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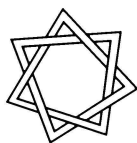
RUSSIAN ACADEMY OF SCIENCES
THE INSTITUTE OF ORIENTAL STUDIES
ST.PETERSBURG BRANCH

Manuscripta Orientalia

International Journal for Oriental Manuscript Research

Vol. 3 No. 2 June 1997

THESA
St.Petersburg–Helsinki

TEXTS AND MANUSCRIPTS: DESCRIPTION AND RESEARCH

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ARABIC MANUSCRIPTS: TEXT DENSITY AND ITS CONVERTIBILITY IN COPIES OF THE SAME WORK*

I

The copyist of manuscript C 2114 from the collection of the St. Petersburg Branch of the Institute of Oriental Studies [1] has made a mistake. Being probably distracted for a while from his work he then resumed copying of a passage already done by him earlier. Due to this mistake we, for the first time, get some definite material and an opportunity to discuss the regularity of individual handwriting in medieval Arabic manuscripts.

Fig. 1 shows two neighbouring pages of the above-mentioned manuscript. The right one (fol. 250b), starting from the last word of the thirteenth line and to the end of the page, contains the text repeated on the next page (fol. 251a) — it is crossed out by the scribe. Both passages take the same number of lines — 22, which makes our find significant as the first and so far the only evidence testifying to the stability and balanced density of handwriting within a single Arabic manuscript.

It is true, of course, that the volume of the text revealing this quality of handwriting is too small to make any far-going conclusions. Still, however, it is much more representative than it may appear [2], and we do not overestimate the proofing value of the discovered twin-texts. It is enough at least to presume that the density of handwriting in Arabic manuscripts was well-balanced. As for the required full-scale system of arguments, one should admit that any search for longer twin-texts in manuscripts does not promise much. We may try therefore to test the reliability of our suggestion "from the opposite". Let us make several first steps in this direction.

Manuscripts C 958 and C 711 from the same collection of the St. Petersburg Branch of the Institute of Oriental Studies present two copies of the same work — *Durar al-ḥukkām fī sharḥ Ghurar al-aḥkām* by Mullā Khusraw (d. 885/1480) [3]. One of them (C 711) is incomplete at the beginning, but the remaining text appears in the second copy (C 958) already from the 15th line of its first folio (compare *figs. 2* and *3*), which means that in manuscript

C 711 only one leaf is missing, with not more than 23 lines of the text [4].

Estimating by codicological methods the maximum possible size of the *lacuna* in manuscript C 711 (not more than 23 lines) we may verify the reliability of our suggestion on the even density of the manuscript text by calculating the size of the same *lacuna* arithmetically.

If the density of handwriting is really a constant value for each manuscript, then the density of two copies of the same text may be compared through linear (line by line) extension of these records — these last can be expected to be proportional in the same way as the proportion of their corresponding density. Let us verify this by calculations. The text taking the first 23 lines in manuscript C 711 (see *fig. 4*) occupies approximately 22.2 lines in C 958, running from line 15 of folio 2b to line 20 of folio 3a (see *figs. 2* and *3*), which means that the handwriting of C 958 is slightly more dense (1.036 times) than in C 711 ($23 : 22.2 = 1.036$). This value presenting the relation of two densities is the instrument for the further conversion of linear text volumes (lines, pages, folios), known by one manuscript (in our case — C 958), into corresponding volumes of a different copy of the same work (C 711).

The comparison of the initial parts of manuscripts C 958 and C 711 (see *figs. 2* and *4*) shows that the missing part of the text in C 711 takes 14 full lines and approximately three quarters of the 15th line in C 958. In all, it makes 14.75 lines. In C 711 it should have taken 1.036 times more space, namely 15 or 16 lines ($14.75 \times 1.036 = 15.28$ lines).

It is less than the normative volume for one page, for which the standard in C 711 is 23 lines, as the preliminary ruling of the MS proposed. The difference between the results of our calculations and the ruling requirements of the manuscript should not, however, undermine our trust in the validity of these calculations. It was evident from the start that the missing text could not occupy a whole page. The

explanation is very simple and obvious: probably there was a coloured pattern (*'unwān*) above the text occupying the space reserved for the first 7 or 8 lines. The beginning of the second copy of the same work is decorated with *'unwān* (see *fig. 2*) [5].

The case considered here in confirmation of the convertibility of manuscript texts is, of course, elementary, i. e. it could have been interpreted with the same results without any calculations. We selected it to enable the common sense of the reader-specialist to follow the mathematical conversion of the text from one volume into another when discussing the method suggested here. Let us consider now a more complicated case, also, however, with a quite predictable size of the *lacuna*. Another pair of manuscripts from the same collection — C 2114 and C 2023 (see *figs. 5* and *6*) [6] — can be taken for this purpose.

