

Miscellanea Palaeographica

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I. Planudes and Triclinius Again

IN 1978 I was able to put forward evidence which suggested that there was a link between the two leading figures of late Byzantine scholarship, Maximus Planudes and Demetrius Triclinius.¹ Recently further evidence has come to light which despite certain palaeographical difficulties points in the same direction.

In the Bodleian Library there is a copy of Ptolemy's *Geography* without the maps (ms. *Arch.Selden* B.46). It is regularly mentioned in the literature and is known by the siglum N. There is no reason to value it highly, but for the present purpose it may be important because of a marginal addition on folio 32^r which seems to me to be in the hand of Planudes. A general similarity of script is not by itself enough to prove the identification; in this case, however, there are two features of the note which are known from Planudes' signed autographs: *phi* without a tail descending below the line, and a long ragged stroke for the abbreviation of the syllable *-ων*. The belief that we are here dealing with an addition by Planudes is consistent with other known facts about him. The best manuscript of the *Geography* (*Vat.gr.* 191) is a composite volume in which the choice of the texts included may be thought to show the influence of Planudes, even though there is no sign of his handwriting in the book. It too lacks the maps, but it could be the basis on which the later and more accurate of the two surviving sets was constructed. An observation by Aubrey Diller which has not received the attention that it deserves should be mentioned here.² He noticed that the three oldest codices which include maps of the *Geography* (*Urb.gr.* 82, *Topkapi* 57, *Fabricianus gr.* 23) all belong to the late thirteenth century. The Seraglio codex is in the same hand as *Paris.gr.* 1393, from which Planudes took his excerpts of Strabo. Planudes also says elsewhere that he discovered the *Geography* without the maps, which he reconstructed in such

¹ N. G. Wilson, *GRBS* 19 (1978) 389–94.

² A. Diller, *TAPA* 71 (1940) 62–67.

a way that the emperor Andronikos II was highly impressed.³ Could the extant codices therefore be those prepared under his direction? If so, the maps would not have ancient authority of the kind usually attributed to them; they would reflect the textual tradition of the manuscripts in question, which has been found to be distinctive. On Diller's view Planudes will subsequently have come across another, superior, source of the text and revised the maps accordingly. Diller is perhaps exaggerating when he says that Planudes claimed to have reconstructed all the maps. It looks to me as if the claim as we know it applies to only one; what Planudes says in some verses in ms. *Ambr.* A 119 super. is that he constructed a diagram without having a model to copy. But he may in fact have performed this operation in every case.

My discovery, if it is one, does not affect Diller's hypothesis directly. But the Oxford manuscript offers something more. Triclinius made notes in it. His interventions are few and slight. Although there may be some doubt in one or two cases, in general the identification seems secure. The folios on which I have noticed his hand are 34^v, 38^{rv}, 40^r, 62^v, 78^{rv}, 120^v, 152^{rv}, 180^v, 192^{rv}, 221^v, 246^r. I have no other evidence that Triclinius was acquainted with this text, except that there is a note in the famous *Urbinas* in the margin of folio 59^v which may conceivably be in his hand.⁴ There is one other fact about the Selden manuscript which is worth adding here: the corrector who supplied the top three lines of the text on folio 270^v is perhaps to be identified with the scribe of the Topkapi manuscript.⁵

A more difficult case arises from a Vatican manuscript (*Urb.gr.* 125). Here the hand of Planudes has recently been detected by the Russian scholar B. L. Fonkić.⁶ According to his analysis nine scribes were involved in writing this miscellaneous collection of texts, and five others made additions in the fifteenth century, among them Isidore of Kiev and John Eugenikos. The lion's share of the original manuscript was written by Planudes. The texts include pseudo-Aristotle *De Mundo*, Libanius, Aristides, Philo, Josephus, and some epigrams. The identification of Planudes is probably secure enough. One should, however, note a feature

³ S. B. Kugeas, *BZ* 18 (1909) 115–18.

