Log. Univers. 13 (2019), 347–393

1661-8297/19/030347-47, *published online* July 26, 2019
https://doi.org/10.1007/s11787-019-00225-1

Logica Universalis

On the Origin of Indian Logic from the Viewpoint of the Pāli Canon

Andrew Schumann

Abstract. In this paper, I show that in the Pāli Canon there was a tradition of Buddhist logic, but this tradition was weak, and the proto-logic we can reconstruct on the basis of the early Pāli texts can be evaluated as a predecessor of the Hindu logic. According to the textual analysis of the Pāli texts, we can claim that at the time of the closing of the Pāli Canon (excluding the later addition of the *Milindapañha* into it by the Burmese tradition) there did not exist the Nyāya philosophy known by the *Nyāya Sūtra*. Meanwhile, we can assume that the *Milindapañha*, the best logical source of early Pāli literature, was written under influences of the Gandhāran Buddhists and this text preceded the Nyāya philosophy.

Mathematics Subject Classification. Primary 03A05; Secondary 03B65, 03B05, 03B22.

Keywords. Theravāda, Pāli Canon, Kathāvatthu, Milindapañha, Buddhist logic, Greco-Buddhism, nyāya.

1. Introduction

This paper provides an argument supporting the claim that the authors of the Pāli Canon and *Milindapañha* did not know about the Nyāya school of logic and knew nothing about syllogisms defined in the *Nyāya Sūtra* (Sect. 2). The methodology for this conclusion is discussed in Sect. 3.

The argument is focused on the following claims: (i) the terms denoting logic (such as *nyāya*) and occurring in the Pāli Canon were not used, in accordance with their contextual meanings, to denote the school of logic or the *Nyāya Sūtra* (Sect. 4); (ii) in some early Pāli *sutta*s some terms denoting logical reasoning have sometimes negative connotations (Sect. 4), nevertheless in the Theravāda tradition there are many explanations why we need logic still; (iii) in the Pāli Canon, the terms like *nyāya* have the meaning of the method of Buddhists distinguishing them from non-Buddhists (Sect. 4); (iv) it seems that in the Pāli texts there are a few logical syllogisms used for the

logical purpose, but the majority of syllogisms are used without understanding of their logical nature, they are rather used for the purpose of rhetoric, e.g. syllogisms often play a rhetorical role in the *Kathāvatthu* (Sect. 5); (v) so, the author of the *Kathāvatthu* had no good competence in symbolic (systematic) logic, because there are a lot of sophisms and other fallacies among correct syllogisms (Sect. 5); (vi) in the *Kathāvatthu* and in other *Abhidhamma* texts there is no requirement to give examples in syllogisms—but it is one of the principal requirements of the Nyāya tradition as well as the Yogācāra logic (Sect. 5); (vii) the author(s) of the *Milindapañha* (its historical context is considered in Sect. 6) did have a good competence in symbolic logic, e.g. there are no sophisms and we face a requirement here to give examples for verifying statements—this requirement is explained in the text in a more primitive way terminologically than it was done in the *Nyāya Sūtra*, hence this text preceded the Nyāya philosophy and can have had an impact on the latter (Sect. 7).

Taking into account the genesis of logical knowledge in early Pāli literature from (i) to (vii) we can assume that the Gandhāran (Greco-Buddhist) influence on the origin of Indian systematic logic is highly possible and at least not excluded *if* we concentrate just on the Pāli texts. In order to infer this statement, the *Mill's joint method of agreement and difference* is applied[1]:

On the one hand, the *Milindapañha* is the only early Pāli source in which we deal with a proto-Nyāya logic—it is a main feature of this text to be logical among all other canonical texts, and, on the other hand, the *Milindapañha* was written in Gandhāra, the region where the Greek language was official for 300–400 years at least (e.g. it was used for edicts, business documentation, courts, and taxation as lingua franca) and the Hellenistic influences on social life here were evident. Thus, the early Buddhist knowledge of systematic logic is supposed to be not connected to the *Nyāya Sūtra*, but can have been established under a Hellenistic (Gandhāran) influence.

Formally:

The canonical texts, such as the *Yamaka*, the *Kalahavivāda-sutta* (*Sutta-nipāta* 4.11), the *Kathāvatthu*, and the *Milindapañha*, deal with syllogisms;

The *Yamaka* deals with a converse of implications (reversing its two parts);

[1] There are the following five methods of induction introduced by philosopher John Stuart Mill in the book *A System of Logic* (1843): direct method of agreement, method of difference, joint method of agreement and difference, method of residue, and method of concomitant variations. These methods give us the best way of modelling the historical reality on the basis of scattered archeological and textological data. In this paper, my conclusions follow these methods. One of the possible schemata for the joint method of agreement and difference is as follows:

A, B, C occur together with x, y, z;
A, D, E occur together with x, v, w;
B, C occur with y, z;
———————————————————————————
Therefore A is the cause, or the effect, or a part of the cause of x.

