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II.—THE QUIRES IN GREEK MANUSCRIPTS.¹

The unit of construction for a Greek manuscript is the quaternion or quire of four double leaves or of eight leaves. It is unnecessary to say that we refer to manuscripts on parchment ; the manuscripts on paper have, in part, followed the rules of their predecessors, so far as the material permitted, but, as more modern, they offer less regularity in formation, and less interest as to contents, than the older volumes. We address ourselves, then, to the quaternion. (See the *Literarisches Centralblatt*, Leipzig, 1880, No. 43, col. 1410.)

For reasons hard to understand, this essential part of these manuscripts has thus far remained unnoticed. Scholars like Montfaucon, Wattenbach and Gardthausen, who have treated of Greek palaeography, seem to have forgotten, disregarded, or failed to observe it. They tell us that the manuscripts are made up of quaternions, or they say that a given manuscript is composed of quaternions and of ternions, but it never occurs to them either to describe the structure of a quaternion, or to say how we can distinguish the leaves one from another. And they seem to think that the quaternions and the ternions put themselves together, or are mingled by chance, in the manuscripts which they describe. Nevertheless, this question of the composition of the quaternions has not merely an archaeological interest, as we wish to know how they used to make ink, papyrus and parchment : it has also a direct interest for palaeographical students, for its solution suggests to us an answer to many questions—for example, as to the original composition of a mutilated manuscript, and as to the position of scattered leaves ; and it even assists a student in the rapid examination of the actual condition of a volume.

First of all, we must speak of the parchment and of its two sides, the outside and the inside, with respect to the animal from which the skin came. We distinguish these two sides by calling one the hair side—that is to say, the outside—and the other the

¹ A paper read before the *Académie des Inscriptions et Belles Lettres* at Paris, August 7, 1885, printed in the *Compte Rendu* of the sessions of that Academy, Paris, 1885, July-September, pp. 261-8, and also struck off separately.

flesh side—that is to say, the inside. They differ as respects color, surface, and the marks of the hair, although in the finest parchment the difference is often very difficult to determine; strangely enough, the distinction which seems to be the most trifling, the color, here comes to our aid. In general, the hair side is relatively dark, rough, and perhaps marked by the roots of the hairs, the remains of the natural hair-dye of the animal. The flesh side, on the contrary, is relatively light, smooth, and free from the hair-marks. It is true that these marks sometimes show through on the flesh side, but in that case they are less distinct than on the hair side. The coarse surface of the hair side may also be so thoroughly polished with pumice-stone as to differ little from the surface of the flesh side. But if the marks and the surface fail us, a slightly darker tint may betray the true nature of the hair side.

It is probable that the ancient parchment-makers prepared the sheets for the most part in certain fixed sizes. Common sense applied to the needs of their trade will have told them, at an early date, that books should have leaves of the same size. So far as I know, we have not yet found the dimensions of these leaves mentioned in ancient authors, but it is clear that we have them approximately in practice in our manuscripts—usually somewhat trimmed by the binders, it is true. The parchment-maker then furnished the parchment for the book demanded.

Here arises an important question. In ordinary cases, did the scribe buy the parchment of such a size that he could fold, and re-fold, and fold again, the one sheet, in order to make the four double leaves desired, the quire sought, of which he then would cut the leaves as we cut our printed books? Or did he rather buy the parchment of the size of a double leaf, so as to have nothing to do but to fold it once? In other words, did the scribe see in his sheet of parchment a quaternion not yet folded, or a double leaf which would form a quarter of a quaternion or of a quire? We answer, the double leaf. Putting aside the large volumes, for which it would have been necessary to use the skin of an elephant to make a quaternion of a single leaf of parchment, it was the double leaf which formed the unit of construction of the quaternion, as the quaternion formed the unit of construction for the volume. Sometimes reasons of economy, or the wish to use a certain parchment for a certain book, may have forced the buying of leaves of parchment which would give two or three double leaves of the size required; this is possible. The letter of Planudes

published recently by Professor Lambros, in the *Δελτίον τῆς ἱστορικῆς καὶ ἐθνικῆς ἐταιρίας τῆς Ἑλλάδος*, 1885, μάϊος, p. 62-4, is of a late date, yet, in any case, this scholar had ordered certain leaves which would give only one double leaf, and other out of which two double leaves could be cut. But, we repeat it, it was the double leaf, the *δίφυλλον*, that they had in view. We not only have not the least indication that they folded a sheet thrice to make a quaternion of it, but we shall soon see that the double leaf is of necessity the aim of the scribe. We may imagine that, in general, the small sheets, which gave only a single double leaf, were cheaper, because they could cut them out of large ones that had been spoiled.

The parchment is ready, whether supplied in sheets of the size of the double leaves desired, or whether cut by the scribe into such sheets. The scribe puts it on his table, if he is careful, and if he is not hurried, leaf by leaf, the flesh side down. Taking a pair of compasses, he measures and points off on the hair side the spacing out of the lines, and he draws these lines against a ruler with a circlet of lead, with the point of his compasses, or with a dull knife. The reason for drawing the lines on the hair side seems to be that this side, which is a little tougher, can better endure the force of the instrument, and that the flesh side, which is more delicate, shows better in relief the lines traced upon the other side of the parchment.

It is important, at this point, to observe that the horizontal lines are drawn upon the entire sheet, the double leaf, without interruption at the middle, where the fold will afterwards be made. The practical reason is, of course, to avoid beginning the line again, and the actual result is, on the one hand, to assure us that the double leaf was the true unit of construction of the quaternion, and, on the other hand, to furnish us with one more means for recognizing the original union of two leaves to-day separated. There are several other things to be said about these lines, but we pass them for the moment in order to follow the process of the formation of the quire.