⁴ See the facsimile in J. Fischer and P. Franchi De' Cavalieri, *Claudii Ptolemaei Geographiae codex Urbinas graecus* 82 (Leiden/Leipzig 1932).

⁵ Illustrated by Diller (*supra* n.2) plates I and III.

⁶ B. L. Fonkić, *VizVrem* 40 (1979) 251.

which is not prominent in the usual script of Planudes, a ligature of and *epsilon* and *xi*. Still, hands do change over the years.

A further interesting question about the *Urbinas* was not noticed by Fonkić. There is a single page (folio 212^r) written in what looks like Triclinius' hand. Yet some features diverge from his normal hand: (i) in two instances *omega* is written in an open form, (ii) the compendium for *alpha-iota* is larger than usual, (iii) the characteristic *sigma* is seen in its larger form but not the smaller one, and (iv) the lower right hand stroke of *chi* stretches further than usual. In such a case it is scarcely possible to decide whether we are dealing with Triclinius or various other people who write very similar scripts, presumably because they were his friends or pupils. Examples of men writing such scripts are (i) the anonymous scribe of most of MS. *Marc.gr.* VIII 9, where Triclinius wrote the last eight folios, apparently completing the work of a pupil;⁷ (ii) John Pepagomenos, who signed and dated *Vat.gr.* 932 in 1319;⁸ the hand in some places is indistinguishable from that of Triclinius, but in general it is less angular and less well controlled; (iii) the scribe of *Paris.gr.* 2832 of Theocritus, which was declared by Wilamowitz to be an autograph of Triclinius,⁹ an identification subsequently questioned by all those who have concerned themselves with this book;¹⁰ (iv) the scribe of *Copenhagen GKS* 3549, about which conflicting views have been expressed.¹¹

II. *Iota* Subscript

In his standard work on Greek palaeography Gardthausen remarked that the history of the *iota* subscript had yet to be written. His invitation has not been taken up. In a provisional sketch he declared that while the subscript came into fairly general use from the late twelfth century onwards, he knew of three examples from the tenth century.¹² This assertion, at first sight surprising, needs

⁷ B. L. Fonkić, *VizVrem* 41 (1980) 210–20 with plate 16.

⁸ A. Turyn, *Codices Vaticani graeci saeculis XIII et XIV scripti annorumque notis instructi* (Vatican City 1964) 116, with plates 95 and 186d.

⁹ U. von Wilamowitz-Moellendorff, *Die Textgeschichte der griechischen Bukoliker* (Berlin 1906) 9.

¹⁰ First by F. Garin, *RivFC* 47 (1919) 76–80, and then by Wendel and Gallavotti.

¹¹ B. Schartau, *Observations on the activities of the Byzantine grammarians of the Palaeologan era* II (Odense 1973) 52–53.

¹² V. Gardthausen, *Griechische Paläographie*² II (Leipzig 1913) 241–44.

modification of two kinds. His three examples do not all stand up to examination, and a yet earlier example is now available.

To begin with his three witnesses. The first of them strictly speaking does not count. It is a liturgical book at St Catherine's monastery on Sinai (*Sinaiticus gr.* 735), a triodion dated to the tenth century, in which there is no example of a subscript as it is now printed. Gardthausen cited it because it shows a stage in the change from adscript to subscript: the *iota* is reduced to about half its normal height and is slightly lower than the preceding vowel, while not being underneath it.¹³ The second example is at first sight more to the point. Another manuscript in the same collection (*Sinaiticus gr.* 1184), assigned by Gardthausen in his catalogue to the eleventh century, but subsequently to the late tenth or early eleventh, exhibits the subscript in its proper form. But the date suggested by Gardthausen is impossible, as the text is the chronicle of George Cedrenus, whose activity is usually placed *ca* 1100. More recent authorities rightly assign the book to the twelfth century.¹⁴

The third manuscript is in Leipzig (Universitätsbibliothek, *gr.* 37) and contains Josephus' *Jewish War*. It may be dated with some confidence to the second half of the tenth century, to judge from photostats in my possession which show three different hands, all characteristic of the period. On folio 67^r there is a subscript under the word *ἀνηρηκότα*, and we must presume that Gardthausen, observing this and a few other examples of the subscript written below an *eta*, but apparently no case with *alpha* or *omega*, was correct in assuming that they are the work of the scribe himself and not due to later correctors.

