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**THE RĀMĀYANA
ITS ORIGIN AND GROWTH
A STATISTICAL STUDY**

By
M. R. YARDI

**Bhandarkar Oriental Research Institute
Poona 411 004 (India)
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APPENDICES

Paper III

POSTSCRIPT

The results of this statistical study have to be accepted with the following reservations. As the statistical tests are based on the law of large numbers, the statistical study can disclose stylistic differences only between sufficiently large groups of sargas. Whether a particular sarga in any group or stanzas in a sarga have been added by a later redactor cannot be determined by the statistical method. If, however, a sarga or group of stanzas in a sarga refer to incidents mentioned by a later redactor, there is a strong presumption that they have been added by him. Likewise if external evidence suggests that a sarga or a passage therein is likely to be a later addition, it should be possible to examine whether it is supported by statistical evidence. It is now proposed to examine such cases.

2. In the study of *Bālakāṇḍa*, it was found that the sargas 1-13 and part of sarga 17 belonged to the R-group. However, after the study was completed, it was found that sargas 1 and 3 contain summaries which differ significantly in some respects. The short summary in sarga 1 (last 125 lines) mentions the accounts of Rāma's encounters with Śūrpaṅkhā, Kabandha and Śabarī, which have all been added by Sūta. Sarga 3, which gives a larger summary, refers to *Sitāt̥yāga*, which was found to have been incorporated later by the author of the U-style. These facts would indicate that sarga 3 has been added by the author of the U-style.

3. Sarga 3 has the mean square 864 with variance 96 (d. f. 9). If we compare this variance with the U-style variance 36.69 (d. f. 1350), we have $F > 1 = 2.62$, $n_1 = 9$, $n_2 = 8$, which is less than its tabular value 3.33. We, therefore, take it out of the R-group and include it in the U-group.

4. It will have to be examined whether the short summary in sarga 1 (last 125 lines) has been contributed by Parvasaṅgrahakāra, who has also added the summary of *Mbh.* in *Parvasaṅgraha* (Chap. 2). The first 35 lines of sarga 1 have the mean square 344.1 (d. f. 1) and the last 125 lines the mean square 2394.9 (d. f. 8). The degrees of freedom 9 have been divided in proportion to their mean squares. If we compare the variance of the second part 299.36 (d. f. 8) with the variance of the β -style (1071.89, d. f. 99), we get $F > 1 = 3.58$, $n_1 = 99$, $n_2 = 8$, which is less than its tabular value 3.74. And so these last 135 lines of sarga 1 could belong to β -style. The first 35 lines of sarga 1, sargas 2 and 4 have the mean square 323.6, 1164.0 and 773.6 totalling 2261.2 with variance 119.01 (d. f. 19) and so belong to the R-group.

5. It was found later (para 15) that the sargas 105 and 107 of the *Yuddhakāṇḍa* which refer to Rāma as an incarnation of Viṣṇu, have been added by Sūta. If so, the proper occasion for Sūta to mention it was in the *Bālakāṇḍa*. But the three sargas which mention Rāma as an incarnation of Viṣṇu have the mean square 993.8 with variance 36.81 (d. f. 27) and so were included in the U-group. But they could very well belong to the α -style, as the comparison of their variance with the α -style variance 55.52 (d. f. ∞) gives $F > 1 = 1.51$, $n_1 = \infty$, $n_2 = 27$, which is less than its tabular value 1.83. Thus the revised position of *Bālakāṇḍa* is as follows : (i) The Sargas 1 (first 35 lines), 2, 4, 5-13 and 17a belong to the R-group; (ii) Sargas 14-16, 17b, 18-21, 29-95 belong to the α -group and (iii) Sargas 3 and 22-28 belong to the U-group.

