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The Nyāya School of Indian Philosophy

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The Nyāya school of philosophy deals with questions of logic, causation, epistemology, and soteriology. These topics are grounded in, and have implications for, concepts of cognition, perception, and the self. Nyāya philosophy is concerned with attaining liberation through knowledge: for the Nyāya school, valid cognitions are the means through which one gains knowledge without illusion or doubt, and by which one can therefore get rid of misconceptions and suffering. This article provides an overview of Nyāya thought in this regard, beginning with the Old Nyāya school, pioneered by Gotama Akṣapāda, and its soteriological and epitemological scheme centred around sixteen grand categories. This is followed by a discussion of the Neo Nyāya – which emerged from the Old Nyāya and Vaiśeṣika schools – introducing its grand categories, epistemology, epistemic instruments, and technical language. The article concludes with a consideration of the lasting contribution of the Neo Nyāya school of logic.

Keywords: Indian philosophy, Nyāya, Vaiśeṣika, Logic, Epistemology, Causation, Knowledge, Perception, Cognition, Soteriology

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1 Introduction

The Nyāya is the Indian school of logic, pioneered by Gotama Akṣapāda, which focuses on epistemology. The fundamental unit of the Nyāya epistemology is cognition (*jñāna*): a piece of cognition is either recollective (i.e. memory or *smṛti*) or fresh (i.e. *anubhava*). A doubt (*saṃśaya*) too is a cognition. Any cognition presents an object (*artha*) to the epistemic subject (i.e. cognizer or *jñātṛ*). When it presents an object as it is, the cognition is valid (*pramā*), and it is invalid (*apramā*) otherwise.

The *Nyāya-bhāṣya* (NB) of Vātsyāyana defines 'Nyāya' as 'the examination (*parīkṣaṇam*) of an object of interest (*artha*) by the epistemic instruments (*pramāṇa*)' (*Nyāyadarśanam* [ND] 3). Here an 'object of interest' is either pain or pleasure (*sukha* or *duḥkha*) or something that causes pain or pleasure (NB in ND 1). One desires that which causes one pleasure and avoids that which causes one pain.

These principles can be illustrated through the following examples. One examines something that one either desires or tries to avoid. However, one's successful attainment or avoidance of it depends on knowledge of that which is desired or undesired. Knowledge of these is gained through epistemic instruments. While thirsty, I see a liquid, and cognize 'this is water', and drink it. Here, the success of my activity and effort depends on my cognition. If my thirst gets quenched, I infer that my cognition of water is valid. According to the Old Nyāya, the epistemic instrument in this case is the sensory connection (*sannikarṣa*) between my eyes and the liquid in question, and it acts as the means to attain a right cognition. Suppose I come to know that 'there is water in that well' upon being told so by John. Now, my epistemic instrument is verbal testimony (*śabda*), which is the words of John. If I hear the burble of a waterfall, and cognize, 'there is water somewhere here', my epistemic instrument is inference (*anumāna*). Also, I may know referents of names through analogy (*upamāna*). The science of Nyāya is basically the study of epistemic instruments. In a narrower sense, 'Nyāya' is *ānvīkṣikī*, an inference based on perception and the words of authentic sources (*āgama*; NB in ND 3). When I infer a solar eclipse on the basis of astronomical texts, or fire after having seen smoke, my inference is *ānvīkṣikī*.

'Nyāya', which has been equated with *ānvīkṣikī*, refers to a particular methodology. However, it is also a philosophical school. Ancient Indian texts such as *Mānava-dharma-śāstra*, *Artha-śāstra* etc. classify all sciences into four categories: the three Vedas (*trayī*), trade and agriculture (*vārtā*), politics and administration (*daṇḍa*), and reasoning (*ānvīkṣikī*). According to Uddyotakara, the author of the Nyāya-vārttika (NV), each science has its own *summum bonum* (*niḥśreyasa* or the highest good) and a special means to attain the *summum bonum* (NV in ND 14). Thus, the *summum bonum* of politics and administration is victory (*vijaya*) that is to be attained through knowledge of such things as warfare. In every science, the means to attain the highest good is the right cognition (*tattva-jñāna*)

of the relevant things (NV in ND 14). The Nyāya philosopher Uddyotakara regards the Nyāya as the science of self-knowledge (*adhyātma*), which uses reasoning as its main methodological tool (NV in ND 14). For the Naiyāyikas (followers of the Nyāya school), the main purpose of learning the Nyāya is to put an end to suffering.

2 The Old Nyāya

The oldest Nyāya text is the *Nyāya-sūtra* (NS) composed by Gotama Akṣapāda (sometime between sixth century BC and second century CE). A succession of texts followed this work, beginning from the second century CE with Pakṣilasvāmin Vātsyāyana's commentary on NS called the *Nyāya-bhāṣya* (NB). Uddyotakara wrote *Nyāya-bhāṣya-vārttika* (NV) in the sixth century, which is an elaborate sub-commentary on the NB. In the ninth century, Vācaspatimiśra wrote a commentary on NV called *Nyāya-vārttika-tātparya-ṭīkā* (NT). *Nyāya-vārttika-tātparya-pariśuddhi* (NTP) is a commentary by Udayana (tenth century) on the NT. Another very important work on the Old Nyāya is Jayanta's *Nyāya-mañjarī* (tenth century). Udayana's *Nyāya-kusumāñjali* and *Ātma-tattva-viveka* are also great works of the Old Nyāya school.

2.1 The soteriological scheme

The Old Nyāya school studies sixteen grand categories (*padārtha*) such as the epistemic instrument and the object of valid cognition. For the Naiyāyikas, the purpose of studying these categories is to understand the true nature of the self and, consequently, attain liberation (*mokṣa*). The Naiyāyikas' definition of liberation is negative, in the sense that it is a riddance to (or the absolute absence of) suffering. In NS 1.1.2, Gotama describes the genesis of suffering (ND 150):

(a) The naïve person has several misconceptions (*mithyā-jñāna*). To them, the body appears to be the self, pains appear to be pleasures, the temporary appears to be the permanent, and liberation appears to be destruction (NB on ND 150).

(b) Since they do not realize that both pain and pleasure are equally problematic, in order to achieve pleasure and avoid pain they develop mental defects (*doṣa*) – such as liking (*rāga*), disliking (*dveṣa*), and mindless attachment (*moha*). These in turn cause subsidiary defects like dishonesty (*asatya*), jealousy (*īrṣā*), and greed (*lobha*).

(c) Under the influence of these fundamental defects, the individual gets involved in good or bad activities (*pravṛtti*), earning merit (*dharma*) or demerit (*adharma*). *Pravṛtti* denotes both an activity and its fruit in terms of merit or demerit.

(d) In order to reap the fruits of their actions, the individual has to be born again and again (*janma*).

According to this account, anybody who is born has to suffer (NB on ND 150). To find a way out of suffering, the Naiyāyikas assert that by attaining the right cognitions about the

self etc., one gets rid of misconceptions. This is similar to getting rid of the illusory snake one mistakenly sees in a rope. When one knows the rope, the snake disappears. If the misconceptions mentioned in (a) are destroyed, all the subsequent effects of (a) in this schema – (b), (c), and (d) – are destroyed one by one as a result (*uttarottarāpāye tad-anantarābhāvād*; NS 1.1.2 in ND 150). This chain of destruction leads one to liberation. The knowledge of the objects of right cognition (*prameya*), i.e. the self, body, mind, etc., is the direct cause of liberation, whereas the knowledge of the rest of the sixteen grand categories helps one understand the former.

2.2 (OC) The sixteen grand categories (*padārtha*)

The Naiyāyikas are realists. They believe that it is possible to know an external entity as it is. The Nyāya epistemic tetrad consists of knowledge (*pramā*), the object of knowledge (*prameya*), the knower (*pramātṛ*), and the means of knowledge or epistemic instrument (*pramāṇa*). These four encompass everything. In fact, both knowledge and the knower are objects of knowledge. Thus, in practice, there are two categories: objects of knowledge and means of knowledge. This raises the question: why do the Naiyāyikas accept sixteen grand categories? In answer: the Nyāya is supposed to lay down the rules for reasoning, debating, and inferring. Without doubt, counterfactuals, determination, and suchlike, debating is not possible. Therefore, these factors figure on their list of categories (NB on NS 1.1.1 in ND 2). The sixteen grand categories (labelled OC1, OC2, etc.) are outlined below.

2.2.1 (OC1) Epistemic instruments (*pramāṇa*)

A cognition C about the object O is valid (*pramā*) only when C captures the truth (*tattva*) of O as it is (*yathā-bhūta*), not as something else (*aviparīta*; NB in ND 1). When one looks at a snake and cognizes, 'this is a snake', the cognition is valid. If one looks at a rope and cognizes, 'this is a snake', the cognition is invalid since it does not capture the object as it is.

