

(the former time is less than 6940 days by $9\frac{1}{2}$ hours, the latter, by $7\frac{1}{2}$ hours). Hence, if the 19 years be divided into 235 months, so as to agree with the changes of the moon, at the end of that period the same succession may begin again with great exactness.

In order that 235 months, of 30 and 29 days, may make up 6940 days, we must have 125 of the former, which were called *full* months, and 110 of the latter, which were termed *hollow*. An artifice was used in order to distribute 110 hollow months among 6940 days. It will be found that there is a hollow month for each 63 days nearly. Hence if we reckon 30 days to every month, but at every 63d day leap over a day in the reckoning, we shall, in the 19 years, omit 110 days; and this accordingly was done. Thus the 3d day of the 3d month, the 6th day of the 5th month, the 9th day of the 7th, must be omitted, so as to make these months "hollow." Of the 19 years, seven must consist of 13 months; and it does not appear to be known according to what order these seven years were selected. Some say they were the 3d, 6th, 8th, 11th, 14th, 17th, and 19th; others, the 3d, 5th, 8th, 11th, 13th, 16th, and 19th.

The near coincidence of the solar and lunar periods in this cycle of 19 years, was undoubtedly a considerable discovery at the time when it was first accomplished. It is not easy to trace the way in which such a discovery was made at that time; for we do not even know the manner in which men then recorded the agreement or difference between the calendar day and the celestial phenomenon which ought to correspond to it. It is most probable that the length of the month was obtained with some exactness by the observation of eclipses, at considerable intervals of time from each other; for eclipses are very noticeable phenomena, and must have been very soon observed to occur only at new and full moon.²³

The exact length of a certain number of months being thus known, the discovery of a cycle which should regulate the calendar with sufficient accuracy would be a business of arithmetical skill, and would depend, in part, on the existing knowledge of arithmetical methods; but in making the discovery, a natural arithmetical sagacity was probably more efficacious than method. It is very possible that the *Cycle of Meton* is correct more nearly than its author was aware, and more

²³ Thucyd. vii. 50. 'Ἡ σελήνη ἐκλείπει' ἐτύγχανε γὰρ πανσέληνος οὐσα. iv. 52. Τοῦ ἡλίου ἐκλίπεις τι ἐγένετο περὶ νοσηνίαν. ii. 28. Νοσηνία κατὰ σελήνην (ὥσπερ καὶ μόνον δοκεῖ εἶναι γίνεσθαι δυνατὸν) ὁ ἥλιος ἐξέλιπε μετὰ μεσημβρίαν καὶ πάλιν ἀν' ἐπληρώθη, γινόμενος μηνουσιδῆς καὶ ἀστέρων τινῶν ἐκφάνειντων.