The first of these manuscripts (C 2114) is defective — the beginning is missing. The number of the missing folios may be estimated by its pagination, which has been done twice at different periods. One is quite recent, probably done when describing the manuscript for the catalogue, the earlier one had been made either by the scribe or by one of its former Muslim owners, obviously before the beginning of the manuscript was lost. A sample of the two paginations can be seen on *fig. 1* at the upper left hand corner, where the present folio 251 of the manuscript is numbered as folio 271 in Arabic. The difference in numbers allows to suggest that 20 folios at the beginning of the manuscript are missing, i. e. two full blocks (*kurrāsa*) of 10 folios each. This suggestion basing upon the old foliation we are going to verify by calculations, once more testing the practicability of the method.

Like in the former case, to estimate the conversion coefficient of density, we are taking a fragment of text common for the two manuscripts. The fragment selected this time is shown on *fig. 5* (C 2023, fol. 22b, line 26 — fol. 23a, lines 1—27) and *fig. 6* (C 2114, fol. 1a). The comparison of the two records of this fragment (35 lines in C 2114 and 33 lines in C 2023) gives the conversion coefficient — $35 : 33 = 1.06$. We can notice also that C 2023 has a more dense text. Now we can approach the estimation of the volume of the missing text in C 2114.

The text missing in C 2114 ends on the 26th line of folio 22b of C 2023 taking in the last one approximately 22 folios. It makes 1364 lines (44 pages, 31 lines on each page). The first page of the manuscript (fol. 1a), however, bears no text, i. e. 31 lines should be subtracted. On the last page (fol. 22b) only 25 of 31 lines corresponding to the

lacuna should be taken into account. Making these corrections we find that the text missing in C 2114 is equivalent to 1327 lines of C 2023. Now, using the conversion coefficient, we can estimate the size of the *lacuna* in its own measure units: $1,327 \times 1.06 = 1,406.6$ lines. With the normative of 70 lines per folio (35×2) for manuscript C 2114 we find the right and, what is important, the expected answer: 20 folios ($1,406 : 70 = 20.08$ folios).

In this way the suggestion of the loss of 20 folios by manuscript C 2114 has been confirmed. It is absolute, if speaking of the number of the leaves of paper bearing the text, or relative, taking into account the text itself — actually, the value estimated was the volume of the text. The matter is that, according to the general rule, the first page of the manuscript could not bear any text, so we could have expected our calculations to show not 20 but 19.5 leaves. It means that, when converting the text, the mistake made around 2.5% of its volume.

Is this error acceptable, or is it too big? In our case, when we actually analyse the contents of the manuscript by blocks, it makes no problem at all. A text written on 39 pages or on 40 pages would equally require 20 leaves of paper. It is, moreover, too early now to discuss errors natural when calculating the volume of a non-typed (hand-written) text. Taking into account the part of psychosomatic factors in the process of writing, one can foresee that the very presence of these errors and their distribution by size following some definite pattern are inevitable. One may happen to compare texts made by scribes of different skill, experience, and even temperament. It is difficult, on the other hand, to estimate the part played by the cursive nature of the Arabic script which is able to be compressed and decompressed without loosing its natural appearance, i. e. these changes are practically undetectable by human eye. At the same time, there are definitely factors maintaining the density of the script within certain limits, especially when it concerns the work done by a professional scribe. One of the most important factors was using of a ruled pattern for the future text, which made the scribes work out a habit for a standard line.

The pattern for ruling Arabic manuscripts (*mistara*) has been described as early as the last century, in particular by English Arabist E. W. Lane (1801—1876): "Paper is ruled by putting underneath it a piece of cardboard paper with cords (*mistara*) glued across it and pressing it slightly" [7]. This primitive but effective device, once widespread over the Muslim East, is directly related to the subject of the present article.

II

The application of *mistara* introduced an important feature into the shaping of a manuscript. It ensured the same length of lines, their equal number and the same distance between them on all pages of the book. It created a number of practical conveniences and possibilities doubtless used by medieval scribes. Let us consider some of them.

First of all, it is the estimation of the volume of text in collections of verse (*dīwāns*). The length of the line is of no significance here, because each verse (*bayt*) occupies a single line, never going to the next one. What is variable and significant in different copies is only the number of lines

per page. In this way a manuscript of 250 folios with a 25-line *mistara* will give us 25 *bayt*s per page, 50 *bayt*s for a single folio and 12,500 *bayt*s for the whole manuscript (in fact, up to 12,500 *bayt*s) [8].