The causal instrument of a valid cognition is an epistemic instrument (*pramāṇa*). For the Old Nyāya, the *causal instrument* (*karaṇa*) for an effect E is that causal factor (kāraṇa) immediately after which E takes place (*phalāyoga-vyavacchinna*). When the axe hits the tree the latter falls. Thus, for felling a tree, the causal instrument is the dynamic contact between the axe and the tree. For taking a picture, the causal instrument is pressing the shutter-release button.

For the perceptual cognition C, the *epistemic instrument* is the sensory connection (*sannikarṣa*) between the eye and the object; for immediately after this connection is established, one cognizes C. We shall discuss the four epistemic instruments of the Old

Nyāya school in the following subsections. This is the most important category, since epistemic instruments are the doorway to valid cognitions.

2.2.1.1 (OC1E1) Perception (*pratyakṣa*)

The author of NB says that one perceives the object O when one's self is connected with one's mind (*manas*), and one's mind with a sense faculty (*indriya*), and the sense faculty with O (NS 1.1.4 in ND 197). Due to its atomic dimension, the mind can be connected only with one sense at a time. Simultaneous perception is an illusion; it actually consists of momentary perceptions that take place very fast, like the fire-wheel created by a firebrand whirled in the air. The sense faculty becomes connected with O through a sensory connection (*sannikarṣa*). Essentially, this connection is the epistemic instrument for perceptual cognition.

NS 1.1.4 defines perceptual cognition as follows: perceptual cognition is (a) generated by the sense-object connection (*indriyārtha-sannikarṣotpanna*); (b) non-verbal (*avyapadeśya*); (c) true to its object (*avyabhicāri*); and (d) doubt-free, that is, certain (*vyavasāyātmaka*; for a detailed discussion, see Matilal 1986: 228–229). When a person's eyes get connected with a cat, and they cognize it as a cat, the person attains a valid perceptual cognition. The cognition is true to its object. A doubt presents multiple contrary objects (e.g. 'is this a cat or a civet?'). A valid perceptual cognition must be doubt-free, since it cannot have contrary objects (A and B are contrary when they both cannot be true at the same time). It is non-verbal because it occurs at the preverbal state. One has to see a cat prior to calling it a 'cat'. Perception is a prerequisite for verbally defining an object.

2.2.1.2 (OC1E2) Inference (*anumāna*)

Every inference is based on perception (*tat-pūrvaka* NS 1.1.5 in ND 291). Take this example. First the epistemic subject observes the correlation between the reason (*liṅga*) and the target (*liṅgī*); for instance, 'every locus of smoke is a locus of fire'. After having observed this, when they see smoke (i.e. the reason) on a hill, they remember its special relation with fire. Finally, they infer fire. Here, the hill (i.e. the locus of the target) is the site (*pakṣa*). The target (i.e. fire) is inferred, not perceived (*apratyakṣo 'rtho 'numīyate*; NB on NS 1.1.5 in ND 291). In this case, inference qua epistemic instrument is basically the cognition 'this hill has smoke, which implies fire', while the inferential cognition is, 'this hill has fire' or, alternatively, 'this hill is a fire-possessor (*vahni-mān*)' (thus 'x is y' is equivalent to 'x has y-hood').

NS 1.1.5 mentions inferences of three types:

(a) cause-based (*pūrva-vat*), which is inferring the effect from the cause – for example, inferring future rain from dark heavy clouds (NB on NS 1.1.5 in ND 291);

(b) effect-based (*śeṣa-vat*; more literal translations of *pūrva-vat* and *śeṣa-vat* could be 'from the antecedent' and 'from the consequent' respectively), which is inferring the cause from the effect – for example, inferring that it rained in the recent past from the rising water level in the river (NB on NS 1.1.5 in ND 291);

(c) general-observation based (*sāmānyato-dṛṣṭa*), in which the occurrence of the target in the site cannot be perceptually known. A self (*ātman*) is not perceptible. Therefore, nobody can perceptually check whether it exists. Still, one can infer it from special attributes such as desires. Based on the observation that an attribute must be housed in a substance (e.g. a colour in an object), it follows that desire, aversion, etc. too must have a substance that houses them. That substance is the self (NB on NS 1.1.5 in ND 292).

2.2.1.3 (OC1E3) Analogy (*upamāna*)

Suppose John is well aware of leopards, although he has not seen a jaguar. Before going to the American mountains, he asks Xico, 'What does a jaguar look like?' Xico answers, 'Like a leopard, although a jaguar has a barrel-like abdomen whereas a leopard has a slender build'. In a few days John sees an animal that looks like a leopard in the American mountains, and cognizes, 'This must be a jaguar'. Through Xico's comparison, John gets to know the referent of the word 'jaguar'. In this way, according to the Naiyāyika, analogy brings about the knowledge of the relation between a noun and its referent (*saṃjñā-saṃjñi-sambandha*) through a statement of similarity (*sādharmya*; NS 1.1.6 and NB's gloss on it in ND 335). The epistemic instrument for analogical knowledge is the knowledge of similarity (*sādṛśya-jñāna*).

2.2.1.4 (OC1E4) Testimony (*śabda*)

Suppose Ram is looking for his pet cat, and John has seen it in a grey vat. John – in this case – is someone who has direct knowledge of the object in question (*sākṣāt-kṛta-dharmā*; NB on NS 1.1.7 in ND 365). Also, John, who has the desire to convey this message to Ram, acts accordingly (*cikhyāpayiṣayā prayuktaḥ*) when he sees Ram (NB on NS 1.1.7 in ND 365). John is a reliable speaker (*āpta*) here. The words of a reliable speaker are testimony qua epistemic instrument (NS 1.1.7 in ND 365). Here, Ram is the epistemic subject, who attains a valid verbal cognition about something he does not have immediate access to.

2.2.2 (OC2) Objects of valid cognition (*prameya*)

Through the epistemic instruments, the epistemic subject knows objects of twelve types:

(1) The self (*ātman*): that which cognizes, witnesses, and experiences all the mental elements (such as cognition, feelings, etc.) is the self (NB on NS 1.1.9 in ND 382). The self cannot be perceived; it can only be inferred from its unique attributes like cognition (*jñāna*), desire (*icchā*), aversion (*dveṣa*), effort (*prayatna*), pleasure

(*sukha*), and pain (*duḥkha*; NB on NS 1.1.10 in ND 397). This special inference is discussed above in .

(2) Body (*śarīra*): the physical space that houses the experience of pain and pleasure (*bhogāyatana*), the internal effort (*ceṣṭā*), and sense faculties (NB on NS 1.1.9 in ND 382).

(3) The sense faculties (*indriya*): the visual, auditory, olfactory, gustatory, and tactile sense faculties are the means (*sādhana*) to experience pain or pleasure (NB on NS 1.1.9 in ND 382).

(4) The object (*artha*): the physical objects are the five elements, namely earth (*kṣiti*), air (*vāyu*), fire (*tejas*), water (*ap*), and ether (*ākāśa*), and their attributes such as smell (*gandha*), taste (*rasa*), colour (*rūpa*), touch (*sparśa*), and sound (*śabda*; NS 1.1.13–14 in ND 417).

(5) Cognition (*buddhi* or *jñāna*): this is experience (*bhoga*) itself (NB on NS 1.1.9 in ND 382). Cognition reveals objects to the self.

(6) Mind (*manas*): even when multiple sense faculties of a person are connected with their respective objects, that person does not grasp all those objects at a time. This is because the mind as a cognitive channel is atomic, meaning it can connect with one sense faculty at a time. The non-simultaneity of experiences (*yugapaj-jñāna-anutpatti*) proves the existence of the mind (NS 1.1.16 in ND 438).

(7) Activity (*pravṛtti*): this category includes the initiation, operation, and fruits of an action. It belongs either to words, or the mind, or the body (NS 1.1.17 in ND 443). It may be good or bad. Every activity bears fruits, and binds a self through those. The fruits are merit (*dharma*) or demerit (*adharma*).

(8) Mental defect (*doṣa*): these motivate one to do something, i.e. to become engaged in an activity (NS 1.1.18 in ND 443). These are liking, disliking, and mindless attachment.

(9) Reincarnation (*pretyabhāva*): a subject is also an epistemic, ethical, and emotional agent. They have to reap the fruit of their activities. Therefore, they have to be born again and again until their liberation (NS 1.1.19 in ND 446).

(10) Experiential fruit (*phala*): these are the fruits of one's activity. They are mainly pain and pleasure. Things that cause pain or pleasure are also understood as 'fruits' (NS 1.1.20 in ND 448).

(11) Pain (*duḥkha*): everybody experiences and wants to get rid of suffering or pain (NS 1.1.21 in ND 450).

(12) Liberation (*mokṣa*): this is the cessation of suffering (NS 1.1.22 in ND 452).

