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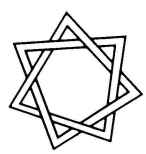

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ORIENTAL MANUSCRIPTS AND NEW INFORMATION TECHNOLOGIES

N. I. Serikoff

IMAGE AND LETTER: "PACE" IN ARABIC SCRIPT (A THUMB-NAIL INDEX AS A TOOL FOR A CATALOGUE OF ARABIC MANUSCRIPTS. PRINCIPLES AND CRITERIA FOR ITS CONSTRUCTION)*

"I know it, I have seen this handwriting!" How often a specialist in medieval manuscripts receives such a reaction from a colleague while showing him handwriting of unknown provenance. However, the matter is given little further attention, since it is usually difficult to recall where the manuscript was seen, especially if it was seen years before. Yet finding evidence of a similar hand, perhaps several years later, does occur. When this happens, it allows two or more manuscripts to be compared, and this comparison can lead to the establishment of the provenance of the manuscript under investigation, the approximate date of its compilation and sometimes its authorship.

To facilitate the difficult task of identifying a particular hand one requires a reliable tool rather than the sometimes unreliable and often fugitive memories of scholars. Specialists in palaeography have already made a number of attempts at producing such a tool. Regardless of the narrow specialization of these scholars (medieval European, Byzantine, Slavonic studies, etc.), the principles of such a tool were generally intended to provide a set of tables which represent dated specimens of medieval handwriting appropriate to these different scripts. Since comparison has been and remains the only method for identifying a particular hand, these tables usually include appendices which consist of lists of selected elements such as letters, ligatures, etc. For example, the specialists in Classical and Byzantine studies, among many other instruments, use reference tools by G. F. Tsereteli [1] and V. Gardthausen [2]. The most recent work in this field is represented by a voluminous and very detailed Repertorium der griechischen Kopisten, an up-dated version of Gardthausen's work published by the Austrian and German Byzantinologists H. Hunger, E. Gamillscheg, D. Haringer and P. Eleuteri [3].

Arabic and Islamic studies, although a much younger discipline, have followed the same course. Many albums of dated manuscripts have been published. The number of published specimens of handwriting in these albums is, however, insufficient if one regards the scale of manuscript production in Islamic culture [4]. One has also to add that most of what has been published is calligraphic specimens, which leave aside less formal hands. These published works are all of significant help in identifying unknown hands, although very difficult to use. It is not easy to compare a particular example of handwriting with several hundreds of specimens listed in the relevant manuals. Attempts to create a computerized tool for identification of scripts were made by the Russians E. Rezvan and N. Kondybaev, who independently repeated the approach of the Austrian team of Byzantinologists [5], taking individual letters as recognition units. The potential of this letter-based approach suggested by Austrian and Russian scholars is, however, limited. A reduction of a script to letter forms with similar or specific characteristics can be very misleading, since one and the same letter is not absolutely identical in one and the same person's hand-writing. Even slight inconsistencies may vitiate a human or machine search and recognition [6]. Further, the letter-based approach does not immediately give the idea of the whole lay out of a page. Thus two apparently similar letters may belong to two different hands.

A THUMB-NAIL INDEX

In my view, in order to facilitate the identification of hands one has to create a tool consisting of reduced specimens of manuscript pages in tabular form, which may be attached to an album of manuscripts or to a manuscript catalogue. This listing should be arranged according to strict search criteria and be in the form of a **thumb-nail index** — a technical term originating from computing science [7]. A thumb-nail index with a series of small illus-

* The present article is a revised and augmented version of my talk held on the MELCOM International Conference (St. Petersburg, June 2001). I am most grateful to Dr. Nigel Allan, Tim Stanley and Michael Rogers (all London) who red the paper and corrected my English.

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trations has already been used as an appendix for a manuscript catalogue. This was undertaken by Peter Friedlander in his descriptive catalogue of Hindi manuscripts in the Wellcome Library [8]. However, this index was not based on search criteria but was arranged according to call numbers.

The aim of the present article is to suggest a set of search criteria for manuscripts written in the Arabic script which enable a cataloguer to create a hard-copy or on-line thumb-nail index for his catalogue, and enable a user to find quickly among the specimens listed in this index those which are the closest match to the manuscript he has in hand.

Difficulties

It is acknowledged that the main problem in arranging a thumb-nail index of manuscripts is the system of classification. Any of the traditional classification systems used in cataloguing are inappropriate, since neither call numbers, sizes of manuscripts, types of paper, colours of ink, or even collation marks etc. are relevant to the handwriting and its style. Nor, as has been shown, can the letter-based approach be credited with high reliability. The traditional division of the script into various styles, e.g. *thulth*, *naskh*, *muḥaqqaq*, *riqa'*, etc., does not help either. Firstly, these styles were not similar in Islamic society throughout its history. Although bearing the same label, the shapes of the letters varied significantly over time [9]. Secondly, even if a scholar follows the classification by style, he must admit that he is dealing exclusively with scripts written by professional and skilled calligraphers. The majority of scribes and learned men were not professional calligraphers at all but received a school training in handwriting (as was the rule in the context of Islamic education). They were writing only within the general framework of a certain style, e.g. *naskh* or *nasta'līq*, and they had a different aim: to relate a message rather than produce a piece of calligraphy as a work of art.

