء» وما جانسده. وكل ما كان من الأسماء يحتمل الجنس. وتزاد اللام بين الألف والكاف ليذكر المشار إليه «من» الشيء الغائب وهي أولى بالهمزة، وتزاد اللام أيضاً في «الذي» بين اللام الثانية والذال ليقع بها الفتح وتكون فاصلة بين سكن اللام وكسر الذال. أما الميم فإنها تزاد في «مَكْرَم» و«مُسْتَضَرَب» وما شاكل ذلك ولا حظ لها في الفعل إلا في شيء شاذ وهو قولهم ١١ «مَخْرَق».

وأما الهمزة والواو والياء والتاء والنون والسين والألف والهاء، فالهمزة تزاد في ١٣ «أَحْمَدُ» و«أَفْضَلُ» وهما اسمان «و» في «أَحْسَنَ» و«أَكْرَمَ» وهما فعلان. وإنما نريك ذلك، وليس مقصودنا تعليمك النحو، لأن من الأحجار والنبات والحيوان «ما يقع اسمه ١٥ كالاسم» وما يقع اسمه كاسم الفعل، فنريك الحروف التي هي زائدة في الأفعال وزائدة في الأسماء، أو زائدة في الأسماء «و» أصلية في الأفعال، أو أصلية في الأسماء ١٧ وزائدة في الأفعال ليحكم على كل شيء بحكمه، إن شاء الله تعالى.

والياء تزاد في «يَعْمَلُ» وهو اسم وفي «يَضْرِبُ» وهو فعل. والواو تزاد في

٥: بهما P, T ٦: تزداد P, T ٧: يزداد P, T ٩: لها P, T ١٠: مخرق P, T ١١: والواو والياء والعقار P, T ١٣: والنبات والعقار P, T ١٤: فنريك P, T ١٧: والياء تزداد P, T ١٨: والياء يزداد P, T ١٩: والواو تزداد P, T ٢٠: والواو يزداد P, T

١ «جَوهر» وهو اسم وفي «حَوَقَل» وهو فعل. والتاء تزداد في «تَضَرَّبَ» وهو اسم وفي «تَضَرَّبَ» وهو فعل. والنون تزداد في «نَرَجَسَ» وهو اسم وفي «نَضَرَّبَ» وهو فعل.

٢ والسين تزداد في «سَيَّحَرَّبَ» وهو اسم وفي «سَيَّضَرَّبَ» وهو فعل. والألف تزداد في «مُضَارِبُ» وهو اسم وفي «ضَارِبُ» وهو فعل. والهاء تزداد في «قَائِمَةٌ» وهو اسم للتأنيث فيقال «قَائِمَةٌ» وفي «إِرمَةٌ» وهو للوقوف. فاعرف ذلك واحكم على كل ما جاءك منه.

— [58b21 - 59a11] —

٧ فإذا قلنا إن الإيقاع حده أنه تأليف عددي؛ ثم كان ذلك التأليف إنما يكون بحركة وسكون، والمتحرك والساكن إذا أُلِفَا في كلام أو إيقاع فأكثر ما يكون من الحركات ٩ أربعة متتالية في مثل قول أصحاب العروض «فَعْلَتْن»، وأكثر ما يجتمع ساكنان في مثل قولهم «فاعِلان» والألف والنون ساكنان، ولو لا اللين الذي في الألف ما أمكن ١١ ذلك وهو غير جائز إلا في حروف اللين الثلاثة وهي الواو والياء والألف، واعرف ذلك!

ولما كان التأليف العددي إنما يكون على الساكن والمتحرك في النطق والسمع كان ١٣ جملة أجزاء التأليف العددي الثمانية، اثنان منها خماسيان وستة سباعية. فأمّا الخماسيان فقولهم «فَعْلَتْن» و«فاعِلان» وأما الستة السباعية فـ «مَفَاعِلَتْن» وقولهم ١٥ «فاعِلاتْن» و«مُسْتَفْعِلان» و«مُتَفَاعِلان» و«مَفَاعِلَتْن» و«مَفْعُولاتْن». ثم يتولد عن هذه أجزاء بالزيادة والنقصان حتى تكاد أن يكون إلى ما نهاية له. فقولهم في حد ١٧ الإيقاع، إنه عددي، أنتج هذا كله.

٣: والسين تزداد P, T والسين يزداد P, T؛ والألف تزداد P, T والألف يزداد P, T؛ مضارب P, T؛ تزداد P, T يزداد P, T؛ قائمة P, T؛ إنما P, T؛ تكاد P, T يكاد P, T

١ وهو يحتاج إلى شيء آخر مثل أن يكون الإبقاء فرداً في العدد أو زوجاً، والزوج  
والفرد إما أن يكون زوج زوج أو فرد فرد أو فرد زوج. والعدد الفرد يكون  
٢ مثل الواحد وأخواته، والزوج مثل الاثنين وأخواته، وزوج الزوج مثل ثمانية فإنها زوج  
الستة والأربعة والاتنين، وأما زوج الفرد فمثل ستة من تسعة وأخواتها كأربعة من  
٥ خمسة وما جرى هذا المجرى، وأما فرد الفرد فالواحد من الثلاثة ومن الخمسة والسبعة  
والثلاثة وما جرى مجراها، وأما فرد الزوج فعكس زوج الفرد وذلك أن يكون الزوج  
٧ ثمانية والفرد فيه سبعة وخمسة وثلاثة وواحد وما جرى مجراها من الأعداد .

وتتولد عن ذلك كله أربع طرائق في الموسيقى تكون نتيجة هذا الكلام كله، وهو  
٩ المقول عليه أنه ثقل الأول وثاني الثقل والرمل والهزج. ثم إنهم ولدوا كل واحد من  
هذه حقيقة فصارت ثمانية وهي: خفيف ثقل الأول وخفيف ثقل الثاني وخفيف  
١١ الرمل وخفيف الهزج. ثم جعل لكل واحد من هذه نسبة في الأصابع فكان خلف هذه في  
الأصابع كخلف تلك في الحلق واللسان والشفتين، إذ كان قد يحدث من هذه الطرائق  
١٢ بالأصابع ساكن ومتحرك كما حدث لنا في الحروف ساكن ومتحرك، فقالوا: ثقل الأول  
المطلق وثقل الأول المزموم وثقل الأول بالوسطى وثقل الأول المحمول (فسمى هذا  
١٥ المحمول محصوراً، وربما فُرق بينهما بنقرة بسيرة) فصارت ثمانية في أربعة يكون  
الثنان وثلاثين طريقة، فانتج قولهم عددي تأليف ذو عدد هذا كله .

— [59b8 - 17] —

١٧ فأما موازين الأجسام التي قد خلطت مثل أن يخلط زجاج وزبيب على وزن ما لا

١ يعرفه أحد غيرك وتُعطيه لصاحب الميزان، فإن في قوة العالم في الميزان أن يكون لك  
كم فيه من جزء من الزجاج وكم فيه من الزبيب، وكذلك الفضة والذهب، والنحاس  
٢ والفضة، أو ثلاثة أجسام أو أربعة أو عشرة، أو ألف إن جاز أن يكون ذلك .  
فإننا نقول: إن هذا من الحيل على تقريب الميزان وهو حسن جداً، ولو قلت إنه  
٥ كالدليل على صحة هذا العلم، أعني علم الموازين، لكنت صادقاً، بل القول كذلك.  
وذلك إذا أردت أن تعرقه وتكون انت صاحب الميزان حتى تختلط لك الأجسام وغيرها  
٧ فتقول ما في ذلك المختلط من كل حجر من المقدار فإنك على اسم الله تعالى —

فاستعمل ميزاناً على هيئة الأشكال ويكون بثلاثة عرى خارجة إلى فوق، واعمل  
٩ بهذه الكفتين كعمل الموازين أعني من شدك بها الخيوط وما يحتاج إليه، ولتكن  
الحديدة الواسطة، التي فيها اللسان، في نهاية ما يكون من الاعتدال حتى لا يميل  
١١ اللسان فيها أولاً، قبل نصب الخيوط عليهما، إلى حبة من الحبات، ويكون وزن  
الكتنتين واحداً، ووسعتهما واحدة، ومقدار ما يملأهما واحداً.

١٣ فإذا فرغت من ذلك على هذا الشرط فلم يبق عليك كثير شيء . ثم شد الميزان كما  
يُشد سائر الموازين. ثم خذ إناء فيه ما يكون عمقه إلى أسفل نحو الشير أو دونه أو  
١٥ أكثر كيف شئت، ثم املأ ماء قد صفى أياماً من دغله وقذره وما فيه كما تصفى  
البنكانات، ثم اعمد إلى سبيكة ذهب أحمر خالص نقي جيد ويكون وزنها درهماً،  
١٧ وسبيكة فضة بيضاء خالصة صرفاً ويكون وزنها درهماً، ويكون مقدار السبيكتين

١: قوة [قول T ٢: جزء من] -- K ٦: تختلط [يختلط P, T ١٢: وسعتهما واحدة]  
وسعتهما واحد P, T [يملأهما] قملأهما P, T ١٥: تصفى [يصفى P, T ١٧: صرفاً] حرقا P, T

١: في العدد] -- T ٩: ولدوا [ولدوا T ١٠: ثقل [الثقل P, T ١٥: اثنين [اثنين P, T  
١٦: ذو [ذو P, T ١٧: الأجسام [الأشياء K

- ١ واحداً. ثم ضع الذهب في إحدى الكفتين والفضة في الأخرى، ثم دلّ الكفتين في ذلك الماء الذي وصفناه إلى أن تغوصا في الماء وتمتلئا من الماء .
- ٣ ثم اطح الميزان فإنك تجد الكفة التي فيها الذهب ترجح عن الكفة التي فيها الفضة، وذلك لصغر جرم الذهب وانتفاش الفضة، وذلك لا يكون إلا من البيورة التي فيه.
- ٥ فاعرف الزيادة التي بينهما بالصنجة واعمل على أن بينهما دانقاً ونصفاً. فتى خلطت بذلك المثقال الذهب الجيد قيراطاً واحداً فضةً أو دانقاً أو أكثر أو أقل نقص من المقدار
- ٧ الحيات بإزاء القيراط إذ هي اثنا عشر لكل قيراط — فاعرف ذلك فهو، وحق سيدي، من أمهات علم الفلاسفة، وكذلك تقيس كل جوهريين وثلاثة وأربعة وخمسة وما شئت
- ٩ من الكثرة والقلّة .

مثل أن تعرف النسبة التي بين الذهب والنحاس، والفضة والنحاس، والذهب والرصاص، والفضة والرصاص، والنحاس والفضة والذهب والرصاص، ومثل أن يُعرف ما بين الذهب والفضة والنحاس المختلطين أو الفضة والنحاس والرصاص، وكذلك إن شئت واحداً واحداً، وإن شئت اثنين اثنين أو ثلاثة ثلاثة أو كيف أحببت ...

- ١٣ قد كنّا لك في غير كتاب، إن كنت قرأت من كتبنا شيئاً، إن الحرفين إذا تكرّرا سقط أحدهما، وإن المرتبة إذا كانت في دواء من الأدوية وكانت أولى أو ثالثة أو رابعة لم يكن في ذلك الدواء غير تلك المرتبة، وإن كانت أولى فأولى، وإن كانت ثانية فثانية، وإن كانت ثالثة فثالثة، وإن كانت رابعة فرابعة. وأن تعلم ذلك فانا أمثله

٢: تغوصا [P, T؛ تمتلئا] تمتلئا P, T؛ ٣: اطح [اخرج/اطرح P، + اخرج T؛ ترجع]

يرجع P, T؛ ٦: أقل [P, T؛ يقصر P, T؛ ٧: اثنا] اثني P, T؛ ٨: تقيس [P, T؛ يقاس P, T؛

٩: من] في P, T؛ ١٥: أولى [H؛ اولة K, P, T؛ ١٦: أولى فأولى [H؛ اولة P, T؛ K،

- ١ لك في الأدوية حتى تراه عباناً. وليس ذلك جائزاً فيما هو دون المرتبة أعني الدرج والدقائق واللواني والوثالث والروابع والخوامس .

— [60b7 - 62a13] —

- ٣ الصورة في كل شيء سبعة عشر، وإذا وجدت في حيوان أو نبات أو حجر خمسة فقد بقي لنا اثنا عشر. ثم ليس يخلو من أن يكون الدواء فيه طبع واحد أو طبعان أو ثلاثة أو أربعة وليس غيره. وإن كان فيه طبع واحد وزعت الاثنى عشر على الثلاثة الباقية، وإن كان من الطبعين وزعت الاثنى عشر على طبعين، وإن كان على ثلاثة جعلت الاثنى عشر من طبع واحد بعد أن يُستخرج من الاثنى عشر ما يقابل ذلك الجزء الذي في الدواء من الطبائع الباقية أعني التي قد خلا الدواء منها، فاعلم ذلك!

— [62a17 - 62b14] —

٤: فقد بقي لنا اثنا عشر] وقد بقي لنا اثني عشر P, T

## الجزء الثاني من كتاب الأحجار على رأي بليناس

- ٢ بسم الله الرحمن الرحيم. الحمد لله الذي اصطفى محمداً نبياً، وانتخب له علياً ولياً  
وصلى الله على صفوته من خلقه وعلى آله وسلم.
- ٤ أما بعد فإنه قد تقدم قبل كتابنا هذا عدة كتب في علم الموازين قد استوفينا في  
كل واحد منها صدرأ صالحاً من علم الموازين. ولما كان بليناس قد خالفنا في بعض  
٦ الفروع والأصول لم يجر أن لا نذكر «ما خالفنا فيه» الذي خالف فيه هي الأوزان  
بالصنجات، وقد ذكرناها في جزء أول لهذا الجزء. وقد كنا وعدنا في غير كتاب أنا  
٨ نذكر الأحجار وصور الطبايع لها مع الميزان حتى لا يخفى على المحب ما يطلبه من  
ذلك ...
- ١٠ إن الحروف التي عليها مدار الكلام كله قد استوفيناها لك في مواضعها من العدد  
الزائد والناقص من المراتب إلى الخوامس، وأنا قد ذكرنا لك أيضاً وزن كل حرف على  
١٢ ما ذكرناه من رأينا ورأي بليناس بالصنجات، وقد ذكرنا لك أيضاً شدة حاجتنا في  
العلوم الدقيقة والتأثيرات اللطيفة إلى المقادير بالصنجات على ما ذكره بليناس وقلة  
١٤ حاجتنا إلى ذلك في نقل الأجسام وفكها.

١: الجزء الثاني ... بليناس [C ٢٢؛ كتاب الأحجار] موازين الأحجار [P, T؛ بليناس] +  
الحكيم T ٢: علياً ولياً [C ١٠؛ في مواضعها] ومواضعها [P, T ١١؛ من] في C ؛  
قد [K -- ١٢؛ حاجتنا] + إلى ذلك [C, K, P, T ١٣؛ المقادير] المقادير/الموازين P؛  
الموازين K

- ١ وأما نحن فقلنا: إن للحيوان ميزاناً، وهو أن جعلنا المرتبة الأولى عشرة دراهم، ثم  
أضفناها لما فرقها ونقصناها لما تحتها. ثم جعلنا لك النبات في سبعة، فأضفناه فيما هو  
٣ فوقه وجزئناه فيما تحته. وجعلنا الحجر في خمسة وزيدناه في الذي فوقه ونقصناه إلى  
ما تحته عند الحاجة. وإن ذلك هو رأينا واعتقادنا في ظاهر الصناعة وليس يخرج على  
٥ التحقيق كما عمل بليناس.
- فأما بليناس فإنه جعل الحكم في الثلاثة الأجناس واحداً واحتج في ذلك بالذي ذكره  
٧ سقراط، فقال: إذا كان محصول الأجناس أنها تحت الطبايع فمن البين إذن أن لا خلاف  
الميزان، هذا هو كلام سقراط. وجعل المرتبة الأولى في سبعمائة وسبعة وسبعين ألف  
٩ ألف وستمائة ألف درهم، وذلك أن هذا الرجل، أعني بليناس، احتاج إلى تجزئة  
الخامسة فجعلها في عشرين، ثم علاها إلى فوق حتى بلغت إلى ما بلغت إليه مما  
١١ ذكرناه في الكتاب الأول من هذه الكتب ...
- إسمع ما قال سقراط!
- ١٣ ... فقال: إنا نجعل المرتبة الأولى درهماً ودانقاً، والمرتبة الثانية ثلاثة دراهم ونصفاً،  
والثالثة خمسة دراهم وخمسة دوانيق، والرابعة تسعة دراهم ودانقين؛ ونجعل الدرجة

١: المرتبة [للمرتبة C, P, T؛ الأولى H] الاولة [C, K, P, T ٢؛ أضفناها H] أضفناها C, K, P, T  
[نقصناها] نصفناها C, T، نصفناها/نقصناها P؛ فأضفناه H] فأضفناها C, K, P, T  
٦: في ذلك [بذلك C, P, T ٨؛ سبعمائة وسبعة وسبعين ... H] سبعمائة ألف ألف وسبعة  
وسبعين ... C, K, P, T ٩: ذلك أن [قال ان/ذلك ان P، قال ان C, T ١٠؛ مما] فيما/مما P،  
فيما C, T ١١: في الكتاب ... الكتب [P ١٣؛ الأولى H] الاولة [C, K, P, T ١٤؛  
خمس دراهم وخمسة دوانيق H] ستة دراهم غير دانق C, K, P, T



- ١ فانظر، عافاك الله، إلى لطف هذا الرجل في العلم ومحلّه منه وحسن قياسه. وأعلم أيضاً أنه اطرح النسبة من الستين، والعلّة في ذلك أنه زعم أن قولنا إنّ المرتبة درجة إنما هو اصطلاح؛ ولو أردنا أن نجعل كل شيء أفضل منه بواحد أو بأكثر، والذي تحته كذلك، ما كنّا إلا كما جعلنا النسبة من الستين. وذلك إنما جعل من الستين ليقرب الحساب وقلة ما يقع من الكسور ...
- ٥ وقد جعلنا لهذه الأوزان مثالا يُعمل عليه في سائر ما يحتاج إليه، وأنا أسوق أمر الأوزان في كتابي هذا على تلك الأوزان أعني على ما قد ذكرناه عن سقراط. فإن أحببت أن تعمل عليه فاعمل، وإن أحببت أن تعمل على ما ذكره بليناس فاعمل، فكلاهما واحد. وإن أحببت على رأينا فاعمل به، وهو مخالف لهما لأنه شيء بالتقريب.

٩: وهو مخالف لهما ... بالتقريب] وهو مخالف لها ... بالتقريب P, -- T, ؛ صحيح C

- ١ الأولى نصف درهم، والدرجة الثانية درهماً ونصفاً، والدرجة الثالثة درهماً ونصفاً والدرجة الرابعة أربعة دراهم .
- ٣ ونجعل الدقيقة من المرتبة الأولى دانقين ونصفاً، والدقيقة من المرتبة الثانية درهماً ورُبعاً، والدقيقة من المرتبة الثالثة درهماً وقيراطاً، والدقيقة من المرتبة الرابعة ثلاثة دراهم وثُلثاً. ونجعل الثانية من المرتبة الأولى دانقين، والثانية من المرتبة الثانية درهماً، والثانية من المرتبة الثالثة درهماً وأربعة دوانيق، والثانية من المرتبة الرابعة درهماً وأربعة دوانيق .
- ٧ ونجعل الثالثة من المرتبة الأولى دانقاً ونصفاً، ومن المرتبة الثانية أربعة دوانيق ونصفاً، ومن المرتبة الثالثة درهماً ورُبعاً، ومن المرتبة الرابعة درهماً. ونجعل الرابعة من المرتبة الأولى دانقاً، وفي المرتبة الثانية نصف درهم، وفي المرتبة الثالثة خمسة دوانيق، وفي المرتبة الرابعة درهماً ودانقين. ونجعل الخامسة في المرتبة الأولى قيراطاً، وفي المرتبة الثانية دانقاً ونصفاً، وفي المرتبة الثالثة دانقين ونصفاً، وفي المرتبة الرابعة أربعة دوانيق .