Since every *bayt* takes only one line in the manuscript, hence from follows the rule: the number of *bayt*s in the manuscript corresponds to the number of lines, and, *vice verse*, the number of lines corresponds to the number of *bayt*s. This simple relation turns collections of verse into a special category of manuscripts: calculations over them produce results freely convertible from one *mistara* to another with no additional information required. For this rea-

son, versified text in a 21-line manuscript, as compared with the above-mentioned versified text of 250 folios with a 25-line *mistara*, will occupy not 250 folios but 596 pages, i. e. 298 folios $(12,500 : 21 = 595.23$ pages; $12,500 : 42 = 297.6$ folios). In a 19-line manuscript the same text will take 329 folios (658 pages), etc.

The convertibility of the formula "the given number of folios by the given number of lines each" from one *mistara* to another is applicable only for versified texts. In this very field we are going to provide an example of its real use. It is the fourth/tenth-century bibliographic work *Fihrist* by Ibn al-Nadīm (d. 380/990).

In the foreword to one of the chapters of *Fihrist*, which, citing its title, "contains the names of new, as well as early Muslim poets, also evidence on the number of their verse that were introduced into circulation", Ibn al-Nadīm writes: "We ourselves aim to present the names of the poets and the amount of poetry written by each poet among them, especially by the more recent ones, and also the variations occurring in their poems, so that whoever desires to collect books and poems can have this information and an insight into the matter. If we say that the poetry of a certian man fills ten leaves, we mean Sulaymānīyah ones, holding twenty lines, I mean on each side of the leaf" [9]. After this introduction the author names a great number of Arabic poets, giving in the account system mentioned above, i. e. in *sulaymānī* folios, exact or approximate figures representing the amount of verse written by them, though one should think that the anthologies actually circulated could have different number of lines on their pages [10].

One of the practical consequences of this connection between the contents of Arabic manuscript (i. e. text) and its material embodiment (manuscript folio) was the possibility to adjust the volume of a new manuscript when making a copy — to estimate beforehand the required amount of paper and ink and in that way to affect the expenses of production. Though, one of the principal factors making the price is still not quite clear, we mean the scribe's labour. Was it estimated directly from the executed copy (considering the length of its lines, the number of lines per page, and the total number of folios) or by converting it to the price of a conventional folio, like the *sulaymānī* folio which appears in *Fihrist* by Ibn al-Nadīm?

Prosaic texts can not be converted in the same way. The reason for this is the very characteristic of *mistara* which in the former case was of no significance — the length of the line.

The matter is that in prosaic texts, unlike in verse, the length of the line is not an account unit indifferent to the length of the textual fragment. In this case the length of the line is no longer a self-standing unit measuring the completeness or incompleteness (defectiveness) of the whole text, the instrument of getting the quantitative estimation of the text in question as a sum of units-lines. Prosaic text, of course, is also divided into *mistara* lines. It has, however, no internal measure like the metrical unit which in the first case determined both the length of the line and the equal total number of lines in all copies of the poetic work in question. Prosaic text is divided into lines after the external, and for this reason irregular measure — the length of the line in this or that *mistara*. Versified text always gives the same total number of lines, no matter what kind of *mistara* is used. Prosaic text gives a different number of lines, depending on different *mistara*s [11].

Prosaic lines, however, can also be converted, as it has been demonstrated above.

In spite of the different width of different letters of the Arabic alphabet the text of Arabic manuscripts reveals the ability to maintain approximately the same number of letters in all lines of a whole codex. This number is only slightly shifting around some numeral presenting an average value for the lines of the given codex [12]. This quality, so far as I know never mentioned in literature, allows to convert prosaic texts from one *mistara* to another.

The method of finding the average density for one line of the text is the usual one. As for the conversion coefficient also required in this case, it presents a proportion expressing the relation between the average density of the text in the lines of two manuscripts, juxtaposed copies of one and the same work. The way of obtaining this value could be either abstract or relevant. When applying the abstract method we first find (by characters-letters) the average density of the text (handwriting) in the lines of two juxtaposed manuscripts, then we calculate the conversion coefficient itself by dividing, say, the greater value of density into the smaller one. The relevant method omits the first stage (working out the average density), namely: one and the same fragment of text is selected in two copies (its volume is taken at random, but with a whole number of lines, pages or folios in one of the manuscripts, accepted as a unit of measure); then, like in the first case, the greater value is divided into the smaller one; the figure obtained is the conversion coefficient we were looking for.

It is impossible, unfortunately, to demonstrate the convertibility of prosaic texts using published, i. e. available to everyone, materials. The matter is that facsimile reproductions of manuscripts, of which there are many now, and which could have been used to arrange a public demonstration of the method, all these are publications of unique manuscripts. To demonstrate the method and the way it works we need at least two copies of one and the same work. That is why the mistake made by the copyist and reproduced at the beginning of this article was so fitting.