The *Kalahavivāda-sutta* deals with a transitivity of implications (combining several implications having a joint part);

The *Kathāvatthu* deals with *modus ponens* and *modus tollens*;

The *Milindapañha* deals with *modus ponens* and *modus tollens*;

The *Yamaka*, the *Kalahavivāda-sutta*, and the *Kathāvatthu* do not provide syllogisms with a Nyāya or proto-Nyāya way of verifying premises;

The *Milindapañha* provides syllogisms with a proto-Nyāya way of verifying premises;

The *Yamaka*, the *Kalahavivāda-sutta*, and the *Kathāvatthu* use sophisms and combine correct and incorrect syllogisms;

The *Milindapañha* does not use sophisms and applies only correct syllogisms;

The *Milindapañha* is, perhaps, the only early Pāli text written in Gandhāra by, one expects, a direct Hellenistic or Gandhāran (Greco-Buddhist) influence;

Therefore, probably, the correct application of inference rules in the early Buddhist logic is explained by a Hellenistic or Gandhāran (Greco-Buddhist) influence.[2]

Notice that the Mill's joint method of agreement and difference I have applied in this paper is not deductive, but plausible with a high probability.

Hence, I have performed an experiment as a logician to check the logical culture of ways of using syllogisms in the Pāli Canon and, as a consequence of my experiment, I am probabilistically concluding that the authors of the early Pāli texts did not know the *Nyāya Sūtra*. It means that on the basis of the corpus of these texts we can claim that at the time of the authors of the early Pāli texts (until the 1st century A.D. or even later) the Nyāya school of logic did not exist yet. (According to some other data the *Nyāya Sūtra*

[2]Formally, a very short version:
Y (*Yamaka*), Kl (*Kalahavivāda-sutta*), Kt (*Kathāvatthu*), M (*Milindapañha*) occur together with x (correct applications of *inference rules*) and y (incorrect applications of *inference rules*);
M as the only Pāli text from Gandhāra occur together with x (correct applications of *inference rules*) and z (proto-*nyāya* doctrine on verification premises) and without y (incorrect applications of *inference rules*);
Y (*Yamaka*), Kl (*Kalahavivāda-sutta*), Kt (*Kathāvatthu*) occur with y (incorrect applications of *inference rules*) and without z (proto-*nyāya* doctrine on verification premises);

Therefore M as the only Pāli text from Gandhāra is the cause, or the effect, or a part of the cause of x and z. In other words, to be Gandhāran is the cause, or the effect, or a part of the cause of x and z.

is dated not earlier than the 2nd century A.D. too, e.g. there are quotings in this *sūtra* from some early Madhyamaka and Yogācāra texts dated to this century or later and written probably in Gandhāra, too—their early fragments in Gāndhārī are excavated in this area).

2. Problem Setting

The following presuppositions are the most principal for any system of symbolic logic:

(i) Each proposition should be factual and, then, it is either true or false. It is true if it correctly describes an appropriate fact, otherwise it is false. For example, the proposition 'it's raining' is true if it's raining now indeed in a specified place.
(ii) Into our reasoning we can involve only true propositions.
(iii) There are logical schemata that are called inference rules and they infer only true propositions from true premises. Hence, our conclusions are ever true if we apply inference rules in relation to true premises.

In symbolic logic the following two inference rules are fundamental:

(1) *Modus ponens*. Let A and B be two factual propositions. Assume that 'A implies B' and A are both asserted to be true. Then we can draw the conclusion that B must be true, too. Symbolically:

$A \Rightarrow B$ is true; A is true.
Then B is true, also.
$(A \Rightarrow B)$; A

B.

(2) *Modus tollens*. Let A and B be two factual propositions again. Suppose, 'A implies B' is considered true, but it is not the case that B. Then we can draw the conclusion that it is not the case that A, too. Symbolically:

$A \Rightarrow B$ is true; B is false.
Then A is false, also.
$(A \Rightarrow B); \neg B$

$\neg A$.

In the Old-Greek philosophy, the above presuppositions (i)–(iii) were widely accepted due to the logical works written by Aristotle (384–322 B.C.) and Chrysippus (ca. 279–ca. 206 B.C.). In the meanwhile, Aristotle proposed a modification of *modus ponens* and *modus tollens* for categorical propositions and Chrysippus formulated *modus ponens* and *modus tollens* conventionally in the way as said above.