- ١: درهماً ونصفاً] درهم ونصف C, P, T؛ درهماً ونصفاً] درهمين ونصف C, P, T
- ٣: الأولى [H] الأولى C, K, P, T؛ ٤/٣: درهماً ورُبعاً] درهم وربع C, P, T؛ ٤: قيراطاً] قيراط C, P, T؛ ٥: ثُلثاً] ثلث C, P, T؛ ٦: درهماً، والثانية] درهم والثانية C, P, T؛ درهماً وأربعة] درهم وأربع C, P, T؛ ٧: أربعة] أربع C, P, T؛ ٨: دانقاً ونصفاً] دانق ونصف C, P, T؛ ٩: درهماً ورُبعاً] درهم وربع C, P, T؛ ١٠: الأولى [H] الأولى C, K, P, T؛ دانقاً] دانق C, P, T؛ ١١: درهماً] درهم C, P, T؛ قيراطاً] قيراط C, P, T؛ ١٢: دانقاً ونصفاً] دانق ونصف C, P, T؛ دانقين ونصفاً] دانقين ونصف C, P, T

## المرتبة الثانية في الأربعة

مرتبة	درجة	دقيقة	ثانية	ثالثة	رابعة	خامسة
ا	درهم ونصف	ط	م	ف	ش	ذ
ب	درهم ونصف	و	ن	ص	ت	ض
ج	درهم ونصف	ز	س	ق	ث	ظ
د	درهم ونصف	ح	ل	ر	خ	غ

## المرتبة الرابعة في الأربعة

مرتبة	درجة	دقيقة	ثانية	ثالثة	رابعة	خامسة
ا	أربعة دراهم	ط	م	ف	ش	ذ
ب	أربعة دراهم	و	ن	ص	ت	ض
ج	أربعة دراهم	ز	س	ق	ث	ظ
د	أربعة دراهم	ح	ل	ر	خ	غ

## المرتبة الأولى في الأربعة

مرتبة	درجة	دقيقة	ثانية	ثالثة	رابعة	خامسة
ا	نصف درهم	ط	م	ف	ش	ذ
ب	نصف درهم	و	ن	ص	ت	ض
ج	نصف درهم	ز	س	ق	ث	ظ
د	نصف درهم	ح	ل	ر	خ	غ

## المرتبة الثالثة في الأربعة

مرتبة	درجة	دقيقة	ثانية	ثالثة	رابعة	خامسة
ا	خمس دراهم	ط	م	ف	ش	ذ
ب	خمس دراهم	و	ن	ص	ت	ض
ج	خمس دراهم	ز	س	ق	ث	ظ
د	خمس دراهم	ح	ل	ر	خ	غ

١ «ب» أيضاً) إما ثلاثة دراهم ونصف من مجموع ثلاث مراتب أولى، أو مرتبة ثانية في نفسها واحدة وهي ثلاثة دراهم ونصف. ولذلك في وزن الفاعلين أربعة دراهم وأربعة دوانيق.

والتماثية من البيوسة أو الرطوبة — وهما «ج د» — إما مجموع ثمان مراتب أولى وهي تسعة دراهم ودانقان، وإما مرتبة واحدة رابعة وهي تسعة دراهم وثلاث. وأما خمس مراتب بيوسة وخمس رطوبة — وهما أيضاً «ج د» — فذلك إما مجموع خمس مراتب أولى فتكون خمسة دراهم وخمسة دوانيق، وإما مرتبة واحدة ثلاثة وهي خمسة دراهم وخمسة دوانيق ...

٩ فلذلك مجموع وزن السبعة عشر في الأحمر من كل شيء في العالم على الميزان الصحيح في الدقيق والجليل في الثلاثة الأجناس وفي العلويات وغيرها من سائر العجائب تسعة عشر درهماً وخمسة دوانيق، وكذلك هو في الأبيض، فينبغي أن تعلم ذلك.

١٣ فأما موضع الخلف في الأبيض والأحمر فإنما هو في زيادة البرودة في البياض ونقصان الحرارة فيه وبعكس ذلك في الأحمر، وزيادة البيوسة في الأحمر ونقصان الرطوبة فيه وبعكس ذلك في البياض، فاعرفه!

وينبغي متى أردت وزن شيء من الأشياء كلها أن تعرف ما فيه مما يوجبه الهجاء

١: أولى [أولة K، أول P ٢: لذلك] كذلك C, P, T ٤: إما ... أولى H] وأما ... أول C, P, T، إما ... أول K ٦: فذلك إما مجموع خمساً وذلك إما مجموع قمن C, P, T ٧: أولى H] أول C, K, P, T ٩: فلذلك مجموع وزن H] فذلك مجموع وزن C، فلذلك مجموع K، فذلك مجموع/وزن P، فذلك مجموع الوزن T ١٦: ما فيه] ما فيها C, P, T

— [74a1 - 75a22] —

١ ونحن نحتاج الآن أن نوريك ذلك بالأشكال في موازين الأحجار الذائبة التي الحاجة إليها ماسة في أول الصناعة — وهي الذهب والفضة والنحاس والحديد والقصص — لتعلم حقيقة حروف هذه الأشياء كلها. فينبغي أولاً أن تعلم أن كل شيء من هذه الأحجار ففيه سبعة عشر قوة، وهو إما أن يكون أحمر أو أبيض. فإن كان أبيض ففيه من الحرارة مرتبة أولى، وفيه من البرودة ثلاث مراتب أولى، وفيه من البيوسة خمس مراتب أولى، ومن الرطوبة ثمان مراتب أولى.

٧ وإن كان أحمر فبعكس ذلك، وهو أن يكون من البرودة مرتبة أولى، ومن الحرارة ثلاث مراتب أولى، ومن البيوسة ثمان مراتب أولى، ومن الرطوبة خمس مراتب أولى. ومحصول القدر في الكمية (وهي في هذا الموضع على الصنجة أعني لهذا السبعة عشر) أن المرتبة الأولى إما من الحرارة أو البرودة — وهما «أ» أو «ب» — درهم ودانق كما قلنا في ذلك أولاً. والثلاث المراتب الأولى (وهي مقام مرتبة ثانية وهما «أ»

٣: كل [لكل C, P, T ٥: مرتبة أولى H] مرتبة أول C, K, P, T؛ ثلاث مراتب أولى H] ثلاثة مراتب أول C, P, T؛ ثلاث مراتب أول K ٦: مراتب أولى ... ثمان مراتب أولى H] مراتب أول ... ثمان مراتب أول C, K, P, T؛ مرتبة أول C, K, P, T؛ ثلاث مراتب أول H] ثلاث مراتب أول C, K, P, T؛ ثمان مراتب أول؛ ثمان مراتب أول؛ ثمان مراتب أول C, K, P, T؛ خمس مراتب أول C, K, P, T؛ ١٠: عشر] أن المرتبة الأولى H] عشر ان المرتبة الأولى C, K, T، عشرات المرتبة الأولى P ١١: والثلاث المراتب الأولى H] وثلاث مراتب الأولى C، والثلاث المراتب الأولى K، وثلاثة مراتب الأولى T

١ وانظر كم مبلغ ذلك وانسبه «إلى» التي هي مبلغ السبعة عشر ...

٢ فأما مسامتة الحرارة فيه للرطوبة ففي الصبغ الأحمر، لو لا ذلك لتهتكت البيوسه بكثرتها الرطوبة إذ كان مقدار البيوسه أكثر من مقدار الرطوبة كثيراً. وكذلك عكس الكلام في الأبيض، فإنه لو لا مسامتة البيوسه للبرودة فيه لعلبت الرطوبة البيوسه. ومعنى المسامتة أي أنها تكون بالقرب منها لا حيث المباشرة أعني في تقابلها أو البعد الذي هو بين المحيط والمركز. ولو لا هذه المسامتة (حتى تغلب في الأحمر الحرارة كما لابد منه وتكون البيوسه أيضاً غالبية) لخرج متفتتاً كسائر ما يعمل كذلك.

٣ ولما لم يكن الأعدل متفتتاً كما أنه لم يكن أيضاً مائعاً وجب أن يكون هو الشيء الذي بين الجميع، وهو مثل الأجسام الثلاثة التي هي الذهب والفضة والنحاس في مقدار اللين والصلابة أعني من الحجارة. فأما من غير الحجر فعلى حسب ما يجعل أيضاً الأعدل، فإنه يحتاج إلى بحث وسير.

٤ وذلك أنه إن كان كل حيوان وأعضائه جامدة فالأعدل هو الجامد، وإن كانت كلها ذائبة فالأعدل أن تكون ذائبة وإن كانت لدنة كانت كذلك، وكذلك إن كانت بغير ذلك من الأوصاف كانت المعدولة كمثلهما ... ولما كان كل عضو منها قائماً بنفسه كان أيضاً كل واحد منها أعدل في ذاته.

٢: للرطوبة [الرطوبة C, P, T: ٣: بكثرتها الرطوبة] بكثرتها للرطوبة C, P, T

٥: المسامتة [H] المساواة C, K, P, T: ٦: المسامتة [H] المساواة C, K, P, T: ١١: وسير

-- C: ١٢: أنه إن كان كل حيوان] انه ان كان كل الحيوان C, P, T, أن كل حيوان K: وإن

كانت] وإن كانت وإن كانت C: ١٣: تكون ذائبة] تكون كلها ذائبة C: لدنة] لدنة/لينة P,

لينة T: ١٤: المعدولة [H] المعمول C, المعدولة K\N, المعمول P, T: بنفسه] بنفسها C, P, T

١ فمن البين الواضح أن ليس الذهب أيضاً أعدل الأجساد وإنما صيروه أهل الصناعة أعدلها لأنهم انتفعوا به، وكذلك لرا انتفعوا بالنحاس أو الرصاص لصيروه الأعدل وساقوا تدابيرهم إليه، فبالضرورة الآن إنما هو أعدل لموضع المنفعة لا غير.

٢ فينبغي أن يُسلك فيما قلنا، وذلك أنك ربما احتجت أن تنتقل الذي هي أعدل إلى غير الأعدل، وذلك أننا لو فقدنا النحاس البتة ثم وجدنا من الفضة والذهب فوق الحاجة وكانت الضرورة داعية إلى النحاس، والذهب هو الأعدل والنحاس هو المضطرب

٣ لاحتجنا أن ننقل الذهب الذي هو الأعدل إلى النحاس الذي هو المضطرب فوجب ضرورة ذلك.

١١ كذلك نقول: إنه ليس الثمر بأعدل بإضافة إلى الورق لأن المنفعة بالثمر أكثر منه بالورق. ولكن ينبغي أن يُعطى كل شيء حقه من الأوزان لينقل بعضها إلى بعض،

١٣ إن شاء الله تعالى ...

فلنأخذ الآن في أمر ميزان الإكسير بالحروف كما ذكرناه في «كتاب ميدان العقل»

١٥ إن شاء الله تعالى. فنقول وبالله الاستعانة: إننا قدمنا من المقالات ما قد أغنى عن أن يُعلم الإكسير ما هو. وذلك أن المعلوم في ذلك هو أن أصله سبعة عشر ينقسم إلى قسمين - إما أحمر أو أبيض. وإن كان أحمر غلب الحار اليابس، وإن كان أبيض غلب البارد الرطب. وإن جملة ذلك بالصنجة تسعة عشر درهماً وخمسة دوايق على الرأي الصحيح الذي لا فساد فيه. فمتى مثلنا مشالات تدل على سبعة عشر تقدمت أو تأخرت تناقصت أو تزايدت فينبغي أن تعلم أن الأصل فيها واحد. لأن الحرارة أين كانت فهي الحرارة، والبرودة أين كانت فهي برودة، وكذلك في الرطوبة والبيوسه.

٥: فوق] يفوق C, T, يفوق/فوق P: ١٥: ما] ما C, P, T: ١٦: أصله [H] أصل C, K, P, T

- ١ وذلك لأنه لا يقال ولا واحد من كل هذه على الآخر. مثال ذلك أن «ا» لا يقال ولا على واحد من «ب» ولا «ج» ولا «د»، وكذلك «ب» لا يقال ولا على واحد من «ا ج د»، وكذلك «ج» لا يقال ولا على واحد من «ا ب د»، وكذلك «د» لا يقال ولا على واحد من «ا ب ج». فقد وضع الفرق الذي تريد أن نوريك.
- ٥ فإن أردت أن بعض «ا» يفسد فيصير إلى «ب» وكذلك إلى «ج» و«د» على أنك تجعل «ا ب ج د» من الثواني التي هي النار والهواء والماء والأرض فلمعري أن بعض هذه المركبات يستحيل. وقد استوفينا ذلك في «كتاب التصريف»، فقد وضع الطريق نقس عليه، إن شاء الله تعالى...
- ٩ ولتأخذ فيما بدأنا به من الميزان الأجساد فتقول وبالله التوفيق: ينبغي، عافاك الله، أن تعلم أن هذه الأحجار مختلفة ولو لا ذلك لكان كلها شيئاً واحداً، فهذا من قرب. وإن فيها ما يزيد على سبعة عشر وفيها ما ينقص عنها وفيها ما يساويها.
- ١١ وإذا درست شيئاً من الأشياء فوجدته مساوياً للسبعة عشر فلا تزيد فيه شيئاً ولا تنقص منه شيئاً، وهذا يكاد أن يكون في باب الممتنع من شدة عسرة. وإذا وجدت شيئاً يزيد على سبعة عشر فأنقصه على تناسب إلى أن يبلغ إلى «سبعة عشر»، فإنه يتناسب ويستقيم ويكون كمثل ذلك العسر الذي لا يكاد أن يوجد، فاعلم ذلك

- ١: كل هذه كل واحد من هذه C, P, T: ٩؛ وبالله التوفيق [C: عافاك الله] -- C؛  
 ١٢: درست [أردت C ١٣: يكاد أن يكون في باب الممتنع] يكاد أن يكون من باب الممتنع K، يكاد يكون من الممتنع C ١٤: يبلغ [C, P, T ١٥: يتناسب] يناسب C -- C؛  
 C, P, T العسر [العشر C, P, T: أن] -- C؛ فاعلم ذلك] -- C

- ١ واعلم به! وإذا وجدت شيئاً ينقص في الميزان عن «سبعة عشر فتدبره ليكون كمثل ذلك الشيء العسر الذي قلنا أنه ليس يكاد أن يوجد، فاعمل به فإنه الوجه، إن شاء الله ...
- ٣ وهذا، عافاك الله، فلا بد أن يزيد أو ينقص، فقد حصل «في» الذهب حينئذ أنه من الزوائد. وينبغي أيضاً أن تعلم معنى قولنا زائد أو ناقص وإن كنا قد قلنا أنه عند «سبعة عشر» فيما تقدم، وذلك إنما هو، عافاك الله، عند الإكسير ...
- ٧ فمتى أراد مريد أن يصير الذهب مثل الإكسير نقص من كل واحد من عناصره بحسب ما يجب إلى أن يبقى في الذهب «سبعة عشر وزنها تسعة عشر درهماً وخمسة دنانير ويطرح الباقي.
- ٩ وكذلك إن أراد مريد أن ينقل الذهب إلى النحاسية عرف وزن النحاس أولاً، ثم عرف وزن الذهب وأيهما زاد على الآخر، إن زاد الذهب نقص إلى أن يبلغ إلى مقدار النحاس، وإن زاد النحاس زيد في الذهب إلى أن يصير إلى حد النحاس، وقد وجب أن الذهب أزيد من النحاس ... وبالله التوفيق، كيف يتم لك ذلك وأنت لا تعرف
- ١٣ «الحدود» ولا تقف عليها!

— [78a4 - 79a6] —

- ١٤ إختلف الناس في الوزن الثقل خلفاً متفاوتاً، وذلك أن منهم من قال: نزنه على أن اسمه «القلعي». وقال أصحاب الرواق: لا بل هو «الرصاص» إذ أخوه اسم الأسرب.
- ١٦ وقالت طائفة أنبذقليس: لا بل نزنه على «زاوس» لأنه أعذب في طبعه وهو معناه.

- ١: واعلم به! -- C؛ وجدت [رايت C ٢: العسر] العسر C, P, T: إن شاء الله] -- C؛  
 ٥: معنى قولنا [معنى أن قولنا P, T ١٠/١١: وإن زاد النحاس ... الذهب أزيد من النحاس] -- C ١٥: «زاوس» [زاوش C

- ١ وقالت طائفة فيثاغورس: هو «المشتري» وبطبع المشتري، لا نزنه إلا على اسم المشتري لأنه صاحبه ومدبره ومكوّنه وليس له اسم غيره. وأما سقراط فحكم على «زاوس» وهو مقارب الحق. وقال بليناس: هو «القصدير» ووزنه منه ولا اسم له غيره.
- ٢ وقالت المشائية: نزنه على قولنا حارّ رطب لأنه لا اسم له يدلّ على طبعه. ولست أختار أنا في هذه الأوزان كلها مثل قولنا «زاوس»، فإن عدلنا عنه فحارّ رطب. والذي أذكره في شكله إنما هو على «زاوس» لأن قولنا «قلعي» يدلّ على غير اسمه، وقولنا «قصدير» أيضاً جيد لأن هذه الأسماء وإن اختلفت بالألسن فإن كل عبّر عنها بلسان فإنما يطلب المعنى فيه، فاعرف ذلك!

— [79a14 - 80b20] —

٣: «زاوس» [زاوش C ٥: «زاوس»] زاوش C

## الجزء الثالث من كتاب الأحجار على رأي بليناس

- ٢ بسم الله الرحمن الرحيم. سبحان المبدء المعيد الفعال لنا يريد، القادر على كل شيء، القاهر لكل قاهر، فاعل الأشياء كلها، بلا مثال ولا معلّم ولا عن شهوة ولا مقهوراً على ذلك بل كما شاء. إنه جواد كريم عزيز حكيم. فتبارك الله أحسن الخالقين، وصلى الله على محمد سيّد المرسلين، وإمام الأولين والآخرين، صلوة تامة بحسب ما يستاهل من ذلك، وعلى آله الطيبين وسلم تسليماً.
- ٤ وقد تقدّم لنا قبل كتابنا هذا كتابان في معرفة موازين الأحجار، ونحن ذاكرون في كتابنا هذا صورة أخلاط الأحجار والأشجار والحيوان بعضها في بعض على طريق المهنة ووجه تسميعها إذ كان ضماننا لذلك قد تقدم في الكتابين الأولين، أعني الأول والثاني. فنقول: ...
- ١٠ الأشياء التي يكون منها الإكسير لا تخلو إما أن تكون حجارة صرف، أو حيوان محض، أو نبات فقط. أو حيوان ونبات، أو حجر ونبات، أو حجر وحيوان، أو حيوان ونبات وحجر — فقد صارت الأشكال، التي يحدث من تركيب الأدوية الإكسير، سبعة. ولكل واحد منها حكم. وإن كان بعضها قد يفارق بعضها في الإجابة إلى العمل، فمعلوم أن «أ» للحرارة و«ب» للبرودة و«ج» لليبوسة و«د» للرطوبة، وأن «أ» لا يخلو في الشيء المتركب من أن يكون على أربعة أنحاء إذ المراتب أربعة، وكذلك

١: كتاب] موازين C ١١: تخلو [H يخلو C, P, T; تكون [H يكون C, P, T

١٢: أو حجر ونبات] + أو حجر ونبات P; أو حجر وحيوان] وحجر وحيوان T

١ «ب» وكذلك «ج» وكذلك «د»، وأوزانها أربعة: من أن يكون درهم ودانق، أو ثلاثة دراهم ونصف، أو خمسة دراهم وخمس دوانيق، أو سبعة دراهم ودانقين كما علمناك أولاً ... ٣

فاعمد إلى حجارتك التي تريد تدبيرها وجمعها بالمهنة والتشميع، فانك تجد وزنها — إن كانت إكسيراً تسعة عشر درهماً وخمسة دوانيق، وإن كانت في غير إكسیر وأكثر وأقل على حسب ما في ذلك الحجر من الطبع — فاعلمه! ٥

٧ والوجه واحد في جمعها أعني للتشميع: فزِدْ فيها إن كانت حرارتها في المرتبة الأولى فخامسةً من المرتبة الأولى، وإن كانت حرارتها في المرتبة الثانية فخامسةً من المرتبة الثانية، وإن كانت حرارتها في المرتبة الثالثة فخامسةً من المرتبة الثالثة، وإن كانت حرارتها في المرتبة الرابعة فخامسةً من المرتبة الرابعة . ٩

١١ والخامسة من المرتبة الأولى قيراط، ومن المرتبة الثانية دانق ونصف، ومن الثالثة دانقين ونصف، ومن الرابعة أربعة دوانيق. هذا واجب في الأشياء الحجرية المحض ما كان الواجب في تشميعها بزيادة الحرارة . ١٣

فأما إن كان الوجه تزيد البرودة فالحكم في البرودة مثل الحكم في الحرارة كما وصفنا سواء، وكذلك إن كان الوجه تزيد الرطوبة واليبوسة ... وذلك إنك تنظر إلى أكثر ما في ذلك الشيء، الذي تريد تركيبه، من الحرارة هو أم من البرودة أو من اليبوسة أو من الرطوبة، فتزيد فيه — من جنس الأغلب في تلك الأحجار — الخامسة، كما قلنا لأنه لا يتشمع شيء إلا بما كان من جنسه عليه، فاعرف ذلك وقس عليه سائر ١٧

١: أربعة [H] الاربعة C, P, T : ١٨ [لا] P --

١ ما يأتيك من وجوه التدابير في الأدوية التي هي من الحجارة فقط .  
فأما إن كان الإكسیر من حيوان فقط زِدَتْ فيه ، إن أردت تشميعه وإن أردت أن تقلبه من شيء إلى شيء، جعلت من أحد الأربعة الغالبة أيضاً أربعة: إن كانت في المراتب الأول فرابعة من المراتب الأول، ومبلغها دانق؛ وإن كانت من المراتب الثانوي ٣ كانت رابعة من المراتب الثانوي، ومبلغها نصف درهم؛ وإن كانت من المراتب الثالث فرابعة من المراتب الثالث، ومبلغها خمسة دوانيق؛ وإن كانت من المراتب الرابع ٥ «فرابعة من المراتب الرابع»، ومبلغها درهين ودانقين — فاعلم ذلك! ... ٧

وإن كان الإكسیر، التي تريد تشميعه أو نقله من حال إلى حال أخرى، من النيات وحده، عرفت أيضاً الأغلب فيه من الأربعة، ثم زِدَتْ ثلاثة من أحدها: وذلك إنه إن كانت من الأول فثلاثة من المراتب الأول، ومبلغها دانق ونصف؛ وإن كانت من المراتب ٩ الثانوي فثلاثة من المراتب الثانوي، ومبلغها أربع دوانيق ونصف؛ وإن كانت من المراتب الثالث فثلاثة من المراتب الثالث؛ وإن كانت من المراتب الرابع فثلاثة من المراتب الرابع ١١ — ومبلغ الثالثة من المرتبة الثالثة درهم وربع، ومبلغ الثالثة من المرتبة الرابعة درهين . ١٣