Although at one time Gardthausen's claims seemed to deserve a sceptical reception, it is now clear that he was right, thanks to the discovery of *Vaticanus gr.* 2249, an early and important codex of pseudo-Dionysius the Areopagite and Theodoret's *Curatio affectionum graecarum*. For the present purpose we are concerned only with the first of these two texts; the second was written by another hand. The credit for recognising the importance of this volume belongs to Dr Salvatore Lilla, *scriptor* of the Biblioteca Apostolica Vaticana. He noticed that the script of the section containing pseudo-Dionysius bears an unmistakable resemblance to that of

¹³ Gardthausen (*supra* n.12) 243; *cf.* his *Catalogus codicum graecorum Sinaiticorum* (Oxford 1886) 160.

¹⁴ G. Moravcsik, *Byzantinoturcica*² I (Berlin 1958) 274; *cf.* R. Maisano, *RivStudBiz Neoell* 14–16 (1977–9) 201.

the manuscripts of mainly philosophical content first identified as a group by T. W. Allen.¹⁵ Although there are a few small differences—one may note in particular the large and clumsy form of *mu*, and the occasional use of the uncial forms of some other letters—there does not seem to be any reason why this hand should not be attributed to the latter part of the ninth century.

In more than one respect the hand is remarkable. It is odd in its use of punctuation, using the comma frequently between words that are not to be separated, such as the definite article and its noun. Two-figure numerals are commonly given in the reverse of the normal order: so 11 is $\overline{A\bar{I}}$.¹⁶ The most notable feature is that from folio 23^r onwards the scribe writes *iota* subscript occasionally, using it indifferently with all three possible vowels. At first I thought the subscripts must be additions by later hands, but a close look convinced me that they are original. The colour of the ink in many cases is precisely the same as in the adjacent letters. Where there is a difference in colour, one can see that the subscript is in the same shade as the corrections which appear to have been made by the scribe himself as he went through the book revising his work. Here is a list of the examples that I was able to find; parentheses indicate corrections identified by the difference in the colour of the ink, while t and s indicate occurrence in text and scholia respectively.

23 ^r t	ἐνικῆ̇	(77 ^v t and s	ἐξηρημένην)
28 ^r t	παρηρημένον	90 ^r t	ζῶα
(29 ^v t	ἀνέλης)	(90 ^v t and s	ἐξήρηται)
(32 ^r t	ῆ̇)	91 ^r s	ζῶων
35 ^r t	ψυχῆ̇	(94 ^v s	εὐαλλοιώτω)
38 ^v t	τῶ̇	99 ^v t	φρίκη
(40 ^r t	πῆ̇)		ἀμηχανία
41 ^v t	ζῶα		εὐχαριστία
42 ^r t	αὐτῆ̇	(101 ^r s	ἠνίξατο)
	(ζῶα)	(103 ^v s	Χῶ <i>nomen sacrum</i>)
43 ^r t	τούτω	110 ^v t	ὁμοίω
44 ^v s	οὐδεμιᾶ̇	(115 ^v t	εἴσορᾶ̇)
65 ^r t	τω (enclitic)	126 ^r t	ἀναβοᾶ̇
	ζῶων	150 ^r t	ὑπαντᾶ̇
(74 ^v t	ἐξηρηῆ̇σθαι)	153 ^r t	ἐπιτιμᾶ̇

¹⁵ *Journal of Philology* 21 (1893) 48–55.