It is possible to presume that medieval scribes used the convertibility of prosaic texts, like in the case with versified texts, also mainly to estimate the amount of paper required for making a copy with a different *mistara*. We do not know how it actually worked in those times, but now specialists can use the convertibility of texts to achieve other aims, for example, to locate quickly selected fragments from some work in any manuscript or printed edition. Textologists and those who work on literary sources constantly encounter such problems, and a conversion coefficient for each pair of manuscripts may be used, if necessary, as a concordance of their pagination. A search for the same fragments by looking through numerous pages of "blind" text (with no paragraphs, etc.) in many cases would be less productive.

The best way to develop the method of converting text from one *mistara* to another is to work on a scholarly publication of Arabic sources involving several manuscripts at once. In this case the problem can be studied indirectly, not distracting one's attention from other tasks but ensuring a more profound study of current materials along separate lines, within the frame of the standard set of operations forming the technique of preparing a critical text.

Not all manuscripts and all texts within them are equally convenient for the study and practical application

Fig. 1

of the text convertibility effect. The two most important manuscripts of *Fihrist* by Ibn al-Nadīm (Paris, No. 4457 and Dublin, No. 3315) are "inconvenient". The matter is that the density of text in them is uneven on different and sometimes on the same pages — against the rule of proportionality declared above. The entire blame for that should not be laid on the copyists. It happens mainly due to the uneven character of the textual materials: usually condensed records of the lives of Arabic authors or deliberately expanded long lists of their works. Besides, one of the manuscripts contains here and there vast free spaces reserved for supplements by the author of *Fihrist* himself and preserved in the copy made directly from the autograph. But even in similar cases it is possible, within certain frames, to apply conversion coefficients. I shall try to demonstrate it by solving one peculiar problem which arose when preparing a new scholarly publication of the above mentioned *Fihrist* by Ibn al-Nadīm.

Nine folios (fols. 10a—18b) of the Paris manuscript No. 4457 show a handwriting different from that of the rest of the book. It means definitely that the corresponding folios had been lost and the missing part was restored by a different scribe. What attracts our attention is the number of leaves lost and restored later. It is sufficient to presume that a whole block (*kurrāsa*), i. e. having an even number of folios, fell out of the manuscript. But what was its original volume? Blocks, as we know, could be of 8, 10 and 12 folios.

After some analysis it becomes clear that a *kurrāsa* of 8 folios should be omitted. The amount of text on the nine "restored" folios is too huge to be set on the original eight. It can be proved in the following way.

The field occupied by the text is practically equal both in the original and the restored part of the manuscript (though there are some slight differences we are going to consider below). Though the actual size of the text field is not indicated in the published description of the Paris manuscript, and the manuscript itself is not, unfortunately, available to me, it is possible to see from the photocopy I have due to the courtesy of Bibliothèqe Nationale in Paris that the text fields are of the same size. The manuscript was photographed in the Library by two pages per one frame, so there are two cases when the original and the restored pages appear within one frame of the field (fols. 9b—10a and 18b—19a). It means that they were photographed simultaneously from the same distance. Prints from the film were made frame by frame in the laboratory of the St. Petersburg Branch of the Institute of Oriental Studies, which ensured equal scale for neighbouring pages on the prints. It is possible therefore to compare the dimensions of the text fields, using only a ruler and not taking the actual scale into account. That was what we did for coming to the conclusion mentioned above.

The dimensions of the two *mistara*s turned to be almost equal. The number of lines is the same — 16 lines per page. Taking into account these equal parameters, it becomes evident from the start that the copyist of the restored part has failed to arrange the text within 8 folios. Even though his handwriting is more dense, he had to use one more folio, i. e. 32 lines (following the *mistara*), plus 4 additional lines which he added to the last folio disturbing its original ruling. That was what actually took place. Eight 16-line *mistara* folios make 256 lines, 9 folios make 288 lines, while the actual record took 292 lines — 36 lines more than

it could have been in a *kurrāsa* of 8 folios. Four extra lines were added exactly to the last folio of the restoration (fol. 18a—b), which demonstrates that the copyist of the restored part was striving to set the text not within 8 but within 9 folios. He succeeded, miscalculating only by four lines.

The same is confirmed by the analysis of the density of the text of the restored part, which is evidently higher than in the rest of the manuscript.

Since the method of a similar analysis has never been demonstrated anywhere, and the volume of the text in question is comparatively small (9 leaves), we would like to demonstrate the density of the text in detail, which in other cases will be doubtless omitted, being dissolved in general formulas (see *Table*).

The *Table* is presenting all possible characteristics of the text density of the restored part: the number of characters-letters for each line of its 18 pages, average density for each particular page (horizontal rows); for a more precise tracing of the dynamics of handwriting the same is done for groups of corresponding lines (columns) [13]; finally, it is marked how often and where the scribe was going beyond the borders of his own ruling-*mistara* (column "Notes", also columns for the 17th and the 18th line).