— [82a7 - 85a2] —

١: يأتيك [تيك/ما يتكون P: التدابير] التدبير C ٤: [الثواني] الثاني T ٥: كانت ...  
[الثواني] C -- ٣: كانت [كان P, T ٥: تريد] تراء P، يراء T

- ١ الكيفية حال ما الشيء المكيف أعني بذی الحال. والأحوال منها بالفعل كمشي عبد الله إذا كان ماشياً؛ والأحوال التي بالفعل منها سرعة الزوال، كالقيام والقعود
- ٢ والحجل والغضب وما أشبه ذلك من الأشياء من الأحوال الموجودة بالفعل سرعة الزوال. ومنها بطيئة الزوال، كالهندسة والطب والموسيقى إذا كان موجوداً للشخص بالفعل .
- ٥ ومنها بالقوة كالمشي لعبد الله (فإن الحيوان نبات بالقوة، غير نبات بالفعل، وكذلك الحجر بالإضافة إلى الحيوان والنبات)، وكاقتناء الهندسة إذا لم يكن مقتنياً لها.
- ٧ والذي بالقوة إما أن يكون الشيء من فعله وهو كقولنا لعبد الله صريع إذا كان له ذلك أن يفعل في قوته، وإما انفعاله في ذاته كما تقول للحجر صلب تريد أنه ليس
- ٩ يتفرق أجزاؤه بسهولة وللخشب رخو أي أنه ينقطع أجزاؤه بسهولة .
- والكيفيات السريعة الزوال لا يكاد يكيف أعني بوصف الشيء بها عند القول، لأننا
- ١١ لا نسمي من اصفر من فزع «مصفر» أو لا من اسود من سفر «مسوداً». وأما البطيئة الزوال فقد يكيف بها الشيء، فإننا نسمي من قد اصفر لونه من مزاجه (أو من
- ١٣ حال أخرى حدثت عسرة النقلة) مصفراً (أو مسوداً) أو ما أشبه ذلك. وهذا أعني العسرة الزوال هي التي يجب أن يقال لها كيفيات لأن الجوهر مكيف بها .
- ١٥ وقد يكون في النفس أيضاً كيفيات سهلة الزوال كالحزن الحادث من سبب ما سريع

- ١ التقضى، أو الفرح. وبين أن الحال في هذه أيضاً كالحال في الأولى، لأننا لا نصف من حزن وقتاً يسيراً لعلته بأنه حزين، ولا من طرب كذلك بأنه طروب؛ بل نصف بذلك
- ٣ الكائن لهما، وذلك دائم أو في الأمر الأكثر .
- والشكل والخلفة والاستقامة والانحناء وما أشبه ذلك فكيفيات، وذلك لأنه يقال لكل واحد منها كيف الشيء؛ فلأننا قد نقول في الشيء أنه مثلث أو مربع أو مستقيم أو منحنى. والتخلخل والنكاثف والخشونة والملوسة وما أشبهها قد يظن بها
- ٧ أنها من الكيفيات، وخليق أن لا تكون منها وذلك بأنها أخرى أن يكون متكاثف لما تقاربت أجزاؤه بعضها من بعض، ومتخلخل لما تباعدت، ولين لما كانت
- ٩ أجزاؤه موضوعة على التساوى والاستقامة لا يعلو بعض وينخفض بعض، وخشن خلاف ذلك .
- ١١ ولعله أن تكون للكيفية ضروب آخر، والذي نذكره في هذه وهي إما في المحسوسات للعين، كالأشكال والألوان؛ وإما في الشم، كالأعراق؛ وإما في الذوق،
- ١٣ كما للطعوم؛ وإما في المس كالحر والبرد؛ وإما في العقل، كالعلم والجهل؛ وإما في القوة، كالقدرة والعجز «وهذه إما بالفعل وإما بالقوة»؛ وإما ثابتة؛ وإما زائلة؛ وإما
- ١٥ فاعلة؛ وإما منفعة .
- وللكيفية إن أسماء المكيفات على الأكثر مشتقة منها، كالكاتب من الكتابة،

- ٢: [لعله] P ٥: منها H منها C, P, T ٦: أشبهها ... بها H أشبهها ... بهما
- ٧: C, P, T ٧: أنها [انهما] C: لا تكون منها H لا يكون منهما C, لا يكون منها T, P:
- أخرى [أجرى] C, T ١١: للكيفية [الكيفية] P, T ١٣: في المس كالحر H في المس هما
- في الحر C, في المس كالحر P, T ١٦: كالكاتب H كالكاتب C, P, T



- ١ والتاجر من التجارة، والجائر من الجور، والعاذل من العدل؛ وربما لم يكن كذلك إما لأن  
الكيفية بالقوة، وإما من أجل أنه لا يقال في اللغة .
- ٣ والكيفية أن فيها مضادة كالعادل والجور، والبياض والسواد، وما أشبه ذلك.  
والمكيفات أيضاً متضادات بها كالعادل والجائر، والأبيض والأسود. ولكن ليس للأحمر  
٥ ولا للأصفر ضد، ولا لما أشبههما، ولا للمدور ولا للمثلث ضديته .
- ٧ وإذا كان أحد المتضادين كيف فإنَّ ضده أيضاً كيف، وذلك ظاهر لمن تصفح سائر  
المقولات — مثال ذلك العدل ضد الجور، والعدل كيف، والجور أيضاً كيف، وذلك أنه لا  
يليق به شيء من المقولات البواقية: لا الكم في المثال ولا المضاف ولا أبين ولا متى  
٩ «ولا شيء» منها خلا كيف .
- والكيفية أيضاً فإنها يقال بأكثر واقل، فإنه قد يقال بأن هذا أبيض بأكثر مما هذا  
١١ أبيض، ويقال أيضاً إن هذا أشد بياضاً من هذا؛ وليس في كلها يقال ذلك لكن في  
أكثرها. فإنه قد يشك في هل يجوز أن يقال عدالة أكثر من عدالة، وصحة أكثر من  
١٣ صحة؟ وقوم يقولون إنه لا يقال ذلك، بل يقال لهذا صحة أكثر مما لهذا، وكذلك في  
العدالة والكتابة وسائر الحالات. فأما المسميات من هذه الكيفيات فعن غير شك قابلة  
١٥ للزيادة والنقصان، لأنه قد يقال أن هذا أبلغ من البلاغة، وهذا أعذل من هذا وأصح  
في العدالة والصحة .
- ١٧ وليس أيضاً كل مسمى من كيفية قابلاً للزيادة والنقصان، فإن المثلث مسمى من  
كيفية التي هو التثليث والمربع «مسمى من كيفية التي هو التربيعة» وليس يقبلان  
١٩ الزيادة والنقصان، لأنه ليس مثلث أكثر تثليثاً من مثلث، ولا مربع أكثر تربيعة من

١٨: [التثليث] المثلث/التثليث P؛ والمربع [التربيعة] C، ولمربع P

- ١ مربع، لأن المثلثات يقال عليها المثلث بالسوية، وكذلك المدورات والمربعات .
- وليس يقال فيما قيل عليها المثلث بالسوية، وكذلك المدورات والمربعات، وليس فيما  
٣ قيل عليها الحد بالسوية أقل وأكثر في ذلك الحد؛ ولا أيضاً على ما لم يقل عليه حد  
واحد فإنه ليس يقال حد أحدهما على صاحبه. وبالجمله فكلاً قيل عليه الحد  
٥ بالتساوي، أو ما لم يقل عليهما حد واحد، فليس يقبل الزيادة ولا النقصان .
- وإنما يقال الأقل والأكثر فيما كان مع الموافقة في الحد له اكتساب الزيادة والنقصان،  
٧ كالبياض الذي هو أن وافق البياض في الحد فله أن يزداد بياضه وينقص .
- والكيفية جميعاً فلها وحدها أن يقال فيها شبيه وغير شبيه فإنه لا يكون هذا  
٩ شبيهاً بهذا شيء غير كفيته، مثال ذلك أنه لا يكون هذا المثلث شبيهاً بهذا المثلث إلا  
في المثلث الذي قبله حده جميعاً.
- ١١ فإن قيل إنما قصد بالكلام إلى كيف وقد ذكرنا كثيراً من المضاف إذ كنا قد ذكرنا  
العلم وما أشبهه وكان العلم على معلوم، فإننا نقول إن أجناس هذه الأشياء، أعني  
١٣ كلياتها، وإن مقولة من أجل غيرها، كالعلم من أجل المعلوم؛ فإن أشخاصها أي  
جزوياتها ليست يقال من أجل غيرها، مثال ذلك إنه وإن كان العلم علماً بشيء من  
١٥ أجل غيره، فإن النحو لا يقال نحو لشيء، اللهم إلا أن يوضع هذا كالجنس أعني  
بذلك أن يعطى اسم الكلي الذي هو العلم، فيقال النحو علم بشيء فليست إذن  
١٧ الجزويات من المضافات، وليس بمنكر أن يكون من جنس على وجهين مختلفين .

— [86a6 - 86b26] —

٢: فيما قيل ... وليس] -- C ٣ ... ١٢: ولا أيضاً ... فإننا نقول] -- C ٧: وافق  
فافق T ١٢: إن] واعلم أن C

## الجزء الرابع من كتاب الأحجار على رأي بليناس

- ٢ يسلم الله الرحمن الرحيم. الحمد لله رب العالمين وصلى على سيدنا محمد وآله  
أجمعين. مَنْ كان ذاكرة لما ذكرناه في المنازل الأولى والثانية والثالثة من هذا الكتاب  
٤ علم أنا وعدنا أن نبين في هذه المنزلة موازين الأرواح، وما جرى مجرى الأرواح، على  
مثل الأشكال التي قد كنا نبينا اشكال الأجسام عليها في المنزلة الثانية. وأن يذكر هذا  
٦ الجزء كيف الوجه في تزييد ما نقص، ونقص ما زاد. ونحن يادرون من موضعنا هذا  
بوجه العمل في الأرواح، تالون ذلك بمعرفة التزييد والنقص، ويكون ذلك مقطع هذا  
٨ الكتاب، وهو آخر هذه الكتب الأربع .
- ١٠ فنقول: إن الأرواح مخالفة للأجسام في النار لا من جهة اللون والصلابة والسك  
وغير ذلك. فإن الأرواح جميعاً أو أكثرها قد تكون ألوانها كاللوان الأجسام — حمرة  
وبيض وسود وغير ذلك. وقد تكون الأرواح كالأجسام في السبك إذ كل الأرواح بسبك  
١٢ في النار انسيك الأجسام، ويجري جرياتها. وقد تكون بعض الأرواح في صلابة  
الأجسام، وبعض الأجسام برخاوة بعض الأرواح؛ وإنما تصصنا على الأرواح والأجسام  
١٤ دون غيرها لما ينبغي أن نعلم أن الصنعة لا تكون إلا من روح وجسم، ولا تكون  
إلا من الثلاثة الأجناس، لأنه لا موجود غيرها .

١: الجزء الرابع من كتاب [كتاب الرابع من C ٣: لما + كان P ٥: بينا] بينا/بينا P,  
بينا C, T ٩: للأجسام [الأجسام C ١٠: تكون] يكون C, P, T ١١: تكون] يكون  
C, P, T ١٢: جرياتها] مجريها C: تكون] يكون C, P, T ١٣: وبعض الأجسام] ما هو  
P, ٢٢: ما هو T: الأرواح والأجسام] أرواح الاجسام C, P, T ١٤: تكون] يكون C, P, T,

- ١ فأما الحيوان فإنه إذا قطر خرج منه روحان وجسمان. قد هنته وماؤه وروحان، وصيفه  
وأرضه جسمان ... وكذلك النبات، فهذا سائر ما فيها. والقول في الحجارة فعلى حسب  
٣ ما يقطر منها، وما لا يقطر. فما قطر كان القول فيه كذلك. وما لم يقطر فهو على  
توعين: إما متصاعداً أو غير متصاعد. فما تصاعد انقسم قسمين — فصاعده روح  
٥ وراعيه جسم. والغير المتصاعد فيقسم أيضاً قسمين — قسم ماء وقسم متكلس؛ فأما  
الماء فروح، وأما المتكلس فجسم. وينقسم هذا الماء الآخر قسمين — قسم فرار وقسم  
٧ غير فرار. فأما الفرار من النار فروح، وأما غير فرار، وإن كان ماء، فجسم .
- ٩ فهذا جميع ما ينقسم عليه أمور الطبائع كلها في الصنعة ... وقد ذكرنا ذلك بعينه  
في «كتاب الكامل» من «المائة واثنى عشر» ...
- ١١ فأما نقل الأجسام من حالة إلى حالة إما أدون منها أو أرفع ففي هذا الكلام باطن  
وظاهر، إذ كذلك باطن وظاهر في حقيقته، إذ كان كل شيء كل منها مدوراً، ومنها ما  
ظاهرة موجود وما باطنه معدوم، وفي باطنه الفائدة. وعكس هذا الكلام كالأسرب ظاهره  
١٣ رصاص منتن، وهو موجود للناس جميعاً، وباطنه ذهب وقضة وهو معدوم؛ فإذا خرج  
ذلك صار الظاهر والباطن موجودين .
- ١٥ وعلى ذلك ميزان النار وميزان سائر الأجسام، وميزان طبائع الكواكب وأبعادها  
وفعلها ونقلها، وميزان عرفوا به الفلك، كما عرفوا بميرانهم هذا الطبائع ذوات الطبائع.
- ١٧ ومن قرأ كتابنا المعروف بـ «المنتهى» و«كتاب الشمس» إطلع أكثر هذه الموازين حتى

٤: قسمين] -- C ٥: قسم ماء] ماء C ١١: إذ كذلك ... ظاهر] -- C, إذ لذلك ...  
ظاهر P ١٢: وعكس هذا الكلام] وعكس فهذا الكلام وعكس هذا الكلام T ١٥: الأجسام،  
وميزان] الاجساد ميزان T ١٦: نقلها] -- C

١ ميزان النفس وميزان العقل، ولا نهاية بعد ذلك؛ وهذه كلها غير ملموسة، لهم ليس بصعب وزن ميزان الحيوان والنبات والحجر، إذ هي موجودة ملموسة ...

— [88a8 - 89a13] —

### باب في ترتيب تعليم المتعلم

٤ ينبغي أن تفهم أولاً من الصناعة شيئاً بسيطاً — وهو أن تعلم ما يحمر وما يبيض، وما يعقد وما يحل، وما يلين وما يجف — وكل ذلك على طريق الميزان. وهذا بين لك واضح في غير كتاب من كتبنا هذه. وقد استوفيتنا كثيراً منه في «الحاصل» وفي «كتاب التصريف» و«الميزان» ومن «المائة واثنى عشر» في كتابنا المعروف بـ «كتاب الأصباغ».

وينبغي أن تعلم العناصر الأول والثواني والثالث والرابع، والأعراض وكفياتها؛ كالنار وأخواتها وهي الثانية، والثالثة كالأزمنة، والرابعة كالمركبات السود والصفرة. وتنتظر كيف قبول طبعك، وكيف تصرفك فيه، وكيف نتائج قريحتك له. فإن كنت قد رأيت عقلك قدح فيه شيئاً وتصرفت فيه بأشياء، فينبغي أن تديم القراءة أولاً، وبخاصة إن وقع إليك «شرح كتاب أسطقص الأس» وإن كنت قد جاوزت هذه المنزلة فبح بئ لك! فارتفع الآن إلى أقوال الفلاسفة وآرائهم في أمور الطبايع وتركيباتها. وتأخذ في شيء من الكلام وعلم المنطق والحساب والهندسة قليلاً بحسب ما يسهل عليك تصور

٢: موجودة ملموسة [موجود أنه T ٦: لك] -- C: منه [منها C, P, T ١٠: والصفر] والصفرة C, P, T ١١: تصرفك [يصرفك P ١٢: قدح] قد قدح C, P, T ١٣: أسطقص أسطقس T ١٤: فارتفع [فترفع T ١٥: علم] -- C: تصور [تصور C

١ المسائل إذا طالت عليك. وإن كنت قد شدت من ذلك شيئاً قديماً فهو أسهل عليك وأجود.

٣ فتصرف الآن، إن أحببت، في علم الطبايع أو غيره. وإن أردت علم الطبايع فلتدرس من الطبايع الأحجار والخواص قليلاً. ثم تنقل جملة واحدة إلى الموازين، فتعرف من جميع نخب الموازين قطعة «قطعة» — مثل ميزان النار وميزان الموسيقى وموازين الأجساد. وقد ذكرنا من ذلك قطعة في غير كتاب وبخاصة في «كتاب الصفة». فإن ملت مع علم الطبايع إلى علم الصنعة فلتدرس «كتاب الخارق» لتكون حذراً من وقوع الآفات وتلف المال ووقوع الحيلة عليك.

٩ ثم تتدرّب في «كتاب الموازين»، وأن تعلم كيف الوجه في تركيب هذه الأشياء وما سببه. وقد عرفت أنك أنه ينبغي أن تكون في هذا الوقت متكاملأ جيد الحس. فإنه لن يفرغ من كتبتي «السبعة» وهو يعوزه شيء من الموازين، وإذا تدرب بها ركب ما يريد.

١٣ ويعوزه الآن تصارييف الأبواب لا غير — وهذا مأخوذ من نشر الكتب — مثل التشميع والتسقيات والسحق والحلوات والعقودات. ومثل ما ذكره الناس على قديم الأيام وأكثروا فيه السرائر على طريق التدايبر للشيء الأعظم، وسقوط التعب هو في

١ ... ١٥: إذا طالت ... قديم الأيام] -- C ١: شدت [شدت P، سددت T ٤: من] + جميع T ٥: نقب [نقب/نعت P، -- T ٧: ملت] مالت T ٩: تتدرّب [تتدرّبت T، تدرب K ١٠: سببه] سبها P, T ١١: يفرغ [يفرغ P, T، يعوزه] يعوزه P, T؛ ركب [ويركب P, T ١٣: تصارييف] + الامور T ١٥: وأكثروا فيه ... هو في] -- C ١٥: للشيء] السر P, T

- ١ الموازين لا غير كما عرّفناك، فافهم ذلك الطريق إن أردت القرب أو ما أردت على حسب شهرتك .
- ٢ واعمل على أنها صنعة تحتاج إلى درية، بل هي أعظم من كل صناعة لأنها غير موجودة في الحسّ وإنما هي شيء قائم في العقل. فمن طالت دراسته كانت سرعته في التركيب على قدر ذلك. ومن قصر كان على حسبه .
- ٣ واعلم أن ثمرة الموازين عمل الرأس من أشياء مدبرة من التراكيب والأكاسير. والميزان إنما يقع بعد الممازجة من الأجسام مع الأرواح، أو الأرواح مع الأجسام، أو الأجساد مع الأجسام، أو الأرواح مع الأرواح، أو الأحجار مع الأرواح، أو الأحجار والأجسام والأرواح، فالميزان يقع بعد هذا الاختلاط. وإن كانت الأرواح والأجسام والأجساد دنسة بحالها وزنتها بعد اختلاطها وعرفت ما فيها من جملة الطبايع وعلمت اعتدالها، ولك قانون للاعتدال معروف: فإن كانت مثله فهي تامة، وإن كانت فوقه أو دونه زيدت فيه من الطبايع أو نقصت منه فيخرج بحاله الأخير سبعة عشر جزءاً ...
- ١٣ وللناس في هذا أحوال. ومنهم من لحظ في الموازين وعمل على أن الأصل في الأشياء كلها الطبايع. فمنهم من قال: إن شيئاً في العالم خلق قبل شيء. فإن جماعة من الصائين وأمتهم يذهبون إلى أن بناء العالم بعضه أسبق في الوجود من بعض، لا على أنه أسبق في الترتيب والنظم، لكن على أن بعضه أسبق من بعض في المدد

- ١ ... ٥: الموزين لا غير ... على حسبه] -- C ٦: من أشياء] من غير أشياء C, P, T
- ٨: الأجساد مع الأجسام] + الاحجار C, P, T ٩: وإن كانت] وإن كنت جمعت C ١١: للاعتدال] الاعتدال C, P, T ١٢: بحاله الأخير] بحالته الأخير في كل C, P, T ١٣: لحظ] C, P, T
- ١٤: شيناً] اشياء C, T ١٦: المدد] المدد T

- ١ والأحوال. وذلك أنني رأيت منهم من يزعم أن أول شيء خلق في الهيولى الأقدار الثلاثة — الطول والعرض والعمق — فصار الهيولى جسماً ساذجاً له ثلاثة أقدار. ثم خلقت فيه الكيفيات الأربع التي هي الحرارة والبرودة والرطوبة واليبوسة، فكانت منه طبايع الأشياء وأركان الخليقة. ثم تركبت هذه الطبايع الأربع وامتزجت بعضها ببعض، فكانت منها جميع الأشخاص والأشباح الموجودة في هذا العالم .
- ٢ فينبغي أن يقال لهم: إنكم قد ترفّيتم في عدد من مراتب مجهولات كلها غير معقولات حتى صحّحت وجود العالم على ما هو به ...
- ٣ فنقول وبالله التوفيق:
- ٩ إن أول تلك المراتب طينة، لم تزل، ليس بجسم، ولا توصف بشيء مما توصف به الأجسام. وزعمتم أنها شبح الأشياء وعنصر البرايا. وتصوير هذا الطينة في الوهم، وإحضارها بالبال متنع غير ممكن.
- ١٣ والمرتبة الثانية أنكم ذكرتم بأنه لما حدثت في هذه الطينة الأقدار الثلاثة صارت جسماً، غير موصوف بشيء من حرّ أو برد أو رطب أو يابس أو لون أو طعم أو رائحة أو حركة أو سكون، لأن هذه كلها كيفيات والكيفيات لم تحدث فيها في هذا الوقت.
- ٢: ساذجاً] سادجا C, P ٤: أركان] ان كان P، امتزجت H امتزج C, K, P, T ٥: جميع الأشخاص] جميع هذه الاشياء والأشخاص C، هذا العالم] هذه العالم P, T ٦: مراتب] المراتب C, P, T ٩: المراتب] المراتبان P، المراتب ان T؛ تزل] يزل C, P, T؛ مما توصف به] ولا يوصف به C ١١: إحضارها] اختصارها K، اخطار T ١٢: بأنه] انه C, T؛ صارت] صار C, P, T ١٢ ... ١٣: الأقدار الثلاثة ... أو طعم] -- C ١٢: أو رائحة] ورائحة C ١٣: أو حركة أو سكون] وحركة وسكون C

١ وهذا شيء غير معقول .