Hence, if we can observe that someone understands presuppositions (i)–(iii) and can follow them in his/her reasoning, then he or she possesses a good logical competence. This competence is detected in the Nyāya as well as in the Madhyamaka and Yogācāra texts. Certainly, the *Nyāya Sūtra* was one of the

first Indian documents, whose author(s) possessed a good logical competence. In particular, the author(s) of the *Nyāya Sūtra* accepted presuppositions (i)–(iii) of symbolic logic. He explicitly pointed out that we cannot cast doubt, first, on factual propositions which are successfully verified (*pratyakṣa*) and, second, on conclusions drawn correctly by means of inference rules from true premises (*anumāna*):

> It is incongruous to attribute or deny what [has already become] the subject of perception or inference
>
> *dṛṣṭānumitānāṃ hi niyogapratiṣedhānupapattiḥ* (*Nyāya Sūtra* 3.1.51).

In the *Nyāya Sūtra*, we face many examples of correct applications of *modus ponens* and *modus tollens*. For instance, *modus tollens* is applied here:

> *Īśvara* is a reason for observing that human actions are fruitless.
> Wrong, because without human actions there is no "fruiting".
> Not an argument – due to the conditionality of the latter.
>
> *īśvaraḥ kāraṇam, puruṣakarmāphalyadarśanāt* ||19||
> *na, puruṣakarmābhāve phlāniṣpatteḥ* ||20||
> *tatkāritatvād ahetuḥ* ||21||
> (*Nyāya Sūtra* 4.1.19–21).

Formally: If the Lord (*īśvara*) is a cause (A), then human actions are without fruits (B). Nevertheless, they are ever with fruits ($\neg B$). Then the Lord is not a cause ($\neg A$)[3]:

$$\frac{(A \Rightarrow B); \neg B}{\neg A.}$$

The *Nyāya Sūtra* is dated very differently by differet scholars: from the 6th century B.C. to the 2nd century A.D. [23, p. 4]. Let us notice that the dating from the 6th to the 5th century B.C. is quite improbable from the *archeological* point of view. The matter is that at that time the Painted Grey Ware culture existed which is characterized by a very low-scale urbanization at the Ganga-Yamuna valley. For instance, the settlements of this culture could be quite large, but they had no town planning and consisted of buildings made from bamboo and loam which can be compared to today's slums of Mumbai—an unstructured housing and lack of infrastructure. There were no states as well as no cities in the strict sense. Therefore it is obvious why there was neither a writing system nor money. The large-scale urbanization began only since ca. 400 B.C. The *śramaṇa* movement was a spiritual way to resist this urbanization—since that time it was just the very beginning of philosophical reflection of India in the pure meaning. Hence, we cannot date the *Nyāya Sūtra* from the 6th to the 5th century B.C. certainly. It was a late-Vedic period without any *sūtra*s.

[3]It is worth noting that this phrase is so close to the Madhyamaka manner of refutation of God's existence and it can be taken from the Madhyamaka texts such as *Iśvara-kartṛtva-nirākṛtiḥ-viṣṇnoḥ-ekakartṛtva-nirākaraṇa* ascribed to Nāgārjuna.

In any case, among different date patterns, the 2nd century A.D. is the most reasonable dating of the *Nyāya Sūtra* from the standpoint of archeology. At that time in the Kuṣāṇa Empire there was observed a flowering of sciences and arts in India, the first big fruit yielded by the large-scale urbanization started from ca. 400 B.C. Textologically, there are also many arguments supporting this dating. So, these arguments are collected by Vidyabhusana [43] and they are as follows: (i) the *Nyāya Sūtra* contains many quotes from some early Madhyamaka and Yogācāra texts which are dated to the 2nd century A.D. or even later; (ii) the *Nyāya Sūtra* can be examined as a systematization of logical pieces from the *Caraka-saṃhitā* dated to the same century.

(i) For instance, there are evidences that the author(s) of the *Nyāya Sūtra* accepts *kṣaṇikavāda* (teaching on momentariness), a key doctrine of Yogācāra (as well as of the earlier Sautrāntika thought), e.g.:

> There is no reason [to deny the difference] in the crystal, because, due to momentariness of [all], the particles [of the crystal] are updated one after the other.
>
> *sphaṭike api aparāparotpatteḥ* ***kṣaṇikatvāt*** *vyaktīnām ahetuḥ* (*Nyāya Sūtra* 3.2.10).

There are many quotings from the *Madhyamakaśāstra* of Nāgārjuna. The verse:

> *na svabhāvasiddhiḥ, āpekṣikatvāt* (*Nyāya Sūtra* 4.1.39)

is used to express the *madhyamaka* doctrine and it is close to:

> *na hi svabhāvo bhāvānāṃ pratyayādiṣu vidyate* |
>
> *avidyamāne svabhāve parabhāvo na vidyate* ||5|| (*Madhyamakaśāstra* 1:5).