The aspect of clear and distinctive script, which does not have much in common with calligraphic script, has been constantly stressed by many theoreticians of writing. One must stress here that penmanship as a discipline is well-represented in the works of Arab (Islamic) authors [10], who frequently reproduce earlier works on the subject [11]. In this instance it is sufficient to give random examples, thus presenting a **tradition** rather than an opinion of one selected author.

The need for clear writing is explicitly testified by an anonymous 15th-century Arab writer, who wrote a *Treatise about Calligraphy* [12], and in sixteenth-century Iranian works on the subject [13]. The anonymous Arab author, among other topics, discusses the question of "why the best script is namely that which is readable — any other forms of it can be considered as pieces of art" [14]. A sixteenth-century Iranian source quotes a predecessor, a fifteenth-century scribe Sulṭān-'Alī Mashhadī, who says that "a good handwriting is that which is clear and distinguishable; the purpose of a written text is to be read" [15]. This remark by Sulṭān-'Alī Mashhadī, frequently repeated over the centuries [16], is logical. Due to the nature of the Arabic script, which rendered only long vowels, one was not able to read (=understand) a written word if the vocalisation is unfamiliar to the reader [17]. Arabic words were therefore mastered as ideograms — according to their shapes (*rusūm*), so forcing a reader to memorize the vocabulary not just orally but also visually [18]. This visual approach to the Arabic script is comparable to scripts from the Far East — Chinese and Japanese. On the one hand, it was used as a vehicle for transmitting information, and, on the other hand, it was aesthetically admired as an artistic masterpiece [19]. This latter aspect, as well as the lack of obvious criteria for identifying Arabic scripts (including non-professional), is reflected in publications on Islamic calligraphy. A majority of these deal with aesthetic features of script rather than handwriting as a mean of written communication. Even learned catalogues of Islamic manuscripts usually give depersonalised descriptions like "small clear *naskh*", etc., which has become commonplace [20].

The aesthetic side of the Arabic script, although not an issue for the present article, must not be underestimated since it is invaluable for establishing rules for individual non-professional scripts, i.e. the criteria for generating a thumb-nail index.

The Arabic Script

In numerous medieval manuals concerned with the Arabic scribal tradition [21], among them, Kitab al-fihrist by Ibn al-Nadīm (10th century) and al-Qalqashandī (15th century), informs us that Ibn Muqlah (10th century) invented the six styles which derived from the main *Kūfī* script: *thulth*, *naskh*, *muḥaqqaq*, *rayḥān*, *tawqī'*, *riqa'*. His successor 'Alī b. Ḥilāl (known as Ibn al-Bawwāb) introduced a new system, called "balanced" (or "proportional") script [22]. This script — in its calligraphic form — had strict proportions between the height and the width of each letter, their ligatures and places for diacritical dots. These proportions were measured by pen dots. This ingenious system, still applied today for educational purposes, was found very convenient and "architectural". A tradition ascribes to the famous Greek mathematician Euclid a saying: "Handwriting is spiritual geometry which appears by means of a bodily instrument" [23]. This "balanced" Arabic script has been compared to certain features in music [24], too. The proportions of letter-parts build up into a style, easily recognizable by eye but very difficult to describe. Remarkably enough, Sulṭān-'Alī Mashhadī writes: "To represent the rules of calligraphy in the form of a poem [25] is to my mind simply a mistake. Similarly, one cannot write about them in prose — do not even think about it! — because handwriting has neither beginning nor an end" [26]. The sayings collected by the tenth-century Arab polymath, Abū Ḥayyān al-Tawḥīdī [27] and others are rather similar to that quoted above. In fact, they show that Arab theoreticians had similar to ours: the lack of an adequately precise terminology to describe handwriting [28]. However, at the same time Arabs **viewed** [29] and **felt** [30] hand-writing differently. Individual hands were not only easily recognizable by the readers [31], but, as in modern graphology, they allowed the reader to make conjectures about the scribe's personal character.

Remarkably, the medieval Arabs' own comparisons of the "balanced" script with music, architecture and other arts, which influence human feelings, turn out to be helpful

in establishing rules for a thumb-nail index. In this instance, it is convenient to refer to the Greek word which describes either architectural or musical style — ρυθμός, a rhythm. However, this term has been already used by V. Atanasiu to describe letter frequency in the languages using Arabic script [32]. Therefore, in the present article another word which has a similar meaning will be used, namely, ***pace*** [33]. The word ***pace*** will denote ***a sequence of repeated patterns which facilitate the description and identification of the hand and the lay out of a whole page***. This notion can be applied to the description of both professional and non-professional handwriting in Arabic script.

