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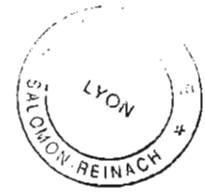

ON THE DATING OF EARLY PTOLEMAIC PAPYRI

BY

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A few years ago, some sebakh-diggers at Kharabet el Gerza in the Fayoum, the site of the ancient Philadelphia, discovered a large and important store of Greek papyri filed and docketed by a certain Zenon, an *oikonomos* who lived in the middle of the III^rd^ century B. C. They consist of letters, accounts, receipts and contracts written in the later years of Ptolemy II and the earlier years of Ptolemy III. A large number of them eventually came to the Cairo Museum, and while deciphering them I have lately been attempting to arrange the dated documents in chronological order, year by year and month by month. That might seem a very simple task, but in reality it is not quite so easy as it seems. For in the first place the years by which official documents of that period were generally dated did not begin on the 1^st^ of Thoth, as in later times, but on some other date which was in all probability the anniversary of the king's accession. In the next place it is not always possible to say whether a papyrus is dated by the regnal year just mentioned or by a financial year, which is shown by certain dates, such as ἔτους ια ὡς δ' αἱ πρόσοδοι ἔτους ιβ, to have been sometimes in advance of the regnal year. The financial year is usually supposed to have begun on the 1^st^ of Thoth, but this is doubtful; such evidence as we possess indicates rather that its starting-point was the month of Mecheir. These and other difficulties in the way of dating early Ptolemaic papyri have been pointed out by Grenfell and Hunt in the admirable appendices to their *Hibeh Papyri*, vol. I, in which all the older material is collected in a most convenient form [1].

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[1] M. Bouché-Leclercq, in the 4^th^ vol. of his *Hist. des Lagides, Appendice I*, has restated the whole problem clearly and critically. More novel, but not altogether convincing, are two dissertations by M. Lesquier in the *Archiv für Papyrusforschung*, vol. 4, and in the Introduction to his edition of the Magdola papyri. I

§ 1. — THE REGNAL YEAR OF PTOLEMY II.

The first question which I propose to discuss is that of the regnal year of Ptolemy Philadelphos. If we can discover in what month it began, a certain advance will have been made. For instance if we have two documents dated in Dios and in Daisios of the 30th regnal year, we shall then be able to say which of the two is the earlier and to date each with absolute accuracy. Unfortunately the papyri that I have had an opportunity of examining, though numerous enough, are only a portion of the whole find; and other lots, one or two of which are said to be very large, are dispersed through Egypt and Europe. If all the documents could be collated we should probably find out with complete certainty at what date the year of Ptolemy II began : indeed a single letter dated at the end of one year and endorsed by the recipient at the beginning of the next might make it plain. But pending the publication of the whole find the following notes on the important material in Cairo may perhaps be of interest to students of Ptolemaic history.

Like other papyri of the same period ours are sometimes dated by the Macedonian calendar, sometimes by the Egyptian calendar, and occasionally by both together. The Egyptian year, until the time of Augustus, consisted of twelve months of thirty days each, together with five intercalary days. The Macedonian year was nominally a lunar year containing twelve months of 29 and 30 days, but it was lengthened by intercalation to such an extent that on the average it was actually longer than the Egyptian year. The new papyri prove that at the period with which we are concerned the intercalation consisted in the occasional insertion of an extra month. In years 27, 29 and 30 respectively we find the dates Περιτίου ἐμβολίμου κ, Περιτίου ἐμβολίμου and Περιτίου ἐμβολίμου Μεχεὶρ κγ : these are of course the years of Ptolemy II. In year 16, which is probably of

much regret that I have not had the benefit of reading Mr. Smyly's articles in *Hermathena* and that I only know his views at second hand. In suggesting that the financial year began in Mecheir I am only following Mr. Smyly's lead, while the view which I adopt that the regnal year was reckoned by the Macedonian calendar was first put forward by M. Revillout.

Euergetes, we find Παυήμου ἐμβολίμου. The question has been raised whether the regnal year was reckoned by the Macedonian or the Egyptian calendar, or, in other words, in which of the two calendars the first day of the regnal year was a fixed date. M. Lesquier (*Pap. Magd.*, p. 47, 48) assumes that for practical purposes it was a fixed date in the stable Egyptian year of 365 days : « C'est le retour périodique d'un quantième égyptien qui constitue en réalité le premier jour de l'an ». That is true of the financial year; but it seems altogether more probable that in the earlier Ptolemaic period the regnal years of the Macedonian kings were reckoned by their own calendar purely and simply. It is significant for instance that in the Kanopos decree Macedonian dates are given for the king's birthday and the anniversary of his assumption of sovereignty and Egyptian dates for the native festivals.