The next passage to show the Madhyamaka doctrine is as follows:

> *nāsanna sanna sadasat, sadasatorvaidharmayāt* (*Nyāya Sūtra* 4.1.48)

It is similar to the following verse:

> *na sannāsanna sadasan dharmo nirvartate yadā* |
>
> *kathaṃ nirvartako heturevaṃ sati hi yujyate* ||9|| (*Madhyamakaśāstra* 1:9).

The doctrine of Madhyamaka and Yogācāra is exemplified as follows:

> *māyāgandharvanagaramṛgatṛṣṇikāvadvā* (*Nyāya Sūtra* 4.2.32)

This example is taken from the following verse:

> *yathā māyā yathā svapno gandharvanagaraṃ yathā* |
>
> *tathotpādastathā sthānaṃ tathā bhaṅga udāhṛtam* ||34||
>
> (*Madhyamakaśāstra* 7:34)

Another Madhyamaka doctrine objected to by the author(s) of the *Nyāya Sūtra*:

> *vartamānābhāvaḥ, patataḥ patitapatitavyakālopapatteḥ* (*Nyāya Sūtra* 2.1.40)

Please compare this to the passage:

> *gataṃ na gamyate tāvadagataṃ naiva gamyate* |

gatāgatavinirmuktaṃ gamyamānaṃ na gamyate ||1||
(*Madhyamakaśāstra* 2:1)

Thus, the *Nyāya Sūtra* cannot be written earlier than the first texts of Madhyamaka and Yogācāra dated not earlier than the 2nd century A.D.

(ii) The *Caraka-saṃhitā*, a medical treatise, includes many passages about *pramāṇa*, the sources of knowledge, similar to the Nyāya doctrine, e.g. some sources are as follows:

Pratyakṣa – Pratyakṣa (perception) is the knowledge which is directly received by the self and the sense organs. Self-perceived are pleasure, pain, desire, aversion etc., while sound etc. are percieved by the sense organs.

Anumāna – Anumāna (inference) is the reasoning supported by invariable concomittance such as the knowledge of *agni* by the power of digestion, that of strength by the power of exercise, auditory organ etc. by the perception of sound etc.

Aitihya – Aitihya (tradition) is the traditional authoritative source of knowledge such as *veda* etc.

Aupamya – Aupamya (analogy) is the statement of similarity between things such is – analogy of *daṇḍaka* with *daṇḍa* (staff), that of *dhanuḥsthmbha* with bow and that of the provider of health with the archer [31, p. 363].

The authorship or at least the deep editorship of this treatise is ascribed to Caraka, the great physician who was the medical attendant of Kaniṣka (the 2nd century A.D.), the Emperor of the Kuṣāṇas. So, in the Chinese text of the *Saṃyukta-ratna-piṭaka Sūtra* it is stated that Kaniṣka had the following three friends: his prime minister Mathara, the physician Caraka, and the poet Aśvaghoṣa [15]. As we thus see, Caraka is considered a resident of Gandhāra, the Greco-Buddhist region.

Let us notice that there are many evidences that the Madhyamaka was founded in the same Gandhāra, too. First of all, there is an archeological evidence. The fragments of the *Aṣṭasāhasrikā Prajñāpāramitā*, the proto-Madhyamaka book, written in the Kharoṣṭhī script in the Gāndhārī language and dated to ca. 75 A.D. by the radiocarbon analysis were reconstructed by Harry Falk and Seishi Karashima [7]. They found out that these fragments are supposed to be a source text for the first Chinese translation of the *Aṣṭasāhasrikā Prajñāpāramitā* by Lokakṣema (ca. 179 A.D.). Also, they proved linguistically that the standard Sanskrit text can be a translation from Gāndhāri, because in Sanskrit there are many expanded phrases that are not present in the Gāndhārī source at all: "the language of the original text was Gāndhāri, just as was assumed on the basis of some expressions in Lokakṣema's translation which presuppose sound changes only found in Gāndhāri, and not in other Indian vernaculars of the time" [7].

Some other fragments of Mahāyāna texts excavated in Gandhāra are: (i) the Gāndhārī manuscripts SC1 (PP-G, similar to the ASP 40), BC2 (*Bajaur*

Mahāyāna sūtra with parallels to the *Akṣobhya vyūha*) in Kharoṣṭhī dated to the first or second century A.D.; (ii) the *Sucitti-sūtra* (NC2, similar to the *Vimalakīrtinirdeśa-sūtra*) with parallels to three Chinese translations (T477–479) and the *Pratyutpannabuddhasaṃmukhāvasthitasamādhi-sūtra*, both written in Kharoṣṭhī and dated to the 1st or 2nd century A.D.; (iii) several small palm leaf fragments from Bamiyan with text passages familiar from the *Bodhisattvapiṭaka-sūtra*, the *Sarvapuṇyasamuccaya samādhi-sūtra*, and the *Bhadrakalpika-sūtra*, written in Kharoṣṭhī and dated to the 3th/4th century A.D., etc. [28].