The Nyāya soteriology is based on the desired tetrad (*artha-pada*) that consists of (a) the rid-worthy (*heya*; something one wants to get rid of is rid-worthy), such as pain; (b) the riddance (*hāna*), that is, salvific knowledge that puts an end to the rid-worthy; (c) the means (*upāya*), i.e. the sacred texts; and (d) salvific freedom (*adhigantavya*), which is liberation (NB on NS 1.1.1 in ND 2). Except for the self and liberation, everything else is

rid-worthy, since it is suffering. Pleasure also figures on the list of the rid-worthy because pleasure binds somebody since it is an experiential fruit and thus ultimately causes suffering. In that sense, pleasure is pain in disguise.

2.2.3 (OC3) Doubt (*saṃśaya*)

Doubt is a cognition that contains contrary objects, e.g.: 'Is this a man or a post?' (NS 1.1.23 in ND 464).

2.2.4 (OC4) Purpose (*prayojana*)

One gets involved in an activity in order to either achieve or get rid of a specific thing, P. P is the purpose of that activity (NS 1.1.24 in ND 494).

2.2.5 (OC5) Example (*dṛṣṭānta*)

See OC7 (section 2.2.7).

2.2.6 (OC6) Thesis (*siddhānta*)

A thesis is an accepted statement. There are theses of four types: (1) assumption (*abhyupagama*); (2) universal thesis (*sarva-tantra-siddhānta*, accepted by all schools concerned); (3) special theses (*prati-tantra-siddhānta*, theses unique to a particular school); (4) corollary theses (*adhikaraṇa-siddhānta*; NS 1.1.26–30, ND 499–504).

2.2.7 (OC7) Limbs of an inference (*avayava*)

When somebody makes an inference for themselves, they can just use this schema: S has T, since S has R. But for convincing others, one needs to use a syllogistic form. The Old Nyāya syllogism has five members. The following is a schematic representation of a five-membered syllogism:

(1) Assertion (*pratijñā*): S has T.
(2) Reason (*hetu*): [Because of the fact that] S has R.
(3) Example (*dṛṣṭānta*): Anything that has R has T. Example: E (for the inference, 'this hill has fire, since it has smoke' an example [E] is 'anything that has smoke has fire, such as a kitchen').
(4) Application (*upanaya*): S is such that if it has R, it has T.
(5) Conclusion (*nigamana*): S has T (NS 1.1.32 in ND 590; see Oetke 2003: 55 for a detailed discussion).

When John uses a syllogism while talking to Mary, his example should be equally accessible to both of them; otherwise, he will fail to convince her that his inference is correct (NS 1.1.25 in ND 497).

2.2.8 (OC8) Evaluative reasoning (*tarka*)

An evaluative reasoning or *tarka* is a reflection (*ūha*) which (i) does not generate certainty, (ii) is applied in order to know whether an under-informed (*avijñāta-tattva*) object has a specific property or not, and (iii) validates just one option by demonstrating its logical fitness and/or demonstrating that the rival option is unfit since it would lead the cognizing subject to something undesired. It does not generate certainty since it does not have its own informative content; it evaluates different options and validates just one. For example, when somebody ponders the question, 'does the largest prime exist?', *reductio ad absurdum* (*prasaṅga-tarka*) validates the option 'there is no largest prime' by demonstrating the absurdity of the option 'the largest prime exists' which leads one to a contradiction. Infinite regress (*anavasthā*) rejects an option that entertains an undesired non-stoppage: if both a small seed and a mountain were infinitely divisible, then one would not be able to account for their size difference. Therefore, one has to accept that after some point one cannot divide a particle any more. The indivisible particle is an atom. Here, an argument based on infinite regress rejects the option of infinite divisibility, and validates the theory of atoms. Ockham's razor (*lāghava-gaurava-tarka*) prefers the most economical option. The circularity *tarka* (*anyonyāśraya*) rejects one's definitions when one defines x in terms of y, and y in terms of x (NS 1.1.40 in ND 580; see Guha 2012 for a detailed discussion).

2.2.9 (OC9) Determination (*nirṇaya*)

After having critically examined both sides of a debate, one gets to know the truth of a thing. That special knowledge is determination (NS 1.1.41 in ND 589).

2.2.10 (OC10) Discussion (*vāda*)

This refers to a philosophical conversation consisting of debates, epistemic instruments, evaluative reasoning, and syllogisms. A *vāda* of a specific philosophical school aims to reach the truth of a matter, and it should be compatible with the main theses of the school (NS 1.2.1 in ND 597).

2.2.11 (OC11) Disputation (*jalpa*)

Disputation is a debate in which one wishes to refute one's opponent by using reasoning based on equivocation (*chala*), misleading arguments (*jāti*), points of defeat (*nigrahasthāna*) and fallacies, and finally, by establishing one's own position (NS 1.2.2 in ND 623).

2.2.12 (OC12) Destructive debate (*vitaṇḍā*)

This is debate that aims to refute the opponent's position. A destructive debate does not establish anything, which means that it does not have a thesis (NS 1.2.3 in ND 629).

2.2.13 (OC13) Fallacy (*hetvābhāsa*)

A fallacy is a defective inferential reason (*hetu*) or a pseudo-reason. It does not have all the properties of a genuine reason (*hetu-lakṣaṇa*). The first property of the reason is (R1) its presence in the site (*pakṣa-sattva*). I cannot infer fire (target) on a hill (site) unless I see smoke (reason) there on that hill. The second property is (R2) presence-in-homologue and/or absence-in-heterologue. That which is known to have the target is a homologue (*sapakṣa*). That which is known to have the absence of the target is a heterologue (*vipakṣa*). The relationship between the reason and target is ascertained based on the observation of the homologue and/or heterologue.

Let us consider the following inference (I): 'The hill has fire, since it has smoke'. Let us assume that every case of smoke is a case of fire. This rule is ascertained by the following observation: (a) every locus of smoke is a homologue (with respect to I), and (b) every heterologue has the absence of smoke. So, the positive ascertainment is, 'every case of smoke is a case of fire'; and the negative ascertainment is, 'every case of the absence of fire is a case of the absence of smoke'. After having observed (a) and (b), when one sees a hill that has smoke, one infers I. But every inference cannot have both the aspects, (a) and (b).

According to NV, inferences are of three types: universally positive (*kevalānvayi*), universally negative (*kevala-vyatireki*), and mixed (*anvaya-vyatireki*). Some inferences do not have heterologues. According to the Nyāya ontology, everything is both nameable and knowable. Therefore, one may infer: 'this is nameable, since this is knowable'. The negative ascertainment of this is not possible, since nothing possesses the absence of the target, that is, nameability. These are universally positive inferences.

Some inferences do not have homologues. Let us assume that only rational beings have abstract thinking, and only humans are rational. Now, one can infer: 'humans have abstract thinking, since they are rational'. No positive ascertainment of this inference is possible since nothing other than the site (the humans) possesses the target (abstract thinking). This is a universally negative inference. The smoke-fire inference is a mixed one, which has both homologues and heterologues.

We may notice here that a reason must have at least one of the following properties, presence-in-homologue and absence-in-heterologue, for the relation between the reason and target must be ascertained in some locus. Thus, NV considers (R1) and (R2) essential for a reason. In *Tātparya-ṭīkā*, Vācaspati adds two more criteria: (R3) association with a target that is present in the site (*abādhita-viṣayatā*); and (R4) not being counterbalanced by an equally strong contradictory reason (*asat-pratipakṣatva*; Vācaspati's gloss on NS 1.2.4 in ND 637). R3 and R4 will be clear in the discussions on the fallacies called the untimed (*kālātīta*) and the counterbalanced (*prakaraṇa-sama*).

For the Naiyāyika, any defect of an inference ultimately contaminates its reason, since it is housed in and emerges from its reason. According to the Old Nyāya, there are pseudo-reasons of five types:

- (OF1) A deviant reason (*savyabhicāra*) intrudes into the heterologues and deviates from its right course. In the inference, 'this hill has smoke, since it has fire', the reason (fire) is deviant since it occurs in homologues such as a kitchen or a sacrificial altar, and in heterologues such as a red-hot iron-ball. It violates R2.

- (OF2) Suppose an inference is supposed to prove x. If its reason R proves the absence of x, R is an opposite reason (*viruddha*). Suppose somebody wants to prove that 'this is a man'. If their statement of reason is 'since it is a horse', the reason, i.e. horsehood, is an opposite one, since horsehood implies that 'this' is not a man. This too violates R2.