To return to the Philadelphian papyri, it is a fact of great interest that many of the letters from the archives of Zenon were written by a certain Apollonios, a well-known personage who held the office of *dioiketes* for many years during the reign of Ptolemy II and received from his sovereign the grant of a large estate in the Fayoum [1]. The *dioiketes* was the chief minister of the king, and Zenon, whose usual title is τῶν περὶ Ἀπολλώνιον, was in direct communication with him. Naturally Apollonios always dates his letters by the regnal year and the Macedonian months, but in most cases he adds the equivalent Egyptian dates. Zenon too, who usually endorses the letters which he receives, sometimes gives us a double date. But while the double dates of Apollonios (or at least those in the Cairo collection) are consistent with each other to within a day or two, the double dates of Zenon are in many cases irreconcilable with those of Apollonios and often contradict each other [2]. One is forced to

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[1] Probably the very estate of which a plan and description are given in a papyrus from Ghoran, *Pap. Lille*, vol. I, n° 1. It contained 10,000 *arourai*.

[2] The following equations are given by Zenon :
Year 29 : Αὐδναίου δ, Χοίαχ δ.
Year 30 : Δίου ιη, Ἀθὺρ ιη. [Δ]ίου κγ, Ἀθὺρ κγ. Αὐδναίου δ, Τῦβι δ. Ἀρτεμισίου κε, Παχὼνς κδ. Δαισίου θ, Παῦνι θ. Δαισίου ια, Παῦνι α. Δαισίου ιθ, Παῦνι ιθ. [Λωί]ου β, Μεσορὴ β.
Year 31 : Δαισίου δ, Παχὼνς κα. [Δαισίου] ιζ, Παῦνι θ. Λωίου κη, Μεσορὴ ιη.

conclude that the double dates of Zenon cannot be accepted as strictly correct unless corroborated by other evidence. And the fact that one of the chief Greek officials in the Fayoum was often five or ten days wrong when dating by the two calendars leads us to suspect that some other double dates from the provinces may be no more trustworthy than Zenon's. On the other hand, the double dates of Apollonios are self-consistent, and it is natural to suppose that in the office of the chief minister of state the two calendars were kept coordinated with a certain amount of care. Assuming then that the dates given by Apollonios are practically correct, what conclusions can we draw from them as to the order of the months in the regnal year of Ptolemy Philadelphos?

The list of the double dates in the letters of Apollonios is as follows:

Year 29.	Hyperberetaios 20	= Thoth 21.
Year 30.	Dios 3	= Phaophi 23.
—	Dios 13	= Athyr 3.
—	Artemisios 10	= Pachons 9.
Year 31.	Dystros 20	= Phamenoth 27.
—	Dystros 23	= Phamenoth 30.
—	Daisios 2	= Pachons 18.
—	Daisios 16	= Payni 2.
Year 32.	Hyperberetaios 25	= Phaophi 25.

In year 29 Hyperberetaios 1 was equal to Thoth 2 (assuming that the year did not begin between Hyp. 1 and Hyp. 20) and in year 30 Dios 1 was equal to Phaophi 21. These two double dates correspond exactly if we insert between them thirteen months plus one intercalary month of thirty days: and, as was stated above, we have in fact evidence of a Peritios embolimos in year 29. From these dates then we get the following sequence for year 29: Hyperberetaios — Dios — Peritios.

Again, the above double dates correspond (to within one day) with the equation year 30, Artemisios 10 = Pachons 9, if we insert an extra month (Peritios embolimos) in year 29 and place Artemisios of year 30 between Hyperberetaios of year 29 and Dios of year 30. This gives us the following sequence: year 29, Hyperberetaios 20 — year 29, Peritios embolimos — year 30, Artemisios 10 — year 30, Dios 13. That is to

say, year 30 began between Peritios embolimos and Artemisios 10 (or between Mecheir and Pachons 9).