We know that the *prajñāpāramitā* teaching was very popular in the North-West of India in the Kuṣāṇa period. In the *Mañjuśrīmūlakalpa* (LIII v. 575) it is affirmed that under Kaniṣka the *prajñāpāramitā* was 'established' (*pratiṣṭhitā*) in the North-West. This doctrine with the *śūnyatā* concept served as a background for the fragments BC4 and BC11. In BC4 we read 'benefit of freedom from all passions' (*vairāga-ǎnuśaṃsa*) and in BC11 'benefit of release' (*avasarga-ǎnuśaṃsa*) in practising the bodhisattva path started with understanding (*parijñā*) the origins of suffering and finished at abandoning (*prahāṇa*) these origins and realising the emptiness of all dharmas within a direct realization of the unconditioned (*lokottara-bhūta-jñāna*) [28].

There are some textological evidences that Nāgārjuna was a resident of the Kuṣāṇa Empire. It is stated in the *Rājataraṃgiṇī* dating from the 12th century that Nāgārjuna was a lord of the earth (*bhūmīśvaro*) in Kāśmīr under the rule of the following three Kuṣāṇa Emperors: Huṣka, Juṣka, Kaniṣka:

athābhavan svanāmankapuratrayavidhāyinaḥ |
huṣkajuṣkakaniṣk*ākhyās trayas tatraiva pārthivaḥ* ||168||
sa vihārasya nirmātā juṣko juṣkapurasya yaḥ |
jayasvāmipurasyāpi śuddhadhīḥ saṃvidhāyakaḥ ||169||
te turuṣkānvayodbhūtā api punyāśrayā nṛpāḥ |
shuṣkaleträdidesheṣu maṭhacaityādi cakrire ||170||
prājye rājyakṣane teṣāṃ prāyaḥ ***kāśmīra****maṇḍalam* |
bhojyam aste sma bauddhānāṃ pravrajyorjitatejasām ||171||
tadā bhagavataḥ śākyasiṃhasya paranirvṛteḥ |
asmin mahilokadhātau sārdham varṣaśataṃ hy agāt ||172||
bodhisattvaś ca deshe 'sminn eko bhūmīśvaro 'bhavat |
sa ca ***nāgārjunaḥ*** *srhīmān sadārhadvanasaṃsrhayi* ||173||
(*Rājataraṃgiṇī* 168–173).

Hiouen Thsang, who visited India in 645 A.D., mentions Aśvaghoṣa, Deva, Nāgārjuna, and Kumāralabdha, as the contemporaries of Kaniṣka and 'as the four suns which illumine the world'. Aśvaghoṣa is named also the spiritual advisor of Kaniṣka [3, pp. 302–303].

Hence, in order to prove that the *Nyāya Sūtra* was created in Gandhāra in the 2nd century A.D. (or later) indeed, we should trace the proto-Nyāya teaching (first of all, the *pramāṇa* doctrine) in the Buddhist sources before the

Mahāyāna and show that this teaching can have been established in Gandhāra. This would give a new argument supporting the dating of the *Nyāya Sūtra* to the 2nd century A.D.

3. Discussion on Methodology

According to some recent results in experimental psychology and cognitive science, systematic (or symbolic) logic is not an 'innate' knowledge of human beings. In order to know logic, we should especially study it and, first of all, study the ways how it can be applied in different situations: public discourse, science or private strategy. As a consequence, we can use strategic, creative or even critical thinking without any logical competence if we did not study systematic logic before, and even if we have studied it, we usually do not follow it in life. At first, psychologists Amos Tversky and Daniel Kahneman showed that even experts take current decisions without using systematic logic. Therefore, they established a research programme in cognitive science to study cognitive heuristics and biases, i.e. ways of making decisions in life: decisions in risk situations, prompt decisions, creative decisions and so on [41].

In the paper, I try to find out the origin of the emergence of logic in India according to the Pāli texts.

Logic is based on distinguishing particulars and generals. Let us consider an example from the Pāli Canon—how particulars and generals are examined in the *Yamaka*. In Sanskrit *yamaka* means 'twin' or 'pair' and it is used to denote a rhetoric trope with a repetition of words after their permutation. In the *Nāṭyaśāstra* (dated to between 200 B.C. and 200 A.D.) there are enumerated excellent points (*laksaṇa*) of a good dramatic composition (*kāvya*) and *yamaka* belongs to one of the four "rhetorical figures of speech" (*alaṃkāra*), used when composing dramas. These four figures are as follows: simile (*upamā*), metaphor (*rūpaka*), condensed expression (*dīpaka*), and *yamaka*.