- (OF3) The site, reason, homologues, and heterologues of a genuine inference are well established before the inference is made. The job of the inference is to establish the target in the site based on the subject's knowledge of association between the reason and target. Here is a classic example of the unestablished reason. Suppose somebody infers: 'A shadow is a substance (and not simply the absence of light), since it moves'. Against this, the Naiyāyika would say that, in this case, the movement of the shadow itself is unestablished. An object blocks the light and casts a shadow. When it moves, different momentary shadows are cast, and they create the illusion of one moving shadow. Therefore, movement (i.e. the reason) cannot be established in the shadow (i.e. the site). This reason is an example of the target-like (*sādhyasama*). This violates R1.

- (OF4) If the reason X that tries to prove z is counterbalanced (*prakaraṇa-sama*), then it has an equally strong rival reason Y that proves the absence of z. (Let us assume that the absence of the absence of z is z itself.) Here is an example: 'A physician has observed that anybody, who eats strawberries every day, suffers from a disease called *Coccinistercus*. She has also observed that anybody, who eats blackberries every day, never suffers from that disease. She has not found any counterexample to either of those observations. Now she comes across a small boy, who eats both strawberries and blackberries every day' (Guha 2016). In this case, the regular consumption of strawberries implies the disease, and the regular consumption of blackberries implies the absence of the disease. Since these two rival reasons are equally strong, neither the inference 'this boy has *Coccinistercus*, since he eats strawberries everyday' nor the inference 'this boy does not have *Coccinistercus*, since he eats blackberries everyday' gets validated. Hence both the reasons are counterbalanced. This violates R4.

- (OF5) The untimed reason (*kālātīta*) is associated with a target T that does not anymore entertain a doubt about T's presence in the site. The target's occurrence

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in the site is unestablished before the inference is made, since it is subject to doubt. One infers 'this hill has fire' since one has not seen fire there, and one doubts whether there is fire. The confirmation of the presence or absence of the target leaves no room for the inference, since it leaves no room for the aforementioned doubt. Suppose somebody infers fire on a hill, and finds that there is no fire. In this case, the time of doubting whether the hill has fire is over. In that sense, the reason – whatever it may be – is untimed (*kālātīta*). This violates R3.

One takes a pseudo-reason P for a genuine reason R due to P's similarity with R (*hetu-sāmānyāt*; NB on NS 1.2.3 in ND 631). It is something like a formal similarity. According to Uddyotakara, one can use both P and R after having stated the inference, 'S has T' (NV on NS 1.2.3 in ND 631). Both a reason and a pseudo-reason can fill in the blank in 'S has T, since S has ___'.

2.2.14 (OC14) Disputing somebody's argument by using equivocation (*chala*)

John tells Mary, 'Add a few drops of lime to your salad; it will enhance the taste'. Mary responds, 'No, consumption of lime is dangerous for health'. For Mary, lime is an inorganic material, not a fruit. This is a linguistic (*vāk*) *chala*. Suppose Mary tells John, 'My company gives me peanuts', referring to her low salary, and John responds, 'No, they give you money'. This is a case of semantic (*upacāra*) *chala*. Here a metaphor is interpreted in a literal sense (NS 1.2.10 in ND 669).

2.2.15 (OC15) Misleading arguments based on similarity/dissimilarity (*jāti*)

Suppose somebody argues, 'Both a cow and a man are mortal. Therefore, let the man have a tail, like a cow'. This is a *jāti*. It is based on similarity, not on a correlation (NS 1.2.18 in ND 681).

2.2.16 (OC16) Point of defeat (*nigrahasthāna*)

This is a statement that leads to the user's own defeat. This defeat is due to expressing either misconceptions (*vipratipatti*) or ignorance (*apratipatti*). The statement may contradict the user's own assertion (*pratijñā-virodha*), or establish something else (*pratijñāntara*), or it may mean nothing (*apārthaka*). There are twenty-two points of defeat (NS 1.2.19 in ND 683).

3 The Neo Nyāya

Both the Nyāya and the Vaiśeṣika schools are the parents of the Neo Nyāya. The oldest text of the Vaiśeṣika school is the *Vaiśeṣika-sūtra* (VS) of Kaṇāda (sixth–second century BCE). Praśastapāda's (fourth century CE) *Praśastapāda-bhāṣya* (PB) (or *Padārtha-dharma-saṃgraha*) is a commentary on VS. Śrīdhara's (tenth century CE) *Nyāya-kandalī* (NK) and Udayana's *Kiraṇāvalī* are important commentaries on PB.

3.1 The grand categories (*padārtha*) of the Vaiśeṣika

Most onto-epistemic models have some kind of typology without which it is difficult for them to describe general rules a rational agent forms (e.g. 'every attribute or activity must belong to a substance'). The Old Nyāya typology is based on polemical requirements whereas the Vaiśeṣika system has a natural typology that begins with linguistic intuition. According to Patañjali (third century BCE), the author of *Mahā-bhāṣya*, Sanskrit grammarians categorized Sanskrit words into four types, words denoting universals (*jāti-śabda*), words denoting attributes (*guṇa-śabda*), words denoting actions (*kriyā-śabda*), and words denoting individuals (*yadṛcchā-śabda*; Guha 2013: 113). Three Vaiśeṣika categories – namely universals (*jāti*), attributes (*guṇa*), and activities (*kriyā*) – are actually meanings of the first three words of the grammarian. A *yadṛcchā-śabda* or proper noun refers to (and therefore means) a substance. Inherence (*samavāya*) is logically required for relating an attribute or activity or universal with a substance (see below). An absence (*abhāva*) is the meaning of a negative morpheme such as 'non' or 'no' or 'not'. The unique particular (*viśeṣa*) is a doctrinal requirement for the Vaiśeṣika.

3.1.1 (VC1) Substance (*dravya*)

Substance is the material cause for any effect (*Praśastapāda-bhāṣya* [PB] in *Nyāya-kandalī* [NK] 67). Clay and threads are material causes for a pot and a cloth respectively. Every other positive entity (that is to say, not an absence) must be located in a substance. There are nine substances: earth (*pṛthvī*), water (*ap*), fire (*tejas*), air (*vāyu*), ether (*ākāśa*), time (*kāla*), space (*dik*), self (*ātman*), and mind (*manas*).

3.1.2 (VC2) Attribute (*guṇa*)

There are seventeen attributes, including colour (*rūpa*), taste (*rasa*), sound (*śabda*), touch (*sparśa*), smell (*gandha*), number (*saṃkhyā*), quantity (*parimāṇa*), cognition (*jñāna*), desire (*icchā*), aversion (*dveṣa*), internal effort (*kṛti*), etc. Each of them inheres in a substance.

3.1.3 (VC3) Activity (*karman*)

Activity is that 'which causes conjunctions (between substances)' (Ganeri 2023). Basically, an activity is movement.

3.1.4 (VC4) Inherence (*samavāya*)

X and Y are inseparable (*ayuta-siddha*) if one of them is housed in the other till its end. The relation between an inseparable pair is inherence. The red colour of a red pot must be located in the pot as long as it (i.e. the colour) lasts. Thus, the red colour is related to the pot through inherence (PB in NK 688).

3.1.5 (VC5) Universal (*sāmānya*)

A universal belongs to many individuals i*1*, …, i*n* and is the ground for categorizing them under a single genre (PB in NK 668). For example, cat-hood is the ground for cognizing an individual cat as a 'cat'.

3.1.6 (VC6) Unique particular (*viśeṣa*)

The unique particular is 'that which exists in eternal substances and functions as their differentiator' (Ganeri 2023). Thus, *viśeṣa*s differentiate between two identical atoms of the same substance.

3.1.7 (VC7) Absence (*abhāva*) as a dubious category

Neither Kaṇāda nor Praśastapāda calls absence a category. Udayana considers it an independent category. In the sentence, 'There is no cat in this room', the meaning of 'no' is the absence of cats (see section 3.2.2 for a detailed discussion on absence).

3.2 The great merger and emergence of the Neo Nyāya

The Vaiśeṣika school accepts six distinct grand categories and two epistemic instruments, namely perception and inference. For them, all non-perceptual instruments are inference. The Old Nyāya, on the other hand, accepts sixteen categories and four epistemic instruments. In the eighth or ninth century, the Vaiśeṣika and Nyāya systems began to form a philosophical syncretism (*samāna-tantra*). The syncretic tendency demonstrates itself through the following works.

Despite being a Naiyāyika, Bhāsarvajña (ninth century) did not accept analogy as an epistemic instrument in his *Nyāya-sāra* (Potter 1977: 401). Vyomaśiva (tenth century), the Vaiśeṣika thinker, accepts testimony as an epistemic instrument (1977: 446). Curiously, Udayana describes the seven Vaiśeṣika categories in his Nyāya work *Lakṣaṇa-mālā* (1977: 526). Two Vaiśeṣika texts – Udayana's *Lakṣaṇāvalī* (1977: 525) and Śivāditya's (thirteenth century) *Sapta-padārthī* – unhesitatingly accept the absence as the seventh grand category.