In the next place the equation year 30, Dios 3 = Phaophi 23 (together with the others just mentioned) corresponds exactly with the double date year 31, Dystros 23 = Phamenoth 30, on condition that there is an interval of sixteen months between Dios in year 30 and Dystros in year 31, or in other words that Dystros 23 comes after Dios 3 in the order of the regnal year and that there is an intercalated Peritios in year 30 or year 31. Further, year 30, Dios 3 = Phaophi 23 (together with the other double dates of years 29 and 30) corresponds exactly with year 31, Daisios 2 = Pachons 18 and Daisios 16 = Payni 2, on condition that there is an interval of six months between Dios in year 30 and Daisios in year 31, or in other words that Daisios precedes Dios in the order of the year and that there is no intercalary month in year 30. It is evident then that Apollonios intercalated a Peritios in year 31 and not in year 30; and, considering his authority as well as the fact that there was a Peritios embolimos in year 27 and another in year 29, we may surely regard the date L λ, *Περιτίου ἐμβολίμου*, *Μεχεὶρ κγ* as a provincial mistake or possibly an Egyptian date equivalent to L *κθ*.

The double date of year 32, Hyperberetaios 25 = Phaophi 25 does not help us much. It corresponds with the double dates of years 29, 30, 31 to within two days and affords further evidence that two months were intercalated between Hyperberetaios in year 29 and Hyperberetaios in year 32.

The sequences of months which we obtain by the above reasoning for the years 29, 30, 31 are shown more fully in the following table (p. 214). And the conclusion which we draw from these sequences is :

1° If the 1st day of the regnal year was a fixed date in the Macedonian calendar, it fell in the interval of 45 days between Dystros 23 and Artemisios 10;

2° If it was a fixed date in the Egyptian calendar, it fell in the interval of 39 days between Phamenoth 30 and Pachons 9.

Let us turn now to some other pieces of evidence. Sometimes by comparing the date on which a letter was written with the date on which Zenon received it, and assuming that such dates are regnal, we get two

TABLE I.

YEAR 29.	INTERVAL BETWEEN LAST DATE IN YEAR 29 AND FIRST DATE IN YEAR 30.	YEAR 30.	INTERVAL BETWEEN LAST DATE IN YEAR 30 AND FIRST DATE IN YEAR 31.	YEAR 31.
Hyperber. 20 = Thoth 21		Artem. 10 = Pachons 8 (or 9)	Dios 14 = Athyr 4	Daisios 2 = Pachons 18
Dios 1 = Phaophi 2	Dystros 1 = Mecheir 30	Daisios 1 = Pachons 28	Apellaios 1 = Athyr 20	Panemos 1 = Payni 17
Apellaios 1 = Athyr 1	Xandikos 1 = Pham. 29	Panemos 1 = Payni 28	Audnaios 1 = Choiak 20	Loios 1 = Epeiph 17
Audnaios 1 = Choiak 1	Artemisios 9 = Pachons 7 (or 8)	Loios 1 = Epeiph 27	Peritios 1 = Tybi 19	Gorpiaios 1 = Mesore 16
Peritios 1 = Choiak 30		Gorp. 1 = Mesore 27	Dystros 1 = Mecheir 19	Hyperber. 1 = Thoth 10
Per. embol. 30 = Mecheir 29		Hyperb. 1 = Thoth 21	Xandikos 1 = Pham. 18	Dios 1 = Phaophi 10
		Dios 13 = Athyr 3	Artemisios 1 = Phar. 18	Apellaios 1 = Athyr 9
			Daisios 1 = Pachons 17	Audnaios 1 = Choiak 9
				Peritios 1 = Tybi 8
				Per. embol. 1 = Mecheir 8
				Dystros 23 = Pham. 30

termini between which the first day of the year did *not* fall. The more important of these termini are given below : in no case do they conflict with the conclusions drawn from a study of the double dates.

Year 28, Gorpiaios	17	—	year 28, Hyperberetaios.		
— 28, Apellaios	26	—	— 28, Audnaios 25.		
— 28, Peritios		—	— 28, Dystros 8 (probably).		
— 29, Mesore	2	—	— 29, Gorpiaios	16.	
— 30, Artemisios	10	—	— 30, Artemisios	25.	
— 30, Dios	3	—	— 30, Dios	18.	