In the Pāli treatise *Yamaka* the repetition of two words A and B after their permutation is used to show what a general is from A and B and what a particular is. So, this book considers many different pairs of *dhamma*s A and B by questions: 'Is $A\,B$? But is $B\,A$?' Answering both questions allows us to define an inclusion relation respectively: 'Is A a subset of B' or 'Is B a subset of A?' There are possibly four answers: (i) A is a subset of B and B is a subset of A ($A = B$, i.e. A and B are of the same generality); (ii) A is a subset of B and B is not a subset of A ($A \subset B$, i.e. A is particular and B is general); (iii) A is not a subset of B and B is a subset of A ($B \subset A$, i.e. A is general and B is particular); (iv) A is not a subset of B and B is not a subset of A (A and B are not comparable).

These four possible answers to the question 'Is $A \quad B$? But is $B\,A$?' can be represented as the following four converses of the universal affirmative syllogistic proposition 'All A are B': (i) 'All A are B' and 'All B are A'; (ii) 'All A are B' and 'Not all B are A' (i.e. 'Some B are not A'); (iii) 'Not all A are B' (i.e. 'Some A are not B') and 'All B are A'; (iv) 'Not all A are B' (i.e. 'Some A are not B') and 'Not all B are A' (i.e. 'Some B are not A').

For instance:

(*Ka*) *ye keci kusalā dhammā,* ***sabbe*** *te kusalamūlā*?

(*Kha*) *ye vā pana kusalamūlā,* ***sabbe*** *te dhammā kusalā*?

(*Yamakapāḷi*, 1 *Mūlayamakaṃ* 1.1)

All faultless states (are present). Are they **all** faultless roots?

These faultless roots (are present). Are they **all** faultless states? [19, p. 22].

Thus, among all the converses from (i) to (iv) for all pairs considered in the *Yamaka* we see just a correct declaration of what a general is and what a particular is and, at the same time, we cannot find out logical inference rule, even in respect to converse or inverse. For example, we know that from 'All A are B' it follows logically that 'Some B are A' (conversation). Nevertheless, the author(s) of the *Yamaka* does not know this rule, see also [11, pp. 306–310]; [44, pp. 152] as well as others. This fact is apologetically explained as follows:

> The *Yamaka* does not consist of a set of logical exercises and is not a textbook on applied logic at all. The members of the pairs of statements do not stand to each other in the logical relation of one being an immediate inference of the other. To conceive them as such is wholly to misunderstand the purpose of the book, which is not an exercise in logical gymnastics, but is intended to convey to the reader the exact logical boundaries of important concepts in the light of their actual technical usage [11, p. 309].

So, on the one hand, the *Yamaka* demonstrates a well-developed philosophical discourse with distinguishing particulars and generals. But, on the other hand, its author does not express any knowledge of logical rules for inferring.

This situation with the *Yamaka* is an example of adopting the *first method* applied in this paper, called a *structural analysis of logical competence*. We can always detect this competence or its deficit by textual analysis: whether there are some evidences of inference rules which are correct from the standpoint of symbolic logic. Even if the author demonstrates a philosophical discourse with some logical notions, but (s)he also often uses sophisms or does not apply inference rules at all, this means that (s)he does not have true logical competence.

Logic is a part of algebra and logical competence means that the author can combine some lexemes algebraically, e.g. (s)he can draw true conclusions from true premises mechanically by means of some algebraic tools.

In fragments of trial records and omens written in Akkadian we can detect some algebraic tools used for trial decisions and forecasting. Hence, the authors of these fragments possessed good logical competence. In India, for example, this good competence is detected in the texts written by representatives of the Hindu schools of Nyāya and Vaiśeṣika and by representatives of the Buddhist schools of Madhyamaka and Yogācāra.

The *Kalahavivāda-sutta* (*Sutta-nipāta* 4.11) is another example from the Pāli Canon in which the author involves difficult logical notions without any logical inference rules. In this discourse, for rhetorical purpose the author uses

a transitivity of implications, when several implications with a joint part can be combined among themselves to build sorities [44, pp. 130–136]. Nevertheless, the author implements semantically true transitions some of which are not correct formally.

The Pāli Canon is a unique Indian text corpus, because we have a chance to observe how the logical competence of its authors continuously grew up from zero in analyzing the same subject of *abhidhamma*. The first definitions of *dhamma*s and the first logical divisions of their concepts contained many fallacies because of 'mutually intercrossing, over-lapping or partially coinciding notions,' see an appropriate apologetics for this fact in [11, p. 294]. But later they became correct and there were two ways of division: (i) by choosing contradictory terms (e.g. in classifying some *duka*s (pairs) (see [44, p. 49]); (ii) and by choosing contrary terms with a neutral between them (e.g. in classifying some *tika*s (triplets): *sukha* (happiness), *dukkha* (unhappiness), and *adukkhamasukha* (neither unhappiness nor happiness) (see [44, p. 52]).