٣ ثم زعمتم أنه حدث فيها بعد هذه المرتبة الثانية الكيفيات الأربع التي هي الحرارة والبرد والرطب واليابس، فكانت منها الأربعة التي هي النار والهواء والماء والأرض. ومن البين أنه غير معقول وجود هذه الطبائع الأربع في حال من الأحوال على غير هذا النظم والترتيب الذي هي به الآن موجودة في العالم، من أن الأرض في وسط الفلك، والماء فوق الأرض، والهواء فوق الماء، والنار فوق الهواء؛ وكل طبيعة من هذه الطبائع الأربع تغالب ضدها من الطبائع، ويستحيل المغلوب إلى الغالب، والشجر والحيوان موجودان معها ومستمدان منها ومستحيلان إليها. فاتيتم هذه المراتب المقدم وصفها وهي كلها غير محسوسة، والعاقل متى خطر بباله حدوث الأشياء لا من شيء كان أسير وأسهل في وهمه مما تصفون .

١١ أو أخبرونا عن الشيء الذي خلقت منه النار من الهيبولى هل كان يجوز أن يخلق منه الماء؟ فإن قالوا نعم أحوالوا، وذلك أن كل شيء تركب منه شيء فهو هيبولى لما تركب منه. ومن قولهم إن نطفة الإنسان هيبولى الإنسان، ونطفة الحمار هيبولى الحمار، ويزعمون أنه محال أن تقبل نطفة الإنسان صورة الحمار لأنها ليست بهيبولى لها، وكذلك محال أن تقبل نطفة الحمار صورة الإنسان. فوجب على هذا القياس أن يكون الشيء يقبل صورة النار هو هيبولى لها، فمحال أن يقبل صورة الماء وأن يكون

١ هيبولى له .

فإن قالوا:

٣ إنا نجد الماء يستحيل فيصير ناراً، فيكون الجوهر الحامل لكيفياته وحالاته هو الحامل لكيفيات النار وحالاتها، فما جاز على الأول حاز على الثاني، وإنما تبدلت أعراضه — فلذلك الهيبولى القديم واحد وهو الحامل لكيفيات الماء وحالاته إن هي حدثت فيه، وحامل لكيفيات النار وحالاتها إن هي حدثت فيه.

٧ قلنا:

إن الماء ليس يستحيل ضربة فيصير ناراً، لكنه يستحيل أولاً بخاراً ثم يصير هواءً، ثم يستحيل الهواء فيصير ناراً. ولو أن قائلًا يقول إن الماء يستحيل هواءً فيستحيل ناراً كان قد أحال بما يعقل .

١١ وليس هكذا قولكم في الهيبولى البسيط الذي لم يزل. لأنكم لا تقولون إن الشيء الذي منه يخلق الماء في الابتداء إنما كان يجوز أن يخلق منه النار على سبيل الاستحالات التي ذكرناها، ولكن قلتم: كان يجوز أن يكون الهيبولى الذي استحوذت عليه طبيعة الماء وحالاته تستحوذ عليه بدلاً منها طبيعة النار وحالاتها بغير

٣: ناراً [هواء C, P, T؛ لكيفياته] الكيفيات P, T, ٤/٣: الحامل لكيفياته وحالاته هو الحامل [C -- ٤: لكيفيات النار] الكيفيات النار C, P, T، الكيفيات ؟؟ النار T؛ فما كما C, P, T ٥: فلذلك كذلك C, P, T؛ حالاتها] حالاتها C ٩: ثم يستحيل الهواء [C -- ١٠: فيستحيل] فيصير P, T؛ يعقل لا يفعل C, P, T ١١: قولكم قولهم C, P, T؛ البسيط البسيطة C, P, T؛ تقولون يقولون P ١٢/١٣: سبيل الاستحالات] سبيل هذه الاستحالة C ١٣: ذكرناها] ذكرنا C, P, T؛ الذي التي C, P, T

٤: هذا] هذه P, T ٥: في العالم] في هذا العالم C، في هذه العالم P, T ٧: تغالب] يغالب C ٩: لا] لا C, T؛ كان] وكان C ١١: منه النار] من النار C ١٢: منه شيء] من شيء C ١٤: نطفة الإنسان صورة الحمار] صورة الإنسان نطفة الحمار C, P, T ١٤ ... ١٥: لأنها ليست ... صورة الإنسان] C --

١ خالف هذا القول وخرج هذا عن هذا النظم والترتيب فهو كلام على غير المعقول .

٢ وما يستدل به على فساد قولهم أن من مقدمات اليقين وعلوم الاضطراب عند الفلاسفة أنه يستحيل أن يكون جوهر موجود عطلاً من الأفعال كلها الطبيعية والصناعية حتى يكون ذلك الجوهر ليس بذی فعل في نفسه ولا في غيره . وهذه الطبيعة التي زعم هؤلاء القوم أنها لم تزل وأنها عنصر الأشياء ، والهيولى الذي منه رُكبت لم تزل في قولهم عطلاً من الأفعال كلها الطبيعية والصناعية — وهذا المعنى الذي أحالته الفلاسفة ونفوا كونه ولم يقدروا على إثبات جوهر عطل من الأفعال كلها بأن يأتوا بالبرهان على ما يقولون ولا من طريق الإشارة إليه .

٩ فإذا كان الوجه غير هذا كله فإن الطبايع على ما بيناه لك فيما تقدم من سائر الكتب هي الأصل وإنها مشغولة للبارئ جل ثناؤه . وعرفت من هذه الطريق الوصول إلى الميزان الطبيعي حتى تكون عالماً بجميع ما في المركبات من الطبايع ومن صلاح وفساد .

١٣ ثم انتقل المتعلم بعد فراغه من هذا إلى المذاكرة والتصنيف له ، فقد تكامل في أوصافه . فإن كانت بصيرته بالصناعة مثل بصيرته بالعلم وفيه لطافة كيفية بالعمل ١٥ سمى فيلسوفاً تاماً .

وقد انتهينا إلى هذا الموضوع ، وهو آخر ما يحتاج إليه من ترتيب تعليم المتعلم ، فهو

٣: عطلاً [عطل C, P, عصل T ٤: في نفسه] نفسه C ٥: تزل [تزل C, P, T ٦: تزل] يزل C, P, T ٨: بأتوا [بأتى C, P, T يقولون] يقول C, P, T ٩: فإن [وإن C, P, T ١٠: هي] هو C, P, T جل ثناؤه -- C ١١: تكون [يكون P, T ١٤: بصيرته بالعلم] بصيرته C ١٦: وقد [واذ قد P, T تعليم المتعلم] العلم المتعلم C, P, T

١ استحالات متوسطة فيما بين الماء والنار — وهذا خلاف المعقول .

٢ وإن زعموا أن الهيولى القديم قبل أن يكتسى بالصور ويحدث فيه الطبايع كان شيئاً إنما قوته أن يقبل بها في الابتداء حالات النار وكيفياتها ، ومنها شيء إنما قوته أن يقبل بها حالات الماء وكيفياتها ، وكذلك في الأرض والهواء ، كان بهذا القول قد أثبتوا للخليقة أربع عناصر لم تزل قديمة وهي مختلفات القوى — وبطل قولهم إن العنصر الأول واحد ليس بمختلف .

٧ ويُسْتَأْون: هل يجوز انحلال الأشياء إلى الهيولى القديم كما تركب منه؟ فإن قالوا لا يجوز هذا ، قيل: ولم لا يجوز؟ فإن قالوا: إن ذلك بطلان الأشياء ورجوع إلى ما لم يزل عليه من أنه بسيط لا تركيب فيه ، قلنا: وما الذي يضرركم من أن تقولوا إن الأشياء تتعود إلى ما لم يزل عليه من أنه علة لم يزل وهيولى بسيط لا تركيب فيه ١١ ويبطل هذا العالم؟

ويقال لهم: إن قوماً كثيراً من الفلاسفة زعموا أن هذه الطبايع الأربع التي هي أركان الخلقة وعناصر الأشياء (أعني النار والهواء والماء والأرض) بعضها في بعض بالقوة ، وأحالوا قول من زعم أن هذه الطبايع الأربع كانت موجودة في غير أنفسها ١٥ وغير ما هو مركب منها . قالوا: ليس المعقول من الموجود إلا هذه .

١٣ فإن ادعى مدّع أن هذه الطبايع الأربع إنما توجد بالقوة في غير أنفسها وفي «غير» ما هو مركب منها ، فليأت على دعواه برهان ، وإنه لم يقدر على ذلك أبداً ، إذ ما

٢: بالصور [الصور C, P, T ٣ ... ٤: في الابتداء ... حالات الماء] -- C ٥: للخليقة [للخليقة P: بطل] يبطل C ٨: هذا ... يجوز] -- C, T ٩: تتعود [تعود] سيعود P, T ١٧: أنه [اثبات C, P, T ١٧: إذ ما] إذا ما P, T

١ حينئذ كما حدّدناه ووصفناه، وهو من أقرب الناس إلينا في ذلك الوقت .  
ونحن الآن بادرون بذكر الأشكال ذوات الموازين، ونتبعه بشكل التزويد والتقصير،  
وهو آخر الكتاب إن شاء الله تعالى .

— [91b - 95a] —

## TRANSLATION, COMMENTARY AND TEXTUAL NOTES

### TRANSLATION

1:1

#### The First Part of the Book of Stones According to the Opinion of Balinās

[1]

1:2

*In the name of God, the Compassionate, the Merciful*

Praise be to God for perpetually bestowing upon us His gifts and favors, 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 Balinās, 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

Balinās 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,<sup>1</sup> I declare:<sup>2</sup> 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"—we have already elucidated [all] this in a number of books on this Art.<sup>3</sup>

1:8

1:10

He went on to say: "The weights which are common to all animals, plants, and stones conform to the proportion of 17. And

as for the elixirs, they are not like this"—<sup>4</sup> again, this is something which we have already explained in several books of ours.

1:12 Then Balinās determined the quantities of these weights; [these quantities are] 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.

## [3]

1:14 Balinās said: "As for the effective weight [of the natures],<sup>1</sup> I believe that its lower limit is the 'ashīr, that is,  $\frac{3}{4}$  habba." 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  
2:1 the fourth is 1 dirham [dir.], the third 60 dir., and the second 3,600 [= 60<sup>2</sup>] dir.; the minute is the product of 3,600 and 60, so that it becomes 216,000 [= 60<sup>3</sup>] dir.

2:3 The grade is the product of 216,000 and 60, thus it is 12,960,000 [= 60<sup>4</sup>] dir.; and [finally], the degree is the product of 12,960,000 and 60, so that the degree in the First Degree<sup>2</sup> [of intensity] of any nature is 777,600,000 [= 60<sup>5</sup>] dir.

2:7 Likewise, [the degree in] the Second Degree [of intensity] is 2,332,800,000 [= 3 × 60<sup>5</sup>] dir., the grade in the Second Degree is 38,880,000 [= 3 × 60<sup>4</sup>] dir., the minute in the Second Degree is 648,000 [= 3 × 60<sup>3</sup>] dir., the second in the Second Degree is 10,800 [= 3 × 60<sup>2</sup>] dir., the third in the Second Degree is 180 [= 360] dir., the fourth in the Second Degree is 3 dir., and [finally], the fifth in the Second Degree is 2½ habbas, that is, 3 [=  $\frac{3}{4} \times 3$ ] 'ashīrs . . .

2:13 To continue: the fifth in the Third Degree is, according to the doctrine of Balinās,  $\frac{15}{4}$  [= 5 ×  $\frac{3}{4}$ ] habbas, or 5 'ashīrs; the fourth in this Degree is 5 [= 5 × 1] dir., the third 300 [= 5 × 60] dir., the second 18,000 [= 5 × 60<sup>2</sup>] dir., and the minute 1,080,000 [= 5 × 60<sup>3</sup>] dir. The grade in this [Degree] is 64,800,000 [= 5 × 60<sup>4</sup>], and, following this pattern . . . , the degree in third Degree is 3,888,000,000 [= 5 × 60<sup>5</sup>] dir.

3:3 Similarly, the fifth in the Fourth Degree is 8 'ashīrs or 6 [= 8 ×  $\frac{3}{4}$ ] habbas, the fourth 8 [= 8 × 1] dir., the third 480  
3:5 [= 8 × 60] dir., and the second 28,800 [= 8 × 60<sup>2</sup>] dir. The minute

in the Fourth Degree is 1,728,000 [= 8 × 60<sup>3</sup>] dir.; the grade in this Degree is 103,680,000 [= 8 × 60<sup>4</sup>] dir., and [finally], the degree in the Fourth Degree is 6,220,800,000 [= 8 × 60<sup>5</sup>] dir.

3:8 So, God protect you, certain ideas of Balinās have been sufficiently elucidated. Let us now work out how, according to his views, these weights are applied to all things.

## [4]

3:10 Balinās 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!

3:13 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, Balinās 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.

3:17 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!

## [5]

4:1 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, Balinās also made a pronouncement on the letters which is in conformity with what we have [ourselves] taught you in the *Book of the Result*.

4:3 Next, he said: "When two letters of identical appearance 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 " b b ". 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." Then Balinās said, "as for the First Balance of animals [etc., etc.]"—here I need not repeat [his words], for what he said is in accordance with, and nothing other than, what I have myself set forth in the *Book of Morphology*.<sup>1</sup>

The same applies to [his assertions concerning 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. 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!

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 *ʿashīr* in the fifth [in the First Degree], and this is the minimum value, to the [degree in the] Fourth Degree which is of the value 6,220,800,000 *dir.*, [this being the maximum]. . . .<sup>2</sup>

# [6]

The reason why we are furnishing an account of stones in these [four] books, setting these books apart from all other writings, is that Balinās 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. . . .<sup>1</sup>

Further, Balinas 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. . . .<sup>2</sup>

Balinās 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!"—what Balinas is here referring to 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.

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.<sup>3</sup>

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,<sup>4</sup> in the interior of the thing, and in its exterior.

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 their primitive structure, and what has entered into this structure due to reasons other than additions.<sup>5</sup> It is known that the [word which denotes the] name of gold, (*al-*) *Dh<sup>a</sup>H<sup>a</sup>B*, exists in its primitive form, since it is free from additions; and the spelling of the [word which names] silver, *fidḍa*, becomes *FD*, since the *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.

So know, O brother, that when you obtain only one letter, like “*ṣ*” 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 intuition. You try to work out the latter in relation to the form,<sup>6</sup> so that the two figures form one unique figure. 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.<sup>7</sup> God is our Guide, may His blessings be upon you. Indeed, He is Generous and Kind.

[7]

[A]

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,  $Z^aYD^{un}$ ,  $Z^aYD^{an}$  and  $Z^aYD^{in}$ , [which are the inflected forms of the primitive noun  $Z^aYD$ ] in the nominative, accusative and genitive cases [respectively]<sup>1</sup>; and  $Z^aYD^{an}$  and  $Z^aYD^{un}$  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  $Z^aYD$  from  $Z^aYD^{an}$ , and  $UM^aR$  from  $UM^aR^{an}$ , and so on.

[B]

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, I mean 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.

You ought to know that there are ten letters which function as adjuncts and these are: *hamza*, *lām*, *yāʿ*, *wāw*, *mīm*, *tāʿ*, *nūn*, *sīn*, *alif*, and *hāʿ*. 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.

[C]

So, seeking assistance from God, may He be exalted and glorified, we proceed: The basic units of speech consist in three structures, namely: trilateral, quadrilateral, and quinqueliteral. As for the trilateral, 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  $FA^cL$ , exemplified in *fahd*, and [nine others are these]:  $FI^cL$ , such as *himl*;  $FU^cUL$ , such as *dubur*;  $FU^cL$ , such as *ʿunq*;  $FA^cAL$ , such as *rasan*;  $FI^cIL$ , such as *ibil*;  $FU^cAL$ , such as *surad*;  $FI^cAL$ , such as *qimaʿ*;  $FA^cIL$ , such as *kabid*; and  $FA^cUL$ , such as *sabuʿ*. So these are ten paradigms into which the trilateral structure multiplies. As for the paradigm which generates only a unique example, it is  $FU^cIL$ : the insect *duwaybba* is called “*duʿil*.” Finally, the structure on which nothing could possibly be based is  $FI^cUL$ .

As for the quadrilateral structure, it has five morphological paradigms, namely:  $FA^cLAL$ , such as *ʿagrab*;  $FU^cLUL$ , such as *burquʿ*;  $FI^cLIL$ , such as *zibrij*;  $FI^cLAL$ , such as *hijraʿ*; and  $FI^cALL$ , such as *qimatr*.

The quinqueliteral is divided into four paradigms, they exist in accordance with:  $FA^cALLAL$ , such as *safarjal*;  $FA^cLALIL$ , such as *jahmarish*;  $FU^cALLAL$ , [such as . . . ?]; and  $FI^cLALL$ , such as *jirdahl*.

[D]

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, *mīm* 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-ghulam*, *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,<sup>1</sup> although it is more appropriate with the *hamza*.<sup>2</sup> Similarly, [a third] *lām* is added between the second *lām* and *dhal* in *alladhi*.<sup>3</sup> 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 *dhal*. As for *mīm*, it is added in [such nouns as] *makrum* and *mustadrib*, 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*, *sīn*, *alif*, and *hā’*, *hamza* is added in *Ahmad*, and in *Afdal*, [these two] being nouns; and in *ahsana*, and in *akrama*, and these two are verbs. 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!

The letter *yā’* is added in the word *ya‘malu*, and this is a noun; and in *yadribu*, and this is a verb. *Wāw* is added in *jawhar<sup>un</sup>*, and this is a noun; and in *hawqala*, and this is a verb. The letter *tā’* is added in the word *tandubu*, this being a noun, and in *tadribu* which is a verb. [Similarly], *nūn* is added in *narjis<sup>un</sup>*, and this is a noun; and in *nadribu* which is a verb.

The letter *sīn* is added in *mustadrib<sup>un</sup>* which is a noun; and in *istadriba*, and this is a verb. The letter *alif* is added in *mudārib<sup>un</sup>* which is a noun; and in the word *dāraba* which is a verb. [Finally], *hā’* is added in *qā’imat<sup>un</sup>*, and this is for feminine designation—thus, [in the apocopate form], the word is [pronounced] *qā’ima*. *Hā’* 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. . . .

[8]

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, *FA‘ALATUN*; and the maximum number of quiescent letters that can cluster in a row is [two], represented by their paradigm *FĀ‘ILĀN*—here the letter *alif* and the letter *nūn* are quiescent. This [latter] would have been impossible were it not for the softness which is in *alif*. Such clustering of quiescent letters is inadmissible except in the case of soft letters, and these are three: *wāw*, *yā’*, and *alif*. So know that!<sup>1</sup>

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 *FA‘ULUN* and *FĀ‘ILUN*. And as for the six septenary ones, they are *MAFĀ‘ILUN*, *FĀ‘ILATUN*, *MUSTAFĀ‘ILUN*, *MUTAFĀ‘ILUN*, *MUFĀ‘ALATUN*, and *MAFĀ‘ULĀTUN*. 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.

[9]

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;<sup>1</sup> even numbers are 2 and its sisters.<sup>2</sup> The even-even number is like 8: it arises out of the pairing of 6, of 4, and of 2.<sup>3</sup> As for the even-odd numbers, they are [the even numbers] like 6 which is contained in [an odd number] 9; and the sisters of 6, like [the even number] 4 contained in [the odd number] 5, and so on.<sup>4</sup> As for the odd-odd, it is the number 1

contained in 3, 5, 7, 9, and in numbers like these.<sup>5</sup> 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.<sup>6</sup>

## [10]

10:8 From all this arise the four musical modes,<sup>1</sup> being the final result of all the above numerical considerations, namely: the [rhythmic] modes called the "first heavy,"<sup>2</sup> the "second heavy,"<sup>3</sup> the *ramal*,<sup>4</sup> and the *hazaj*.<sup>5</sup> Then, from each of these, four light modes are generated, giving altogether eight [rhythmic] modes. These latter are: the "first light heavy,"<sup>6</sup> the "second light heavy,"<sup>7</sup> the rapid *ramal*,<sup>8</sup> and the rapid *hazaj*.<sup>9</sup> Finally, a relationship is established between each one of these and [the melodic modes called] the *asābi*.<sup>10</sup> 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.<sup>11</sup> So they call [these combined modes]: the "first heavy freed,"<sup>12</sup> the "first heavy tightened,"<sup>13</sup> the "first heavy middle,"<sup>14</sup> and the "first heavy carried"<sup>15</sup> (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.