Interesting also is a letter from Apollonios dated year 31, Dystros 23, Phamenoth 30 and endorsed by Zenon year 31, Pharmouthi 1 ; for this shows that the new year did not begin till after Dystros 24 or Pharmouthi 1, according as we reckon by the Macedonian or the Egyptian calendar.

In a statement of expenditure dated year 28 certain months are written in the following order, which is in accord with the sequences given by the double dates : Artemisios, Daisios, Panemos, Loios, Dios. The use of the Macedonian months makes it probable that the year in question is a regnal year. In any case it cannot be a financial year starting in Thoth, for at that time Thoth began before Dios.

A letter to Zenon dated L λβ, *Φαῶφι κς*, contains the following interesting passage : *τοῦ σησάμου τῶν ρ ἀ(ρταβῶν) ὧν ἐμέτρησας ἐν τῶι λα (ἔτει) τοῦ* M[. . . . . , *ϖ]αραγενομένου Ἐπεάρχου τοῦ Φαῶφι* $\overline{ζ}$, *ἐγράψαμεν τὸ σ[ύμ]ξολον πρὸς Πύθωνα, ὡσαύτως δὲ καὶ τῆς κνήκου τῶν ρε ἀ(ρταβῶν) ὧν ἐμέτρησας ἐν τῶι λβ (ἔτει) τοῦ Ἐπεὶφ* $\overline{ι}$. This proves in the first place that in year 32 Epeiph preceded Phaophi. And if we read M[*εχείρ*], which is perhaps more probable than M[*εσορή*] as it leaves a shorter interval between the measuring of the sesame and the writing of the receipt, it would follow that the first day of year 32 fell between Mecheir and Epeiph (or between Peritios embolimos and Panemos); while if we read M[*εσορή*], we have to place the first day of the year between Phaophi and Epeiph and admit the possibility of its being a financial year beginning in Mecheir. The former conclusion is in close accord and the latter is not in conflict with what we have inferred from the double dates of Apollonios.

An entry in a list of silver vessels deposited as securities on money loans gives some still closer indications. On Pharmouthi 21 of year 36 a

certain sum of money was lent on three pieces of plate. After giving details about the money and the security the entry proceeds thus. Καὶ τόκος προσεγένετο τοῦ [λς] (ἔτους) μηνῶν ιβ̄ καὶ τοῦ λζ (ἔτους) μηνῶν ζ̄ [(δραχμαὶ).]ος (ὀβολοὶ δ). Μετετέθη δὲ πρὸς Δ[ιονυσό]δωρον (ἔτους) λζ Ὑπερβερεταί(ου) θ̄ [Φαῶ]φι ις̄, and here follow details of the money paid over. Taking into account that fractions of months were sometimes reckoned as whole months when interest was being estimated, we may infer from the words quoted that Pharmouthi 21 was near the beginning of year 36 and that Phaophi 16 (equivalent to Hyperberetaios 9) was in the seventh month from the beginning of year 37. If we can trust a double date given by one of the Hibeh papyri, n° 77,8, in year 36 Pharmouthi 21 was equal to Xandikos 22. For reasons which will appear later I am inclined to think that in the 36th regnal year Pharmouthi 21 really fell about the end of Dystros. But in any case the passage indicates that in years 36 and 37 the beginning of the year was either in or close to Xandikos and Pharmouthi.

Of capital importance is the following letter, preserved among the files of Zenon though not addressed to him directly.

Κόρραγος Προξένωι χαίρειν. Εἰς μὲν τὸ ἕβδομον καὶ τριακοστὸν ἔτος Δύστρου [ ]
γενεθλίοις ὁ δίδοται ἡμῖν ὑψώνιον τοῖς εἰς Κάνωπον ἀποδημοῦσι μετὰ τοῦ [ ]
συνετάγη δοῦ[[ται]]ναι, τοῖς δὲ παρ' ἐμοῦ τότε οὐθεὶς ἔδωκε, μετὰ ὀλίγα[ς δὲ ἡμέ]-
ρας τὸν διατυνεσταλημένον παῖδα Θράσωνα Λευκίππωι τῶι γραμματε[ῖ . . . . τὸ]
ἐκκομίζεσθαι τὰ ὑψώνια καὶ τὰς ἀγορὰς δεδεμένον μετεπεμψάμην [ ]
αἰτίας. Περὶ μὲν οὖν τούτων ὁ τὴν ἐπιστολήν σοι ἀποδιδοὺς Διογενὴς ἐντε-
λ[ῶς ἐρεῖ]
ὢν οἰκεῖό{υ}ς μου, ἐντεύξεταί δέ σοι καὶ Ζήνων. Εἰς δὲ τὸ ὄγδοον καὶ τριακοστὸν ἔτ[ος καὶ μῆ]-
να Ξανδικὸν ὁ υἱός μου Ἄτταλος καὶ Διογενὴς ἔλαβον τὸ γινόμενον ὑψώνιον, με[τὰ ταῦ]-
τα δὲ οὐθεὶς ἡμῖν οὐθὲν ἔδωκεν. Καλῶς ἂν οὖν ποιήσαις ἐνθυμηθεὶς ἵνα μηθεὶς ἡ[μᾶς τῶν]