It is evident from the *Table* that the density of the text is fluctuating, reaching its maximum on folios 12a, 15b, then on the last 4 pages of the restored part (fols. 17a, 17b, 18a and 18b) [14]. The increase of density is achieved, especially on the last folio (18a—18b) also by extending lines (i. e. by going beyond the *mistara* frame) and by increasing the number of lines on the last page from 16 to 18 (i. e. also by breaking the frame in the vertical direction). Finally, it should be taken into account that the *mistara* frame of the restored part was overloaded with text: 41.8 characters per line (see *Table*) against 37.75 characters per line [15] in the main part of the Paris manuscript.

So, we once more come to the following conclusion: the scribe was striving hard, manipulating with the density of handwriting, to arrange the text within the given 9 folios. There was no way to fit the text into 8 folios having the same *mistara* as the rest of the Paris manuscript. It was not possible even to arrange it within 9 folios, if he had followed the *mistara* strictly.

Evidently, the initial text replaced by the present restoration occupied 10 folios (following the rule of the even number of folios in one block)?

Now let us reckon the volume of the restored part of the manuscript in the characters of the Arabic alphabet (the total sum of lines multiplied by average density): (18 pages $\times$ 16 lines + 4 lines) $\times$ 41.8 characters = = 12,205.6 characters. Taking the density of the original, which is equal to 37.75 characters (see above, note 15), we find that this volume is equal to 323.3 lines of the text original part (12,205.6 : 37.75) or to 20.2 of its pages (323.3 : 16), i. e. around 10 folios. The extra 0.2 of a page, the inevitable error in reckoning, make only 3 lines of text.

In the case of the Paris manuscript the demonstration of convertibility does not possibly require such a detailed analysis. The question of the size of the *lacuna* restored in the manuscript is important, however, in a different context — the study of *Fihrist*, filiation of its copies and the authenticity of its text. The matter is that to establish the critical text covered by the restored *lacuna* we have only two manuscripts — Paris No. 4457 and Dublin No. 3315.
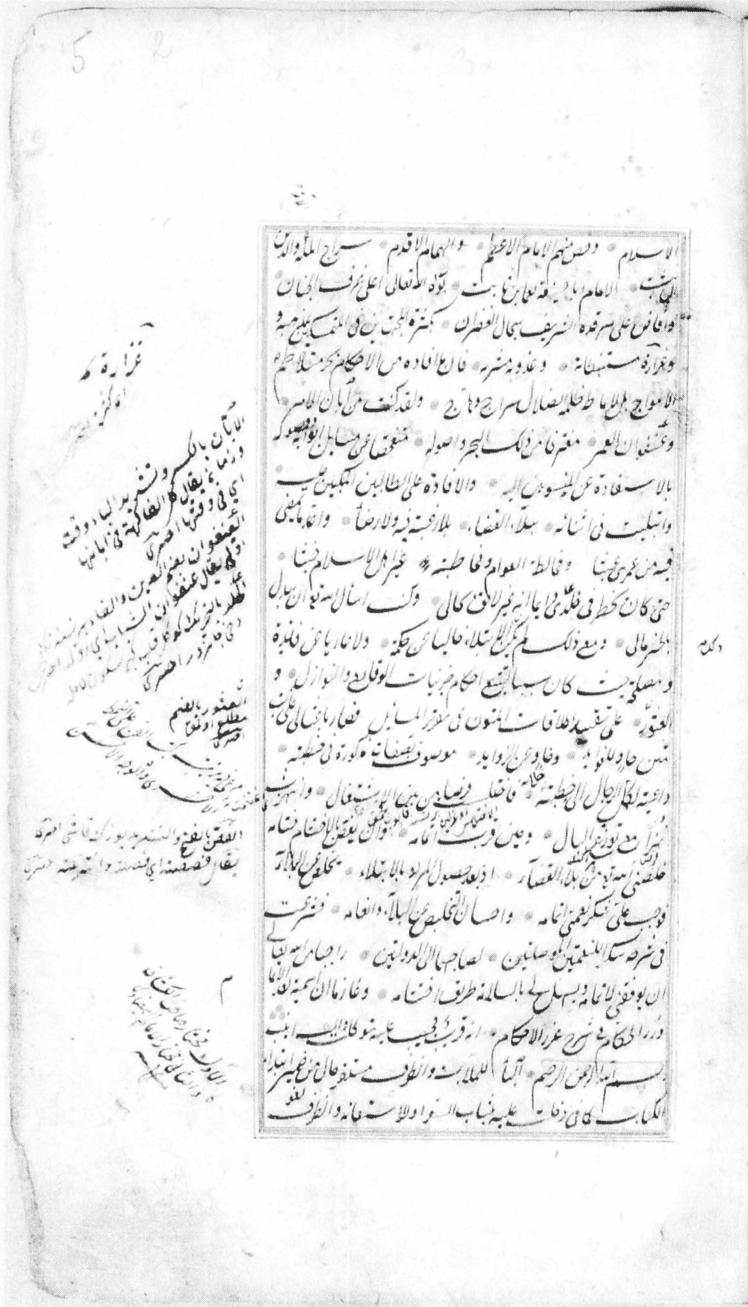
Fig. 2