The scribe now has before him a pile of flat sheets, the lines drawn on the hair side and showing through as a slight elevation on the flesh side. He takes a sheet and places it on the table, the flesh side down; upon this a second, the hair side down; upon this a third, the flesh side down, and upon this a fourth, the hair side down. He folds the four sheets together at the middle; he

unites them, perhaps, for the moment by a thread around the middle, or perhaps by a thread entering into the cuts which will serve later for the binding of the volume, and we behold the quire, the quaternion, ready to receive the writing. If we look at it, we shall find that the first page is a flesh page, light, smooth, the lines in relief; the second and third pages are hair pages, dark, less smooth, the lines indented; the fourth and the fifth are flesh; and so in succession, until we find that the last page is a flesh page, to answer to the first page of the following quire. This is the quaternion. The reason for this—for every rule in a trade has its practical reason—seems to be beauty, the need of having the two pages, at whatever place you open the book, altogether alike, one to the other, in color, surface and lines. The effect of the neglect of these rules, in a manuscript in which the difference of the sides of the parchment is distinct, is very disagreeable.

It is scarcely necessary to show how useful a knowledge of these rules is in the examination of manuscripts. Aside from the chief cases in which we can determine by these means the original condition of a volume or of a quire, a knowledge of these rules permits us to determine in an instant, by the eye, or even by the hand, in turning over the leaves rapidly, the lack or the transposition of leaves.

When Tischendorf described the *Codex Sinaiticus*, he noted, as a remarkable circumstance, that the leaves were so arranged that two flesh sides and two hair sides followed each other alternately. We are now in a position to say that it would have been much more remarkable if the arrangement had been different. Every one will ask how such a rule could have escaped not only Montfaucon, but also Tischendorf, who lived among manuscripts during so many years. The answer is that his work bore almost always upon ancient manuscripts with very fine parchment, in which the arrangement is less striking, and upon palimpsests—like the *Codex Ephraëmi*—or upon fragments, and that his researches touching the manuscripts in which he might easily have observed the rule, were made very rapidly and with a view to the contents rather than to the condition of the books themselves. The *Codex Sinaiticus* was his bread and his wine, the air in which he breathed for a long while, and it was in this intimacy that he came to discover the singularity in question, without suspecting for a moment that he had approached a general rule of Greek palaeography.

Some persons may be tempted to say that the thing is a matter of course, and that there is no need of even mentioning it. On the contrary, when the rule presented itself to my mind in 1879, I communicated it to one of the most eminent palaeographers of our day, and he refused to admit it. It is only after examining hundreds of manuscripts, in various libraries, that I have dared to state the rule publicly.

In these few words we have not exhausted the subject. But we do not wish to abuse the time of the Academy. We shall only allow ourselves to name a few exceptions, as, for example, the quinions instead of quaternions. Hebrew manuscripts generally have quinions, and I am inclined to think that these quinions in some Greek manuscripts give us a hint as to the origin of the manuscripts. In any case, it is necessary to examine very carefully the manuscripts which offer another number of leaves than eight in a quire. For example, they were sure, they had printed, that the *Codex Alexandrinus* at London was not in quaternions; it seems to me that they had even unsewed one of the volumes. Nevertheless, Mr. Henry Bradshaw, the learned librarian of the University of Cambridge, refused to believe it, and a still more careful examination revealed the fact that a binder had cut apart all the double leaves of the quaternions, and had joined them again in other combinations. The variations observed in many manuscripts result from the wish to begin important books, for example a Gospel, with a new quire. In consequence, the quire which concludes the Gospel, or the preceding book, is made up of two, three, four, six or ten leaves at need, in order to finish the material and to permit the following book to begin with honor. The manuscripts in which the Gospels do not each begin with a quire are much fewer. Another exception concerns the side of the parchment for the first page. In a very small number of cases the quire begins with the hair side, and this, if I mistake not, is another indication of origin.

As to the lines, it is necessary to say that this rule is far from being as general, far from being as carefully followed in a given manuscript, as the rule for the sides of the parchment, which has but few exceptions. When the scribe was lazy or hurried, he pointed off and drew the lines on two or three leaves at once, or even on more, and sometimes he did it after the quire was made up. The way in which the lines are drawn is to be carefully observed, for it may at times betray to us a second hand; never-

theless, it is possible for a scribe, who has prepared the first sheets accurately, to finish by drawing the lines less exactly. In each case we must study the habit of the scribe in the manuscript, before pronouncing upon an apparent exception to the rule.

We have throughout spoken of the scribe, but, of course, in the large bookshops they may well have had a workman to prepare the quires for the scribes.

Other questions would lead us too far: the signs for the numbers of the quires; the page on which the writing begins for the initial quires, whether of the volume, or of the books in the volume; the number of the lines, and many other points, remain to be discussed.

A special study should be made of each kind of manuscripts. I hope that my friend, Dr. Reinhart Hoerning, of the British Museum, will answer for the Oriental manuscripts. Who will treat of the Latin manuscripts, I do not know; among other things, he will have to speak to us of manuscripts which begin with the hair side, and in which the writing begins on the second page; for my friend, M. Henri Omont, of the National Library at Paris, tells me that these peculiarities are often found in Latin manuscripts. This work upon other palaeographies will explain to us some of the variations in Greek manuscripts, and permit of conclusions as to the age and as to the country of the scribe.

In reference to the lines: I trust that my friend, Mr. T. W. Jackson, of Oxford, who had observed a certain regularity of the lines, without reaching the rule here stated, will continue and publish his researches upon this subject.

CASPAR RENÉ GREGORY.