ὑπὸ σὲ γραμματέων ἀδικῆι. Τὰ δὲ ἄλλα ὁ φέρων σοι τὴν ἐπιστολὴν ἐρεῖ.
Ἔρρωσο.

About six letters are wanting at the end of each line. In the first line one is tempted to read τοῖς after the day of the month, taking τὰ γενέθλια to be the king's birthday[1]; and indeed this seems to be the most natural restoration of the passage. I have filled up most of the other lacunæ with tentative readings, but this is not the place to discuss the details of the text. For our present purpose its importance consists in this : it shows that the end of year 37 was in or about Dystros and that the beginning of year 38 was before or in Xandikos.

One other indication may be mentioned here, though whether it has any bearing on our inquiry is very doubtful. Two letters addressed to Zenon by a certain Euempolos are dated L κε, Παχὼνς β, and one of them speaks of the planting of vegetables in vineyards εἰς τὸ κε (ἔτος); yet both are endorsed L λς, Παχὼνς ς. One cannot help asking then whether κε is not a mistake for λε and whether year 36 did not accordingly begin between the 2nd and the 6th of Pachons. But it is difficult to believe that L κε was not written advisedly, and I scarcely think that the above suggestion is the right explanation of the discrepancy.

Putting together all these pieces of evidence we are led to the conclusion that if the beginning of the regnal year was a fixed date in the Egyptian calendar, it fell between Pharmouthi 1 and Pachons 9, and most probably

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[1] It is not clear whether the Kanopos mentioned in line 2 is the famous town near Alexandria or a village of the same name in the Fayoum. But in any case if γενεθλίοις refers to the king, the letter of Korragos invites comparison with the opening sentences of the Kanopos decree which speak of the priests assembling at Kanopos on the birthday of Euergetes and the anniversary of his accession, the 5th and the 25th of Dios. If the regnal year of Ptolemy II began likewise about the date of his birthday, it may be conjectured that it was on the occasion of his completing his 25th year that he was raised to the throne in association with his father : unless indeed the beginning of his regnal year was reckoned from the death of Soter. Whether the regnal year of Euergetes began on the 25th of Dios is another question : it may be that that was merely the date on which he first received the title of βασιλεύς and that his regnal year started from the day on which he finally began to reign.

was not later than the twenty-first of Pharmouthi. On the other hand, if the regnal year was fixed by the Macedonian calendar, the above arguments show that it began between Dystros 24 and the end of Xandikos. And surely the probability is that the years of the king were reckoned by the Macedonian calendar, by which all royal and ministerial documents were dated even in Egypt, while in the king's possessions outside Egypt the Egyptian calendar was practically unknown. One point inclines me to surmise that the year may have begun in Dystros rather than in Xandikos, and this is the fact that (at least in the time of Apollonios) the intercalated month was Peritios *bis;* for on general grounds it seems a reasonable supposition that the thirteenth month was inserted at the end of the year, *i. e.* before the month in which the new year began.