The best outcome of the syncretism of the Vaiśeṣika and Nyāya is the *Tattva-cintā-maṇi* (TCM), authored by Gaṅgeśa. This book marks the beginning of the Neo Nyāya. Jayadeva (fourteenth century) wrote *Āloka*, which is a commentary on TCM. Raghunātha Śiromaṇi's (fifteenth century) *Tattva-cintā-maṇi-dīdhiti* is perhaps the most intricate commentary on TCM. Mathurānātha's (sixteenth century) commentary on TCM is called *Rahasya*, and it is more lucid than *Tattva-cintā-maṇi-dīdhiti*. Both Jagadīśa Tarkālaṅkāra (sixteenth century) and Gadādhara Bhaṭṭācārya (seventeenth century) wrote elaborate and highly intricate commentaries on *Tattva-cintā-maṇi-dīdhiti*.

Two notable works of the Nyāya-Vaiśeṣika syncretic school are Viśvanātha's (sixteenth century) *Nyāya-siddhānta-muktāvalī* (NSM), a commentary on Viśvanātha's *Bhāṣā-pariccheda*; and Annambhaṭṭa's (sixteenth century) *Tarka-saṃgraha-dīpikā* (TSD), a commentary on Annambhaṭṭa's *Tarka-saṃgraha*. They are written in the Neo Nyāya style.

3.2.1 Vaiśeṣika categories and Nyāya epistemic instruments

There are several ways in which the Nyāya epistemology interacts with the Vaiśeṣika categories. Gaṅgeśa's narrative is built around epistemic instruments that reveal categorized objects. Some syncretic texts (such as NSM of Viśvanātha) discuss mainly the Vaiśeṣika categories. While discussing the self, which is a substance, they talk about its unique attributes such as cognition, desire, etc. Cognitions are of two types: valid and invalid. Here, the notion of epistemic validity is introduced. Valid cognitions are of four types, each one of which has a unique causal instrument (*karaṇa*). In this, the theory of causation is introduced. The causal instrument of a valid cognition is an epistemic instrument. This article mostly follows Gaṅgeśa's approach.

3.2.2 Technical language

Stylistically speaking, what distinguishes the Neo Nyāya from the Old Nyāya is its extensive use of technical terms and analytical methods. Here are a few technical concepts.

3.2.2.1 The ontic triad

A thing is a complex having three elements: a property-holder (*dharmin*), properties (*dharma*), and relations (*sambandha*) through which a property P_i resides in the property-holder. Thus, a grey cat is a property-holder that has properties such as the grey colour and cat-hood. Both reside/are related to the cat through inherence.

3.2.2.2 The epistemic triad

A cognition is formless, but its object has got a form. The grey cat as the object of a cognition too is tripartite. In the cognition, 'this is a cat' (*ayaṃ mārjāraḥ*), *this* (i.e. the referent of the word 'this') is the qualificand (*viśeṣya*), and cat-hood (*mājāratva*) is the qualifier (*prakāra*), since, in this cognition, *this* appears to be qualified by the property cat-hood. Inherence, through which the qualifier is related with the qualificand, is the cognitive relation (*saṃsarga*). This triad may be represented as *In*(cat-hood)(*this*) where *In* = inherence.

3.2.2.3 Limitation, residing, and determination

When an entity x 'becomes' y by virtue of having the property P_i, P_i becomes the limiter/limiting property (*avacchedaka*) of y-hood. This is required since several essential properties P_1, ..., P_n are resident (*niṣṭha*) in x. A stick (*daṇḍa*) causes a pot (*ghaṭa*). It

does not do that all the time. When the stick causes a pot, the former becomes a cause (*kāraṇa*) for the latter. Thus, the stick, at that time, possesses an adventitious property (*āgantuka-dharma*) namely cause-hood (*kāraṇatva*), and the pot possesses another one namely effect-hood (*kāryatva*). The stick has many other properties such as substance-hood (*dravyatva*), corporeal-hood (*mūrtatva*), entity-hood (*padārthatva*), etc. But it becomes a cause for a pot only by virtue of being a stick. Therefore, its cause-hood would be limited by stick-hood. In other words, stick-hood would be the limiter of the cause-hood residing (*niṣṭha*) in the stick.

In the language of Nyāya: *daṇḍa-niṣṭha-kāraṇatvāvacchedakaṃ daṇḍatvam*. Substance-hood or entity-hood cannot limit this cause-hood, since every substance or entity is not entitled to cause a pot. On the other hand, the effect-hood residing in the pot would be limited by pot-hood. In Sanskrit: *ghaṭa-niṣṭha-kāryatvāvacchedakaṃ ghaṭatvam*. We can generally say that when x becomes y by virtue of having the property P*i* (i.e. x qua P*i*-possessor becomes y), P*i* limits y-hood in x.

In the stick-pot case, the stick has the cause-hood limited by stick-hood, and the pot has the effect-hood limited by pot-hood. Intuitively we understand that there must be a thread between the cause-hood and the effect-hood. That thread, for the Naiyāyika, is determination (*nirūpaṇa*), which is symmetric. Thus, we can say that the effect-hood limited by pot-hood is determined by the cause-hood limited by stick-hood (*ghaṭatvāvacchinna-kāryatvaṃ daṇḍatvāvacchinna-kāraṇatva-nirūpitam*).

3.2.2.4 Describing an absence

Every absence has an absentee (*pratiyogin*) and a locus (*adhikaraṇa*). Consider a bag that has no cat. Here, the bag (*syūta*) is the locus for the absence of cat (*mārjāra-abhāva*), and cat-hood limits the absentee-hood (*pratiyogitva*) of the absence. Let ¬x denote 'the absence of x'. The absentee has absentee-hood, and it is the absentee of an absence by virtue of having a specific property, i.e. cat-hood. Hence, cat-hood becomes the limiter of the absentee-hood residing in the cat (*mārjāra-niṣṭha-pratiyogitvāvacchedakaṃ mārjāratvam*). The cat is a substance too. Therefore, it is true that there is a substance that is absent in the bag. But saying that the limiter of the absentee-hood of ¬cat is substance-hood is saying that there is no substance in the bag, which is not true. There is an entity qua cat, and that is absent in the bag by virtue of having cat-hood. Now, there is ¬cat in the bag, and there is absentee-hood limited by cat-hood in the cat. Once again, the relation of determination comes here to glue them up. Thus, we say that the absentee-hood limited by cat-hood in the cat determines an absence in the bag. In technical Sanskrit: *mārjāra-niṣṭha-mārjāravāvacchinna-pratiyogitva-nirūpitaḥ syūta-niṣṭhābhāvaḥ*. Sometimes, ¬cat is described as the absence, whose absentee-hood is limited by cat-

hood (*mārjāratvāvacchinna-pratiyogitākābhāvaḥ*; these technical terms are discussed by Guha 1968; Ingalls 1988; Goekoop 1967; Wada 2007; and many others).

3.3 Neo Nyāya epistemology

Gaṅgeśa's epistemological journey begins with suffering. He says that the compassionate sage (*muni*) Gotama established the system based on the sixteen great categories in order to rescue the world from the mud of suffering (*duḥkha-paṅka*). Since the truth of each of these can be discovered by mainly using the epistemic instruments, he presents his critical views on those (see Phillips 2020a: 79).

3.3.1 Basic notions

An epistemic instrument unaffected by epistemic defects (*doṣa*) brings about a valid cognition. But what is validity (*prāmāṇya*)? After dealing with this question, Gaṅgeśa discusses the epistemic instruments, which are causal instruments (*karaṇa*) for producing valid cognition. At this point, the Nyāya causal theories should be brought in. This section presents these two foundational concepts.

3.3.1.1 Epistemic validity (*prāmāṇya*)

According to Gaṅgeśa, a cognition C is valid if and only if (i) C is non-recollective (*anubhava*, not *smṛti*), and (ii) the property that figures as the qualifier (*prakāra*) of x in C really belongs to x (*tadvati tat-prakārakānubhavaḥ*). When John sees his grey cat, and cognizes, 'this is a cat' (C1), his cognition is valid. C1's qualificandum (*viśeṣya*) is *this* (i.e. the referent of 'this'), qualifier cat-hood, and cognitive relation (*saṃsarga*) inherence (*samavāya*). Thus, its epistemic structure is: *In*(cat-hood)(*this*). This is valid since cat-hood really belongs to *this*. When, in a dull evening, John sees a civet in a bush and remembers his grey cat, he may attain a doubt-free – but invalid – cognition, 'this is a cat' (C2). Although C1 and C2 share the same epistemic structure, C2 is invalid since cat-hood does *not* reside in a civet through inherence. (For the original text and detailed discussions, see Phillips 2020a: 227–230; and Mohanty 1989: 34–44.)

