The Date of the 11th Paripāḍal

By K. G. ŚAṄKAR

THE *Paripāḍal*, which belongs to the *Eṭṭuttogai* collection, is of unique interest in that it enables us to fix the Saṅgham age accurately, by a careful consideration of its astronomical data. The data are contained in the following opening lines of the 11th *Paripāḍal* of Nallanduvanār :—

> virikadir madiyamoḍu viyal viśumbu puṇarppa
> veriśaḍaiyeḷilvēḷan talaiyenak kīḷirundu
> teruviḍaippaḍutta mūnṟonpadiṟṟirukkaiyu
> ḷurukeḷu veḷḷivandēṟṟiyal śēra
> varuḍaiyaip paḍimagan vāyppap poruḍeri
> pundi mitunam porundap pular viḍiya
> laṅgiyuyar niṟpa vantaṇan paṅguvi
> nillattuṇaikkuppāleyda viṟaiyaman
> villiṟkaḍai makaramēvap pāmbollai
> madiyamaṟaiya varuṇāḷil vāynda
> podiyin munivan puraivaraikkīṟi
> mitunamaḍaiya virikadir vēni
> ledirvaravu māriyiyaikena vivvāṟṟāṟ
> puraikeḷu śaiyam poḷimaḷaitāḷa.

In this passage the actual positions of the leading planets and stars are given as observed at daybreak on a day at the beginning of a rainy season. The first three lines inform us that the heavens were divided into three *vīthīs*, named after the *rāśis* indicated by *eri* (Kṛttikā, whose God is Agni), *śaḍai* (Ārdrā, the asterism of Śiva), and *vēḷam* (Rēvatī or Bharaṇī, whose *yōni* is the elephant). Parimēlaḷagar, commenting on them, says that by Kṛttikā is meant Ṛṣabha, which includes $\frac{3}{4}$ Kṛttikā segment. But this assumes without proof that Nallanduvanār used a Rēvatyādi zodiac ; and it is besides strange that he should have indicated a *rāśi* by a *nakṣatra* segment, part of which was in another *rāśi* (Mēṣa).

We must, therefore, infer that Kṛttikā, Ārdrā, and Rēvatī
or Bharaṇī are the asterisms so named, and not the segments,
and that they were in Ṛṣabha (30° to 60°), Mithuna (60° to 90°)
and Mēṣa (0° to 30°) respectively. The longitudes of these
asterisms are given in several *siddhāntas*, but the only dated
siddhānta is the *Brahma-Siddhānta* of Śaka 550 = 628 A.C.
According to it, the polar longitudes of Rēvatī, Bharaṇī,
Kṛttikā, and Ārdrā are 0°, 20°, 37° 28′, and 67° respectively.
The *yogatārā* of Rēvatī is identified with ζ Piscium, whose
longitude in 1690 A.C. was, according to Flamsteed's *Catalogus
Brittanicus*, 15° 32′. If therefore by *vēḷam* we mean Rēvatī,
it could not have been in Mēṣa before 628 A.C., and the
Paripāḍal would have to be dated then or thereafter only.
But this is not necessary, as by *vēḷam* Bharaṇī may have
been meant. The *yogatārā* of Bharaṇī is identified with
35 Arietis (42° 36′ in 1690 A.C.), or with 41 Arietis (43° 52′
in 1690 A.C.). The true longitude of Bharaṇī, corresponding
to its polar longitude of 20° is 24° 41′, and its precession in
1,062 years (from 628 A.C. to 1690 A.C.) is therefore 17° 55′ or
19° 11′. Since these give us the rate of sidereal precession
as 1° in every $59\frac{1}{4}$ or $55\frac{1}{3}$ years, of which the former accords
more closely with the true rate of 1° in 61 years, as determined
by Mr. L. D. Svāmikaṇṇu Piḷḷai, we have to identify Bharaṇī
with 35 Arietis only. Accepting this identification, we may
infer that Bharaṇī could not have been in Mēṣa before 24° 41′
$\times\ 59\frac{1}{4}\ -\ 627\ =\ 835$ B.C. or after $(30° - 24°\ 41′) \times 59\frac{1}{4}$
$+\ 628 = 943$ A.C. This period of 1,777 years (835 B.C. to
943 A.C.) is too wide for our purpose. But Kṛttikā and Ārdrā
will help us to define the limits more closely. The *yogatārā*
of Kṛttikā is identified with Alcyone (55° 40′ in 1690 A.C.),
and its true longitude is 38° 58′. Its precession in 1,062
years is therefore 16° 42′, yielding a rate of 1° in $63\frac{3}{5}$ years,
and it could not have been in Ṛṣabha before 628 − 8° 58′
$\times\ 63\frac{3}{5} = 58$ A.C. The *yogatārā* of Ārdrā is usually identified
with ∝ Orionis (84° 25′ in 1690 A.C.), and its true longitude is
65° 5′. Its precession in 1,062 years is therefore 19° 20′,