¹⁶ Père Julien Leroy has kindly pointed out to me that this unusual feature is found in a number of other books; apart from two famous manuscripts of classical authors, *Marc.gr.* 447 of Athenaeus and *Bodleian Auct.* T 4.13 of Epictetus, he has observed it in *Ambros.* Q 25 super., *Athen.gr.* 428, *Borg.gr.* 18, *Crypt.* Γ.β. VII, *Marc.gr.* 101, *Sinait.gr.* 154 and 549, *Vat.gr.* 190, 570, 760, and 2093. I can now add *Coislin* 394.

There are in addition a number of passages where the scribe wrote the *iota* in the intermediate position between adscript and subscript that has already been referred to. It is found in conjunction with all three possible vowels. The folios in question are 47^r, 50^v, 51^r, 60^r, 95^v, 101^r, 145^v, 150^r, 153^v, 157^r, 158^v. It is worth recording that this practice was followed by the scribe of the section of the manuscript that contains Theodoret (*cf.* 167^r, 183^r).

Nothing is known for certain about the origin of *Vaticanus gr.* 2249. The group of books to which it belongs has been thought to have links with the circle of the patriarch Photius, but no more definite statement can be made. If we are to speculate on the reason why the subscript was invented, perhaps it is best to suppose that an increasing concern with the problems of orthography posed by the sound changes of mediaeval Greek led to the suggestion of special treatment for the only letter that was not pronounced.

III. Arabic Numerals

The Byzantine contribution to the history of civilisation is usually taken to consist mainly of the preservation and study of the literary and scientific writings of ancient Greece. It is worth while considering whether the Byzantines had any awareness of or any part in transmitting to the West one of the most significant Oriental contributions, the use of Arabic numerals. In passing it ought to be said that the importance of the Arabic system does not lie in the use of the zero, for which the Greeks had had a symbol, employed at least in astronomical calculations.¹⁷ What makes it important is the use of such a symbol in what is termed place notation, wherein the position of a symbol determines its value (and in fact Babylonian astronomers had used the zero symbol in such a system, but with a sexagesimal instead of a decimal base). The received view of the history of Arabic numerals in Byzantium may be summed up as follows.¹⁸ Arabic numerals are found in marginal notes to copies of Euclid and various Byzantine writers from the ninth century onwards. The significance of the position of zero is not properly understood until the eleventh century. Two treatises, one

¹⁷ O. Neugebauer, *The exact sciences in antiquity*² (New York 1969) 13–14 with plate 2.

¹⁸ K. Vogel, *Akten des XI. internationalen Byzantinisten-Kongresses* (Munich 1960) 660–64; *cf.* also H. Hunger, *Die hochsprachliche profane Literatur der Byzantiner* II (Munich 1978) 246.

anonymous and dated 1252, the other by Planudes (died 1305), discuss and exemplify the use of the Arabic system, which is occasionally found employed after that date but is not generally adopted by the mathematicians of the late Byzantine period. All this is in contrast with the older view that Arabic numerals could not be traced in Byzantium until the thirteenth century and were then introduced from the West, the fact being inferred from the particular form of the numerals in the treatise of 1252. Introduction from the West is easily explained if one allows for the influence of Leonardo Fibonacci of Pisa, whose *Liber abaci* of 1202 made the Arabic system available in Europe.

The truth of the matter is more complicated, as much of the evidence has been incorrectly presented. I deal in turn with the three key pieces of evidence cited by Vogel.

(1) The Bodleian Euclid, ms. *D'Orville* 301, dated 888, written by Stephen for Arethas, who later became archbishop of Caesarea in Cappadocia. Although there is a set of Arabic numerals on folio 32^v of this manuscript, it was noted by Heiberg¹⁹ that they are written by a later hand, and I have verified myself that his statement is correct. It is not possible to say how much later they are than the main text.