I have not found more than one or two dates that seem in any way to conflict with the above conclusions concerning the regnal year of Ptolemy II. The docket L λη, Φαρμοῦθι Παχώνς on a long bread account from the archives of Zenon is difficult to reconcile with my proposed dating if year 38 be taken as a regnal year and Pharmouthi and Pachons as two quite complete months. But this may be a financial date, or L λη may be used loosely to include the tail-end of year 37. Again a papyrus from Hibeh, n° 80, is dated in demotic «year 34 which makes year 35, Epeiph 4». If in this case year 35 is interpreted as a financial year beginning on Thoth 1, the date indicates, as Grenfell and Hunt have argued (*P. Hib.*, p. 362), that the 34th regnal year of Ptolemy II began between Epeiph 4 and Thoth 1. In face of the evidence of the new documents one might put aside an isolated indication of this sort by supposing that the demotic scribe has made a mistake; but I think the date is right and capable of explanation. It probably refers to a financial year beginning not on the 1st of Thoth but on the 1st of Mecheir : and in that case Epeiph of revenue year 35 would in fact be equal to Epeiph of regnal year 34 (see Table II). The probable existence at this period of a financial year starting from Mecheir was pointed out by Grenfell and Hunt (*P. Hib.*, p. 360), and various dates in the papyri are difficult to explain without the hypothesis of such a year. The regular Egyptian year which started from the 1st of Thoth superseded in the end all other systems of reckoning; but to what extent it was used at this period is a matter of doubt.

§ 2. — THE MACEDONIAN CALENDAR.

It has been shown by Grenfell and Hunt that the Macedonian year gradually fell behind the Egyptian year, that is to say, it was on the average longer; and as it was nominally a lunar year, it is plain that some method of intercalation must have been employed. But the double dates hitherto known made it difficult to believe that there was any consistent method. «The irregularities are such that the number of intercalated days seems to have varied from year to year» (*P. Hib.*, p. 356). It has even been suggested that days were occasionally suppressed as well as intercalated (Lesquier, *P. Magd.*, p. 44). One is loath to think that the calendar by which the King and the chief officials dated their edicts and correspondence was in such a state of disorder; and perhaps, if we re-examine the question with the aid of the new material, we may find reason to doubt whether the system of intercalation was so irregular as has been supposed.

That a whole month was sometimes intercalated had already been inferred from a mutilated date in the Petrie papyri (see *P. Hib.*, p. 334). But the new papyri give us more definite and important information, for they show that a Peritios embolimos was inserted in years 27, 29, and 31 of Ptolemy II and, probably, a Panemos embolimos in year 16 (or year 15) of Ptolemy III. These facts almost oblige us to conclude that the intercalation of an extra month at occasional intervals was the normal method by which the Macedonian year was lengthened in the period under review. If this seems highly probable, it is equally probable that the method employed was the intercalation of a month every second year, which is in fact an old method of intercalation described by Herodotos, I, chap. 32. For it will be found that the number of days by which the Macedonian year fell behind the Egyptian year up to the end of the reign of Euergetes corresponds very closely to the number of days by which the application of this method would lengthen it, allowance being made for errors and for the different systems of reckoning the year. Let us take a specific instance. The best attested of the double dates that we possess are those of Apollonios and that of the Kanopos decree. According to the former, in year 29 of Philadelphos Apellaios 1 was equivalent to Athyr 1; according

to the latter, in year 9 of Euergetes Apellaios 1 coincided with Tybi 11. Now between these two dates there are eighteen Macedonian years (on the reasonable assumption that Philadelphos died in his 39th regnal year before the 1st of Thoth or at least before Dios 25); so if, starting from year 29, we intercalate nine months of thirty days, we find that in year 9 of Euergetes Apellaios 1 ought to coincide with Tybi 13, a difference of only two days from the actual date.

To make the question clearer I have drawn up a Table of concordance between the two calendars for the reign of Ptolemy II on the assumption that a thirteenth month was intercalated every second year. The basis of calculation is the double date of Apollonios for year 29, which in all probability is either right or very nearly so. For convenience Xandikos 1 is taken as the starting-point of the regnal year, though it is very probable that it really began in the last week of Dystros. We assume further that the Macedonian months were of 29 and 30 days alternately, that the intercalated month was of 30 days [1], and that the regnal year was reckoned on the Macedonian calendar. And now let us compare the results given by the Table with such double dates of this period as are known to us.

Year 1 of Philadelphos coincided roughly with year 41 of Soter. From a passage in *P. Hib.*, n° 84 (*a*), it has been inferred that in year 40 of Soter [2] Panemos was one of the harvest months. According to our Table, in year 40 Panemos would coincide with Phamenoth. Grenfell and Hunt give Pharmouthi, Pachons and Payni as the harvest months; but from *P. Hib.*, n°s 44, 47, it appears probable that harvest began in Mecheir, and in any case there is little doubt that Phamenoth was a harvest month at this period [3]. The passage then is quite consistent with the theory which we are testing.