yielding a rate of 1° in 55 years. But this rate is too wide
of the true rate (1° in 61 years), and the latitude of $\propto$ Orionis
is 16° 4′ S., while the polar latitude of Ārdrā is given as 11° S.
The *yogatārā* of Ārdrā may therefore be more correctly
identified with 135 Tauri of 9° 10′ S. latitude, and true
longitude of 83° 20′ in 1690 A.C. Its precession in 1,062 years
would be 18° 15′, yielding a more probable rate of 1° in
$58\frac{1}{5}$ years, and it could not have been in Mithuna before
$628 - 5° 5' \times 58\frac{1}{5} = 332$ A.C. Even calculating at the true
rate of 1° in 61 years, Ārdrā could not have been in Mithuna
before $628 - 5° 5' \times 61 = 318$ A.C.   Putting together the
inferences from the positions of Rēvatī or Bharaṇī, Kṛttikā
and Ārdrā in Mēṣa, Ṛṣabha, and Mithuna respectively, we
may conclude that *c.* 300 A.C. is the earlier limit for the date
of the 11th *Paripāḍal.* On the other hand, it is certain that
c. 700 A.C. is the later limit, as according to the Cinnamanūr
plates the Saṅgham was founded and the victory at Talai-
ālaṅgānam won by ancestors of Māravarman Arikēsari. The
Paripāḍal must therefore be dated between *c.* 300 and
c. 700 A.C. It may also be pointed out that according to the
Paripāḍal the *nakṣatras* were not Kṛttikādi, as in that case
Rēvatī or Bharaṇī should be in Mīna, not Mēṣa.

We are then told that Venus was in Ṛṣabha (30° to 60°),
Mars in Mēṣa (0° to 30°), and Mercury in Mithuna (60° to 90°).
Then we have the phrase *aṅgi uyar niṟpa*. Parimēḷaḷagar
says this means that Kṛttikā was in the zenith. If this is
right, the Sun was in 90° + 39° = 129°, and Venus and
Mercury, whose maximum distances from the Sun are 48°
and 26°, cannot have longitudes less than 81° and 103°,
which are at least 21° and 13° beyond the required positions.
Uyar cannot therefore mean " Zenith ", but only " visibly
high up ". Again, *aṅgi* may mean either Kṛttikā (the asterism
of Agni) or the asterism Agni, identified with β Tauri, whose
longitude in 1690 A.C. was 78° 14′. Jupiter is said to be in
Mīna (330° to 360°). The position of Saturn is indicated by
the words *villir kaḍai makara mēva*. Parimēḷaḷagar takes it