Fig. 3

Fig. 4

٢٣a

Fig. 5

Fig. 5 (continuation)

Fig. 6

Table

Absolute and average characteristics of text density in the Paris manuscript 4457 (in characters—letters)

Fols.	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8	Line 9	Line 10	line 11	Line 12	Line 13	Line 14	Line 15	Line 16	Line 17	Line 18	Average number of lines per page	Notes
fol. 10a	41	29	46	38	37	47	44	41	42	47	50	44	41	45	41	42			**42.2**	longer lines
fol. 10b	35	37	43	41	33	39	31	23	39	43	41	45	40	38	37	44			**38.0**	standard lines
fol. 11a	41	46	43	41	39	44	44	39	43	44	42	38	44	48	41	50	---	---	**42.9**	longer lines
fol. 11b	47	49	54	39	29	42	42	21	50	43	27	14	46	41	47	43	—		**39.6**	longer lines
fol. 12a	47	41	45	45	46	43	45	31	46	46	49	43	43	43	48	46	---		**44.2**	longer lines
fol. 12b	43	41	42	47	46	43	42	41	13	41	26	16	46	45	49	43	---	- -	**39.0**	longer lines
fol. 13a	41	36	20	41	45	42	41	52	47	37	44	44	44	23	31	36			**39.0**	longer lines
fol. 13b								see note 13									—	—	—	longer lines
fol. 14a	50	51	46	43	44	39	50	44	49	42	36	41	37	39	28	16	- -		**40.9**	standard
fol. 14b	0	21	41	40	36	39	38	45	45	43	37	42	46	37	44	46	---	---	**40.0**	standard
fols. 15a	40	35	44	35	33	42	27	46	44	37	46	42	43	42	46	36	—	---	**39.9**	standard
fol. 15b	47	48	45	39	51	44	48	50	23	0	50	42	46	47	50	42	—		**44.8**	standard up to 6th line
fol. 16a								see note 13											—	longer lines
fol. 16b	35	39	40	42	10	0	35	40	31	39	45	37	38	45	47	34		- -	**37.2**	longer lines
fol. 17a	47	36	48	43	56	39	49	44	54	45	51	47	19	0	0	44	---	---	**44.4**	standard
fol. 17b	49	41	49	47	45	44	49	51	40	44	34	0	48	34	0	46	—	- -	**44.3**	longer lines
fol. 18a	38	0	50	57	52	60	48	47	45	41	48	52	50	57	54	59	44	46	**49.8**	longer lines 6—10
fol. 18b	44	44	50	42	46	46	46	34	17	42	39	51	52	46	0	51	43	39	**43.0**	longer lines
average	43.0	39.6	44.1	42.5	40.5	43.5	42.5	40.5	39.5	42.2	41.5	39.9	42.6	42.0	43.3	42.4	43.5	42.5	**41.8**	—

The first one, as it is known, contains 9 restored folios of unknown origin. Only a part of this text can be collated with the second, Dublin manuscript — there also, as if on purpose, the text is interrupted by a *lacuna*. The two overlapping *lacunae* place several pages of the text of *Fihrist* beyond the reach of textological criticism, they are represented now only by one anonymous restoration. The authentic character of this fragment can be confirmed only by quantitative arguments: the correspondence between the size of the *lacuna* and the division of the manuscript by blocks and folios.

Taking this last into account, we can put the obtained results to a test in one more way — through the Dublin manuscript. First let us find conversion coefficients for the two sets of texts: 1) the original text of the Paris manuscript and Dublin manuscript; 2) the restored part of the Paris manuscript and the Dublin manuscript. In the first case it will be 44 lines of the Paris manuscript (fol. 8b, line 4—9b, line 16) and 30.5 lines of the Dublin manuscript (fols. 4b—5a) giving the conversion coefficient of 1.44 (44 : 30.5). In the second case these are 16 lines of the restoration (fol. 10a) and the corresponding text of 12.5 lines in the Dublin manuscript (9.5 lines of fol. 5a and 3 lines of fol. 5b), which gives the conversion coefficient of 1.28 (16 : 12.5). Now we convert the text of the restored fragment (18 pages of 16 lines each) to the *mistara* of the Dublin manuscript, which has 25 lines: $18 \times 16 : 1.28 = 225$ lines (or 9 full pages), and then convert this result to the *mistara* of the Paris manuscript: $225 \times 1.44 : 16 =$

$= 20.28$ pages. In this way, reckoning the text of the restored fragment through the second (Dublin) manuscript we get the same result — 10 folios and 4.5 lines (reckoning error).