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[1] It may be noted that on this hypothesis a hundred months would contain 2952 days, whereas in fact a hundred lunations cover rather more than 2953 days. Therefore a calendar arranged on the above system would gain on the moon about one day in eight years, unless a month was occasionally lengthened.

[2] That year 40 of King Ptolemy Soter is the correct date of this papyrus was pointed out by Rubensohn, *P. Elephantine*, p. 22.

[3] Cf. Lesquier, *P. Magd.*, p. 38 and p. 105, and Rubensohn, *op. cit.*, p. 27.

For year 22 *P. Hib.*, n° 92 contains a double date which the editors read *μηνὸς Ξανδικ[ο]ῦ Αἰγυπτίων μη[νὸ]ς Μεχ[ὶρ] τεσσαρεσκαιδεκάτηι*. But they remark that except for *μ* of *Μεχίρ*, which might also be *η* or *κ*, the traces of all the letters are very slight, that palæographically *Με[σο]ρὴ τ[ῆι]* would be possible, and that not much reliance can be placed on their reading (p. 340). I therefore pass it by with the remark that, if our Table is approximately right, the only possible restoration of the text is *Αἰγυπτίων δὲ* [Φ]*αμεν[ώθ]*.

Year 27. In the *Revenue Laws* Gorpiaios is equated to Mesore (*P. Hib.*, p. 340). This corresponds exactly with the concordance in the Table, in which Gorpiaios 2 coincides with Mesore 1.

Years 29, 30, 31. For these three years we have the double dates of Apollonios and Zenon, of which I have already spoken. The date year 29, Dystros 18, Phamenoth 18 on a contract from Philadelphia differs from the Table by one day, and so also does the date of Apollonios year 30, Artemisios 10, Pachons 9. A date on a demotic contract in Leyden (*P. Hib.*, p. 341) L *κθ Περιτίου* L *κθ Τῦβι* offers no difficulty. As has been already said, the double date L *λ Περιτίου ἐμβολίμου Μεχεὶρ κγ* is proved by the dates of Apollonios to be either an error or (what is also possible) to refer to regnal year 29 : but in the latter case, as a glance at the Table will show, L *λ* cannot be a financial year beginning in Mecheir, but must be an Egyptian year reckoned from Thoth.

Year 32. A double date of Apollonios, Hyperberetaios 25 = Phaophi 25, differs from the Table by two days.

Year 35. The equation Hyperberetaios 29 = Phaophi 29 on a Hibeh papyrus, n° 146, differs from the Table by five days.

Year 36. A letter of this year from Hibeh, n° 77, is dated Artemisios 23, Pachons 22. Between this equation and that of the Table there is a difference of 23 days. But as the matter with which the letter deals is the payment of revenues, it is possible that the date is a financial date and that year 36 is equivalent to regnal year 35. In that case the difference would be reduced to four days.

Year 37. On a papyrus from Philadelphia already cited (p. 216),

Phaophi 16 is equated to Hyperberetaios 9, a concordance which differs from the Table by four days.

Year 39. A contract of this year from Philadelphia is dated μηνὸς Ἀρ-[τε]μισίου Αἰγυπτίων δὲ Παῦνι, which does not imply more than that these two months partly coincided. This and the preceding date refer in all probability to the regnal year.

On the whole then it may be said that the dates given by the papyri correspond roughly with those of the Table and that the rate at which the Macedonian year fell behind the Egyptian is practically the same as that which would result from the intercalation of a whole month every second year. Differences of one or two days may be disregarded, especially as we are not sure of the exact length of the separate Macedonian months. But differences such as we find in years 35 and 36 are more serious : either the scribes were very inaccurate or something is wrong with our hypothesis. That such discrepancies are simply due to inaccuracy seems indeed far from unlikely when we consider how many indisputable errors (amounting sometimes to five and sometimes even to ten days) are made by the methodical Zenon in the course of three years. Further it should be noted in how many of the double dates which differ from the Table, especially those of Zenon, we find that the day of the month is the same in both calendars, *e. g.* year 35, Hyperberetaios 29 = Phaophi 29. Is it not probable then that when the scribe was not sure of the correct concordance, but knew that Hyperberetaios was *roughly* equivalent to Phaophi, he was tempted to treat the two months as *exactly* equivalent?