PACE

Non-professional scribes and scholars, when they were not preparing a calligraphic copy as a work of art, tended to stick to a certain style, although they did not meticulously follow the rules of that style. Therefore, in classifying non-professional scripts it is worth avoiding strict definitions, e.g. *naskh*, *nasta'līq*, etc. They should be replaced by descriptions of large groups which include ***naskh-like*** or ***nasta'līq-like*** specimens even (if possible) with a relevant indication to their provenance, e.g. "Syrian", "Iranian", etc.

Within each of these groups the following proportions should be measured:

1. The ratio between the height of *alif* ا and the width of the separate form of *bā'* ب (see **a**, **b** in *fig. 1*).

The reason for measuring this ratio has its roots in the theory of Arabic calligraphy, since *alif* is the highest and *bā'* [34] is the longest letter of the Arabic alphabet. Ideally, they should be equal to the diameters of a circle which, according to Ibn Muqlah, is the basic element for the construction of letters [35].

Fig. 1

2. The angles of inclination of the connected form of *alif* سا and the bar of the letter *kāf* ک in medial position (see **c**, **d** in *fig. 1*).

The angles of inclination of the connected form of *alif* and the bar of the letter *kāf* in medial position seem to be characteristic elements of the individual non-calligraphic hands. Being a calligraphic flourish, they distinctively betray ***individual*** features, i.e. the personality of the scribe.

Thus *alif*s, especially in their final form, tended not to be written vertically. This "freedom" seemed to be an object of constant attention for the Arab theoreticians of writing. In this instance an account of the handwriting of the Caliph al-Ma'mūn's secretary Aḥmad b. Abī Khālid al-Aḥwal (d. A.D. 825/26) related by al-Tawḥīdī is worth mentioning. Al-Tawḥīdī, while quoting Ibn al-Musharraf al-Baghdādī, explicitly notes that in the secretary's hand *alif*s and *lām*s were as straight as they could be [36]. Another theoretician, 'Abd al-Qādir al-Ṣadāwī [37], also stresses the fact that *alif* should not be inclined: "The first letter with which we begin among the letters [of the alphabet] is the *standing alif* among the ranks // It is the greatest [letter] among those which are vertical and erect // And it is the best which stands within symmetry // *Alif* collects everything, it is the pillar of superiority..." [38]. Descriptions of *alif* are innumerable. I quote here only the first warning of al-Qalqashandī describing the pitfalls in writing this letter: "it should be *erect*, must not incline to one side or fall" [39].

According to al-Ṣadāwī, the letter *kāf* — especially in its medial form — had obviously to be written without lifting the pen [40], regardless of the number of strokes [41]. However, this did not seem to happen frequently. The upper bar usually appears to be divided from the body of the letter. On the other hand, from al-Qalqashandī's description of the *kāf* in the medial position it follows clearly that the bar above was added separately [42]. Being an element of a flourish, the angle of the bar of the *kāf* clearly represented the scribe's individuality and therefore, together with the slope of *alif*, it can be seen as an element of pace in Arabic handwriting.

However, the same scribe can write on large or small pieces of paper, in large or small letters. In order to be able to compare handwriting independently of the size of paper, one has to introduce an additional parameter, i.e. the ***density***. Density [Δ] is a parameter which describes how much of a written text could be located in a given measure of paper. As has recently been shown by Valery Polosin [43], density was an important parameter, since it helped to assess the amount of paper and ink required to complete a manuscript and therefore the scribe's salary. According to Polosin, density has to be calculated by multiplying the number of letters in one line by the number of lines on a page. Contrary to Polosin, I suggest density is the number of word segments (not letters, as proposed by Polosin) as visually recognizable units in one line multiplied by the number of lines on a page. Thus, for example, a sequence of Arabic words على الاطلاق has the following segments على / الا / طلا / ق. However, the article ال and the conjunction و, as well as the components of words written above the line, are not counted as segments. All the separate letters in word, however, are to be counted as segments: الورد has following segments: الو / ر / د.

One should explicitly stress the fact that counting word segments is preferable to counting individual letters. These segments are usually written on the line and only their contraction or stretching (which relatively rarely occurs) can thus changing the density of the script. Density is given in the form of a formula (number of segments by the number of lines) and in a round figure which is expressed to the nearest ten, e.g. 18×17 (310) (18 — number of segments,

17 is a number of lines). 18×17 = 306 which is rounded up to 310.

Among other parameters are: (i) number of lines to the page; (ii) existence (or lack) of a frame; (iii) colour of paper. The last two parameters are not included in the description of pace. However, they can be used as additional criteria for arranging material. The ***pace*** can therefore be expressed with a ***formula*** comprising *resemblance* (*to a certain calligraphic style*), *number of lines to the page*, Δ (*density*), *ratio* (*of alif to bā'*) *a* (*inclination of alif*), *k* (*angle of the bar of kāf*); *call number of the manuscript*. In a short and searchable form it appears as, for example: *naskh-like*; 18; Δ 15×12 (220); 1:1.1; a100°, k35°; (B 1219) as presented in *fig. 2*.