0:16 All this is yielded by their doctrine that [music is] governed by numbers, that is, it is a composition of numbers. . . .

## [11]

1:17 *Concerning the Balances of those bodies which are mixed together:*

## [A]

Take, for example, glass<sup>1</sup> mixed with mercury in some proportion of weight known to nobody except you, and you give it to the

11:1 practitioner of Balance. [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.

11:4 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—

## [B]

11:8 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<sup>1</sup> 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

11:10 *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.

11:13 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.<sup>2</sup>

11:16 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  $1\frac{1}{2}$  *dānaqs*. Note that when you mix to this weight of pure gold roughly 1 *qīrāt* or 1 *dānaq* of silver the former will drop in weight in the ratio of *ḥabbas* to *qīrāts*, since there are 12 *ḥabbas* to each *qīrāt*.<sup>3</sup>

So know this, for it is, by my Master, a fountainhead of the knowledge of philosophers! It is in this manner that you determine 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 exists 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]

We have pointed out to you in several books, if you have read them at all, 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 is 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. 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]

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 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 Balinās

[14]

- 14:2 *In the name of God, the Compassionate, the Merciful*  
Praise be to God Who chose Muhammad 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]

- 14:4 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. Now, since Balinās disagreed with us in  
some fundamental principles as well as in some matters of detail, it  
would be wrong not to specify these disagreements.
- 14:6 [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. . . .
- 14:10 We have thoroughly explicated to you those letters on which  
language entirely depends, specifying instances, from degrees to  
fifths, when these letters are excessive or deficient.<sup>1</sup> Likewise, we  
have given you an account of the [effective] weights of all letters  
as we have them and as Balinās has them. In addition, we have
- 14:13 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 Balinās, and that our  
need for this kind of knowledge is not so great when we deal with  
locomotion of bodies and their decompositions.<sup>2</sup>

[16]

- 15:1 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.
- 15:3 [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 Balinās.
- 15:6 As for Balinās, 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.” So Balinās assigned a weight of 777,600,000 *dirhams*<sup>1</sup>  
to [the degree in] the First Degree [of intensity]. And since this  
man, I mean Balinās, needed the fifth as the [smallest] subdivision  
[of a Degree], he assigned to it a weight of 1 *ashir*.<sup>2</sup> He then  
increased this weight [for the] higher [subdivisions] till it reached  
where it reached. These quantities have been specified in our  
account of Balinās in the first part of this book. . . .

[17]

- 15:12 Now listen to what Socrates had to say! . . .  
He said: “We make [the degree in] the First Degree [of intensity]  
1 *dirham* and 1 *dānaq*, [in] the Second Degree 3½ *dirhams*, [in]  
the Third 5 *dirhams* and 5 *dānaqs*,<sup>1</sup> and [in] the Fourth 9 *dirhams*  
and 2 *dānaqs*. We make the grade in the First Degree [of intensity]  
½ *dirham*, in the Second Degree 1½ *dirhams*, in the Third  
2½ *dirhams*, and in the Fourth 4 *dirhams*.
- 16:3 “We make the minute in the First Degree [of intensity]  
2½ *dānaqs*, in the Second Degree 1¼ *dirhams*, in the Third

2 *dirhams* and 1 *qirāt*, and in the Fourth  $3\frac{1}{3}$  *dirham*. We make the second in the First Degree 2 *dānaqs*, in the Second 1 *dirham*, in the Third 1 *dirham* and 4 *dānaqs*, and in the Fourth 2 *dirhams* and 4 *dānaqs*.

16:8 "We make the third in the First Degree  $1\frac{1}{2}$  *dānaqs*, in the Second  $4\frac{1}{2}$  *dānaqs*, in the Third  $1\frac{1}{4}$  *dirhams*, and in the Fourth 2 *dirhams*. We make the fourth in the First Degree 1 *dānaq*, in the Second  $\frac{1}{2}$  *dirham*, in the Third 5 *dānaqs*, and in the Fourth 1 *dirham* and 2 *dānaqs*. Finally, we make the fifth in the First Degree 1 *qirāt*, in the Second  $1\frac{1}{2}$  *dānaqs*, in the Third  $2\frac{1}{2}$  *dānaqs*, and in the Fourth 4 *dānaqs*."

[18]

17:1 May God protect you, just look at the erudition of this man, his stature in science, and the quality of his judgments! Note, likewise, that he discarded the sexagesimal system [adopted by Balinās], and the reason for this is his view that it is only a convention to say that one degree equals 60 grades, [and one grade equals 60 minutes, and one minute equals 60 seconds, etc]. 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 than to adopt the sexagesimal system.<sup>1</sup> But the sexagesimal system is used only because it makes calculations easy and gives rise to fewer fractions. . . .

17:6 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. Now if you wish to follow the doctrine of Socrates, go ahead; and if you wish to follow the ideas of Balinās, 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]

14-19

	Ist Deg.	IInd Deg.	IIIrd Deg.	IVth Deg.	Hot	Cold	Dry	Moist
	1	3	5	8				
	<i>dān.</i>	<i>dān.</i>	<i>dān.</i>	<i>dān.</i>				
Degree	7	21	35	56	<i>alif</i>	<i>bā'</i>	<i>jīm</i>	<i>dal</i>
Grade	3	9	15	24	<i>hā'</i>	<i>wāw</i>	<i>zā'</i>	<i>ha'</i>
Minute	$2\frac{1}{2}$	$7\frac{1}{2}$	$12\frac{1}{2}$	20	<i>tā'</i>	<i>yā'</i>	<i>kāf</i>	<i>lam</i>
Second	2	6	10	16	<i>mim</i>	<i>nūn</i>	<i>sīn</i>	<i>'ayn</i>
Third	$1\frac{1}{2}$	$4\frac{1}{2}$	$7\frac{1}{2}$	12	<i>fā'</i>	<i>sād</i>	<i>qāf</i>	<i>rā'</i>
Fourth	1	3	5	8	<i>shīn</i>	<i>tā'</i>	<i>thā'</i>	<i>kha'</i>
Fifth	$\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	4	<i>dhāl</i>	<i>dād</i>	<i>zā'</i>	<i>ghayn</i>

[20]

20:1 At this point we need to show you by means of tables the Balances of fusible stones.<sup>1</sup> These fusible stones which constitute the first and foremost need 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. So 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 possess hot in the First Degree [of intensity]. They possess 3 times as much cold, 5 times as much dry, and 8 times as much moist.<sup>2</sup>

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.

[21]

20:9 *The quantitative magnitudes obtained (in the present context, these are the measured weights, I mean those which make up the total of 17):*



20:10 In the First Degree [of intensity] exists either hot or cold (and these two are [signified by] the letters *alif* or *bāʾ*) 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 *bāʾ*) is 3½ *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 [ $\{1 \text{ dir.} + 1 \text{ dān.}\} + \{3\frac{1}{2} \text{ dir.} = 3 \text{ dir.} + 3 \text{ dān.}\} = 4 \text{ dirhams}$  and 4 *dānaqs*.

21:4 The eight-times 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. As for the five-times 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 . . .

21:9 In this way, among all objects belonging the three kingdoms of nature, from the smallest to the largest, when these are considered according to the precise Balance, and among all the celestial bodies and among all the other wonders of the natural world, the total weight of 17 in red [bodies] is [represented by] 19 *dirhams* and 5 *dānaqs* [=  $17 \times 7 \text{ dān.}$ ]. 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 with white [bodies]. It behooves you to know this!

21:13 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 understand that!

21:16 When you desire the weight of a given thing, you ought to find out, [first], what its letters necessitate; next, work out what it adds up to. [Finally], adjust your result so that it reaches a value which is related to 17.<sup>2</sup>

[22]

22:2 When in a natural object the nature hot is on the opposite side of moist, then we have an instance of the color red. Had this not been the case, the dry due to its preponderance would have torn the moist apart, since [in red bodies] the quantity of dry is enormously greater than that of moist. Reverse is the case with the white, for if [in white bodies] dry had not been on the opposite side of cold, the moist would have overpowered the dry. The meaning of spatial opposition between the natures is that they exist in mutual proximity; but they do not stand against each other in conflict, I mean in being face-to-face. Nor [are these natures separated from each other] by distance such as that which exists between the circumference of a circle and its center. To be sure, had spatial opposition not existed between the natures (and, consequently, the hot in the red had overpowered [the cold], as 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.

[23]

22:9 When a thing in equilibrium exists in an integral state, just as when it is not a [flowing] liquid, then among all things it necessarily occupies the medial position. 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 warrants further examination and research.

22:12 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 have meant being fusible; and if they happened to be soft, the characterization of equilibrium would have changed likewise. Indeed, if [the



parts of animals] happened to have attributes other than these, they would have been considered to be in equilibrium in a similar manner. . . . Since all parts of animals have their own proper constitution, in themselves they are all equally in equilibrium.

23:1 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, and to these they would have directed their operations. So one reaches the inescapable conclusion that gold is distinguished only from the point of view of its utility.

23:4 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.

23:11 But here we likewise 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,<sup>1</sup> God willing! . . .

## [24]

23:14 Let us now consider those 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.

23:15 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 and that it is divided into two kinds: red and white. If the elixir is red, it has a preponderance of hot and dry; if it is white, it has a preponderance of cold and moist. And, according to the opinion that is sound and free from corruption, the total effective weight of the elixir is [a multiple of

17, namely] 19 *dirhams* and 5 *dānaqs*. Indeed, all our examples signify the number 17 [even] if [in practice] we arrive at a number which is higher or lower. Thus, it behooves you to know that in all of them [sc. in all natural objects] the governing principle 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.

## [25]

24:1 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*.

24:5 If you intend to make a given "*alif*" degenerate into a "*bā*?", or into a "*jīm*" or a "*dāl*," [you can achieve this] provided you derive these letters from the Second Elements, namely, Fire, Air, Water, and Earth.<sup>1</sup> Upon my life! some of these compounds undergo transmutation. All this we have meticulously explicated in the *Book of Morphology*; thus, the method has already been clarified: Pursue it! God the Most High willing!

## [26]

## [A]

24:9 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]. And among these metals there are those which [in their Balance] exceed 17, others which fall short of it, yet others [whose Balance] equals 17.

24:12 If, when analyzing a thing, you find that it equals 17, don't add anything, and don't subtract anything. However, this is an exceedingly rare case. If you find a thing whose [Balance] is greater than 17, subtract it in proportion till it reaches 17. Proportionalized and regularized, it will correspond to that thing which is so rare as to be practically non-existent. So know that, and proceed accordingly!

25:1 If, on the other hand, you find a thing which in its Balance falls short of 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. . . .

25:4 So, God protect you, [in practice] everything either exceeds [17] or falls short [of it]—this is inevitable. Thus, one obtains the result that gold is among the excessive ones. Indeed, it behooves you to know the meaning of excessive and deficient, even though we have so far spoken of that which [is neither excessive nor deficient, namely that which] precisely conforms to 17; and, God protect you, such can only be the case of the elixir. . . .

[B]

25:7 So when a seeker desires 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* [=  $17 \times 7$  *dān.*]; the rest is discarded.

25:10 Similarly, if the seeker desires to transform gold so that it acquires the properties of copper, he finds out, first, the total weight of [the natures in] copper; then, he finds out the weight [of the natures in] gold. Next, he compares the two weights to know which one is greater. If [the weight obtained from] gold turns out to be the greater of the two, the adept 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 *Hudūd*, and if you have not pondered over it! . . .

[27]

25:14 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-qalaʿi*'." But the Stoics say, "no, its name is, rather, '*al-nasās*' since its sibling is called '*al-usrub*'." "No," say the followers of Empedocles, "we determine its weight, rather, according to the appellation '*zāwus*' 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-mushtarī*,'<sup>1</sup> for it has the nature of this celestial body. We determine its weight in accordance with no appellation except '*al-mushtarī*,' for it is *al-mushtarī* which governs it, guides it, and brings it forth. Nay, this is its only name." As for Socrates, he judged in favor of '*zāwus*,' and he is close to the truth. Balīnās said, "its name is '*qasdir*' 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."

26:4 From among these differing models, none merits our choice the way '*zāwus*' does; and if we were to substitute for it, we would opt for the description 'hot and moist.' Thus, that which we have illustrated in the figure<sup>2</sup> is worked out according to the name '*zāwus*,' for '*al-qalaʿi*' signifies something other than the name [of the metal in question]. Indeed, the name '*qasdir*' is also an accurate one, and this is so because all [correct] names, while being different in different languages, seek to express a unique language—for what is [ultimately] sought is only the *meaning* of these differing names.

The Third Part of the Book of Stones  
According to the Opinion of Balinās

[28]

27:2 *In the name of God, the Compassionate, the Merciful.*

Praise the Creator and the Raiser of the Dead, the One Who subjects to His Acts whatever He chooses. He Who is Powerful over everything, and is the Subjugator of all subjugators. The One Who causes the acts of all things, without a parallel and without a teacher; He acts 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!

27:5 God's blessings be upon Muḥammad, the Lord 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!

[29]

27:7 Two books have preceded this one, dealing with the understanding of the Balances of stones. According to the commitment we made in these two books (I mean the first book and the second book), we shall specify in the present book, proceeding in a natural way, the forms which stones, plants and animal [substances] take upon combining with one another. Furthermore, we shall talk about the procedure for the ceration of these substances. So we say . . .

27:11 The things from which the elixir derives are [of seven possible kinds]: [i] pure stones, [ii] animal [substances] exclusively, [iii] plants only, [iv] animal [substances] *and* plants, [v] stones *and* plants, [vi] stones *and* animal [substances], and [vii] animal [substances] *and* plants *and* stones. This makes a total of seven patterns occurring in the pharmaceutical composition of the elixir, with each one of them having its own governing principles.

[A]

27:14 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

28:2 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.*], 3½ *dirhams* [= 21 *dān.*], 5 *dirhams* and 5 *dānaqs* [= 35 *dān.*], or 7 *dirhams* and 2 *dānaqs* [= 56 *dān.*]. . . .

[B]

28:4 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 *dānaqs* [= 17 × 7 *dān.*]. 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!

28:7 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 *qīrāt* [= ½ *dān.*], in the Second Degree 1½ *dānaqs*, in the Third Degree 2½ *dānaqs*, and in the Fourth Degree 4 *dānaqs*.

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

28:14 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.

[C]

- 29:1 Concerning the elixir made out of animal [substances] only. If you wish either to cerate 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
- 29:4 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  $\frac{1}{2}$  *dirham* [= 3 *dan.*]; 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!

[D]

- 29:8 And if the elixir which you want to cerate 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
- 29:10  $1\frac{1}{2}$  *dānaqs*; if this nature is in the Second Degree, you add a third in the Second Degree; here the weight of the third is  $4\frac{1}{2}$  *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  $1\frac{1}{4}$  *dirhams* [=  $7\frac{1}{2}$  *dan.*], and in the Fourth Degree it is 2 *dirhams* [= 12 *dān.*]. . .

## [30] [On Quality]

- 30:1 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
- 30:2 'AbdAllāh when he is, in fact, walking. Further, among such

- 30:3 actually existing conditions are either those which change or disappear quickly, for example standing, sitting, being in a state of embarrassment or anger, and the like—such actually existing conditions do not last long; or 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.

- 30:5 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 our saying that 'AbdAllāh is [in a state of being] fallen to the ground 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 a given piece of wood is soft, meaning that it can be broken apart without difficulty.

- 30:11 Things are rarely said in discourse 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]. And as for the conditions which last longer, things might be said to be qualified by them. Thus we call yellow (or, say, black) that which acquires this color as part of its natural make-up (likewise, if it acquires some other condition which is not easily removed, [it is called accordingly]). And these, I mean the
- 30:13 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.

- 30:15 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 for some reason, nor happy one who is happy briefly. Rather, we do so when these are part of someone's essential nature, whence permanent or preponderant.

31:4 Shape, external form, straightness, curvedness, and the like are also qualities, for each one of these is 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. 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, to be precise, 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.

31:11 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 colors; [b] those which are perceived by the sense of smell, like perfumes;<sup>1</sup> [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.

31:16 Qualified things are named after their quality. Thus in most cases things are named paronymously—such as *kātib* from *kitāba*, *tājir* from *tijāra*, *ja'ir* from *jawr*, *ādil* from *ādil*. 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.

32:3 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 colors. Likewise, there is no contrary to triangle and circle.

32:6 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, for example, nor relation, place, time, nor any other category except qualification.

32:10 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.

32:13 Some people say that it is not permissible, yet 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.

32:17 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 squareness: these two do not admit of a more and a less.

32:19 For one triangle does not exceed another in respect of triangularity, and one square does not possess more squareness than another. All triangles are equally said to be triangles, and the same applies to circles and squares.

33:2 Things which are equally said to be triangles [and thus] equally said to fall under the definition [of triangularity] are not called more or less with respect to that definition; the same holds for circles and squares. Conversely, when two things are not said to fall under one definition, the definition of one is not applied to the other.

33:4 In general, all things which are equally said to fall under a given definition, as well as two things which are not said to fall under one definition, such things do not admit of a more and a less.

33:6 One speaks of a more and a less only in cases where the [quality to whose] definition a thing conforms sustains increase and decrease; for example a white thing which conforms to the definition of being white can very well be more or less with respect to whiteness.

33:8 It is in virtue of a universally defined quality only that things are said to be similar or dissimilar; for a thing is not similar to another except in virtue of its quality. For example, this triangle is not similar to that triangle except in virtue of the triangle which has already been universally defined.

33:11 It may be said that though we only proposed to discuss qualities we have frequently mentioned<sup>1</sup> relatives since we have spoken of knowledge and the like, and knowledge exists in virtue of the known. Indeed, the genera comprehending these things, I mean the universals, are spoken of in virtue of something else, such as knowledge which is spoken of in virtue of the known. But none of the individuals [of a given genus], that is, none of the particular cases [of a given universal], is spoken of in virtue of something else. For example, knowledge, [a genus], is called knowledge of something, but grammar, [a particular case], is not called grammar of something. This is so unless the particular case is set forth as the genus, that is, given the name of the universal, which in this case is knowledge—then, grammar would be called knowledge of something. Thus the particular cases are not relatives and there is nothing absurd in a thing's falling under two different genera.<sup>2</sup>

The Fourth Part of the Book of Stones  
According to the Opinion of Balīnās

[31]

*In the name of God, the Compassionate, the Merciful*

34:2 Praise be to God, the Lord of the worlds! May God's blessings be upon our Master Muhammad and all his family.

34:3 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.<sup>1</sup> 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.<sup>2</sup>

34:6 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.

34:9 So we say: In fire, spirits are unlike bodies—but not with respect to color, hardness or casting. For all spirits, or [at least] most of them, may have the same colors 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. We are setting forth a specific account of the spirits and the bodies, to the exclusion of others, since it behooves us to know that the Art does not exist except due to spirits and bodies; [that is to say], there is no Art except in virtue of the three kingdoms of nature since [in the real world] nothing else exists.

35:1 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 not they lend themselves to

distillation. If they do, then the same applies to them too.

35:3 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.  
 35:5 And those which do not evaporate divide likewise into two kinds: the aqueous kind, and the calcined kind. The former is spirit, the  
 35:6 latter body. The aqueous kind, in its turn, divides further into two kinds: the kind that flees, and the kind that does not. As for the one that flees from fire, it is spirit; and that which does not, even though it is water, is body.

35:8 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*<sup>3</sup> belonging to the *CXII Books*.

[32]

35:10 As for the transformation of bodies from one state into another higher or lower state, 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.

35:11 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.

[33]

35:15 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

35:7 natures. Those who have read our book known as *The End Attained*<sup>1</sup> and our *Book of the Sun*<sup>2</sup> 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. . . .

### 36:3 Chapter on the Curriculum for the Training of the Disciple

[34]

36:4 [A]

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.<sup>1</sup> 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], we have thoroughly explicated this already in the *Result*, the *Book of Morphology*, the *Balance*,<sup>2</sup> and in a book belonging to the *CXII* known as the *Book of Tinctures*.

36:9 Then, you ought to know the First, Second, Third and the Fourth Elements, [their] accidents and their qualities.<sup>3</sup> For example, [you ought to know that] Fire and its sisters are the Second Elements,<sup>4</sup> durations of time are the Third, and black and yellow compounds are the Fourth Elements.

36:11 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 of Foundation*, if it has reached you. But if you have already moved beyond this stage, congratulations!

36:14 Having accomplished this, move ups 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. But if you are already somewhat trained in these disciplines, the task will be simpler for you, and this would be a more favorable situation.

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.

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 toward the knowledge of the craft, you study the *Book of Trickeries*<sup>5</sup> so that you can be on your guard 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*.<sup>6</sup> 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*,<sup>7</sup> 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 [skill 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.<sup>8</sup> 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.

38:3 Proceed with the understanding that this is an art which demands special skills; nay, it is the greatest of all arts for it [concerns] an ideal entity which exists only in the mind.<sup>9</sup> 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. Know that the fruit of the Balances are the higher operations performed on the products of syntheses and elixirs.

[B]

38:7 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].

38:9 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]

38:13 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. So, a group of Ṣābians 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 priority. 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



39:3 primitive body. Next, [according to this claim], the four qualities—namely, hot, cold, moist and dry—were created in it, and 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.

39:6 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]

39:9 So we say [to them], our success depending on God: [According to you], the first of these stages [of creation] is *tīna* 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 *tīna*, [you tell us], exists [only] in the imagination, and it is impossible to visualize it as a defined entity.