What attracts our attention in these last calculations is the conversion coefficient in the pair "restoration — Dublin manuscript" (1.28). In its "unwrapped" form it appears as the proportion 32 : 25, which reminds the ruling of the same texts — 32 lines make 2 pages of the restored fragment, 25 lines — a full page of the Dublin copy of *Fihrist*. It is more than evident that this relation is not just occasional. The scribe of the restored part was probably looking for the easiest way to fill the *lacuna* exactly, fitting it to the surrounding text. Finding that the 225 lines he was expecting to copy made 9 full pages, he decided to accept the closest exact number of pages multiple by 9, i. e. 18. Now he had only to check that every 25th line of the original was going to correspond the very last line on the reverse side of each folio of the copy he was making (i. e. the 32nd line) [16]. The comparison of the restored part with the Dublin manuscript shows that that was exactly the way of adjusting the density of handwriting, after each 25th line of the Dublin copy. This last one was most probably the protograph from which the restored part was copied.

With this discovery we approach a new for textology and study of sources category of direct evidence and arguments provided by the methods of quantitative analysis of manuscripts, which are also new in Arabic studies.

Notes

1. On manuscript C 2114, see *Arabskie rukopisi Instituta vostokovedeniia. Kratkiĭ katalog* (Arabic Manuscripts of the Institute of Oriental Studies. Concise Catalogue), ed. A. B. Khalidov, Pt. I (Moscow, 1986), p. 189, No. 3849.

2. Two folios once opening the 26th *kurrāsa* of the manuscript, preceding fol. 251, are cut out (without any loss to the text). This *kurrāsa*, previously having 10 folios like the rest, now has only 8 (3 in the first half, five — in the second). Fol. 251 is its first leaf. The missing folios probably also contained repeatedly copied text.

3. On both manuscripts, see *Arabskie rukopisi Instituta vostokovedeniia*, p. 224, No. 4731 (C 958) and p. 223, No. 4717 (C 711).

4. In Arabic manuscripts text usually starts from the verso side of the first folio, the recto side either performs protective functions or is reserved for the title of the work or for their owners' records. The ruling of 23 lines per page is maintained through the whole manuscript.

5. The suggestion of the presence of an *'unwān* on this page makes us hope that the first leaf missing in the manuscript still exists somewhere. Formerly there was a fashion among collectors and those trading in manuscripts to collect illuminated leaves, cutting them from manuscripts. Some of these leaves have already come to museums and libraries, some still wander from auction to auction; see E. J. Grube, *Persian Painting in the Fourteenth Century. A Research Report* (Napoli, 1978), p. 12, n. 30). If our leaf has survived, there exist numerous features available to identify it: its size, width of the text (line), the number of lines, the last word on the page, as well as the whole text on it, the width of the main frame of the *'unwān* (corresponding to that of the text), and even that gold and blue are the dominating colours of the pattern (the colours of the frame surrounding the text of C 711).

6. On these manuscripts, see *Arabskie rukopisi Instituta vostokovedeniia*, p. 189, No. 3849 (C 2114) and No. 3850 (C 2023).

7. E. W. Lane, *An Account of the Manners and Customs of the Modern Egyptians* (London, 1871), i, p. 265. It is noteworthy that a *mistara*-like instrument performing the same function was discovered comparatively recently among the Old Believers (Starovers) in Siberia; see N. N. Pokrovskiĭ, "O drevnerusskoĭ rukopisnoĭ traditsii u staroverov Sibiri" ("On Old Russian manuscript tradition among the Siberia Starovers"), *Trudy Otdela drevnerusskoĭ literatury* (*Instituta russkoĭ literatury AN SSSR*), XXIV (1969), pp. 396—7, with a drawing. This article was translated into English, see N. N. Pokrovsky, "Western Siberian scriptoria and binderies: ancient traditions among the Old Believers", trans. from Russian by J. S. G. Simmons, *The Book Collector*, XX / Spring 1971 (1971), pp. 20—1 and pl. 1.

8. In some cases pieces of poetry in Oriental *dīwāns* are preceded by a brief prosaic introduction of one or two lines. This "admixture" taking a number of lines in a manuscript ruins the complete coincidence of the two account units we declare here. In every case this "admixture" should be estimated individually.

9. *The Fihrist of al-Nadīm*. A Tenth Century Survey of Muslim Culture, ed. and trans. by Bayard Dodge (New York—London, 1970), i, p. 351; for the Arabic text, see *Kitâb al-Fihrist*. Mit Anmerkungen hrsg. von G. Flügel, nach dessen Tode besorgt von J. Roediger und A. Mueller. Bd. 1, den Text enthaltend, von. J. Roediger (Leipzig, 1871), p. 159: 18—20.