Test

The categories of ***pace*** have been tested on approximately 200 manuscripts while compiling the forthcoming descriptive catalogue of the Christian Arabic manuscripts at the St. Petersburg Branch of the Institute of Oriental Studies [44] and the descriptive catalogue of the Arabic medical manuscripts in the Wellcome Library for the History and Understanding of Medicine [45]. *Fig. 2* shows a page of the thumb-nail index prepared for the catalogue of the St. Petersburg Christian Arabic manuscripts. A comparative table of pace (see below) shows coinciding pace in a number of manuscripts kept at the St. Petersburg Branch of the Institute of Oriental Studies and in the Wellcome Library (WMS Ar. 205, WMS Ar. 216, WMS Ar. 207, see *fig. 3.1 — 3.5*) [46]. At the same time, another Wellcome manuscript (WMS Ar. 217, cf. *figs. 3* and *4*) has a different pace. Close analysis of the first three manuscripts from the Wellcome collection shows that all of them can be identified as a group of that were transcribed in Christian circles in Syria from the beginning of the nineteenth to the beginning of the twentieth century, similar to those from St. Petersburg.

The thumb-nail index, which is arranged by pace according to density (Δ) also helps in identifying the approximate date of acephalous manuscripts. Thus a hitherto undescribed composite manuscript (WMS AR. 357, see *figs. 4.1 — 4.2*) [47] can be attributed to the middle or second half of the eighteenth century on the basis of the pace of its different parts: 15; Δ 15×21 (310); 1:1; a90°, k30°; and 15; Δ 15×15 (225); 1:0.8; a90°, k15°. This attribution coincides with readers' notes in the manuscript. The earliest gives the date A.H. 1190 which corresponds to the year A.D. 1776/77, giving a *terminus post quem*.

To conclude, the system proposed cannot be regarded as universal, since handwriting will always retain an element of individuality. However, it is sufficiently practical to allow a researcher to identify the manuscript he has in hand with a circle of manuscripts to which it is most likely related on the basis of the handwriting.

Table

Comparative table of paces in the manuscripts from St. Petersburg and Wellcome collections written in a *naskh*-like script

St. Petersburg manuscripts (call numbers)	Pace	Wellcome manuscripts (call numbers)	Pace
A 740	15 Δ 15 × 13 (190); 1:0.8; a100° k35°		
B 1115	15 Δ 15 × 12 (200); 1:0.9; a105° k35°		
B 473	15 Δ 15 × 12 (200); 1:1.1; a100° k30°		
A 189	15 Δ 15 × 14 (210); 1:1.1; a100° k30°	WMS Ar. 205	17 Δ 17 × 31 (530); 1:1.1; a100° k30°
B 1219	18 Δ 18 × 12 (220); 1:1.1; a100° k35°		
B 1118	16 Δ 16 × 16 (260); 1:1; a100° k35°		
B 1226	18 Δ 18 × 18 (320); 1:1; a100° k40°	WMS Ar. 216	20 Δ 20 × 16 (320); 1:1.1; a100° k35°
B 474	19 Δ 19 × 16 (300); 1:1; a100° k40°		
B 1223	21 Δ 21 × 24 (420); 1:0.8; a100° k40°	WMS Ar. 207	21 Δ 21 × 17 (360); 1:0.9; a100° k40°
		WMS Ar. 217	21 Δ 21 × 17 (360); 1:0.8; a90° k30°
		WMS Ar. 219	31 Δ 31 × 30 (930); 1:1.5; a95° k35°

