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INTERCALARY MONTHS IN THE ATHENIAN DARK-AGE PERIOD[1]

Jörg W. Müller

The absolute dating of the new-style coinage of Athens, for which M. Thompson, in her admirable corpus [1], assembled all the numismatic evidence then available, is made difficult by the incomplete knowledge of the calendar. This prevents us from establishing a reliable correlation between the dates of issues for which, on the one hand, the presence of an amphora letter N (i.e. 13; see Fig. 1) attests an intercalary month and, on the other hand, the character

[1] An oral version of this paper was presented on September 10, 1991, at the XI[th] International Numismatic Congress in Brussels. Prof. T. Hackens, President of the Organizing Committee, is thanked for his kind permission to have it published separately.

of years is based on epigraphical documents. The situation is particularly difficult for the first century BC, to which about half of the coinage seems to belong, but for which hardly anything is known from epigraphy.

The importance of numismatically attested intercalations for the chronology was clearly realized by M. Thompson. However, she was unfortunate in calling on the services of B.D. Meritt who, instead of raising doubts on the proposed correlation – which was often at variance with the epigraphical evidence – did not hesitate to arrange the latter to achieve full agreement. The apparent support thereby given to her dating was a decisive argument for maintaining the erroneous chronology.

The new correlation was quickly refuted by D.M. Lewis [2] for historical reasons, and most scholars have subsequently accepted his arguments for assigning the Mithradates-Aristion issue to the year 87/86 BC, as it had been done before.

Based on this chronological cornerstone, several attempts have been made at establishing an absolute chronology, particularly for the decade preceding Sulla's intervention in Athens. For an excellent review see Mørkholm's article [3]. Such a sequence can take advantage of a number of known obverse die links and of hoard evidence, but it also relies strongly on the stylistic arguments put forward by Thompson [1]. The result is a historically plausible order, but one which cannot claim to give an absolute chronology. In fact, this would require the existence of a solid connection with independent calendaric information. While the necessary links can indeed be found for the second century BC, thus allowing us in a reliable way to reconstruct the sequence of new-style issues for the early period from about 150 to 100 BC, no such possibility seems to exist for the later years.

In what follows we present arguments which should allow us to circumvent this difficulty. They are based on a critical interpretation of what is actually known on intercalary and ordinary years in the Athenian calendar. For this purpose we use the following data:

- 23 epigraphically attested years, between 126/125 and 95/94 BC, essentially assembled by W.K. Pritchett [4],
- 12 epigraphical dates[2] extending from AD 111/112 to 211/212, collected by S. Follet [5], and
- 3 numismatically attested intercalary months[3], from the Pontic kingdom [6], for the years 91/90, 89/88 and 75/74 BC.

The sequence of years provided by these sources is presented in graphical form in Figure 2. The arrangement in periods of 19 years results in a grid from which – in spite of the numerous gaps – a pattern clearly emerges which can be seen to agree with a periodic occurrence of intercalary years according to the Metonic cycle. The earliest and the latest years known at present which are at variance with the assumed periodicity are 126/125 BC (intercalary) and AD 211/212 (ordinary); all the others within these boundaries agree with our expectations.

This is a most surprising result for at least two reasons. First is the very existence of a 19-year period, known to be absent in earlier times in Athens, and second its (apparently uninterrupted) application for three centuries. Such a longevity, although well known in the Late-Babylonian calendar [7], was certainly not expected for Athens.

[2] Doubtful identifications are not included.

[3] They are added on a tentative basis as the exact relation between the Pontic and the Athenian calendars is not known. Their withdrawal would not change our conclusions.

Figure 1: Some issues of the Athenian new-style coinage with amphora letter N, indicating an intercalary month.
a) Thompson no. 305, b) Thompson no. 355f, c) Thompson no. 1164, d) Thompson no. 1220b.
Photos kindly provided by S. Hurter, Zurich.