Let K*c* be the set of causal conditions for producing the cognition C. Gaṅgeśa thinks that the validity of C originates from another causal factor K*v*. This means that C is valid only when K*c* + K*v* obtains. K*v* is called epistemic excellence (*guṇa*). Each epistemic instrument has its own excellence. For a perceptual cognition P, the excellence is a causal connection between each part of P (i.e. the qualificandum, qualifier, and relation) and a sense faculty (*avayava-indriya-sannikarṣa*). For an inference I, it is a proper reason (*yathārtha-liṅga*). For a testimonial cognition T, it is the knowledge of the phrase (*vākyārtha-jñāna*). For an analogy A, it is the similarity (*sādṛśya*). Similarly, the epistemic invalidity (*aprāmāṇya*) is due to another factor K*i*, which is called the epistemic defect (*doṣa*). For P and I, these defects may be bile etc. (*pittādi*) and an error about the reason

(*liṅga-bhrama*) respectively (see Phillips 2020a: 172–173; and Mohanty 1989: 51–58). This is the Nyāya theory of extrinsic origin of validity (*parataḥ-utpatti*).

Let R*c* be the set of factors that captures the cognition C. According to Gaṅgeśa, R*c* does not capture the validity of C. If it did, then nobody would ever doubt their cognition. Even after cognizing that 'this is water' (W), one may doubt whether W is really valid. In that case, one goes there and tests the thing that seems to be water. If it quenches one's thirst, then one's testing activity (*pravṛtti*) is successful (*saphala*) and one infers W's validity from this successful activity. This is a negative inference: had this cognition not been true in regard to the object, it would not cause a successful activity (for Gaṅgeśa's text and its translation, see Mohanty 1989: 150–153). This activity captures the validity of W. This is the Nyāya theory of extrinsic apprehension of validity (*parataḥ-jñapti*).

3.3.1.2 Theory of causation (*kārya-kāraṇa-bhāva*)

Indian epistemology is an extension of the Indian theory of causation. An epistemic instrument is the causal instrument for valid cognition (*pramā-karaṇa*). What is a causal instrument for the Neo school? It is the most important (*sādhaka-tama*) cause. A cause of E is a factor that regularly precedes the production of E. Suppose among all the causal factors C*1*, …, C*n*, C*o* is such that E takes place immediately after C*o* happens. An axe fells a tree, and the felling happens immediately after the dynamic contact between the axe and the tree (*kuṭhāra-vṛkṣa-saṃyoga*) takes place. A camera takes a picture, which is produced immediately after pressing the shutter-release button. These final causal factors are called causal operations (*vyāpāra*). For the Neo Nyāya, the factor that houses the causal operation is the causal instrument. In the abovementioned cases, they are the axe and the camera respectively.

In his TSD (ch. 2), Annambhaṭṭa presents the Neo Nyāya position:

> According to the view that holds, 'The cause that possesses the causal operation is the causal instrument', the cognition of pervasion is the causal instrument for *inference*. It acts through consideration (*paraṁarśá*). The causal operation is that which is caused by *I* and causes the (principal) effect of *I*. (Brahmacārī n.d.: 167, original emphasis)

The causal operation is not independent of the causal instrument *I*. The causal instrument causes both the effect and the causal operation. So the '*I*' in the definition of causal operation (that which is caused by *I* and causes the principal effect of *I*) is actually the causal instrument. In the axe-tree case, both the dynamic contact and the felling are caused by the axe. But the dynamic contact is one of the causes of 'the felling of the tree'. Thus the dynamic contact is caused by the axe and at the same time causes the effect of the axe, i.e. 'the felling of the tree'. Therefore, the dynamic contact is the causal operation.

In the case of visual perception, the eye is the causal instrument and the perception is the effect. The eye-object contact is caused by the eye and causes the perception as well. Thus, in this case, the eye-object contact is the causal operation.

3.3.2 Epistemic instruments (*pramāṇa*)

3.3.2.1 (NE1) Perception (*pratyakṣa*)

Perceptual cognition – for Gaṅgeśa – is characterized by cognitive immediacy (*sākṣāt-kāritva*; Phillips 2020a: 307–309). When one perceives x, one naturally intuits, 'I am immediately aware of x' (*sākṣāt-karomi*). Gaṅgeśa adds that a perceptual cognition is that which has no other cognition as its causal trigger or instrument (Phillips 2020a: 311–313). For the inferential cognition, 'S has T, since S has R', the causal instrument is the cognition of pervasion: 'every locus of R is a locus of T'. For the verbal cognition, 'there is a cat in that vat', the causal instrument is the cognition of the words like 'there', 'cat', and 'vat'. Perceptual cognition does not depend on any other cognition. That is its immediacy.

There are two stages of perception. When somebody's eyes establish a connection with a cat, first they capture three things: the object, the universal called cat-hood, and inherence. At this preverbal non-relational level, the perception is indeterminate (*nirvikalpa*) since its objects are discrete and unrelated. At the final level, the objects are combined, and the subject cognizes, 'this is a cat'. This is determinate (*savikalpa*). This theory of two-tier perception is based on the assumption that the cognition of the qualified (*viśiṣṭa*, x qualified by y) is preceded by the cognitions of the qualificand and qualifier. Prior to having the knowledge of a man with a staff, one must know a man and a staff separately.

The Nyāya system presents a complex network of sensory connections (*sannikarṣa*). Some of those are ordinary (*laukika*) and some extra-ordinary (*alaukika*). First of all, the object of perception must be the size that can be perceived (medium size; *madhyama-parimāṇa*). Infinitesimal (*aṇu-parimāṇa*) and extremely large (*mahat-parimāṇa*) objects are not fit for perception. Secondly, one perceives the object O after the self-mind-O connection gets established (see section 2.2.1.1). NSM gives a detailed account of the sensory connections that connect the mind with O (NSM 257–271).

Let us consider the case of a black cow B. The black colour and cow-hood reside in B through inherence, and black-colour-hood is inherent in the black colour. The eye captures B through the connection called contact (*saṃyoga*). It captures the black colour and cow-hood through contacted-inherence (*saṃyukta-samavāya*) and black-colour-hood through the contacted-inherent-inherence connection (*saṃyukta-samaveta-samavāya*). Since the sound resides in the ether (*ākāśa*), and the ear in nothing but a part of the ether, the ear captures a sound through the inherence (*samavāya*) connection. It captures sound-hood (i.e. the generic property inherent in a sound) through inherent-inherence (*samaveta-samavāya*). An absence modifies or qualifies its locus; therefore one captures an absence

through the qualifier-hood (*viśeṣaṇatā*) connection. It is worth noting the systematic nomenclature of the sensory connections here.

There are three extra-ordinary connections in the Nyāya system (NSM 272–275):

(1) Through the mystical (*yogaja*) connection, a *yogī* can perceive distant objects, even past or future objects.

(2) Through the connection of generality (*sāmānya-lakṣaṇā*), one knows the inferential pervasion (*vyāpti*; see section 3.3.2.2).

(3) Through the connection of cognition (*jñāna-lakṣaṇā*), the subject cognizes an object of illusion.

The Nyāya theory of perceptual illusion is known as *anyathā-khyāti-vāda* (otherwise-cognition theory). Suppose somebody looks at a piece of nacre. Their eye gets connected with the object through the connection of contact, and with inherence through the connection of contacted qualifier-ness (*saṃyukta-viśeṣaṇatā*). However, it fails to capture nacre-ness due to some reason; the gap must be filled up in a perceptual cognition. So, they remember silver-hood (maybe because nacre looks like silver), and the recollective cognition itself – according to the Naiyāyika – serves as a sensory connection. It fills up the gap in 'this is ___' with 'silver'. We may notice here that neither is the object of cognition qua 'this' illusory, nor is silver-hood illusory (since it exists in a real piece of silver), nor is inherence illusory. Thus, silver-ness is true 'otherwise' (*anyathā*), although it is not there in the object right in front of the subject. An error is basically cognitive heterogeneity according to the Nyāya view. Had 'this' been a piece of silver, all three objects of the cognition, 'this is silver' (namely 'this', inherence, and silver-hood) would be collected from the same source. Thus, the content of a valid cognition is homogenous (see NSM 280–282; Dravid 1996).

Sometimes one may look at a sandalwood from a distance, and perceptually cognize, 'this sandalwood is fragrant', even though the fragrance of the sandalwood cannot reach one at that distance. This too is a case of the connection of cognition. The sight of the wood invokes the memory of the sandalwood fragrance, and the recollection itself works as a connection. As a result, one perceives the recollected fragrance (NSM 281–282).