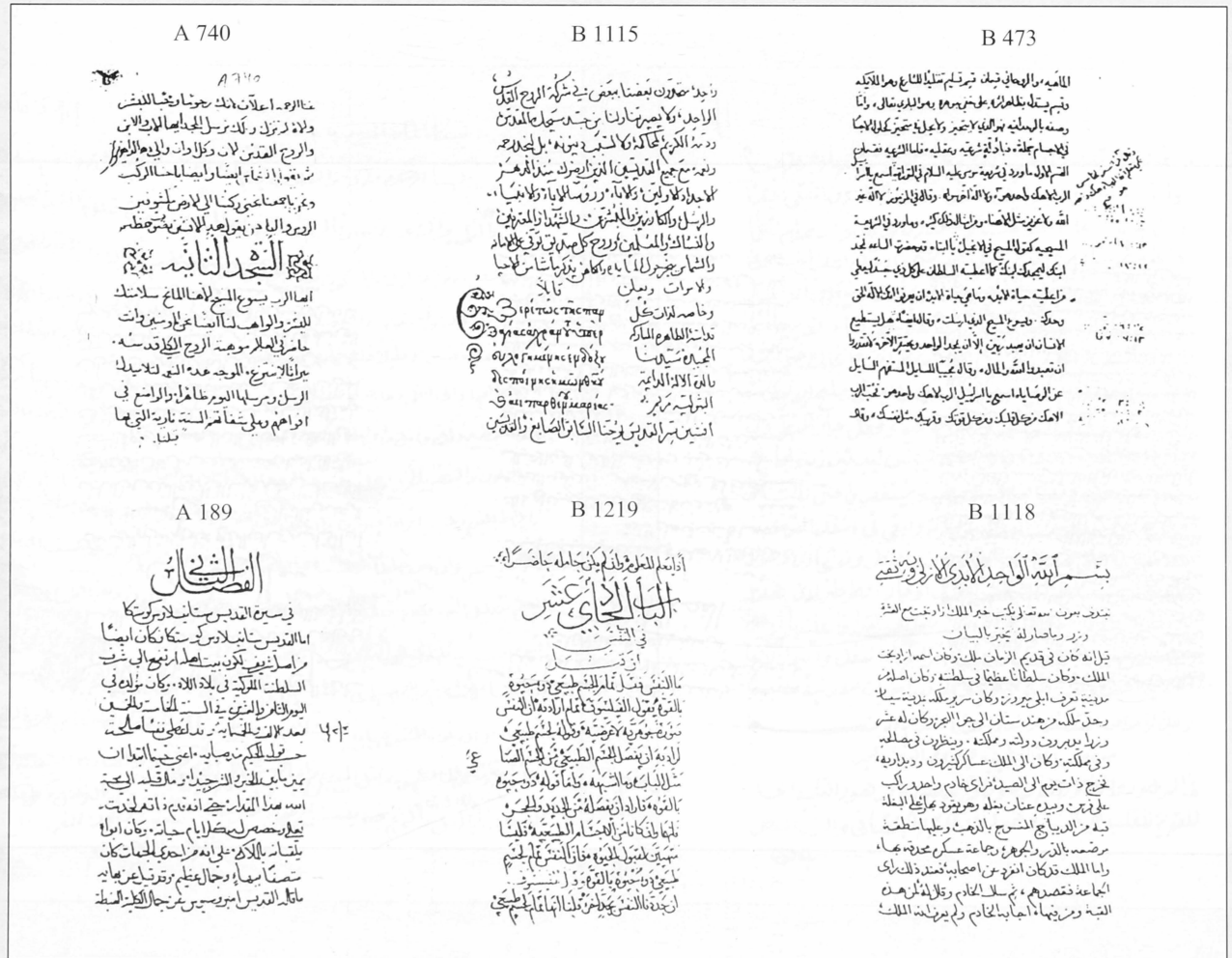

Fig. 2

B 1226

B 474

B 1223

Fig. 2, a

Fig. 3. 1

Fig. 3. 2

Fig. 3.3

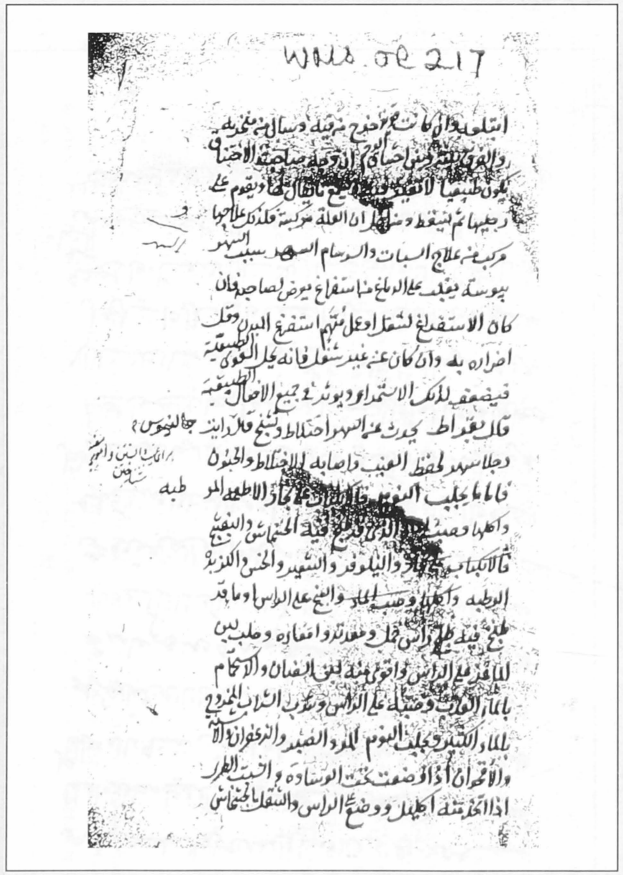

Fig. 3.4

Fig. 3.5

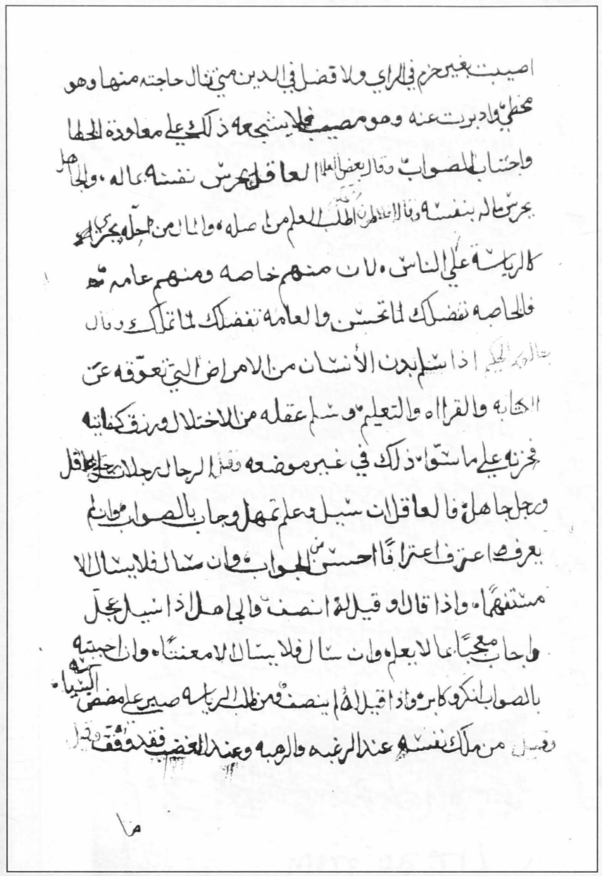

Fig. 4.1

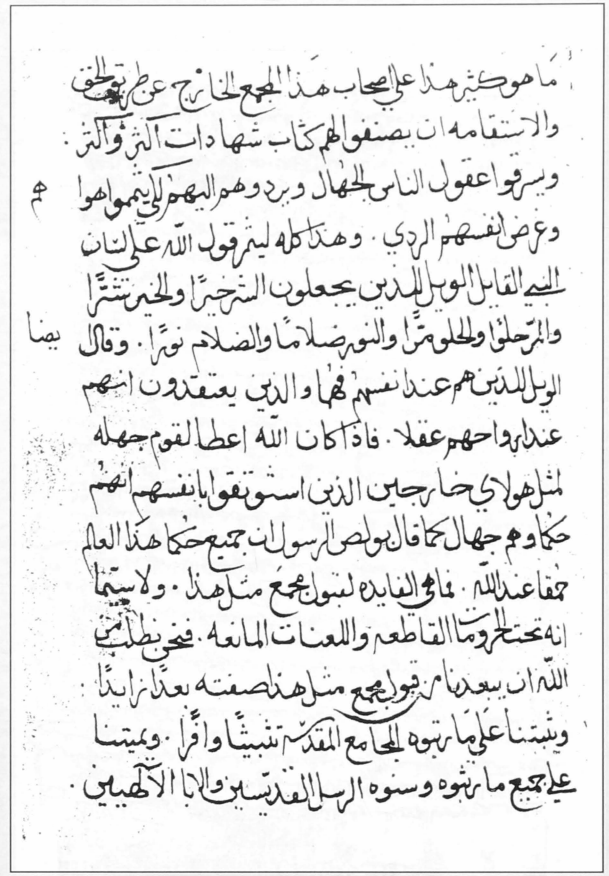

Fig. 4.2

Notes

1. G. F. Tsereteli, *Sokrashcheniia v grecheskikh rukopisiakh, preimushchestvenno po datirovannym rukopisiam S.-Peterburga i Moskvy* (Abbreviations in Greek Manuscripts as Presented Predominantly in Dated Codices Kept in St. Petersburg and Moscow) (Hildesheim, 1969), reprint.

2. V. Gardthausen, *Griechische Paleographie* (Leipzig, 1913).

3. *Repertorium der griechischen Kopisten 888—1600.* Teil 1: Handschriften aus Bibliotheken Grossbritanniens, erstellt v. E. Gamillscheg, D. Haringer. Ver offentlichungen der Komission für Byzantinistik, Bd. III/1A—1C (Wien, 1981); Teil 2: Handschriften aus Bibliotheken Frankreichs und Nachträge zu den Bibliotheken Grossbritanniens, *ibid.*, Bd. III/2A—2C (Wien, 1989); Teil 3: Handschriften aus Bibliotheken Roms mit dem Vatikan, erstellt v. E. Gamillscheg unter Mitarbeit von D. Haringer und P. Eleuteri, *ibid.*, Bd. III/3A—3C (Wien, 1997). The volumes 1B—3B (Paläographische Charakteristika) are compiled by H. Hunger.