In reconstructing the history of logical competence of the authors of the Pāli Canon I appeal to the *second method*, *historical reconstructive hermeneutics*. This hermeneutics allows us to examine texts diachronically and it is grounded on the motto of Ludwig Wittgenstein: 'use as meaning' according to which we should reconstruct meanings of words on the basis of understanding their contextual use.

This hermeneutics is the opposite of the *philosophical synchronic hermeneutics*. The latter examines texts synchronically for the sake of philosophical inspirations. It can be productive from the point of view of philosophy, although it is not scientific. For instance, sometimes the *Abhidhamma* is analyzed by Ronkin [26] by the philosophical synchronic hermeneutics, e.g. when she compares *abhidhamma* and the *vaiśeṣika* way of classifying categories. On the one hand, this comparison is interesting philosophically, but, on the other hand, it ignores the fact that the Vaiśeṣika classification of categories demonstrates a good logical competence, while the Pāli classifications were proposed at a different time and some of them are not perfect logically. So, from the standpoint of historical reconstructive hermeneutics the latter fact would mean that some Pāli classifications of *dhamma*s were created earlier than the Vaiśeṣika classification. Historically, the Vaiśeṣika one can be compared to the *Abhidharmakośakārikā* of Vasubandhu, because their logical competences are comparable and perfect simultaneously.

Some versions of philosophical synchronic hermeneutics can be even absurd historically. For instance, according to the Mīmāṃsā hermeneutics the Nyāya school of logic existed at the time of Kṛṣṇa and Arjuna, as the word of *nyāya* is mentioned in the *Mahābhārata*:

> The sciences called ***nyāya***, orthoephy and treatment of diseases; <...> a description of places of pilgrimage and other holy places of rivers, mountains, forests, the ocean, of heavenly cities and the *kalpas*; the art of war <...> (*Mahābhārata* 1.1.52).

The historical reconstructive hermeneutics allows us to trace back the logical competence of the authors of the Pāli Canon. In [11,44] there is proposed

a well-grounded reconstruction of logical discourse in the early Pāli texts, although the first book is quite subjective, because its author tries to be so apologetic for Theravāda. In both books their authors note that from the very beginning, the *abhidhamma* as well as other texts was often taught in the form of questions and answers and, as a result, some (proto-)logical techniques were thought up for the purpose of rhetoric.

For example, in the *Nikāya*s and *Āgama*s the following four kinds of explanations of questions were proposed [11, p. 281]; [44, pp. 72–73]: (i) *ekaṃsa-vyākaraṇīyo*, a categorical explanation when a questioner demands 'Yes' or 'No' from an answerer; (ii) *paṭipucchā-vyākaraṇīyo*, an answer by a counter-question when an answerer returns a reply in the form of a new question; (iii) *ṭhapanīyo*, when a questioner suggests some reply to an answerer but all such suggestions are set aside as inapplicable; (4) *vibhajja-vyākaraṇīyo*, an analytical explanation when a questioner requests some explanation of an answerer.

One of the first logical tools represented in the Pāli texts is to classify things according to the following four-fold assertions: (i) S is P; (ii) S is not P; (iii) S is and is not P; (iv) S neither is nor is not P. For instance, the Buddha engages these four-fold assertions to show that none of them 'fit the case' (*upeti*). Thus he says that when an enlightened person dies: (i) 'he is reborn ... does not fit the case' (*upapajjatī ti ... na upeti*); (ii) 'he is not reborn ... does not fit the case' (*na upapajjatī ti ... na upeti*); (iii) 'he is and is not reborn ... does not fit the case' (*upapajjati ca na ca upapajjatī ti ... na upeti*), (iv) 'he is neither reborn nor not reborn ... does not fit the case' (*n'eva upapajjati na na upapajjatī ti ... upeti*) (*Majjhima Nikāya* 1.486; [11, p. 289]). This type of answer corresponds to the following strategy in questioning: (i) 'Is $S\,P$?'; (ii) 'If not, is S not P?' (iii) 'If not, is S both P and not P?' (iv) 'If not, is S neither P nor not P?'

As we see, the first logical techniques, such as the four-fold assertions, which were invented in the Pāli Canon, were used, first of all, for some rhetorical purposes.

Thus, in this paper I propose the structuralist analysis of logical competence, how it is expressed in the Pāli Canon, by means of the historical reconstructive hermeneutics. My aim is to show that the *Milindapañha* is a unique Pāli text close to the true original point of logic's emergence in India.