(2) The treatise which at one time was ascribed to Michael Psellus, edited by J. L. Heiberg (Copenhagen 1929). In the margin of one eleventh-century copy there is a list of the Arabic numerals, but further examination of the marginal notes in question shows that they are to be dated to the year 1314 (*cf.* note no. 26 printed by Heiberg on p. 144), and it cannot be assumed that they are as old as the text.²⁰

(3) The so-called scholium of the monk Neophytus. This is sometimes alleged to be as early as the eleventh century. It consists of a note on folio 15^r of ms. *Paris.gr.* 1928 exemplifying Arabic numerals for the numbers 1–21, followed by the tens, hundreds, and thousands up to ten. The zero is placed above the other symbols; in other words its positional value is not grasped, and this failure to understand is confirmed by the note immediately following, ascribed to Neophytus the monk, in which reference is made to the zero standing above the symbols. For our present purpose what is most important about the note is the date of the manuscript; it is

¹⁹ *Euclidis opera* V (Leipzig 1888) p. xix.

²⁰ Its composition has been placed in the year 1008 by V. Rose, *Hermes* 2 (1867) 465–67, and A. Diller, *Isis* 36 (1945–6) 132–33.

on paper with watermarks and can be dated from the script with confidence to the second quarter of the fourteenth century. As to the date of Neophytus himself, I should like to put forward tentatively the notion that he is to be identified as the scribe of this manuscript. The name occurs again, not only in a title on folio 17^r but also in a note, now partly cut away, on the top of the first page; all these occurrences are in the hand of the scribe, and on folio 9^r, where a new hand takes over for a few pages, there is a note saying that the hand belongs to Matthew Chortatzes the Thessalian. Even if my conjecture is not right, the date at which the note was transcribed cannot be in doubt, and it certainly cannot be used to support that idea that Arabic numerals were in use as early as the eleventh century. I may add in passing that if my conjecture is worth serious consideration, Neophytus is possibly to be identified with the person who is the target of the satirical poem by John Catrares, attacked for lecturing on Aristotle, astronomy, and mathematics in the fish-market.²¹

Neophytus' identity becomes clearer when we realise that the same script and the same indications of its autograph nature are found in a copy of Aristotle's *Organon* (*Vat.gr.* 1018). The heading on the first folio reveals a further fact: Neophytus was a member of the famous monastery of St John the Baptist known as Petra (the rock) in Constantinople. A number of other books have been attributed on the basis of the script to the same Neophytus (*Vat.gr.* 209, philosophical texts; *Vat.gr.* 246, Aristotle; *Paris.gr.* 2286, a miscellany of medical and scientific texts; *Padua Seminario* 194, the herbal of Dioscorides). Certainly it is quite reasonable to think this scribe is the man accused by Catrares of lecturing in the fish-market. We have found proof of his interest in two of the three topics named by the satirist, Aristotle and mathematics, and the absence of any sign of astronomical interests will be due to the accidents of survival.²²

Despite these negative remarks, however, it is correct to maintain that there was some use of Arabic numerals in Byzantium before the time of the two thirteenth-century treatises mentioned above. They are found in marginal notes accompanying the text of

²¹ Ed. F. Matranga, *Anecdota graeca* II (Rome 1850) 675–82, and I. Dujčev, *Sbornik na Bulg. Akad. na Naukite i Izkustvata, Kniga XLI–1, ist.-fil.klon* 21, (Sofia 1945, actually 1949) 132–43 with commentary on 130–32, 144–50.

²² Neophytus' activities are discussed by A. von Premerstein in the preface to the facsimile ed. of the Vienna Dioscorides (Leiden 1906) columns 11, 36, 87; V. Lundström, *Eranos* 5 (1903–4) 129–55; and most recently by G. Schmalzbauer, *JOB* 26 (1977) 159–68.

Euclid's *Elements*, and there appear to be five examples, all dating from the twelfth century.