3.3.2.2 (NE2) Inference (*anumāna*)

The causal instrument for the inferential cognition 'S has T, since S has R' is the knowledge of the general rule, 'every locus of R is a locus of T', which is known as pervasion (*vyāpti*). It generates the inference through a reflective cognition (*parāmarśa*): 'S has R, which is pervaded by T'. The site (S) (*pakṣa*) is the locus, where the target (T) (*sādhya*) is inferred from the reason (R) (*hetu*). Thus, one sees smoke on a hill and remembers the pervasion: 'every locus of smoke is a locus of fire', which is equivalent

to 'smoke is pervaded by fire' or 'fire pervades smoke'. Then, one cognizes, 'this hill has smoke that is pervaded by fire', and then finally infers, 'this hill has fire'.

According to Gaṅgeśa, Y pervades X if Y is not limited by the absentee-hood determined by an absence, which coexists with X in a locus. Suppose every locus of smoke is a locus of fire. That being the case, ¬Z (i.e. the absence of Z), which coexists with smoke in some locus can have anything but fire as its absentee. Suppose smoke coexists with the absence of cats on a hill (i.e. there is no cat on that hill). Since cat in general is the absentee of ¬cat, ¬cat determines an absentee-hood limited by cat-hood. We must notice here that fire is not limited by cat-hood, since fire is not a cat. This applies to a bat or a rat or a mat, since smoke may coexist with the absence of any of these. Y, that is not limited by cat-hood or bat-hood or rat-hood or mat-hood, pervades smoke. Y happens to be fire. In sum, Y pervades X if Y is not absent in any locus of X (the absence, i.e. ¬Z, which figures in the definition must not be a partial absence, that is, one that coexists with its absentee in the same locus; for a detailed discussion, see Phillips 2020b: 623–624).

Pervasion is of two types. Y positively pervades X (or X has the positive pervasion or *anvaya-vyāpti* of Y) if every locus of X is a locus of Y. Y negatively pervades X (or X has the negative pervasion or *vyatireka-vyāpti* of Y) if every locus of the absence of Y is a locus of the absence of X. Inference is of three types based on the type of pervasion. The Nyāya believes in some omnipresent properties such as nameability and knowability. When one observes only the positive pervasion of these two, and infers, 'this is nameable, since this is knowable', one's inference is purely positive. No case of negative pervasion exists in this case, since nothing has ¬nameability or ¬knowability. In contrast, one can only observe that anything that does not have abstract thinking is not rational before inferring, 'a human has abstract thinking, since (s)he is rational'. Assume that only humans (i.e. the site) have rationality and abstract thinking. The confirmation of pervasion must take place outside the site although nothing other than the site has these two properties. Therefore – in this case – no positive observation (such as 'every locus of rationality is a locus of abstract thinking') is possible (see section 2.2.13). The third type is the mixed inference such as the smoke-fire case. One may observe that every locus of fire is a locus of smoke, and every locus of ¬fire is a locus of ¬smoke.

Gaṅgeśa thinks that one epistemically grasps pervasion through an extra-ordinary sensory connection called the connection of generality (*sāmānya-lakṣaṇā pratyāsatti*; for a detailed discussion, see Chakrabarti 2010: 149–168). After having known that every observed case of smoke has been a case of fire, and after having found no counterexample, one establishes an extraordinary connection with both smoke-ness and fire-ness. This is how, in a way, *all* smoke-individuals and *all* fire-individuals of the past, present, and future figure in one's cognition of pervasion. Does one 'perceive' all these individuals? No, because through this connection one does not grasp the special features of each and every

individual. One just knows that every smoke-individual is such that it must be accompanied by a fire-individual. Thus, one ascertains that every case of an entity having smoke-ness is a case of an entity having fire-ness.

Every inference having the form 'S has T, since S has R' makes three claims: (C1) the inference (*anumiti*): 'S has T'; (C2) the pervasion (*vyāpti*): 'every locus of R is a locus of T' or 'every locus of ¬T is a locus of ¬R'; (C3) the reason's presence in the site (*pakṣa-dharmatā*): 'S has R'. The defect of a reason or inferential fallacy (*hetvābhāsa*) is a fact that contradicts at least one of these claims. For Gaṅgeśa, the inferential defect of the inference I is the object of a piece of valid cognition that blocks the production of I (for the original Sanskrit definition, see Phillips 2020b: 868; Gaṅgeśa offers three definitions). For the Naiyāyika, the cognition about x and the cognition about the absence of x are mutual blockers (*pratibandhaka*). If one has the certain cognition, 'this hill has no fire', it blocks the production of the cognition, 'this hill has fire'. As long as the former exists, the latter cannot come into being. Therefore, if somebody already cognizes the former, they cannot infer, 'this hill has fire'.

Gaṅgeśa classifies fallacies into five types: (NF1) deviation (*vyabhicāra*), (NF2) contradiction (*virodha*), (NF3) un-establishment (*asiddhi*), (NF4) defeat (*bādha*), and (NF5) counterbalancing (*satpratipakṣa*; most of the names of the Neo Nyāya fallacies are borrowed from Phillips 2020b). Let us consider a few fallacies defined by Gaṅgeśa.

- (NF1) Deviation opposes the pervasion-claim, i.e. (C2). It is not very different from the deviation of the Old Nyāya. It is conceptualized as being in opposition to pervasion, not as the absence of a prescribed feature. The 'common' (*sādhāraṇa*) deviation is the reason's coexistence with the absence of the target in a locus.
- (NF2) The defect called 'contradiction' is essentially the fact that any case of the target is a case of the absence of the reason. This too opposes the pervasion-claim. Let us consider the old example of (OF2, see section 2.2.13): 'this is a man, since this is a horse'. Although (NF2) and (OF2) are the same concept, we may notice the difference in their formulations. Any case of being a man is a case of not being a horse, i.e. a case of the absence of horse-hood (the reason). Therefore, horse-hood is not a genuine reason for proving manhood; it is a contradictory reason.
- (NF3) Un-establishment opposes the presence-in-site claim, i.e. (C3). (NF3a) The un-established location (*āśrayāsiddhi*) involves an un-established or nonexistent site such as a golden mountain. As a consequence, the reason does not find a proper location; hence its presence-in-site remains un-established. Consider the example: 'this golden mountain has fire, since it has smoke'. The reason (smoke) cannot be located in the site (the golden mountain), since there is no golden mountain. (NF3b) The un-established nature (*svarūpāsiddhi*) is the reason's absence in the site. Suppose somebody sees a cloud of mist on a hill, and infers: 'this hill has fire, since

it has smoke'. Since no smoke-individual has been established in the hill through this inference, its reason suffers from the defect called *svarūpāsiddhi*.

- (NF4) The Neo Nyāya concept of the defeat is the untimed reason in the terms of the Old Nyāya. For the Neo Nyāya, the defeat of the inference 'S has T' is the absence of T in S. It clearly opposes the main inferential claim (C1).
- (NF5) Counterbalancing is largely the same as the counterbalanced reason of the Old Nyāya. Gaṅgeśa defines counterbalancing as the defect that involves a reason, whose function has been blocked by the presence of another equally strong reason that establishes the absence of the target (Phillips 2020b: 907), as in the *Coccinistercus* case (section 2.2.13, OF4). Gaṅgeśa's general definition of a fallacy does not seem to cover counterbalancing; for the cognition of the rival reason of a counterbalanced reason need not be valid. In the *Coccinistercus* example, if the blackberry-inference is valid then the strawberry-inference must be false; for either the strawberry-pervasion is faulty (i.e. deviation) or the boy does not consume strawberries everyday (i.e. un-establishment). In this case, the fallacious strawberry-inference does not suffer from counterbalancing. If the blackberry-inference is invalid, then the strawberry-inference is not fallacious – because, by definition, a fallacy is the content of a valid cognition.

We shall briefly discuss an important inference the Naiyāyika makes: '[E]arth and the likes have an agential cause, since they are effects, like a pot' (Phillips 2020b: 981). Here the assumption is: such things as Earth are not eternal; they have a beginning. The homologues for this inference are objects such as pots. The heterologues are the eternal things such as space and time. It is observed that a thing like a pot is made by an intelligent agent, who has knowledge of the relevant materials (such as clay) and has the power and intention to produce the pot. From that, one may infer that things such as the Earth, which are effects too, have an intelligent maker. (This is a simplified version of Gaṅgeśa's argument; for a detailed discussion, see Vattanky 1984.)

3.3.2.3 (NE3) Analogy (*upamāna*)

For Gaṅgeśa, analogy qua epistemic instrument brings about the knowledge of the basis for semantic usage (*pravṛtti-nimitta*) of a word, especially a noun, in a certain way. First of all, let us understand the phrase 'the basis for semantic usage' (for a detailed discussion, see Ganeri 2011b: 129–158). When one knows the meaning of the word 'cat', one would use it upon seeing a cat. Any factor that triggers the usage of the word W is the basis for semantic usage (or semantic basis) of W. In other words, W must be applied to each of its semantic bases. When John asks Xico, 'What is a jaguar?', John basically asks for the semantic basis of the word 'jaguar'. John analogically learns the meaning of 'jaguar' when Xico's answer is based on similarity (*sādṛśya*) – something like, 'A jaguar is that which is similar to a leopard'.