6. We now take up *Uttarakāṇḍa* Sargas 1-38 which were originally included in the R-group. Some of these Sargas refer to the birth of Śūrpanakhā, a character created by Sūta (pp. 15, 16) and Kumbhakarna, a character created by Harivaṁśakāra (p. 19). On a further scrutiny of sargas 1-40, it was found that the sargas 23-34 have the mean square 17259.4 with variance 159.81 (d. f. 108) which belong to the C-style (171.51 d. f. ∞). For if we

compare their variances, $F > 1 = 1.07$, $n_1 = \infty$, $n_2 = 108$, which is less than its formula value 1.33. These Sargas have been added by Harivaṃśakāra. The remaining Sargas (excluding 23-34), have the mean square 19640.5, with variance 77.94 (d. f. 252). If we compare it with the B-style (variance 87.08, d. f. ∞), we get $F > 1 = 1.12$, $n_1 = \infty$, $n_2 = 252$, which is less than its formula value 1.2. If we compare it with the α -style (55.52, d. f. ∞), we get $F > 1 = 1.4$, $n_1 = 252$, $n_2 = \infty$, which is more than its formula value 1.1. These sargas, therefore, belong to the B-style and have been added by Sauti.

7. Thus of the sargas 1-40 of *Uttarakāṇḍa*, Harivaṃśakāra has added the sargas 23-34, the rest being added by Sauti. Thus the whole of *Uttarakāṇḍa* contains later additions made by Sauti, Harivaṃśakāra and the author of the U-style.

8. In sargas 74, 75, and 77 of the *Ayodhyākāṇḍa*, when Bharata decides to visit Rāma to persuade him to return to Ayodhyā, he takes a large army with him. So he constructs a road by filling up dips, levelling up bumps, building bridges and even planting trees on the roadside. Sankalia¹ remarks that the various artisans, technicians, craftsmen and engineers would do credit to a modern Municipal Corporation and Public Works Dept. These sargas have a mean square 1368.1, with variance 50.67 (d. f. 27) and have been added by Sūta.

9. Sarga 83 belongs to the Guba episode (2.78-81), describing Guba's encounter with Bharata. This sarga has a mean square 316.4 with variance 35.16 (d. f. 9) and so has been added by the author of the U-style.

10. Sarga 85 describes the royal reception given by sage Bharadvāja to Bharata. Sankalia (pp. 57-58) questions its propriety on the ground firstly that instead of giving a fare suitable to his way of living, the sage has given them a sumptuous feast by using his magical powers. Secondly he points out that the

1. ABORI., Dimond Jubilee Volume, 1978, p. 912.

occasion is inappropriate as the entire party was in mourning after the demise of Daśaratha. This Sarga has a mean square 3934.9 with variance 437.21 (d. f. 9). Comparing this with the β -style variance (1071 89, d. f. 99) we get $F > 1 = 2.45$, $n_1 = 99$, $n_2 = 9$, which is less than its formula value 3.31 and belongs to the β -style and so this Sarga has been added by the Parvasaṅgrahakāra.

11. In Sarga 94, Rāma fires at Bharata a volley of questions about the administration of his kingdom without waiting for a reply to his question about the purpose of his visit. If he had waited for his reply, he would have known that Bharata had declined to be king of Ayodhyā. Prof. Edgerton in his note on the Addenda and Corrigenda to the Sabhāparvan of *Mbh.* (pp. 489-91) has pointed out that about 37 stanzas of *Rāmāyaṇa* have their parallel in the *Mbh.* II. 5. The *Kaccit* sarga of *Mbh.* has been added by Sauti (*MGG.* p. 157). However, the mean square of sarga 94 is 1376.4 with variance 152.93 (d. f. 9) which *prima facie* exhibits the C-style. This sarga has been added by Harivamśakāra, who has modelled it on the *Kaccit* sarga of *Mbh.*

12. In the *Kiṣkindhākāṇḍa*, the sarga 43 also seems to belong to the group 44-54, as its mean square is 166.4 with variance 18.49 (d. f. 9).