(1) In the D'Orville Euclid in the Bodleian there are notes by one of the later owners on folios 1–5. On folio 1^v there are Arabic numerals in the text and a diagram relating to proposition 20 of Book 10, and on 2^v and 3^r some simple multiplication and division of seven-figure numerals is done with Arabic numerals.

(2) Heiberg noted Arabic numerals in a Vienna manuscript, *phil. gr.* 31.²³ They occur in various notes to Book 10. I have not seen the manuscript itself, but judging from photostats I should think a date in the twelfth century perfectly possible.

(3) Another Bodleian copy of Euclid, ms. *Auct.F.* 6.23, also has Arabic numerals, some of which seem to belong to the twelfth century. The manuscript has been assigned to the fourteenth century hitherto, but that view goes back to the catalogue by H. O. Coxe, published in 1853, and needs revision in the light of current knowledge of Greek palaeography.²⁴

(4) ms. *Paris.gr.* 2344 has a few Arabic numerals in the marginalia on folio 186^v relating to *Elements* 10.10. The scribe gives the impression of not knowing how to use them. I am inclined to think that the marginalia are of the same date as the text itself, the twelfth century, but realise that there is some slight doubt in this case.

(5) ms. *Paris.gr.* 2466 has Arabic numerals used in some of the diagrams that accompany Book 5, beginning on folio 45^v, and they also occur in the notes on 49^v and 50^r. I do not think there can be any doubt that the text and notes in this manuscript belong to the twelfth century.

From this evidence it follows that Arabic numerals were in use in a restricted circle of mathematicians in the twelfth century. It is interesting that their use seems to have been slow to spread. One is also bound to ask where the Byzantines derived their knowledge from. The date of the marginalia that we have mentioned precludes the idea that Leonardo of Pisa had anything to do with their introduction, and it does not seem easy to suppose that the use of the numerals in Spain²⁵ led to their adoption by even a limited number of Byzantines. In fact such an idea is excluded by the forms of the numerals found in these twelfth-century manuscripts,

²³ See *supra* n.19, pp.xix, 490, 495.

²⁴ A specimen is published in R. W. Hunt *et al.*, *The Survival of Ancient Literature* (Oxford 1975) plate 4.

²⁵ See Vogel (*supra* n.18) 662 n.12.

as they are of the same eastern type as seen later in the treatise of Planudes, not the western type known from the treatise of 1252. What contacts can there have been between Byzantium and the east during the twelfth century that might have facilitated the adoption of the new system? One is tempted to wonder whether the contacts of Constantinople and the Islamic world were greater at that time than is generally supposed. Long before the twelfth century there was already a mosque in Constantinople,²⁶ and in the middle or late eleventh century we find Michael Psellus boasting that pupils came to study with him from all over the world, including even Arabs.²⁷ It has also been pointed out that there are signs of Arabic influence on astronomy in Byzantium in the eleventh century. The signs are as follows: a note written originally in 1032 and now found in MS. *Vat.gr.* 1594 draws comparisons between the *Almagest* and *Handy Tables* of Ptolemy on the one hand and the work of Ibn al-A'lam on the other;²⁸ and there is a treatise in MS. *Paris.gr.* 2425 composed *ca* 1060–72 which draws on Arabic astronomy.²⁹ But as there is no indication so far that the astronomers as opposed to the students of Euclid employed the new numerals it is best to suspend judgement.

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²⁶ R. Janin, *Constantinople byzantine*² (Paris 1964) 257–59.

²⁷ K. Sathas, *Mesaionike Bibliotheke* V (Paris 1876) 508.

²⁸ J. Mogenet, *Osiris* 14 (1962) 198–221, esp. 217ff.

²⁹ Ed. O. Neugebauer, *MémAcadRoyBelgique* 59.4 (1969). A third piece of evidence alleged by A. Tihon, *Le 'petit commentaire' de Théon d'Alexandrie aux Tables faciles de Ptolémée* (Rome 1978) 188f, seems to rest on a misreading; the star catalogue in question is of the twelfth century.