For the present the most we can say is that the evidence of the papyri points to a system of intercalation by means of whole months, that the only system of this sort that would correspond to the increasing divergence between the Macedonian and Egyptian calendars at this period is a system of biennial intercalation, and that the double dates of the reign of Philadelphos neither confirm nor disprove this theory. As regards the double dates of Euergetes it is difficult to apply them as a test until we know the starting-point of his regnal year. I incline to believe that it began in Loios, but I am not prepared to argue the question without more decisive evidence than we have at present.

C. C. Edgar.

TABLE II.

	YEAR 2.	YEAR 22.	YEAR 27.	YEAR 28.	YEAR 29.	YEAR 30.	YEAR 31.	YEAR 32.	YEAR 33.	YEAR 34.	YEAR 35.	YEAR 36.	YEAR 37.	YEAR 38.	YEAR 39.
Xandikos 1 . . .	Choiak 7	Mecheir 27	Pham. 2	Pham. 21	Pham. 10	Pham. 29	Pham. 18	Phar. 7	Pham. 26	Phar. 15	Phar. 4	Phar. 23	Phar. 12	Pachons 1	Phar. 20
Artemisios 1 . .	Tybi 7	Pham. 27	Phar. 2	Phar. 21	Phar. 10	Phar. 29	Phar. 18	Pachons 7	Phar. 26	Pachons 15	Pachons 4	Pachons 23	Pachons 12	Payni 1	Pachons 20
Daisios 1	Mecheir 6	Phar. 26	Pachons 1	Pachons 20	Pachons 9	Pachons 28	Pachons 17	Payni 6	Pachons 25	Payni 14	Payni 3	Payni 22	Payni 11	Payni 30	Payni 19
Panemos 1	Pham. 6	Pachons 26	Payni 1	Payni 20	Payni 9	Payni 28	Payni 17	Epeiph 6	Payni 25	Epeiph 14	Epeiph 3	Epeiph 22	Epeiph 11	Epeiph 30	Epeiph 19
Loios 1	Phar. 5	Payni 25	Payni 30	Epeiph 19	Epeiph 8	Epeiph 27	Epeiph 16	Mesore 5	Epeiph 24	Mesore 13	Mesore 2	Mesore 21	Mesore 10	Mesore 29	Mesore 18
Gorpiaios 1 . . .	Pachons 5	Epeiph 25	Epeiph 30	Mesore 19	Mesore 8	Mesore 27	Mesore 16	Epag. 5	Mesore 24	Thoth 8	Epag. 2	Thoth 16	Thoth 5	Thoth 24	
Hyperber. 1 . .	Payni 4	Mesore 24	Mesore 29	Thoth 13	Thoth 2	Thoth 21	Thoth 10	Thoth 29	Thoth 18	Phaophi 7	Thoth 26	Phaophi 15	Phaophi 4	Phaophi 23	
Dios 1	Epeiph 4	Thoth 19	Thoth 24	Phaophi 13	Phaophi 2	Phaophi 21	Phaophi 10	Phaophi 29	Phaophi 18	Athyr 7	Phaophi 26	Athyr 15	Athyr 4	Athyr 23	
Apellaios 1 . . .	Mesore 3	Phaophi 18	Phaophi 23	Athyr 12	Athyr 1	Athyr 20	Athyr 9	Athyr 28	Athyr 17	Choiak 6	Athyr 25	Choiak 14	Choiak 3	Choiak 22	
Audnaios 1 . . .	Epag. 3	Athyr 18	Athyr 23	Choiak 12	Choiak 1	Choiak 20	Choiak 9	Choiak 28	Choiak 17	Tybi 6	Choiak 25	Tybi 14	Tybi 3	Tybi 22	
Peritios 1	Thoth 27	Choiak 17	Choiak 22	Tybi 11	Choiak 30	Tybi 19	Tybi 8	Tybi 27	Tybi 16	Mecheir 5	Tybi 24	Mecheir 13	Mecheir 2	Mecheir 21	
Per. embol. 1.			Tybi 22		Tybi 30		Mecheir 8		Mecheir 16		Mecheir 24		Pham. 2		
Dystros 1	Phaophi 27	Tybi 17	Mecheir 22	Mecheir 11	Mecheir 30	Mecheir 19	Pham. 8	Mecheir 27	Pham. 16	Pham. 5	Pham. 24	Pham. 13	Phar. 2	Pham. 21	

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