4. F. Déroche et al., *Manuel de codicologie des manuscrits en écriture arabe* (Paris, 2000), p. 229.

5. E. A. Rezvan, N. S. Kondybaev, "New tool for analysis of handwritten script", *Manuscripta Orientalia*, II/3 (1996), pp. 43—53; *idem*, "The ENTRAP software: test results" *ibid.*, V/2 (1999), pp. 58—64.

6. The search and comparison facilities are still not available for the Austrian tool.

7. The usage of this term was suggested by Dr. Dominik Wujastyk, Wellcome Library for the History and Understanding of Medicine.

8. P. Friedlander, *A Descriptive Catalogue of the Hindi Manuscripts in the Library of the Wellcome Institute for the History of Medicine* (London, 1996).

9. A. Gacek, "Al-Nuwayrī's classification of Arabic scripts", *Manuscripts of the Middle East*, 2 (1987), pp. 126—7.

10. For a selected bibliography of classical and post-classical texts on penmanship, see Gacek, *op. cit.*, pp. 129—30.

11. Cf. parallel places in F. Rosenthal, "Abū Ḥayyān at-Tawḥīdī on penmanship", *Ars Islamica*, 13—14 (1948), pp. 1—30.

12. Cited after A. M. Rayef, *Die ästhetischen Grundlagen der Arabischen Schrift bei Ibn Muqlah.* Inauguraldiss., Universität Köln, 1974, p. 37.

13. For example, Kazi-Akhmed (Qaḍī Aḥmad), *Traktat o kalligrafakh i khudozhnikakh* (A Treatise on Calligraphy and Artists), introduction, translation into Russian and commentary by B. N. Zakhoder (Moscow—Leningrad, 1947).

14. Rayef (see n. 12) quotes an unpublished manuscript (Staatsbibliothek zu Berlin. Stiftung Preussischer Kulturbesitz, Codex We 167, fols. 47a—50b; cf. A. Grohmann, *Arabische Paläographie* (Wien, 1967), p. 23. He also writes: "The author of this treatise is not known. There are answered three questions why the 'proportional script' was called as such, why this script was highly regarded both by the learned people as well as by analphabets and even foreigners...".

15. G. I. Kostygova (ed., tr.), "Traktat po kalligrafii Sultan-Ali Meshkhedi" ("A Treatise on Calligraphy by Sulṭān-'Alī Mashhadī"), *Trudy Gosudarstvennoĭ Publichnoĭ Biblioteki imeni M. E. Saltykova-Shchedrina*, II (V) (Leningrad, 1954), fol. 5a.8 (tr., p. 127): بهر انست خط که برخوانند. Cf. Kazi-Akhmed, *Traktat*, p. 116.

16. Kostygova, *op. cit.*, p. 109, n. 2.

17. This peculiar feature is reflected in semantics of an Arabic word "to read" (قرأ) which means "to gather" or "to articulate". Cf. also here a remark by S. Hurgronje in his *Mekka* (Leiden, 1931), p. 168. Cited after B. Messick, *The Calligraphic State. Textual Domination and History in Muslim Society* (Berkeley and Los Angeles, 1993), p. 22. Thus to be able to "read" in a strict sense means to be able to pronounce correctly, whereas the idea of reading in Greek ἀναγιγνώσχω reflected gaining knowledge or learning.

18. Messick, *op. cit.*, pp. 21—2; N. Serikoff, "Mistakes and defences. Foreign (Greek) words in Arabic and their visual recognition" (in print).

19. S. Fu, G. D. Lowry, A. Yonemura, *From Concept to Context: Approaches to Asian and Islamic Calligraphy* (Washington D.C., 1986). P. Jaquillard, Ung No Lee, *Calligraphie, peinture chinoises et art abstrait* (Neuchâtel, 1973); B. Lussato, C. Mediavilla, *Du signe calligraphié à la peinture abstraite*, préface de Jean Deérens. Textes de Bruno Lussato et de Claude Mediavilla (Paris, 1996), *non vidi.*

20. As far as I know, only Dr. Fateme Keshavarz has introduced a definition "personal handwriting" in order to distinguish it from a professional hand, thus reflecting local, educational, confessional features of a non-calligraphic script. See F. Keshavarz, *A Descriptive and Analytical Catalogue of Persian Manuscripts in the Library of the Wellcome Institute of Medicine* (London, 1985), *passim.*

21. See supra n. 9.

22. Rayef, *op. cit.*, pp. 42—6.

23. Tawḥīdī as cited in Rosenthal, *op. cit.*, No. 56, p. 25 (tr. p. 15).

24. Tawḥīdī as cited in Rosenthal, *op. cit.*, No. 10, p. 23 (tr. pp. 7—8).

25. The whole work is actually written in form of a poem.

26. Kostygova, *op. cit.*, fol. 10a.6—8 (tr. p. 147).

27. Tawḥīdī as cited in Rosenthal, *op. cit.*, *passim.*

28. Cf. the usage of almost the same vocabulary for descriptions of the different manuscript specimens: "kalligraphische disziplinierte Hand mit deutlicher Wort- und Buch-stabentrennung", *Repertorium der griechischen Kopisten*, vol. 1B, No. 11; "Senkrechte, lockere Gebrauchsschrift einer geübten Hand mit weitgehenden Wort- und Buchtaben-trennung", *ibid.*, No. 39; "Senkrechte bis richtungslose kalligraphische Minuskel unter-durchschnittlichen Niveaus", *ibid.*, vol. 2B, No. 155.