to mean that Saturn was in Makara (270° to 300°). But in that case, the mention of *vil* (Dhanu) has no significance. It will be noticed that Mars, Venus, Mercury, and Jupiter are all in what are astrologically known as *svakṣētras* (own houses), and it is possible that Saturn was really in Dhanu, but Nallanduvanār was influenced by the astrological notion of planets in *svakṣētra* indicating heavy showers to link Dhanu with Makara in placing Saturn. If so, we have to consider the possibility of Saturn being in Dhanu (240° to 270°), especially as Nallanduvanār was acquainted with the *svakṣētras* of planets (*panguvin illattuṇai*) and the theory of *vīthīs*. Then we have the words *pāmbollai madiya maraiya varunāḷil*. They naturally mean that a lunar eclipse was shortly expected, though it is possible to take them to mean that the moon set in the region of Āślēṣa (the asterism of Sarpa). Agastya (Canopus) is then said to be in Mithuna (60° to 90°), but there is no reference here to its heliacal rising, which in Varāha-mihira's time (*c.* 500 A.C.) happened when the Sun was in 143°. The longitude of Canopus in 1690 A.C. was 100° 46′, and so in *c.* 300 A.C. its longitude was 100° 46′

$$- \frac{(1690-300)}{61} = 78°.$$

Since Agastya (at least 78°) is said to have been above the horizon, the Sun's longitude cannot be less than 78°. Nor can it be more than 108°, as Venus, whose maximum distance from the Sun is 48°, was between 30° and 60°. The Sun's longitude was therefore between 78° and 108°, and the solar day must have been between the 81st and the 111th. Between the 81st and 111th solar days, the mean longitudes of the major planets, corresponding to their geocentric ones, Saturn (240° to 300°), Jupiter (330° to 0°), and Mars (0° to 30°), are Saturn (243° to 306°), Jupiter (321° to 348°), and Mars (314° to 351°). Between these same solar days in 1 B.C. their mean longitudes were Saturn (73° to 74°), Jupiter (170° to 172°), and Mars (297° to 313°). The required increases in their mean longitudes are therefore : Saturn (169° to 233°),

Jupiter (149° to 178°), and Mars (1° to 54°).   Between 300
and 700 A.C., these increases are found only in 397 A.C. and
634 A.C.   The increases in 397 A.C. are Saturn 171°, Jupiter
168°, and Mars 28°, and in 634 A.C. the increases are Saturn
187°, Jupiter 161°, and Mars 31°.   But in 397 A.C. there was
no lunar eclipse between the 81st and 111th solar day, while
in 634 A.C. there was a lunar eclipse on Āshādha Paurṇamī,
16th June (89th solar day), the Paurṇamī *tithi* ending at
·94 of the day.   At daybreak on that day the planets were
all in their required positions, Saturn 257°, Jupiter 341°,
Mars 18°, Venus 43°, and Mercury 69°.   Since 634 A.C. is
only six years after Brahmagupta, the longitude of Kṛttikā
was then 39° and, the Sun being then in 86°, the asterism,
if it is the *aṅgi* of the text, was 47° above the horizon.   If,
on the other hand, the asterism was Agni, its longitude was

then $78° \ 14' - \dfrac{(1690-634)}{61} = 61°$, and it was 25° above the

horizon.   The longitude of Agastya in that year was 100° 46′

$- \dfrac{(1690-634)}{61} = 83°$, i.e. it was in Mithuna ;   and it is well

known that the monsoon generally begins about the 16th June.
The 16th June, 634 A.C., is therefore the only date that
completely satisfies the astronomical data of the *Paripāḍal*,
and the credit for discovering it is due to Mr. Svāmikaṇṇu
Piḷḷai, though his demonstration left much to be desired.
It will be noticed that this date for the *Paripāḍal* is in perfect
agreement with the date for the Saṅgham age (seventh
century A.C.) determined by me on other grounds, in my
paper on " The Date of Māṇikyavācaka " (*Journal of the
Mythic Society*, vol. 22, pp. 54–5).

78.   CALCUTTA.
                                    1st November, 1931.