Grammar problem found in Panini's 'Ashtadhyayi' solved

December 19, 2022

In news– Recently, a Cambridge scholar Dr Rishi Rajpopat claims to have solved Sanskrit's biggest puzzle–a grammar problem found in the 'Ashtadhyayi', an ancient text written by the scholar Panini.

What exactly was the problem?

- Written more than 2,000 years ago(4th century BC), the **'Ashtadhyayi' is a linguistic text that set the standard for how Sanskrit was meant to be written and spoken**.
- **It delves deep into the language's phonetics, syntax and grammar,** and also offers a 'language machine', where you can feed in the root and suffix of any Sanskrit word, and get grammatically correct words and sentences in return.
- To ensure this 'machine' was accurate, **Panini wrote a set of 4,000 rules** dictating its logic. But as scholars studied it, they found that two or more of the rules could apply at the same time, causing confusion.
- To resolve this, Panini had provided a **'meta-rule' (a rule governing rules),** which had historically been interpreted as:

- *'In the event of a conflict between two rules of equal strength, the rule that comes later in the serial order of the 'Ashtadhyayi' wins'.*
- However, following this interpretation did not solve the machine's problem.
- It kept producing exceptions, for which scholars had to keep writing additional rules. This is where Dr Rishi Rajpopat's discovery came through.

The solution-

- **In his thesis titled 'In Panini We Trust', Dr Rajpopat took a simpler approach,** arguing that the meta-rule has been wrongly interpreted throughout history; what Panini actually meant, was that for rules applying to the left and right sides of a word, readers should use the right-hand side rule.
- Using this logic, **Dr Rajpopat found that the 'Ashtadhyayi' could finally become an accurate 'language machine'**, producing **grammatically sound words and sentences almost every time.**
- The discovery now makes it possible to construct millions of Sanskrit words using Panini's system—and since his grammar rules were exact and formulaic, they can act as a Sanskrit language algorithm that **can be taught to computers.**
- According to Dr Rajpopat, it took a long time to crack the 'puzzle', because of how Sanskrit academia has operated so far, where scholarship is built upon the writings of other scholars, and not necessarily the original text.
- Katyayayana, another ancient scholar, was also familiar with two interpretations of Panini's work. But according to Dr Rajpopat, Katyayana misunderstood the meta-rule, and his wrong interpretation got compounded over centuries.

About Panini-

- Panini probably lived in the 4th century BC, the age of the conquests of Alexander and the founding of the Mauryan Empire, even though he has also been dated to the 6th century BC, the age of The Buddha and Mahavira.
- **He likely lived in Salatura (Gandhara),** which today would lie in north-west Pakistan, and was probably **associated with the great university at Taksasila,** which also produced Kautilya and Charaka, the ancient Indian masters of statecraft and medicine respectively.

- By the time Panini's great grammar, the '**Ashtadhyayi'** was composed, Sanskrit had virtually reached its classical form — and developed little thereafter, except in its vocabulary.
- Panini's grammar, which built on the work of many earlier grammarians, effectively stabilised the Sanskrit language. The earlier works had recognised the root as the basic element of a word, and had classified some 2,000 monosyllabic roots which, with the addition of prefixes, suffixes and inflexions, were thought to provide all the words of the language.
- **The Ashtadhyayi laid down more than 4,000 grammatical rules,** couched in a sort of shorthand, which employs single letters or syllables for the names of the cases, moods, persons, tenses, etc. in which linguistic phenomena are classified.
- The *Ashtadhyayi* is **an eight-chapter treatise on the phonetics, semantics (meanings), and syntax (arrangement of words) of classical Sanskrit, as laid out by the grammarian** and scholar *Daksiputra Panini*.
- It treats the language as formulaic and rule-bound — engineered, in a sense — and offers differences between how Sanskrit is spoken, versus how it ought to be used in sacred texts.
- **Apart from its contribution as a 'language machine**' (not a literal one, but a conceptual model), the *Ashtadhyayi* has also been used to glean cultural, religious and geographic information about ancient India.
- Since the discovery and publication of his work by European scholars in the nineteenth century, Pāṇini has been considered the "first descriptive linguist",and even labelled as "the father of linguistics".
- **Later Indian grammars such as the Mahabhasya of Patanjali (2nd century BC) and the Kasika Vritti of Jayaditya and Vamana (7th century AD), were mostly commentaries on Panini.**