29. Tawḥīdī as cited in Rosenthal, *op. cit.*, (رایت !), *passim.*

30. Tawḥīdī as cited in Rosenthal, *op. cit.*, Nos. 13, 34, 35—44 (tr. p. 12). Cf. words of a secretary Ibn al-Marzubān (*ibid.*, No. 13): "A script is a difficult engineering, if it is elegant it is weak, if it is solid it is easily washed off (?), if it is big it is coarse, if it is thin it looks scattered and if it is round it is thick".

31. Tawḥīdī as cited in Rosenthal, *op. cit.*, relates about the scribe of 'Amr b. al-'Āṣṣ who recognized the handwriting of a certain scribe: "The qalam does not to hesitate to show to whom it belongs", No. 50, p. 25 (tr. p. 14).

32. V. Atanasiu, *De la fréquence des lettres et de son in uence en calligraphie arabe* (Paris, 1999).
33. *Gradus* in Latin, *alliur* in Russian, allure in French (not to confuse with allure in English!).
34. As well as other letters built from its base, like ت and ث.
35. Rayef, *op. cit.*, pp. 111 and 146. Zayn al-Dīn Nājī, *Maṣūr al-khaṭṭ al-'arabī* (Baghdad, 1388/1968), p. 113.
36. Tawḥīdī as cited in Rosenthal, *op. cit.*, No. 14, p. 23 (tr. p. 9).
37. 'Abd al-Qādir al-Ṣadāwī, "*Wiḍḍāḥat al-'uṣūl fī al-khaṭṭ*", *ḥaqqaqahā* Hilāl Nājī, in *al-Mawrid*, 15/4 (1986), pp. 156—72.
38. *Ibid.*, p. 177, verse 41—43. The translation is deliberately literal.
39. Abū-l-'Abbās Aḥmad b. 'Alī al-Qalqashandī, *Ṣubḥ al-a'shā fī ṣinā'at al-inshā'* (Cairo, s.a.), ii, p. 23.18.
40. Thus I understand the verses by 'Abd al-Qādir al-Ṣadāwī: اعلاه غير قاسم // له وابداءه من (*op. cit.*, verse 77).
41. Cf. al-Qalqashandī, *op. cit.*, ii, pp. 30—1 and a commentary by Rayef, *op. cit.*, pp. 97—8.
42. al-Qalqashandī, *op. cit.*, ii, p. 80.13—14.
43. Val. Polosin, "Arabic manuscripts. Text density and its convertibility in copies of the same work", *Manuscripta Orientalia*, III/2 (1997), pp. 3—17.
44 Val. Polosin, Vl. Polosin, N. Serikoff, *A Descriptive Catalogue of the Christian Arabic Manuscripts Preserved at the St. Petersburg Branch of the Institute of Oriental Studies of the Russian Academy of Sciences* (*Asiatic Museum*), eds. N. Serikoff, H. Teule (forthcoming).
45. In preparation by N. Serikoff.
46. The call numbers will be changed in the final description.
47. The Wellcome call number will be changed in the final description.

Illustrations

Fig. 1. MS B 1226, fol. 60b.
Fig. 2. A specimen of the thumb-nail index. St. Petersburg Christian MSS arranged after the density (Δ) of the script.
a — a specimen of the thumb-nail index. St. Petersburg Christian MSS arranged after the density (Δ) of the script (continuation of ***fig. 2***).
Fig. 3.1. WMS AR. 205, *Kitāb mūjiz al-qānūn* by Ibn al-Nafīs, copied 5 January 1804 A.D.
Fig. 3.2. WMS AR. 207, *Kitāb iqtiṣār al-iqtiḍāb 'alā ṭarīq al-su'āl wa-l-jawāb*, copied *ca.* 18th century A.D.
Fig. 3.3. WMS AR. 216, an acephalous MS on diverse illnesses, a convolute entitled *Kitāb al-aqrābāddīn* in the colophon, copied 12 January 1804 A.D.
Fig. 3.4. WMS AR. 217, an acephalous MS containing a list of diverse diseases and their treatment, copied *ca.* mid-19th century.
Fig. 3.5. WMS AR. 219, *Kitāb mūjiz al-qānūn* by Ibn al-Nafīs, copied in Lebanon at the beginning of the 20th century.
Fig. 4.1. WMS AR. 357.
Fig. 4.2. WMS AR. 357.