39:12 You say that the second stage arrives when the three dimensions come to pass in this *tīna* whence it becomes a body. This body, [you claim], is not predicated of any of [the four natures], hot, cold, moist and dry, nor is it predicated of any color, 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!

40:2 Then you claim that after this second stage the four qualities<sup>1</sup> 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

40:4 in the natural world. Thus, Earth is in the middle of the Sphere,

40:5 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 transform-

40:9 ing [back] into them. Now the afore-described 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 things arise but not out of a single [abstract] entity.

[B]

40:11 Or [let us ask them that] they tell us if it is possible for Water to be created from the same prime matter as the one from which Fire is created. If they say 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.

[C]

41:2 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

41:4 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.

41:7 Then in reply we say:  
Water does not transform in a single stroke into Fire. Rather it transforms first into vapors 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.

41:11 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 the afore-mentioned 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!

42:2 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  
42:4 Earth and Air. It is through this doctrine that they demonstrate the creation of the four eternally indestructible elements which possess different potentialities. But, then, this refutes their affirmation that the First Element is unique and does not admit of diversity.

[D]

42:7 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  
42:9 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?"

[E]

42:12 It [ought to be] said to them: A majority of philosophers believes that the four natures, which are the fundamental principles

of creation and are the elements of the things (I mean [the elements of the primary bodies] 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.

42:16 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 which contravenes the organization and arrangement [of which we have spoken]!

[F]

43:2 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.

43:5 [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  
43:7 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]

43:9 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 real 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]

43:13 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!

43:16 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!

44:2 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! . . .

# COMMENTARY AND TEXTUAL NOTES

[1]

Jābir opens his discourse in the familiar traditional manner. One notes that there is nothing particularly Shī'ī or specifically Ismā'īlī about his religious locutions here. No prayers have been offered for 'Alī, or for any other Imāms.

The most important feature of this opening section, however, is the way our author refers to Balinās. 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 Balinās. But we must first identify this figure.

Since the researches of Silvestre de Sacy (see particularly his [1799]), it has been known that Balinās is the Arabicization of Apollonius (it exists in other forms too, such as Balinūs, Abulūniyus, Afulūniyūs, 'lūsūs, Abulūs, etc. See Plessner, *s.v.* "Balinūs," [EI<sup>2</sup>], I, p. 994). In the Islamic tradition, two persons named Apollonius are known: the well-known mathematician Apollonius of Perge (d. c. 200 B.C.), and the 1st century A.D. 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 Balinās 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]; *idem*, [1931]; Kraus [1942-3], II, pp. 270-303), but the most important from our point of view is the work entitled *Kitāb Sirr al-Khalīqa wa Ṣan'at al-Ṭabī'a* which is now available in a critical edition (Weisser [1979]). Also known as the *Kitāb al-ʿIlāl*, the *Sirr* seems to have had a direct influence on the ideas of Jābir (see Chapter 1 above). Now, as we have discussed in Chapter 1 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-khalīqa wa ṣanʿat al-ṭabīʿa*" 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 *Baḥṭh* Jābir refers to a *Sirr al-Ṭabīʿa* of Balīnās (MS Jārullāh 1721, f. 44) 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 A.D. 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], pp. 524-525), has been quoted in its entirety in Jābir's *Ustuquṣ al-Uṣṣ* (Holmyard ed. [1928], 90:9-16), and partially elsewhere (*Ḥayy*, *Baḥṭh*). However, neither the *Tabula*, nor any other parts of the *Sirr* show any trace of Jābir'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 Jābir have available to him some other work of Balīnās?

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 Jābir's sources:

(a) Attributed to Balīnās is a treatise entitled *Kitāb al-Filāḥa* (The Book of Agriculture) and it has been observed that Jābir's *Khawass* shows some significant dependence on this work (Sezgin, [GAS], IV, p. 163).

(b) The alchemist al-Jildakī in his *Sharḥ al-Shams al-Akbar* (Commentary on the Supreme Sun) mentions a *Kitāb al-Sabʿa* (Book of the Seven) of Balīnās, on the first part of which he claims to have written a commentary (MS Berlin 4188. See Kraus [1942-3], II, p. 297, n. 4). Kraus suspected an influence of this work on Jābir's Science of Balance (*ibid.*, pp. 297-298).

(c) In the confused Arabic Balīnās literature, there is also a *Kitāb Miṣṭāḥ al-Hikma* (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.*, p. 167).

[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, as Needham acknowledged, devoted to it an immensely learned disquisition in his [1942-3] (II, pp. 199-223), recalling the *Timaeus* and Pythagoras, looking for connections with the Music of the Spheres, and alluding to 17 consonants in the Greek alphabet (Needham [1980], V, iv, p. 462). 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 gnomonic analysis to explain not only the number 17 of Jābir, but also its Jabirian elements 1, 3, 5 and 8:

4	9	2
3	5	7
8	1	6

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 B.C. as the ground plan of the *Ming-Tang*—the Ducal (and, later, Imperial) Temple of Mystic Enlightenment" ([1953], p. 36). And further, writes Stapleton, "this Magic Square was known in Europe to Theodorus, a pupil of . . . Porphyry." (p. 37).

Finally, in the early eighties, Needham reopened this question, but only to reinforce Stapleton's conclusions (Needham, *op. cit.*, pp. 461-464). 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." (p. 462).

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-Mawāzīn al-Ṣaḡīr* (The Small Book of Balances, Kr 980, Berthelot ed. [1893], III, p. 118). 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-Mawāzīn*!

#### TEXTUAL NOTES

<sup>1</sup> 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. (Cf. Pingree [1968]. For a general survey of Arabic Hermetica see Plessner [1954]; Affifi [1951]; for specific accounts in the Arabic tradition see Scott [1936], IV, pp. 248-276; Massignou's "Appendix" to Festugière [1944]).

<sup>2</sup> This entire quotation of Jābir (namely, "To expound the wisdom . . . I declare"), comes practically verbatim from the *Sirr* of Balinās where one

reads, "*aqūlu 'alā ithri kitābī hādhā wa asifu'l-hikmata'l-latī uyidtu bihā . . .*" (Weisser ed. [1979], 1:3-4). Indeed, the legend of the cave in which Hermes revealed his Tablet to Balinās is also found in the *Sirr* (Weisser ed. [1979], pp. 5-7).

<sup>3</sup> The Art = alchemy.

<sup>4</sup> In other words, elixirs vary according to the objects to which they are applied (see below).

[3]

Below is a tabular representation of the contents of this section:

	Ist Deg. 1	:	IInd Deg. 3	:	IIIRD Deg. 5	:	IVth Deg. 8
Degree	60 <sup>5</sup> <i>dir.</i>		3×60 <sup>5</sup> <i>dir.</i>		5×60 <sup>5</sup> <i>dir.</i>		8×60 <sup>5</sup> <i>dir.</i>
Grade	60 <sup>4</sup> <i>dir.</i>		3×60 <sup>4</sup> <i>dir.</i>		5×60 <sup>4</sup> <i>dir.</i>		8×60 <sup>4</sup> <i>dir.</i>
Minute	60 <sup>3</sup> <i>dir.</i>		3×60 <sup>3</sup> <i>dir.</i>		5×60 <sup>3</sup> <i>dir.</i>		8×60 <sup>3</sup> <i>dir.</i>
Second	60 <sup>2</sup> <i>dir.</i>		3×60 <sup>2</sup> <i>dir.</i>		5×60 <sup>2</sup> <i>dir.</i>		8×60 <sup>2</sup> <i>dir.</i>
Third	60 <i>dir.</i>		3×60 <i>dir.</i>		5×60 <i>dir.</i>		8×60 <i>dir.</i>
Fourth	1 <i>dir.</i> = 60 'ashīrs		3 <i>dir.</i>		5 <i>dir.</i>		8 <i>dir.</i>
Fifth	1 'ashīr		3 'ash.		5 'ash.		8 'ash.

#### TEXTUAL NOTES

<sup>1</sup> *Sanja* is the term used for standard weights used as counterpoise in balances. Thus, "*al-wazn bi al-sanja*" would mean the measured weight, or the effective weight.

<sup>2</sup> It should be noted that Jābir uses the term "degree" in two different senses: (i) in the Galenic sense of *taxeis*, and (ii) as the largest subdivision of (i) which latter seems to have been borrowed from astronomy. To distinguish the two, the 'd' in (i) 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 Jābir believes in the artificial generation not only of plants and animals but also of human beings. His *Tajmī*<sup>6</sup> 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-Mizān al-Saghīr*, 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, Jābir explains, the natures are brought into relation with substance in one instant (*daf'atan wāhidatan*), whereas in the latter case, man is able to unite the natures with substance only in successive steps (*daf'āt*), 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 Balīnās.

[5]

Given our detailed exposition of Jābir's Balance of Letters doctrine (Chapter 3 above), the contents of this section should present little difficulty (for the problem of repetition of letters in a given name, see especially "Application of the Balance of Letters").

We are told once again that Balīnās 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 Balīnās is an Arab writer? An answer to this question might provide some important clues toward the identification of the pseudo literature available to our author.

There are two further points of interest in this passage. Jābir's Balīnās 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 Metaphysical Synthesis," Chapter 3 above).

Finally, one notes 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

<sup>1</sup> The text 4:8-9 is somewhat ambiguous due to the author's broken style.

<sup>2</sup> See the table in [3] above.

[6]

See Chapter 3 above.

## TEXTUAL NOTES

<sup>1</sup> If the weights of the natures in a thing did not conform to the proportion 1:3:5:8, one had to discover it by intuition: thus, if these weights fell short, one made additions; if the weights were in excess, then, again by means of intuition, "separations" had to be carried out.

<sup>2</sup> This is strange, for "*dhābāb*" 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).

<sup>3</sup> Note the eulogy here.

<sup>4</sup> It is not clear what the author means by "away from everything else."

<sup>5</sup> Jābir very likely means inflections, feminine designations and plural forms.

<sup>6</sup> Form = 17 (see [13] below).

<sup>7</sup> Indeed, through the method of artificial generation, the adept could accomplish this (see [4] above).

[7]

Quite abruptly, all references to Balīnās 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 reconstitute a word to its primitive core—this was, we recall, the first step toward determining the quantitative structure of a thing (see “Application of the Balance of Letters,” Chapter 3 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

<sup>1</sup> Jābir specifies two terms for the genitive case, *khafā* and *jarr*. This betrays a terminological eclecticism, for the former term was used by the grammarians of Baghdad, the latter by those of Kūfa.

[B]

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, p. 31).

[C]

In discussing the three classes of roots, Jābir is concerned not with verbs but with nouns, and, given his interest in the 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.

[D]

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-‘Arab*).

## TEXTUAL NOTES

<sup>1</sup> Indeed, *lām* is added in “*dhāk*” so that it becomes “*dhāfk*.”

<sup>2</sup> This is not clear.

<sup>3</sup> The case Jābir has in mind is that of the relative pronoun for the dual, e.g., *allādhāni* (masc. nom.) and *allādhayni* (masc. acc. and gen.)—these words are, indeed, spelt with three *lāms*, and the same applies to the feminine forms.

[8]

See Chapter 3 above. (For the grammarians’ idea of ‘motion’ and ‘rest,’ see n. 16 of that chapter).

## TEXTUAL NOTES

<sup>1</sup> For an extensive study of Arabic phonetics see Bravmann [1934]. An excellent brief account is to be found in Fleisch s.v. “*Ḥurūf al-Hidjā*,” [EI<sup>2</sup>], III, p. 596 ff.

[9]

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. Note that this is somewhat of a digression for the author makes no use of these ideas in what follows.

Significantly, the terms used by Jābir all come from the Greeks. Thus,

*fard* = *peritton*; *zawj* = *artion*; *zawj al-zawj* = *artiakis artion*; *fard al-fard* = *perittakis peritton*; *zawj al-fard* = *perittakis artion*; and *fard al-zawj* = *artiakis peritton*. All these terms appear in Euclid's *Elements*, Book VII (Heath tr. [1956], Def. 7-10, pp. 277-278). The standard text of Euclid does not mention the last one on the above list, but see Heath's "Notes," (*op. cit.*, p. 283) where he specifies a manuscript which does contain a definition of *artiakis peritton*. The same terms are found also in the other major source of Arabic science of numbers (*ʿilm al-ʿadad*), namely the *Introduction to Arithmetic* of the 2nd century A.D. 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 I have not imitated the standard translations of Euclid's Greek terms, namely "odd-times odd," "even-times even," etc. 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 notes also 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 Ikhwān al-Ṣafā' (*Rasā'il*, Zirikli ed. [1928], pp. 23-48). 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 *Mafātih al-ʿUlūm* of the 4th/10th century author al-Kātib al-Khwarizmi also reproduces the definitions of Nicomachus (Khadevejam ed. [1968], pp. 177-179). 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, p. 445; Busard, [1968], [1983]; De Young [1981]), it is definitively known that there are two ultimate sources of the Arabic tradition of the *Elements*: (i) the translation of Ḥajjāj ibn Yūsuf, first made during the reign of

Hārūn al-Rashid (170-194/786-809); and (ii) that of Ishāq ibn Hunayn, which was revised by another famous translator Thābit ibn Qurra who died in 289/901 (Busard [1968], p. 1). Thus the first version of the Ḥajjāj 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 ʿilm al-ʿAdad*, 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.

#### TEXTUAL NOTES

<sup>1</sup> Jābir defines odd numbers before defining even numbers. This reverses the order one finds in Euclid's *Elements* (Def. 7 and 8, Heath tr. [1956], II, p. 277). 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, Jābir follows the order of Euclid.

But perhaps the most significant feature of this definition of Jābir is his use of the term "*wāhid*" for unit, rather than "*wahda*," for this is one of the identifying traits of the Arabic Euclid tradition which derives from, *inter alia*, the Ḥajjāj text (see De Young, *op. cit.*, pp. 565-567). 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, Jābir does, indeed, consider the unit to be an odd number. Thus, we can legitimately place him in a pre-Ishāq-Thābit environment.

<sup>2</sup> 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 tr., *loc. cit.*).

<sup>3</sup> 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,

$$8 = 4 + 4, 6 + 2, 2 + 2 + 2 + 2 \text{ (double pairing).}$$

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).

<sup>4</sup> 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., p. 278). 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.

<sup>5</sup> 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, assuming that our translation is accurate, 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.

<sup>6</sup> Odd-even (or rather, "odd-times even") numbers are not mentioned in Nicomachus' *Introduction* (and hence not in the *Rasā'il* of the Ikhwān), nor are they found in all MSS of the *Elements*. Heath tells us (*op. cit.*, p. 283) that in the manuscript 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?

[10]

The musical modes mentioned by Jābir are all well-known in the Arabic tradition (see Wright [1978], pp. 250-254). We note that he uses the term *Tariqā* (pl. *Tarā'iq*, *Turuq*, etc.) to designate both rhythmic and melodic modes known more specifically as *'iqā'āt* and *aṣābi'* respectively (al-Fārābī [1967], p. 1022 ff.; al-Kindī [1965], p. 26, qu. Farmer [1967], p. 151; al-Mas'ūdī [1874], VIII, pp. 98-99; al-Ghazālī [1901], pp. 220-222. 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., *ḥayyāṣūf*) al-Kindī, it is also known that already the earliest musicians of Islam, Abū Uthmān ibn Miṣjah (d. c. 97/715) and his students, Ibn Surayj (d. c. 108/726), and Ibn Muḥriz (d. c. 97/715), had between them formulated the rhythmic and melodic modes known to our author (see Lois al-Faruqi [1981], pp. 101-102; Farmer s.v. "Ibn Miṣjah," [EI<sup>1</sup>], IX (Suppl.), p. 94; *idem*, s.v. "The Music of Islam" [NOHM], I, pp. 421-477; Wright [1966], etc.).

## TEXTUAL NOTES

<sup>1</sup> Here Jābir is talking about rhythmic modes.

<sup>2</sup> One of the "famous rhythmic modes" (*al-'iqā'āt al-Maḥḥūra*) which are described, among others, by al-Fārābī in his *Kitāb al-Mūsīqā al-Kabīr* ([1967], p. 1022 ff.). 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], p. 1045 ff. (See Lois al-Faruqi [1981], p. 369).

<sup>3</sup> According to al-Fārābī (*op. cit.*, pp. 1038-1041), it had three slow percussions, forming an arithmetic progression: 4 - 6 - 8.

<sup>4</sup> The invention of this mode is credited to Ibn Muḥriz (Lois al-Faruqi [1981], p. 276). al-Fārābī tells us that it consisted of a three-percussion cycle beginning with one long percussion, followed by two short ones ([1967], pp. 1033-1037). Similar descriptions are found in al-Kindī and Ibn Sīnā (Lois al-Faruqi, *loc. cit.*). *Ramal* is also a poetic meter.

<sup>5</sup> *Hazaj* is a pre-Islamic Arabic term applied to one of the three kinds of singing in ancient Arabia (see *al-'Iqd al-Farīd* of Ibn 'Abd Rabbihi

(d. 329/940) [1887], p. 186; Farmer [1941], p. 25). 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 Sinā, *hazaj* designates *any* conjunct (*muttaṣil*) rhythmic mode ([1930], p. 92). But al-Fārābī restricts the application of this term only to the conjunct (*mutawassil*) modes of moderate tempo ([1967], p. 453). Like *ramal*, *hazaj* is also a poetic meter.

Lois al Faruqi adds that *hazaj* "was thought to have been the first rhythmic mode introduced in the new genre of song of the [1st/7th century known as *ghināʾ al-mutqan*." ([1981], p. 94).

<sup>6</sup> A three percussion cycle, two short followed by one longer (O.O.O. . . : 2 - 2 - 4). (See al-Fārābī [1967], p. 1048).

<sup>7</sup> This rhythmic mode is described by Fārābī as a fast version of *thaqīl al-thānī* (OO.O. . . : 1 - 2 - 3) (al-Fārābī [1967], p. 1042 ff. Cf. Farmer [1943], p. 82).

<sup>8</sup> The "rapid *ramal*" is described variously by authorities. Thus al-Kindi says that it designates a rhythmic mode of either two or three percussions (OO. . . : 1 - 2 or OOO. . . : 1 - 1 - 1) (see Farmer [1943], p. 85). But according to al-Fārābī, the term was used for a rhythmic mode with two percussions, the first short, the second long (O.O. . . : 2 - 8) (al-Fārābī [1967], p. 1029; p. 1033). In contrast, Ibn Sinā tells us that it is made of three percussions of two different lengths (O.OO. . . : 2 - 1 - 2) (Ibn Sinā [1935], p. 209). Cf. Lois al Faruqi [1974], pp. 134-135.

<sup>9</sup> 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-Fārābī [1967], p. 451. See al Faruqi [1981] p. 143).

<sup>10</sup> "*Asābi*" literally means "fingers," 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 *Risāla fiʾl-Mūsīqa* [1976], pp. 853, 868 ff.). See Lois al Faruqi [1981] p. 20; Farmer [1957], p. 448; Wright [1978], p. 41. 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], pp. 250-251) tells us that at one stage these melodic modes were, indeed, allied to rhythmic modes to produce a corpus of 36 *Turuq*. This essentially verifies Jābir's claim.

<sup>11</sup> See Chapter 3 above (for the phonetic terms 'motion' and 'rest' see n. 16 of that chapter).

<sup>12</sup> *Mutlaq*, according to al-Fārābī, designates the open string of a chordophone ([1967], p. 500). Jābir mentions it as one of the octave modes which were systematically described by later musical theorists such as 'Abd al-Qādir ibn Ghaybī (d. 839/1435) (Lois al Faruqi [1981], p. 216).

<sup>13</sup> Again, *mazmūm* is described by Ibn Ghaybī as one of the six octave modes known collectively as the *asābiʿ* (Lois al Faruqi [1981], p. 180).

<sup>14</sup> The term *wustā* signifies the use of the middle finger for producing the starting tone. (For a detailed account see Lois al Faruqi, [1981], p. 389).

<sup>15</sup> *Mahmūl* is mentioned by Ibn Ghaybī as one of the *asābiʿ*, i.e. one of the six octave modes (Lois al Faruqi [1981], p. 164).

# [11]

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 Chapter 1 above).

In the *Ikhrāj* (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-ṭabāʾiʿ*). 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 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-ʿilm al-lāhūtī*," *Khamsīn*, qu. Kraus [1942-3], II, p. 188, n. 3), beyond the grasp of a common man (*al-Sirr al-Maknūn*, *ibid.*, p. 188, n. 7). Here, however, Jābir concerns himself with gross quantities of metals in a given alloy—i.e., he is concerned with *al-mizān al-waznī*.

# [A]

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 (i) whether a given metal object consists of one metal or more, he is also able to (ii) determine the precise constitution of an alloy, and to (iii) measure accurately the weights of the constituents.

Now, task (i) 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 (ii) and (iii) 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 reckoner' 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 of ways, and that their different proportions in alloys were not only finite, they were also known in advance.

#### TEXTUAL NOTES

<sup>1</sup> 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 Chapter 1 above).

[B]

We have here a partial description of the construction of an equal-arm balance. 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-Maqdisi's *al-Taḡāsim fī Ma'rifat al-Aqālim*, qu. Wiedemann s.v. "al-Mizān" [EI<sup>1</sup>], V, p. 531; *idem*, "Zur Technik der Araber," Fisher [1970]). In Chapter 1 above, we have referred to the rich and extensive account of balances in al-Khāzinī's *Mizān al-Hikma* which indicates, once again, that already by the middle of the 3rd/9th century the art of balance construction had reached in Islam a very high degree of sophistication. al-Khāzinī illustrates, e.g., the elaborate balance of the alchemist al-Rāzī (Khanikoff ed. [1859], p. 86). It should be remarked that Jābir's balance looks like a crude one, and it is only through improvization that it functions as a hydrostatic balance. He describes a similar balance also in the *Baḥth*, MS Jārullāh 1721, f. 133 (See Kraus ed. [1935], p. 142, n. 12).

