The monkey on the tree and other dilemmas

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First words . . .

- ▶ Thanks to Wang Yi for this opportunity and to Zhejiang University for the wonderful atmosphere.
- ▶ Please feel free to interrupt any time to comment or question.
- ▶ `Statutory Warning`: I am not a Sanskrit scholar or expert on the ancient Indian systems of logic, am only sharing what I have learned from secondary sources.

Acknowledgements: 1

Bimal Krishna Matilal

- Bimal Krishna Matilal (1935 — 1991): an influential Indian philosopher who wrote extensively on the Indian philosophical tradition in logic.

- From 1977 to 1991 he was the Spalding Professor of Philosophy at University of Oxford.

Acknowledgements: 2

Jonardon Ganeri

- Jonardon Ganeri is a philosopher whose work spans the philosophy of mind, metaphysics and epistemology. He is the editor of the Oxford Handbook of Indian Philosophy (2017).

- The Open Minds magazine named him of one of its 50 global open minds for 2016. He is currently in New York.

- Almost everything I am talking of here is from Ganeri's writing, and the Stanford Encyclopaedia of Philosphy.

Perspectives on logic

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- **Linguistic**: Use the forms of linguistic expressions to identify forms of inferences and arguments. This is the modern method.

Indian philosphers seem to have been mostly preoccupied with the first three.

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- Panini's Ashtadhyayee: the worlds earliest extant grammar.

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- ▶ Logical principles of reasoning such as the principle of non-contradiction, the principle of excluded middle and the principle of double negation.
- ▶ Some authors isolated canonical forms of argument.

Early logicians

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- Bhartrhari (6th CE), eminent grammarian and philosopher of language, Vakyapadeeya (On sentences and words): elaborate discussion on the excluded middle.

Arguments with form

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- Xian chang sheng jiao lun (Treatise which reveals and disseminates the wise teachings), and Shun zhong lun (Treatise on following the middle way).

Central concepts

Canonical arguments by similarity (supaksha) or dissimilarity (vipaksha).

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- Alongwith corroboration by illustration, include an explicit step for generalization.

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- Sankarasvamin (c. 6th century CE): Nyaya-pravesha (Beginning logic).

The epistemic shift

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- ▶ Jain thinker, Jinabhadra (6th CE): relation to deduction.
- ▶ Mimasa thinker, Kumarila Bhatta (c. early 7th century CE): application to deontic reasoning.
- ▶ Central structure of argument: the universal and the particular; which properties are inherited, and how; limits to knowledge.

Navya Nyaya

Two traditions, the Nyaya (grounded in Gautama's Nyaya-sutra, c. 100 C.E., dealing with logic, epistemology, and debate), and Vaisheshika (grounded in Kanada's Vaisheshika-sutra, c. 100 B.C.E., dealing with ontology), developed in parallel.

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- Development for about four centuries, the works of Raghunatha, Jagadisha and Gadadhara.
- Several manuals or compendia in the 17th and 18th centuries: Annambhatta's The Manual of Reason (Tarkasamgraha).

Ontology

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- ▶ Metaphysical truth is somehow to be derived from these.

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- ► This gets more sophisticated, moving to *n*-place relations. (Mars and Venus are two planets; hence they are in a binary relation.)

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- Motion: Long discussions on motion and causation.
- Notions like rest, impetus, elasticity, fludity, etc. Discussions on 'special' types of motion such as "the movement of an iron needle towards a magnet, the upward motion of flames, the movement of air, and the initial motion of the atoms at the beginning of creation".

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- The potter-pot example: what caused the pot ?
- The thread-cloth example: the threads from which it is woven, the weaver, the shuttle, the loom, etc.
- The axe-tree example: the felling of the tree is caused by the axe, its contact with the tree, the axeman, etc.

Types of cause

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- Instrumental cause: the weaver's shuttle or the weaver herself.

Model of causation

A formal distinction is made between causes and non-causes.

- c is a causal factor for e iff
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- Extensive discussion distinguishing the threadcolour-cloth regularity and the thread-cloth regularity.

Perceptual acts

What is common to all the perceptions below ?

- Looking out of the window, I see that the sky is blue.
- I sense that the air is cold.
- I see too that there is nobody on the street.
- In the corner of the room, I notice something coiled up, which I perceive to be a piece of rope.

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- To see that the passing animal is a horse, one must first possess the concept horse, by means of previous acquaintance with the type.
- What happens when I see a new shade of blue on a vase ?
- Perceptual illusions are explained as cases in which a wrong feature is recalled from memory.

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- Much discussion on 'false memory'.

Doubt

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- Related notion: 'tarka' or "Suppositional Thinking".

Inferential Warrant

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- Typical example: wherever there is smoke there is fire.
- Knowledge of this relation is the instrumental cause in the inferential process.

Defining pervasion

Gangesha considers and rejects 21 definitions of vyapti before offering one of his own !

- ▶ The 'No Counter-Example' Definition:

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- ▶ The monkey on the tree example.

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- ▶ A sophisticated theory of partial relations.

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Gangesha's definition of vyapti:

- $Pervades(S, H)$ iff
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- Note the second order quantification.

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- Such sentences, though grammatically correct, do not make sense.
- An utterance is intelligible only if the proposition expressed is ontologically possible.

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- ▶ The Naiyayikas offer a fascinating account of language acquisition by children to argue that general features of the sentence are enough to connect the meaning-relations.

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- Discussion on identity and equality.

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Closing remarks

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- ▶ Indexical reasoning in Nyaya has relevance to modern modal logics.
- ▶ Interesting connections to argumentation theories.
- ▶ Emphasis on everyday reasoning and empirical structure may have some relevance for logics in artificial intelligence.
- ▶ A surprising lack of connection with the development of mathematics in India (which was led mostly by astronomy).

Discussion time

Thank you.
Questions, comments, suggestions welcome; also, please write to jam@imsc.res.in.

Welcome to ICLA / ISLA

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- ICLA 2021 will be at IIT-Goa, co-located with WOLLIC.

Welcome to Chennai!