10. It is possible that a far echo of this most simple characteristic of the volume of manuscripts through account units of paper (folio) and text (line) is the never explained but sometimes appearing in descriptions of Arabic manuscripts manner to express the volume

through two rather far related features, for instance: "48 folios ⟨...⟩ of 21 lines per page"; see I. Iu. Krachkovskiĭ, *Izbrannye sochineniia* (Selected Works) (Moscow—Leningrad, 1960), vi, p. 507.

11. Exclusions from this rule are very rare, but still they do exist. One of them is Ismāʻīl b. al-Muqrī's work *'Unwān al-sharaf al-wāfī fīʼl-fiqh waʼl-tārīkh waʼl-naḥw* etc. (*GAL* II, 190, § 10, 1; *SB* II, 254, § 10, 1, 1). It is a prosaic text with a fixed length of lines, like in verse. On this unusual literary work, see my paper "Arabskoe srednevekovoe sochinenie-krossvord" ("The Arabic medieval composition-crossword"), *Rossiia i arabskiĭ mir. Nauchnye i kul'turnye sviazi*, fasc. 2 (St. Petersburg, 1996), pp. 47—55, especially pp. 50—4.

12. It is more evident here than in versified texts that the real text unit is not the line of a manuscript but the number of characters-letters it contains. Line is just a particular form in which this unit is realised in this or that manuscript. To some extent, possibly, with the feeling of this measure of text the absence of spans between words in manuscripts is connected. The introduction of spans could have possibly led to disappearance of the conversion effect to which this article is dedicated.

13. Folio 13b containing verse, which should be counted by line, and folio 16a with samples of Old Persian writing different from Arabic are excluded from reckoning by line in the *Table*. Also excluded are 9 lines reserved for samples of other non-Arabic alphabets but left blank (zero mark in the *Table*). All these passages were not taken into account when working out average characteristics. Later, however, when converting, for example, the whole text of the restored part, all these omissions were replenished according to the average text density; it possibly affected the errors which every time occur in calculations.

14. It is enough to look at the cycled fluctuations which are specially underlined in the *Table*. These extremities and other less prominent fluctuations of density can be explained not by some natural unstableness of the scribe's handwriting but by the specific character of his task. He was not just copying the text, like in other cases, but inserting it within the frames set not by himself but by the size of the *lacuna*. In this way he had to keep watch on the gradually diminishing paper space maintaining the balance between it and the remaining portion of the text. In this position corrections of the density of handwriting are inevitable.

15. The density of handwriting of the principal scribe of the Paris manuscript is reckoned in the following way: on fol. 9b (page before the restored part) there are 16 lines containing in all 600 characters ($600 : 16 = 37.5$ characters per line). On fol. 19a (after the restored part) there are also 16 lines containing 608 characters ($608 : 16 = 38$ characters per page). The average is — $1,208 : 32 = 37.5$)

16. If he selected a different *misṭara*, say of 21 lines, the calculations would be the same. The conversion coefficient — $42 : 25 = 1.68$; the number of lines in the copy — 225×1.68; the number of pages in the copy —$225 \times 1.68 : 21$, the number of folios — $225 \times 1.68 : 42$; the number of characters in one line of the copy is 1.68 times less than in the original. Not to go beyond the limit of 18 pages, when making a copy, the scribe was striving every 25th line of the original to correspond to the last, i. e. to the 42nd line of each folio of the copy.

Illustrations

Fig. 1. Ibn Māza (d. *ca.* 570/1174), *al-Muḥīṭ al-burhānī fī-l-fiqh al-nuʼmānī*. Manuscript C 2114 in the collection of the St. Petersburg Branch of the Institute of Oriental Studies, vol. I, fols. 250b—251a.

Fig. 2. Mullā Khusraw (d. 885/1480), *Durar al-ḥukkām fī sharḥ Ghurar al-aḥkām*. Manuscript C 958 in the collection of the St. Petersburg Branch of the Institute of Oriental Studies, fol. 2b.

Fig. 3. The same manuscript C 958, fol. 3a.

Fig. 4. Mullā Khusraw (d. 885/1480), *Durar al-ḥukkām fī sharḥ Ghurar al-aḥkām*. Manuscript C 711 in the collection of the St. Petersburg Branch of the Institute of Oriental Studies, fol. 1a.

Fig. 5. Ibn Māza (d. *ca.* 570/1174), *al-Muḥīṭ al-burhānī fī-l-fiqh al-nuʼmānī*. Manuscript C 2023 in the collection of the St. Petersburg Branch of the Institute of Oriental Studies, vol. I, fols. 22b—23a.

Fig. 6. Ibn Māza (d. *ca.* 570/1174), *al-Muḥīṭ al-burhānī fī-l-fiqh al-nuʼmānī*. Manuscript C 2114 in the collection of the St. Petersburg Branch of the Institute of Oriental Studies, vol. I, fol. 1a.