But what is similarity? According to Gaṅgeśa, x's similarity to y is x's having a significant number of properties P*1*, …, P*n* that are possessed by y (*tad-gata-bhūyo-dharma-vattva*) too, and none of these is unique to x (*asādhāraṇānya*; Phillips 2020b: 1180). P*1*, …, P*n* are 'common properties' (*niyata-dharma*). Finally, Gaṅgeśa thinks that analogical cognition is the cognition of the semantic basis of a word, when the factor that servers as the semantic basis coexists with the common properties (Phillips 2020b: 1211). Let us consider the sentence, 'a jaguar is that which is similar to a leopard'. 'A jaguar is similar to a leopard' means 'a jaguar and a leopard share a significant number of properties P*1*, …, P*n*'. When John sees an animal x that has P*1*, …, P*n*, he experientially grasps the semantic basis of the word 'jaguar'. Notice that the semantic basis of the word 'jaguar' is coexistent with P*1*, …, P*n* (*niyata-dharma-samānādhikaraṇa*) in x.

3.3.2.4 (NE4) Testimony (*śabda*)

For Gaṅgeśa, testimony (*śabda*) is defined as the words that are produced by proper knowledge (*tattva-jñāna*) of objects (*artha*), and the knowledge must be conducive to producing linguistic utterance (*prayoga*; for an excellent discussion, see Mukhopadhyay 1992: 26–73; see also Phillips 2020b: 1213). John sees a cat in a vat, and tells Ram, 'There is a cat in that vat'. These words are produced by proper visual knowledge of a cat in a vat. Also the knowledge is capable of analysing its object-complex into a cat, contact, a vat, etc., and represent those in an intelligible linguistic expression. Thus, John's words are the epistemic instrument called testimony. A linguistic phrase P (*vākya*) preserves the truth of its source S by representing S's elements correctly.

John, who has seen Hari cook rice, tells Ram, 'Hari cooks rice' (*hariḥ annam pacati* = *hari* + *su* [nominative, singular] *anna* [rice] + *am* [accusative, singular] *pac* [cook] + *ti* [third person, present, singular]). What this sentence conveys is more than the mere concatenation of its morpheme-meanings (*padārtha*). Let the meaning of the morpheme m be [|m|]. The meaning of John's sentence (*vākyārtha*) consists of the relations between [|Hari|], [|cook|], and [|rice|] (for the sake of simplicity, the inflectional endings are dropped). Let the meaning be [|Hari|] ↔ [|cook|] ↔ [|rice|]. Not only does the phrase 'cooks rice' present *cooking* and *rice*, it also presents *rice* that is being *cooked*. This semantic connection '↔' or *saṃsarga* is the essence of the phrase-meaning. How are the semantic connections known? On the Nyāya view, Ram knows the semantic connections John's sentence has because it has three features, verbal expectation (*ākāṅkṣā*), contiguity (*āsatti*), and semantic fit (*yogyatā*).

Gaṅgeśa defines verbal expectation as an incompleteness of reference (*abhidhāna-aparyavasāna*). In the phrase 'cooks rice', 'cooks' raises the expectation 'cooks what?' and this is fulfilled by 'rice'. In other words, without 'rice', 'cooks' will not be able to make complete semantic sense. This applies equally to 'rice'. Consider the ungrammatical

phrase, 'cooks rice you'. Here, the standalone morpheme 'you' does not refer successfully, since it cannot connect itself with any other morpheme. Additionally, 'cooks' and 'rice' (in 'cooks rice') share a grammatical relation (*anvaya*); without one, the other is not able to refer to its own meaning as a semantic element that is connected with another (*na svārtha-anvaya-anubhāvakatvam*; Phillips 2020b: 1259). An unrelated meaning blocks the production of phrase-meaning, and makes the phrase ungrammatical.

The string 'Hari cook s (third person, singular, present) rice' is not grammatically well formed since it lacks contiguity. For Gaṅgeśa, contiguity glues all the discrete morphemes together, and causes morphophonemic conversions (e.g. 'cook + s' becomes 'cooks'; Phillips 2020c: 1281–1282). Some Nyāya texts including TSD and NSM state that contiguity is the property of being uttered/presented in succession (*avilamba*; see Jhalakīkar 1928: 134–135).

According to Gaṅgeśa, the semantic fit of the phrase 'X Y' is the absence of the knowledge of counterevidence (*bādhaka-pramā-viraha*) that could prevent [|X|] from being semantically connected with [|Y|] (Phillips 2020c: 1271). Here is an example: 'Today I saw a round square'. It is blocked by the knowledge that 'there is no round square', which prevents roundness to be predicated of a square. Thus, this string of words lacks semantic fit and fails to generate any semantic connection.

The Vaiśeṣika school, which aims to reduce testimony to inference, may now say that: when John tells Ram 'X Y', Ram infers [|X|] is related with [|Y|] through the relation R, since [|X|] is denoted by the word 'X' that is related with 'Y' through some syntactic relation R*s*. On this view, R*s* is part of the reason of the inference. If this inference is correct, Ram gets to know from John that [|X|]R[|Y|]. In *Nyāya-mañjarī* (NM, Ch III), Jayanta wrote:

> A phrase, whose relational content is not known before [hearing it], is capable of generating its meaning. This is evident from the fact that one who knows the meanings of the words of a newly composed verse understands its sentential meaning. On the contrary, the relation that constitutes the base for an inference, has to be known before making the inference. Such being the case, how is testimony the same as inference? (NM 140)

Upon hearing 'X Y', one may at most infer [|X|] and [|Y|]. Where does the relational content R come from? Gaṅgeśa adds: 'Before hearing "X Y", one did not know the [syntactic] relation between X and Y' (Phillips 2020c: 1215–1217). His point is: before inferring fire from smoke, one needs to experience both in several loci. But R*s* is known only upon hearing the phrase, 'X Y'. That being the case, R*s* cannot serve as a part of the reason for inferring R (see Chakrabarti 1992 for a detailed discussion on the irreducibility of testimony).

The meaning of the sentence, 'This white horse, that is running here, is not Bucephalus' consists of a substance, in which the white colour and the activity of running reside through the relation of inherence, and it has the absence of the property of being identical to Bucephalus. Here the word-meaning relations (*vṛtti*) are straightforward. But philosophers have been debating over the reference of the common noun 'horse'. According to Gaṅgeśa, it is a horse-individual qualified by horse-hood (Phillips 2020c: 1564–1565). The meaning of the white-horse sentence consists of all primary meanings (*śakya*) presented through the primary semantic power (*śakti*) of the words (see Ganeri 1999 for semantic powers of words). In contrast, a phrase such as 'the cowherd village on the Ganges' involves a secondary meaning (*lakṣya*) since 'the Ganges' here means 'the bank of the Ganges'.

3.4 The contribution of the Neo Nyāya

The Neo Logic school peeps into the kitchen of the mind, as it were, and aims to understand the recipe of each piece of cognition. Then, it represents the cognition in an analytic style full of technical terms. The Neo Nyāya analytic method tends to lessen the possibility of ambiguity and error. Curiously, despite being extremely rigorous, it is open-ended. Due to its expressive power and flexibility, it was adopted by most academic schools of early modern India including grammar, poetics, and law.

4 Primary texts

- [KV] *Kārikāvalī of Viśvanātha Nyāyapañcānana Bhaṭṭa with the commentaries Muktāvalī, Dinakarī, Rāmarudrī*. Edited by Ātmārām Nārāyaṇ Jere. Bombay: Nirṇaya Sagar Press, 1927.
- [NB] *Nyāyabhāṣya of Vātsyāyana* in ND.
- [ND] *Nyāyadarśana of Gautama with the Bhāṣya of Vātsyāyana, the Vārttika of Uddyotakara, the Tātparyaṭīkā of Vācaspati and the Pariśuddhi of Udayana*. Volume 1. Edited by Prof. Anantalal Thakur. Darbhanga: Mithila Institute, 1967.
- [NK] *Nyāyakandalī*. Edited by J. S. Jetly and V. G. Parikh. Oriental Institute, 1991.
- [NM] *Nyāyamañjarī of Jayantabhaṭṭa*. Edited by S. N. Śukla. The Chaukhamba: Sanskrit Series Office, 1936.
- [NSM] *Nyāyasiddhāntamuktāvalī* in KV.
- [NV] *Nyāyavārttika of Uddyotakara* in ND.
- [PB] *Praśastapādabhāṣyam* in NK.
- *[TSD] Dīpikāsahitaḥ Tarkasaṃgrahaḥ of Annambhaṭṭa*. Edited by N. Brahmacārī. Daṇḍisvāmī Śrīmad Ānanda Bodhāśrama.

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