#### TEXTUAL NOTES

<sup>1</sup> 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.

<sup>2</sup> *bankān* = *finjān*. The word is of Persian origin (see Kraus ed. [1935], p. 142, n. 12).

<sup>3</sup> 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 :  $\frac{1}{12}$ .

[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 Chapter 3 above (see especially "Application of the Balance of Letters").

[14]

The only point of interest in this beginning is its Shī'ī character: note the epithet "Wali" for 'Alī. As we have already remarked (see Chapter 1), 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'ī* leanings.

[15]

On the whole this section presents no major difficulty.

## TEXTUAL NOTES

<sup>1</sup> That is, when the weights they signify do not exactly add up to 17 or its multiple.

<sup>2</sup> 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

<sup>1</sup> 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 Edited Text, 15:8-9 above where this error has been specified. Indeed, according to [3] above, the weight of the degree in the First Degree of intensity is 777,600,000 *dirhams*.

<sup>2</sup> See [3] above.

[17]

Given below is a tabular representation of these 'Socratic' values:

	Ist Deg.	IIInd Deg.	IIIrd Deg.	IVth Deg.
	1	3	5	8
	<i>dānaq</i>	<i>dānaq</i>	<i>dānaq</i>	<i>dānaq</i>
Degree	7	21	35	56
Grade	3	9	15	24
Minute	2½	7½	12½	20
Second	2	6	10	16
Third	1½	4½	7½	12
Fourth	1	3	5	8
Fifth	½	1½	2½	4

(Note that all weights here are given in *dānaqs*. For Jābir's system of units see Chapter 3, n. 69, above.)

While we see that Jābir's Socrates also believes in the proportion 1 : 3 : 5 : 8, his values, unlike those of Balīnās, 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

<sup>1</sup> Again, all three manuscripts, as well the text of Kraus (ed. [1935], 160:7), contain an error. See critical notes to Edited Text, 15:14.

[18]

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 Chapter 1, n. 29 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 *Tajmī'* Socrates is presented as the pioneer of the Science of Artificial Generation! (Kraus ed. [1935], 377 ff.). Similarly, the *Kitāb al-Fidda* (Book of Silver, Kr 948) records a historically impossible conversation between Socrates and Thales (Kraus [1942-3], I, p. 113).

In the last paragraph of this section, Jābir expresses indifference with respect to Balinās and Socrates—follow whichever system takes your fancy, he says. Yet it is interesting that throughout the rest of the *Ahḡār*, 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 A.D.) which has been cited by Thureau-Dangin in his work on the history of the sexagesimal system (Thureau-Dangin [1932]).

## TEXTUAL NOTES

<sup>1</sup> 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.

[19]

Concerning this table see the remarks in Chapter 3 above (see especially n. 69). 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 Chapter 3, n. 68).

[20]

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 '*ajsād*' (sing. *jasad*). Further, here he names only six metals, elsewhere we find a list of seven; the substances listed as metals likewise keep changing (for a fuller discussion see Kraus [1942-3], II, pp. 18-30. See also the remarks concerning Jābir's classification of substances in Chapter 1 above).

We observe metals being classified according to color. Red metals, we are taught, have a preponderance 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). (cf. Chapter 3 above).

It should be remarked that even though Jābir's specific red and white classification is original to him, color has remained since ancient times a fundamental criterion for the classification of substances and has a fascinating chemical history (see Crosland [1962], pp. 30-32, 66-73). In one form or another, color classification is found throughout Arabic alchemy (see, e.g., Stapleton, Azo and Husain [1927], pp. 367, 385).

## TEXTUAL NOTES

<sup>1</sup> He does give the tables at the end of this second part of his book.

<sup>2</sup> Note that throughout Jābir makes the natures conform to the proportion 1 : 3 : 5 : 8.

[21]

Within the internal perspective of the Jabirian system, there is no obscurity in this passage if it is read in conjunction with the 'Socratic' table reproduced in section [19] of the translation above. Here the author extends his color classification to all corporeal objects of the natural world. We are told that the total weight of the four natures in every natural object, when these objects are considered "according to the precise Balance," is exactly  $17 \times 7$  *dān*.—a multiple of 17. This means that all corporeal objects are quantitatively *identical*. Indeed this was so, but only in the case of *ideal* bodies represented by the letters *alif*, *bā*<sup>2</sup>, *jīm* and *dāl* (ABJAD). In practice, to be sure, the names of physical bodies did not necessarily have these four letters, a fact emphasized by the

author's repeated declaration that the weight of 19 *dir.* and 5 *dān.* "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 Chapter 3 above, especially "Application of the Balance of Letters" where Jābir's idea of external/internal natures has been discussed).

## TEXTUAL NOTES

<sup>1</sup> Like Aristotle, Jābir 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).

[22]

In effect, Jābir here gives a clear expression to his belief in the corporeality of the four qualities in the natural world (see Chapter 2 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?

Jābir 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 were corporeal entities, so they necessarily occupy place.

[23]

The doctrine that qualities must occupy place now leads the author naturally to his concept of equilibrium. While this has already been examined in Chapter 2 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, Jābir's concept of equilibrium is perfectly legitimate for, effectively, equilibrium is viewed by him as a balance of natural forces. At the macro level, he

evidently identifies equilibrium with the state of rest (the phrase "and it is not a [flowing] 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-Mawāzīn al-Saghīr* 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-Mawāzīn al-Saghīr* is different from the *al-Mizān al-Saghīr* 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, p. 477 confuses the two).

## TEXTUAL NOTES

<sup>1</sup> That is, elements pass into one another—this is an assertion of Jābir's belief in transmutation.

[24]

Like many other (in the case of Jābir all) substances, elixirs were classified by the alchemists of Islam into two groups—red and white. The former were supposed to turn its subject into gold, the latter into silver (see Haschimi [1962]). 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], p. 31). 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* (=  $17 \times 7$  *dān.*, a multiple of 17)—and this is precisely the effective weight he gave, specifically, to the *metals* and, generally, to all (ideal) corporeal objects (see [20] and [21] above).

This means that elixirs are nothing but *ideal metals*. Indeed, already in the *al-Rahma al-Kabir*, 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 a weight precisely of  $17 \times 7$  *dān.*; one had to augment (*ziyāda*) or suppress (*nuqsān*) their natures in order to make them conform to 17.

The last passage in this section explicitly repeats the Jabirian idea that the quantitative structure of all natural objects is ultimately identical—"all our examples signify the number 17. . ." (see [21] above).

[25]

The Jabirian distinction between letters as units of articulated speech and letters as signs of the Arabic script is clearly expressed here. As we have discussed in Chapter 3 above, the former were for Jābir natural entities, while the latter were no more than a mere convention. Maintaining with remarkable consistency his ontological equivalence between the letters (in the former sense) and the four natures, the author now speaks of transmutation in *alphabetical* terms: indeed, physical change in an object was in his system equivalent to a change in the *name* of the object. Thus, in keeping with this doctrine of the equivalence of physical and nominal transformations, Jābir here speaks of a change of "alif" into "bā" or into "jīm" or into "dāl," etc., rather than speaking of a change of, say, Earth into Fire, or into Air, or into Water, etc.

This passage provides a further instance of Jābir's logical consistency—while speaking of transformation of one letter into another he says "provided you derive these letters from the Second Elements, namely, Fire, Air, Water and Earth." To be sure, it was in the Jabirian system not the natures but the four Empedoclean elements which passed into one another. The natures, being the First Elements, maintained their individual character—neither did they transform into one another nor destroy one another. Logically speaking, the primitive elements had to have these features, for it was in terms of these elements that all else had to be explained.

[26]

[A]

Jābir now explicitly 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!

[B]

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  $17 \times 7$  *dānaqs* (see [24] above). Indeed, Jābir is remarkably consistent in this matter.

[27]

Quite courageously, the author contends with the embarrassing question of the plurality of names of a given thing. But he resolves the issue quite simply by saying that all languages "seek to express a unique language," and this unique language was concerned only with meanings.

The passage here is perfectly accurate in its survey of different appellations applied to the metal tin, namely: *qala'i*; *zāwus* (= Zeus, identified with the planet Jupiter); and *qasdir* (= Gr. *kassiteros*). For Jābir to make a group say that "its [tin's] sibling is called '*usrub*'" is to make a statement which is also historically true, for indeed lead and tin were often distinguished as *raṣāṣ al-usrub*, and *raṣāṣ al-qala'i* (for a detailed discussion of these names see Goltz [1972], especially pp. 243-245).

And here, once again, one notices Jābir's preference for Socrates (cf. [18] above).

## TEXTUAL NOTES

<sup>1</sup> The planet Jupiter.

<sup>2</sup> 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."

[28]

In sharp contrast to the opening words in the "Second Part," note the *non-Shī'i* character of this opening: to call Muḥammad an *Imām* is to disregard the very foundation of sectarian Shī'ism!

[29]

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, notwithstanding 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. In his table, Jābir has already given the quantity of these weights 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 *Kitāb al-Lāhūt* (Book of Divinity, Kr 123, MS Jārullāh 1554, f. 4b, see Kraus [1942-3], I, p. 45). The alchemist Rāzī has in fact devoted a whole section to this process in his *Kitāb al-Asrār* (Book of the Secrets, qu. Stapleton, Azo and Husain [1927], p. 332), a work in which he invokes the authority of our author referring to him as "our master Jābir ibn Hayyān" (*ibid.*, p. 385).

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 distinct steps:

(a) determination of the preponderant 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 method 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 Jabirian Degree.

Here one notes Jābir's peculiar use of the term 'elixir'. Clearly, in the present context, 'elixir' denotes *any* substance which is the subject 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 the table reproduced in section [19] of the translation above.

[D]

To 'cerate' a substance derived from plants, we are told, one added a 'third'—the next higher subdivision of the Degree—to the preponderant nature. The weights are all specified from [19].

Once again, 'elixir' = *any* substance to be operated upon.

[30]

Here I present to the reader a textual discovery of mine.

What we have at hand, I hereby declare, is a hitherto unknown Arabic rendering of Aristotle's *Categoriae*, 8, 8b25-11a37, a discovery which is likely to have profound consequences for the whole question of the transmission of Greek ideas into the world of Islam.

Some forty years ago, the well-known authority on the Arabic tradition of Aristotle, Richard Walzer, had called it "common knowledge" that the "Arabic *Categories* . . . [is] due to Ishāq ibn Hunayn [d. 299/911]." (Walzer [1962], p. 67). Indeed, no other Arabic translation of this work of Aristotle has hitherto been known despite the fact that it had generated such monumental and sustained interest among the philosophical writers of Islam that we have received from them a considerable legacy of Arabic *Categoriae* literature in the form of commentaries, paraphrases, introductions, and the like (see Peters [1968]; Walzer, *op. cit.*; Zimmermann [1981]). It seems, then, that the

discovery of another translation would warrant a somewhat happy revision of the position stated by Walzer.

To be sure, as I shall demonstrate, there is clear evidence in the Jabirian translation that it is totally and significantly independent of Ishāq's text. More than that, it shows a remarkable ignorance of the Arabic philosophical terminology found in the latter, terminology which had been definitively fixed and standardized by the second half of the 3rd/9th century. Further, in its style the Jabirian text is much cruder than that of Ishāq displaying what seems to be an archaic character. And finally, as we shall presently witness, the Jabirian translator sometimes shrinks from translating Aristotle's philosophical terms, providing instead a gloss or presenting the original text in the form of paraphrases and adaptations; thus, our Arabic text betrays a translator not quite at home with the Greek logical tradition. All these features converge to suggest an earlier date for Jābir's version.

The possible existence of a pre-Ishāq Arabic translation of the *Categoriae* is hardly an anomaly, for we already know of the living Syriac tradition of Aristotelian logic which had been inherited by Islam from the Hellenized centers of the Near East. Thus, as early as the beginning of the 2nd/8th century, available to Arabic writers was an enormous corpus of Syriac *Categoriae* literature which included not only numerous commentaries, but at least two independent translations—one of them by James of Edessa (d. 90/708) (Georr ed. [1948], pp. 253-305), or possibly by Sergius of Rīsh'aynā (d. 536 A.D.) (see Tkatsch [1928-32], I, p. 70b); the other by the famous scholar of the school of Qennesre, George, Bishop of the Arabs (d. 106/724) (Gottheil ed. [1893]; -cf. Furlani [1933]). A third Syriac translation was produced somewhat later, and this is attributed Job of Edessa (*fl.* c. 184-336/800-850) (see Georr, *op. cit.*, p. 380).

Furthermore, as I have pointed out earlier (Chapter 2, n. 28), contemporary scholars now generally agree that Porphyry's familiar introduction to the *Categoriae*, the *Eisagōgē*, marks the *first* entry of Aristotle into the world of Islam. As for the earliest Arabic translation of the *Eisagōgē*, its critical editor Danishpazhuh concludes that the traditional attribution of this text to the well-known translator of Pahlavi works Abū Muḥammad 'AbdAllāh ibn al-Muqaffa' (d. 142/760) is correct, and that, contrary to the contention of Kraus (see Kraus [1933], pp. 1-5), this work cannot be credited to his son Muḥammad *ibn* 'AbdAllāh ibn al-Muqaffa' (Danishpazhuh ed. [1978], pp. 65-66). Given all this, the claim seems

highly plausible that there existed more than a single version of the Arabic *Categoriae*; equally plausible seems the further claim that there did exist a version considerably earlier than that of Ishāq.

Turning now to my evidence, I have, in what follows, juxtaposed the texts of Aristotle and of Jābir, carrying out a direct comparison of the Arabic translation with its source. The two texts are then compared and contrasted with Ishāq's rendering.

## ARISTOTLE

(Minio-Paluello ed. [1956], Ackrill tr. [1963])

By *quality* I mean that in virtue of which things are said to be qualified somehow (8b25).

It seems that we have here a free and somewhat crude translation. Note that there is in Aristotle no mention of conditions as yet. In contrast, Ishāq's translation is much more elegant and strictly literal, thus: "*wa usammā bi'l-kayfiyyati tilka'l-lati lahā yuqālu fi'l-ashkhāsi kayfa hiya*." (Badawi ed. [1948], 29:13).

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

(Edited Text, 30:1-33:17)

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 either those which change or disappear quickly, for example standing, sitting, being in a state of embarrassment or anger, and the like—such actually existing conditions do not last long; or 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.

Providing its own gloss and its own illustrative examples, the Jabirian text gives what is virtually a terminology-free rendering. In contrast, Ishāq remains strictly faithful to the source and translates all terminology accurately: thus, kind (*eidos*) = *naw'*; state (*hexis*) = *malaka*; condition (*diathesis*) = *hāl* (Badawi ed., 29:15). Note that our translator has no terminology to render into Arabic the nuance between "states" and "conditions"; the word "*hāl*" has to perform both functions. Thus, rather than translating the two terms of Aristotle, the Jabirian text explains them.

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).

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 our saying that 'AbdAllāh is [in a state of being] fallen to the ground 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 a given piece of wood is soft, meaning that it can be broken apart without difficulty.

Another Jabirian gloss. Aristotle's idea of qualification in virtue of a natural capacity (*dunamis phusikē* = Ishāq's *quwwa tabi'iyya*, Badawi ed., 30:18), and his affective qualities (*pathētikai poiōtētes* = Ishāq's *kayfiyyāt infī'aliyya*, *ibid.*, 31:9) and affections (*pathē* = Ishāq's *infī'ālāt*, *loc. cit.*) are both effectively subsumed in our text under potentially existing qualities (*bi'l-quwwa*). Once again, Ishāq gives a faithful rendering and,

as we just witnessed, translates Greek terms directly and rigorously. Note, however, that Aristotle's example of the hard (*sklēros*) and soft (*malakos*) has been faithfully reproduced in the Jabirian text, but the rendering of the latter term is here *rakhw* as opposed to Ishāq's *līn* (*ibid.*, 31:7).

... 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).

Things are rarely said in discourse 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 (or, say, black) that which acquires this color as part of its natural make-up (likewise, if it acquires some other condition which is not easily removed [it is called accordingly]). 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.

In contradistinction to Ishāq, the Jabirian translator does not follow the order of the original text. One also notes several Jabirian glosses. Aristotle speaks of swarthy from sunburn; our text changes sunburn to journey, obviously meaning a journey in the heat of the sun. Ishāq, on the other hand, does translate "sunburn" literally (*ihrāq shams*, Badawi ed., 32:16). Similarly, unlike the case with Ishāq, the example of reddening out of shame has been omitted in our text. For the term *phusikê sustasis* Ishāq has the Arabic equivalent *al-jibilla al-tabī'iyya* (*ibid.*, 32:14); in the Jabirian text it is *mizāj*. The last sentence in the latter speaks of essential nature (*jawhar*), and this is another gloss.

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 or even completely unchangeable; 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 rather bad-tempered; for the man who in such an affection is rather bad-tempered is not said to be bad-tempered ... (9b33-10a8).

We have here a lucid paraphrase. Note again the absence of technical terminology from the Jabirian text; thus, unlike the literal translation of Ishāq, no direct Arabic equivalents appear for "affective qualities" and "affections," and Aristotle's idea of such qualities as are present from birth is expressed by the commonly used word "*kā'in*" (which has been translated by me rather freely).

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 ... (10a11-15).

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 for some reason, nor happy one who is happy briefly. Rather, we do so when these are part of someone's essential nature, whence permanent or preponderant.

Shape, external form, straightness, curvedness and the like are also qualities, for each one of these is 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.

A reasonably faithful translation and similar, though not identical, to that of of Ishāq. Thus in both translations: *skhēma* = *shakl*; *huparkhousa morphē* = *khilqa*; *euthēs* = *istiḡāma*; *kampulotēs* = *inhinā*? But, in contrast to our translator, Ishāq follows Aristotle's text very closely and—typically—gives a literal rendering (Badawi ed., 33:13-17).

'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, a faithful translation and close to Ishāq's. Note, however, that while both texts employ the same Arabic root to translate Aristotle's four terms (*manos*, *puknos*, *trakhus*, *leios*), Ishāq remains strictly literal and renders them as adjectives (*mutakhalkhal*, *mutakāthaf*, etc., Badawi ed., 33:17); the Jabirian translator renders them as verbal nouns (*takhalkhul*, *takāthuf*, etc.).

Perhaps some other manner of quality might come to light, but we have made a pretty complete list of those most spoken of (10a25-26).

In contrast to the brief sentence of Aristotle, the Jabirian translator adds another ten kinds of qualities to the list. These are nowhere to be found in Minio-Paluello's text.

Rareness, denseness, roughness, and the like might be thought of as qualities; they seem however not to belong to qualities. This is so because, to be precise, 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.

Qualities are possibly of other kinds too. Among these other kinds which we shall mention are. . . .

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 . . . (10a28-32).

Qualified things are named after their quality. Thus in most cases things are named paronymously—such as *kātib* from *kitāba*, *jā'ir* from *jawr*, *ādil* from *adl*. 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.

The Jabirian text follows Aristotle closely but does add its own gloss. Thus, out of the three illustrative examples given in the source (the pale from paleness, the grammatical from grammar, the just from justice), the first two have been changed to "the writer from writing," and "the unjust from injustice"; the third one is faithfully reproduced. Not so with Ishāq. The difference in the approaches of the two translators is also reflected by the overall technical nature of the latter's renderings: thus *parōnumōs* has been translated by Ishāq as a formal term *'alā ṭariq al-mushtaqqā* (Badawi ed., 34:7-8); in contrast, the Jabirian translation is clearly non-technical. Note that our text 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 colors though they are qualifications (10b12-17).

There is contrariety with regard to qualifications. 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 colors. Likewise, there is no contrary to triangle and circle.

A faithful translation, but dissimilar to that of Ishāq. There is also a terminological difference: our text has *ahmar* for red as against Ishāq's

*ashqar* (Badawi ed., 35:12). It is interesting to see the Jabirian translator adding to Aristotle's red and yellow his own two examples of circle and triangle.

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 . . . (10b18-25).

We have here a lucid, accurate and highly faithful translation. But, again, it differs from Ishāq's—for instance, in our text we have *maqūla* for *katēgoria*; Ishāq has *na't* (Badawi ed., 35:14)

Qualifications admit of a more and a less; for one thing is called more pale or less pale than another, and more just than 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

Further, when one of a pair of contraries is a qualification, the other too will be a qualification. This is clear if one examines 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 quality, for example, nor relation, place, time, nor any other category except qualification.

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 it is not permissible, yet they say that one 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

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 (10b26-11a4).

Even though the Jabirian text adds its own gloss here and there, it gives a fairly faithful translation; and here, despite clear differences in formulations, our translator is quite close to Ishāq.

Triangle and square do not seem to admit of a more, nor does any other shape. For things which admit the definition of triangle or circle are equally triangles or circles, while of things which do not admit it none will be called *more* 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 (11a5-14).

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 . . . and the square . . . do not admit of a more and a less. For one triangle does not exceed another in respect of triangularity, and one square does not possess more squareness than another. . . . Things which are equally said to be triangles [and thus] equally said to fall under the definition [of triangularity] are not called more or less with respect to that definition; the same holds for circles and squares. . . . In general, all things which are equally said to fall under a given definition, as well as two things which are not said to fall under one definition, such things do not admit of a more and a less. One speaks of a more and a less only in cases where the [quality to whose] definition a thing conforms sustains increase and decrease; for example, a white thing which conforms to the definition

of being white can very well be more or less with respect to whiteness.