13. In sarga 25 of the *Sundarakāṇḍa*, Trijaṭā tells Sītā her dream in which she saw the invasion and destruction of Laṅkā by Rāma. In this sarga the female guards of Sītā threaten her that they will eat her up if she did not yield to *Rāvṇa*. The mean square of this sarga is 1110.4 with variance 123.38 (d. f. 9). There is, therefore, a strong probability that this sarga has been added by Harivamśakāra.

14. Since Laṅkā was situated on the Trikūṭa hill surrounded by *sāgara*, a big lake, it did not need any artificial fortification as described by Harivamśakāra (5.2). The *Yuddhakāṇḍa*, sarga 3 also describes how Laṅkā is protected by a rampart, a mote and a formidable causeway. Although this sarga has been included in

the original *Rāmāyaṇa*, it has a mean square 730.4 with variance 81.16 (d. f. 9), which at first sight seems to exhibit the B-style. But if we compare it with the C-style (variance 171.51, d. f. 1773), we have $F > 1 = 2.11$ $n_1 = \infty$, $n_2 = 9$, which is less than its tabular value 3.35 and so it could very well have been added by Harivamśakāra.

In the *Yuddhakāṇḍa*, sarga 46 (lines 100) with mean square 2636.9 describes the fight between Nīla and Prabhasta, in which Prabhasta is killed. Since both these were appointed as generals of their respective armies, this should properly belong to the original *Rāmāyaṇa*.

Again the sargas 80-82 refer to lamentations of the Rākṣasa women who curse Śūrpanakhā as the cause of all this calamity and the killing of Kabandha, which do not figure in Vālmīki's *Rāmāyaṇa*. They also contain Rāvaṇa's intention to kill Sītā which even in anger is out of character for him. These three sargas have the mean square 3896.5 with variance 144.31 (d. f. 27). If we compare it with the C-style variance (171.51, d. f. ∞), we get $F > 1 = 1.19$, $n_1 = \infty$, $n_2 = 27$, which is less than its tabular value 1.85. The sargas 80-82, therefore, exhibit the C-style, and have been added by Harivamśakāra.

15. The sargas 103-108 of the *Yuddhakāṇḍa* describe the ordeal by fire of Sītā in which the sargas 105 (5-10) and 107 (17-30) mention Rāma as an incarnation of Viṣṇu. A further scrutiny showed that these six sargas have the mean square 2991.7 with variance 55.4 (d. f. 54). These sargas, therefore, display the α -style and have been added by Sūta. It is to be noted that the short summary in *Bālakāṇḍa*, sarga 1 also does not mention it.

16. The results of this statistical study may be summarised as follows. The Critical text of *Rāmāyaṇa* describes six different styles, represented by distinct variances within the sargas with their degrees of freedom as shown below :

Table

Style	Variance	Degrees of Freedom
R	105.34	2214
α	48.45	929
B	77.73	288
C	180.21	639
β	629.97	26
U	36.57	1332

The style R has been identified as the style of Vālmīki (12th century B. C.) as it contains most of the important elements in the Rāma story. The styles α , B, C and β belong to Sūta and Sauti, father and son (5th century B. C.), Harivaṁśakāra (2nd century B. C.) and the Parvasaṅgrahakāra (1st century B. C.), who were also the redactors of the *Mahābhārata* (MGG. chap. IX). The U-style is entirely distinct from the other styles and its author lived in the first century A. D. (pp. 50, 57). The Critical Edition consists of 18040½ ślokas. The respective shares of the original *Rāmāyaṇa* and the contribution made by the later authors are as follows: Original *Rāmāyaṇa* 8305½ ślokas (46%) the additions made by Sūta being 2547 (14%), by Sauti 810 (4.5%), by Harivaṁśakāra 2940½ (16%), by Parvasaṅgrahakāra 271½ (1.5%) and by the author of U-style 3166 (18%).