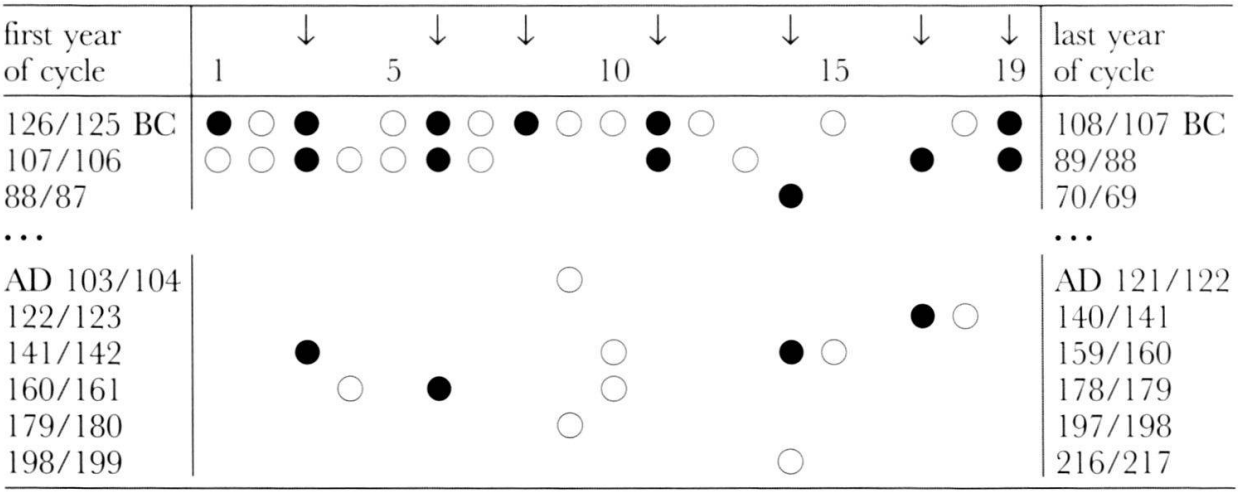

Figure 2: Graphical representation of the attested sequence of intercalary (●) and ordinary (○) years. For the period between 125 BC and about AD 180 the distribution is in agreement with a regular 19-year cycle of the Metonic type. The expected position of the years with an intercalary month is indicated by an arrow.

At first sight, therefore, the finding seems to be quite improbable and one may wonder whether one is not just the victim of a random coincidence. However, this suspicion can readily be refuted. For this purpose, we evaluate the probability that the observed character of the years in the second century is the result of pure chance. For a year chosen arbitrarily, the probability that it is of intercalary type is about $p \cong 1/3$, independent of any cycle. In our case we have 11 years, 4 of which are intercalary (for the period of about AD 110 to 190). The probability P that all of them happen to agree with the types predicted by the Metonic cycle only by chance, if they are assumed to be independent, is given by the expression

$$P = p^4 (1 - p)^7 \cong 7 \times 10^{-4} .$$

Thus, since a random agreement has a likelihood of less than 0.1%, this possibility can be safely excluded and we are led to believe in the reality of a Metonic cycle in the Athenian calendar for the period considered.

We realize, of course, that the hypothesis would have to be abandoned even if only a single «contradictory» year were firmly established between, say 100 BC and AD 150, i.e. in the dark-age period of Athens. As long as this is not the case, we have good reason to assume that the observed periodicity is real, and we may take advantage of this fact. After all, few historical assumptions can claim to have such a low probability of error.

A comparison of the intercalary years thereby recovered for the first century BC with the numismatic evidence is now possible. This leads to the correspondences listed in Table 1 for the intercalary issues.

The four new dates given in Table 1 provide reference points by means of which the other issues of the late period between about 100 and 80 BC can now be put in absolute chronological order.

The practical realization of this programme will be addressed in an article now in preparation where the dates for the complete new-style coinage of Athens are discussed and rearranged on the basis of the calendar.

Magistrates	Dates (BC) previously attributed by				New date (BC)
	Thompson [1]	Lewis [2]	Boehringer [8]	Mørkholm [3]	
Dositheos-Charias(2)	132/131	(99/98)	100/99	(100/99)	100/99
Demeas-Hermokles	125/124	92/91	93/92	93/92	91/90
Kleophanes-Epithetes	119/118	(85/84)	c.82/81	85/84	86/85
Nestor-Mnaseas	113/112	(79/78)	c.76/75	(79/78)	81/80

Table 1: New absolute dates for the known intercalary issues of the Athenian new-style coinage of the first century BC, together with some previous proposals(1).

(1) Years in parentheses have been obtained by extrapolation.
(2) This is a recently discovered intercalary year (cf.[9]).

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This note is dedicated to Prof. Dr. B. L. van der Waerden, University of Zurich, by a former student of his. B.L. van der Waerden, one of the leading mathematicians of our time, is also known for his interest in the astronomy and the mathematics of Antiquity. May the impressive flow of his historical publications, extending over half a century, go on for many years to come.