We have here a rendering that is full of Jabirian gloss, some of which I have omitted in this citation (but see Edited Text, 32:17-33:8). One notes also some rearrangement of the source: Aristotle's last sentence appears first; whereas the last Jabirian sentence seems to be based directly on the former's second sentence in the immediately preceding citation ("Moreover, it itself sustains increase . . ."). The Jabirian terminology in this passage differs markedly from that of Ishāq: thus, for *logos* our text has *hadd* as opposed to Ishāq's literal translation *qawl* (Badawi ed., 36:12); the former skips Aristotle's reference to oblong, the latter has the standard term *mustatil* (*ibid.*, 36:14).

Nothing so far mentioned is distinctive of quality, but it is in virtue of qualities only 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 . . . (11a15-18).

It is in virtue of a universally defined quality that things are said to be similar or dissimilar; for a thing is not similar to another except in virtue of its quality. For example this triangle is not similar to that triangle except in virtue of the triangle which has already been universally defined.

While Ishāq and the Jabirian translator have identical translations for *homoios* and *anomoios* (*shabīh*, *ghayr shabīh*), the former provides a faithful and accurate rendering of the source; the latter, as we note, presents a paraphrase.

We should not be disturbed lest someone may say that though we proposed to discuss quality we are counting in many relatives. . . . For in pretty well all such cases the genera are spoken of in relation to something, but none of the particular cases is. For knowledge, a genus, is called just what it is, of

It may be said that though we only proposed to discuss qualities we have frequently mentioned relatives since we have spoken of knowledge and the like, and knowledge exists in virtue of the known. Indeed, the genera comprehending these things, I mean the universals, are spoken of in

something else . . . ; but none of the particular cases is called just what it is, of something else. For example, grammar is not called grammar of something nor music music of something. If at all it is in virtue of the genus that these two are spoken of in relation to something: grammar is called knowledge of something (not grammar of something). . . . Thus the particular cases are not relatives (11a20-30).

virtue of something else, such as knowledge which is spoken of in virtue of the known. But none of the individuals [of a given genus], that is, none of the particular cases [of a given universal], is spoken of in virtue of something else. For example, knowledge, [a genus], is called knowledge of something, but grammar, [a particular case], is not called grammar of something. This is so unless the particular case is set forth as the genus, that is, given the name of the universal, which in this case is knowledge—then, grammar would be called knowledge of something. Thus the particular cases are not relatives. . . .

The Jabirian text again appears with its own glosses and paraphrases. Note that Aristotle, while speaking of *genē*, does not invoke the concept of universals (nor, correspondingly, does Ishāq). In contrast, the Jabirian author does speak of universals more than once. In this passage our text is quite distant from that of Ishāq who is consistently faithful and literal; for example, for *sunkatarithmeisthai* Ishāq has the literal rendering '*addadnā*' (Badawi ed., 37:5). The example of music is, likewise, faithfully reproduced in Ishāq; from our text it is missing.

Moreover, if the same thing really is a qualification and a relative there is nothing absurd in its being counted in both the genera (11a36-37).

. . . and there is nothing absurd in a thing's falling under two different genera.

Note that the first part of the sentence is missing from the Jabirian text; the second part is rather awkward, though it may appear smooth because I present it here in a rather free translation. Literally rendered, the Arabic text will read something like: "and there is nothing absurd in a thing's

falling in the genus in two different ways." Note that Ishāq's translation is utterly unlike ours and is quite elegant (Badawi ed., 37:16-17).

[31]

As we have already observed in 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-Khawass al-Kabir* in which three kinds of substances are distinguished (qu. Kraus, II, [1942-3], pp. 18-20):

- (a) Spirits—those which completely volatilize 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:
  - (c<sub>1</sub>) containing some quantity of spirit (e.g., mica);
  - (c<sub>2</sub>) containing a very small quantity of spirit (e.g., shells); and
  - (c<sub>3</sub>) containing no spirit (e.g., onyx).

(For a detailed account of these principles see Kraus, *op. cit.*, pp. 18-30).

Jābir is teaching us that the difference between spirits and bodies does not lie in their color, hardness, or in the manner in which they undergo casting. Indeed, all natural substances, no matter from which of the three realms they were 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

<sup>1</sup> At the end of the book Jābir does give illustrative calculations of the weights of the natures in spirits.

<sup>2</sup> 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.

<sup>3</sup> Kr 71-73.

[32]

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).

[33]

See Chapter 3 above where this passages have been cited and discussed.

## TEXTUAL NOTES

<sup>1</sup> Kr 373. This work belongs to the Books of Balances.

<sup>2</sup> Kr 51. This is the title of a lost treatise which is part of the *CXII* collection. There is also a *Kitāb al-Mirrikkh wa al-Shams* (Book of Mars and the Sun) in the *LXX* collection (Kr 189).

[34]

Abruptly, Jābir introduces his curricular program 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 Sābians. 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.

[A]

In this section Jābir specifies several stages in his training program. His disciple was supposed to study the following subjects in the order given:

- (i) Alchemical Processes: Recognition of substances
- (ii) Cosmology: the Four Classes of Elements, Their Accidents and Their Qualities



- (iii) Philosophy: Sayings and Doctrines of Philosophers
- (iv) *Kalām*, 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*
- (vi) Science of Balance: Balance of Fire and of Music; Balances of Metals
- (vii) Study of the *Book of the Balance*
- (viii) Alchemical Operations: Ceration, Coagulation, etc.; Operations Concerning Elixirs

## TEXTUAL NOTES

<sup>1</sup> For a detailed account of these chemical processes see Stapleton, Azo and Ḥusain [1927].

<sup>2</sup> See note 6 below.

<sup>3</sup> Note the distinction Jābir maintains between *ṭabʿ* and *kayfiyya*.

<sup>4</sup> See Chapter 3 above.

<sup>5</sup> Kr 1063. This work is not extant.

<sup>6</sup> There are two works in the Jabirian corpus with this title, Kr 197 and Kr 366. Both are lost.

<sup>7</sup> 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 *khārsīnī*), and this is likewise referred to by the author as the *Sabʿa* (Kr 947-953).

<sup>8</sup> A fuller discussion of these operations is in Stapleton, Azo and Ḥusain [1927].

<sup>9</sup> Note the categorical statement that elixirs are only ideal substances and do not actually exist.

[B]

The first paragraph of this subsection is somewhat obscure. If everything has a Balance, why are we told now that the Balance comes about only after substances are mixed together?

The second paragraph is largely clear but only if we assume that by equilibrium Jābir here means Balance, not what he meant in [23] (cf. the account of Jābir's Canon of Equilibrium in Chapter 3 above).

[35]

Coincidentally, it was by examining the cosmological foundations of Jābir's Balance that we had begun our substantive study of his natural scientific system (Chapter 2 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 Jābir 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 Jābir is troubled by the idea of an abstract, imperceptible, unknowable and attributeless prime matter has already been examined at length in Chapter 2 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, Jābir 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 (Chapter 2 above). But, then, this was not, according to Jābir, 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 was not *replaced* by another. Rather, like the steps of a ladder, all stages existed *together* in a hierarchy of an ontological plurality. The elements, and the things which are constituted out of these elements, had both come into being at the same instant, created by a single act of God ("*daʿātan waḥidatan*" see [4] above). This position has been explicitly stated in [A] below.



In this way, Jābir distinguishes himself from his Ṣābians, and, indeed, from his Hellenistic predecessors in general.

[A]

This subsection has been quoted and discussed already in Chapter 2 above. (For the term *tīna*, see n. 53 of that chapter). But here we particularly note Jābir's assertion that the elements of the material world (the four natures) and things which arose out of these elements (plants, animals and minerals) existed simultaneously. The world, we are told, did not temporally 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

<sup>1</sup> Note the very rare application of the term *kayfiyyāt* to primary qualities.

[B]

Continuing with his polemical attack, Jābir now tries to beat his Ṣābians at their own game. He points out that in terms of their own theory, these philosophers cannot consistently maintain that their *hayūlā* (= Gr. *hylē*) is a *unique* entity (for a discussion of the term *hayūlā* see Chapter 2 above). Jābir demonstrates that if they are true to their own logic, these people will have to postulate as many *hayūlās* as there are elements!

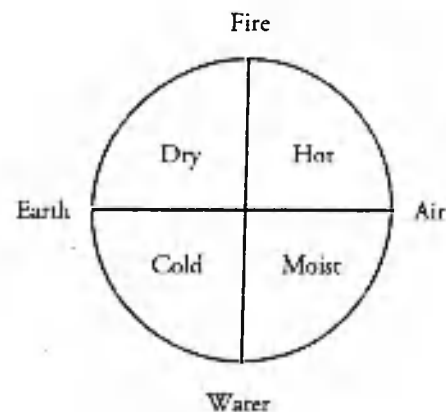
One particular point of interest in this subsection is the way Jābir widens the concept of prime matter in order to give it a defined and concrete sense.

[C]

The argument dismissing the uniqueness of prime matter continues. Jābir's Ṣābians 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 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).



[D]

As we have already observed in [A] above and elsewhere (see Arabic text in n. 59, "Addenda to Notes," Chapter 2 above), Jābir 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.

[E]

It is clear that Jābir is here attacking the abstract notion of the four natures, which, upon his account, the Ṣābians seem to espouse. To him such a notion is elusive. Thus, invoking the authority of the “majority of philosophers,” Jābir 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 Ṣābians.

The doctrine that natures exist potentially in one another is a very interesting one, but it makes an appearance as an isolated thought, for Jābir neither elaborates on it here, nor does he bring it up anywhere else in his cosmological discourses in our text. Thus, a philosophical commentary on this doctrine is unwarranted.

[F]

This passage has been quoted and discussed in Chapter 2 above.

[G]

Finally, Jābir declares the core doctrine of his entire system: *The four natures constitute the fundamental principle of the natural world.*

[36]

After a long digression, Jābir now returns to the subject of his training program. 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.

## APPENDICES

# CONTENTS OF THE EXCLUDED SECTIONS OF THE *AḤJĀR*

Square brackets specify the folios and lines of MS Paris 5099

## [58b21-59a11]

Criticism of the views of Balinās and his followers. Bibliographic notice. The importance of the *Kitāb al-Hudūd*: "While all other books should be read once a month, the *Hudūd* ought to be kept before the eyes all the time!"

## [59b8-59b17]

Digression into an elaboration of the concept of definition (*ḥadd*, pl. *ḥudūd*). Definition of definition (*ḥadd al-ḥadd*). Definition of alchemy. Definition of love (*ʿishq*). Eulogy on the merits of the *Kitāb al-Hudūd*.

## [60b7-62a13]

Extensive alphabetical list of the names of drugs. Morphological analysis of the specified names. Suppression of "excessive letters" and the determination of the primitive literal core in the appellations applied to drugs. Determination of the Balance of drugs.

## [62a17-62b14]

The contents of the following three books. The importance of collecting together from the *Aḥjār*'s four parts all the various aspects of the Science of Balance.

## [74a1-75a22]

Explanation of the "Socratic" values of the letters as these are presented in the immediately preceding table. The ABJAD system. Name-Nature correspondence.

## [78a4-79a6]

Discourse on geometry. The three dimensions (*ab'ād*): length (*tūl*), breadth (*'ard*) and depth (*'umq*). Geometrical/conceptual objects (*'aqlī*) and real/natural objects (*ḥissī*). The concept of a straight line (*khatt mustaqīm*), point (*nuqṭa*) and center (*markaz*). Geometrical surfaces (*suṭūḥ*), three-dimensional sensible bodies (*ajsām*), regular solid bodies (*mu'tadila*). Curves (*khutūt qawsiyya*), chords (*khutūt watariyya*), circles (*dā'ira*, pl. *dawā'ir*), spheres (*kura*, pl. *ukar*). Arc (*qaws*) and segment/cross-section (*qit'*). Claim that the shape of animals arise out of straight lines, that of stones out of curves, and that of plants out of the combinations of straight lines and curves. The section contains three geometric illustrations.

## [79a14-80b20]

Illustrative numerical examples of the calculation of the Balance of copper, gold, silver, lead, tin and iron. Digression into a discourse on the logical structure of geometrical proofs. Explication of the seven logical notions (*sab' muqaddimāt*) of the science of geometry: claim/predicate (*khābar*), likeness (*mithāl*), absurdity (*khalf*), arrangement (*naẓm*), differentia (*faṣl*), proof (*burhān*) and conclusion (*tamām/natīja*). Logical truths (*ṣidq*) and falsehoods (*kadhīb*).

## [82a7-85a2]

Bibliographic notice. Explication of the theory and practice of ceration (*tasmī'*). The logical notion of, and the hierarchical relationship between, genus (*jins*), species (*naw'*) and individual (*shakhs*)

## [86a6-86b26]

Transmutation (*istihala*): its philosophical meaning and its alchemical meaning. Different forms of movement (*ḥaraka*).

## [88a8-89a13]

Further elucidation of the difference between spirits and bodies. Illustrative examples.

## [91b-95a]

Exposition of the Balance of spirits. Worked-out examples to illustrate the numerical calculation of the Balance of spirits—yellow arsenic, red arsenic, yellow sulphur, red sulphur, sal ammoniac, camphor, etc.

# MODERN EDITIONS AND TRANSLATIONS OF JABIRIAN TEXTS

*K.* = *Kitāb*

B. = Book

S = Selections

## Editions

### (1) Steele [1892]:

*K. Hatk al-Asrār* (B. of the Discovery of Secrets, Kr 972)

### (2) Berthelot and Houdas [1893], III:

- (i) *K. al-Mulk* (B. of the Dominion, Kr 454)
- (ii) *K. al-Rahma al-Saghīr* (Small B. of Mercy, Kr 969)
- (iii) *K. al-Rahma al-Kabīr* (Great B. of Mercy, Kr 5)
- (iv) *K. al-Tajmīc* (B. of Concentration, Kr 398)
- (v) *K. al-Zibāq al-Sharqī* (B. of Eastern Mercury, Kr 470)
- (vi) *K. Zibāq al-Gharbī* (B. of Western Mercury, Kr 471)
- (vii) *K. al-Nār al-Hajar* (B. of the Fire of the Stone, Kr 472)
- (viii) *K. Ard al-Hajar* (B. of the Earth of the Stone, Kr 473)
- (ix) *K. al-Mawāzīn al-Saghīr* (Small B. of Balances, Kr 980)

### (3) Holmyard [1928] (from an Indian lithograph of 1891):

- (i) *K. al-Bayān* (B. of Elucidation, Kr 785)
- (ii) *K. al-Hajar* (B. of the Stone, Kr 553)
- (iii) *K. al-Nūr* (B. of Light, Kr 17)
- (iv) *K. al-Idāh* (B. of Explication)
- (v) *K. Ustūquṣṣ al-Uṣṣ* (B. of the Element of Foundation, Kr 6/7/8) /  
*Tafīr K. Uṣṣ al-Uṣṣ* (Commentary on the B. of the Elem. of  
Foun., Kr 9)
- (vi) *K. al-Tajrīd* (B. of Abstraction, Kr 399)
- (vii) (S) *K. al-Manfaʿa* (B. of Utility, Kr 973)

- (viii) *K. al-Rahma al-Saghîr* (Small B. of Mercy, Kr 969)
- (ix) *K. al-Malik* (B. of the King, Kr 1985)

#### (4) Kraus [1935]:

- (i) *K. Ikrāj mā fi'l-Quwwa ila'l-Fi'l* (B. of the Passage of Potentiality to Actuality, Kr 331)
- (ii) *K. al-Hudūd* (B. of Definitions, Kr 328)
- (iii) *K. al-Mājid* (B. of the Glorious, Kr 706)
- (iv) (S) *K. al-Aḥjār 'alā Ra'y Balinās* (B. of Stones According to the Opinion of Balinās, Kr 307/308/310) (First Part / Second Part / (S) Fourth Part)
- (v) (S) *K. al-Khawass al-Kabîr* (Great B. of Properties, Kr 1900 - 1970)  
First Discourse / Second Discourse / Fifth Discourse / Sixth Discourse / Tenth Discourse / Fifteenth Discourse / Sixteenth Discourse / Seventeenth Discourse / Nineteenth Discourse / Twentieth Discourse / Twenty First Discourse / Twenty Fourth Discourse / Twenty Fifth Discourse / Thirty Second Discourse / Thirty Third Discourse / Thirty Eighth Discourse / Sixty Third Discourse
- (vi) (S) *K. al-Sirr al-Maknûn* (B. of the Hidden Secret, Kr 389-391)
- (vii) (S) *K. al-Tajmîc* (B. of Concentration, Kr 398)
- (viii) (S) *K. al-Taṣrîf* (B. of Morphology, Kr 404)
- (ix) (S) *K. al-Mizân al-Saghîr* (Small B. of Balance, Kr 369)
- (x) (S) *K. al-Sab'în* (LXX Books, Kr 123-192)
- (xi) (S) *K. al-Khamsîn* (Fifty Books, Kr 1835-1884)
- (xii) (S) *K. al-Baḥṭh* (B. of Research, Kr 1800)
- (xiii) (S) *K. al-Rāhib* (B. of the Monk, Kr 630)
- (xiv) (S) *K. al-Hāsil* (B. of the Result, Kr 323)
- (xv) (S) *K. al-Qadîm* (B. of the Eternal, Kr 981)
- (xvi) (S) *K. al-Ishṭimāl* (B. of Comprehensive Understanding)

#### (5) Zirnis [1979] (unpublished):

*K. Ustuquṣṣ al-Uss* (B. of the Element of Foundation, Kr 6/7/8) / *Tafsîr K. Ust. al-Uss* (Commentary on the B. of the Elem. of Foun., Kr 9)

#### (6) Lory [1988]:

- (S) *K. al-Sab'în* (LXX Books, Kr 123-192)  
*K. al-Lāhūt* (B. of Divinity, Kr 123) / *K. al-Bāb* (B. of Operation, Kr 124) / *K. al-Thalāthîn Kalima* (B. of Thirty Words, Kr 125) / *K. al-Munā* (B. of Desire, Kr 126) / *K. al-Hudā* (B. of Guidance, Kr 127) / *K. al-Sifāt* (B. of Attributes, Kr 128) / *K. 'Ashara* (B. of the Ten, Kr 129) / *K. al-Nu'ūt* (B. of Epithets, Kr 130) / *K. al-'Abd* (B. of the Pact, Kr 131) / *K. al-Sab'a* (B. of the Seven, Kr 132) / *K. Tadbîr al-Arkân wa'l-Uṣûl* (B. of the Treatment of Elements and Principles)\* / *K. Hatk al-Asrâr* (B. of the Discovery of Secrets, Kr 972) / *K. al-Ṣāfi* (B. of the Pure, Kr 640)

#### English Translations

##### (1) Steele [1892]:

*K. Hatk al-Asrâr* (B. of the Discovery of Secrets, Kr 972)

##### (2) Zirnis [1979] (unpublished):

*K. Ustuquṣṣ al-Uss* (B. of the Element of Foundation, Kr 6/7/8) / *Tafsîr K. Ust. al-Uss* (Commentary on the B. of the Elem. of Foun., Kr 9)

#### French Translations

##### (1) Berthelot and Houdas [1893], III:

- (i) *K. al-Mulk* (B. of the Dominion, Kr 454)
- (ii) *K. al-Rahma al-Saghîr* (Small B. of Mercy, Kr 969)
- (iii) *K. al-Rahma al-Kabîr* (Great B. of Mercy, Kr 5)
- (iv) *K. al-Tajmîc* (B. of Concentration, Kr 398)
- (v) *K. al-Zîbaq al-Sharqî* (B. of Eastern Mercury, Kr 470)
- (vi) *K. Zîbaq al-Gharbî* (B. of Western Mercury, Kr 471)

\* This work is not listed in the census of Kraus [1942-3].

- (vii) *K. al-Nār al-Hajar* (B. of the Fire of the Stone, Kr 472)
- (viii) *K. Ard al-Hajar* (B. of the Earth of the Stone, Kr 473)
- (ix) *K. al-Mawāzīn al-Ṣaghīr* (Small B. of Balances, Kr 980)

## (2) Corbin [1950]:

*K. al-Mājid* (B. of the Glorious, Kr 706)

## (3) Lory [1983]:

(S) *K. al-Sabʿīn* (LXX Books, Kr 123-192)

*K. al-Lāhūt* (B. of Divinity, Kr 123) / *K. al-Bāb* (B. of Operation, Kr 124) / *K. al-Thalāthīn Kalima* (B. of Thirty Words, Kr 125) / *K. al-Munā* (B. of Desire, Kr 126) / *K. al-Hudā* (B. of Guidance, Kr 127) / *K. al-Ṣifāt* (B. of Attributes, Kr 128) / *K. al-ʿAshara* (B. of the Ten, Kr 129) / *K. al-Nuʿūt* (B. of Epithets, Kr 130) / *K. al-ʿAhd* (B. of the Pact, Kr 131) / *K. al-Sabʿa* (B. of the Seven, Kr 132)

## German Translations

## (1) Siggel [1958]:

*K. al-Sumūm* (B. of Poisons, Kr 2145)

## (2) Rex [1975]:

*K. Ikrāj mā fiʾl-Quwwa ilaʾl-Fiʾl* (B. of the Passage of Potentiality to Actuality, Kr 331)

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