4. Some Occurrences of the Terms 'Logic', 'Logical' in the Pāli Canon

The *Milindapañha* consists of many short dialogues and each dialogue can be examined as (or reduced to) a syllogism with the following four steps:

(a) Is A B? (question or thesis);
(b) A is (not) B, because... (argumentation or inference, *anumāna*);
(c) The illustration for inference (b) is as follows: ... (example, *opamma*);
(d) Accepting or denying (a) on the basis of (b).

This structure of syllogism proposed in the *Milindapañha* holds even for definitions:

(a) "Venerable Nāgasena, what is the differentia (distinguishing characteristic) of *A*?"
"*Bhante nāgasena kiṃlakkhaṇā A*?" *Ti.*

(b) "The differentia of *A*, your majesty, is *B*."
"*B -lakkhaṇā mahārāja A*" *ti.*

(c) "Give me an illustration."
"*Opammaṃ karohī*" *ti.*
Then the Nāgasena illustration follows.

(d) Accepting the definition put forward by Nāgasena.
"*Kallo'si bhante nāgasenā*" *ti.*

Let us notice that this kind of definition is very close to the Aristotelian model of genus-differentia definitions: the item is defined through its differentia, but the difference from Aristotle is that Nāgasena always verifies his definitions by examples.

In the *Milindapañha* there is no name for the four-step syllogisms. The word *ñāya*, the Pāli analogue for the Sanskrit *nyāya*, occurs in the meaning 'the method, the dhamma' *ñāya dhamma* (*Milindapañha* 6.1.3), i.e. as a method, distinguishing Buddhists from non-Buddhists. Let us emphasize that *ñāya* occurs very often in the Pāli Canon, but never in the meaning of the Hindu school of logic. In most cases it means an analytic method or even a Buddhist method of cognition distinguishing Buddhists from non-Buddhists. For example, there is an expression 'the noble method' (*ariya cassa ñāya*) in the *Gahapativagga* of the *Saṃyutta Nikāya*:

> At Savatthī. Then the householder Anathapiṇḍika approached the Blessed One, paid homage to him, and sat down to one side. The Blessed One then said to him:
>
> "Householder, when five fearful animosities have subsided in a noble disciple, and he possesses the four factors of stream-entry, and he has clearly seen and thoroughly penetrated with wisdom the **noble method**, if he wishes he could by himself declare of himself: 'I am one finished with hell, finished with the animal realm, finished with the domain of ghosts, finished with the plane of misery, the bad destinations, the nether world. I am a stream-enterer, no longer bound to the nether world, fixed in destiny, with enlightenment as my destination" [5, vol. 1, p. 578].
>
> *Sāvatthiyaṃ viharati. Atha kho anāthapiṇḍiko gahapati yena bhagavā tenupasaṅkami; upasaṅkamitvā bhagavantaṃ abhivādetvā ekamantaṃ nisīdi. Ekamantaṃ nisinnaṃ kho anāthapiṇḍikaṃ gahapatiṃ bhagavā etadavoca:*

> "*Yato kho, gahapati, ariyasāvakassa pañca bhayāni verāni vūpasantāni honti, catūhi ca sotāpattiyaṅgehi samannāgato hoti,* ***ariyo cassa ñāyo*** *paññāya suditṭho hoti suppaṭividdho, so ākaṅkhamāno attanāva attānaṃ byākareyya: 'khīṇanirayomhi khīṇatiracchānayoni khīṇapettivisayo khīṇāpāyaduggativinipāto, sotāpannohamasmi avinipātadhammo niyato sambodhiparāyano'ti*" (*Saṃyuttanikāya*, *Pañcaverabhayasutta* 41 – 42 [*Gahapativagga*]).

Also, there is an expression 'the method, the dhamma' (*ñāya dhamma*) in other texts:

> At Savatthī. "Bhikkhus, whether for a layperson or one gone forth, I do not praise the wrong way. Whether it is a layperson or one gone forth who is practising wrongly, because of undertaking the wrong way of practice he does not attain the **method**, the **Dhamma** that is wholesome [5, vol. 2, p. 1536].
>
> *Sāvatthinidānaṃ. "Gihino vāhaṃ, bhikkhave, pabbajitassa vā micchāpaṭipadaṃ na vaṇṇemi. Gihi vā, bhikkhave, pabbajito vā micchāpaṭipanno micchāpaṭipattādhikaraṇahetu nārādhako hoti* ***ñāyaṃ dhammaṃ*** *kusalaṃ* (*Saṃyuttanikāya*, *Mahāvaggapāḷi* 1.24 [*Dutiyapaṭipadāsutta*]).

Contextually, only the *Milindapañha* among other Pāli texts assumes that *ñāya* should include 'logic'—by assuming the four-step syllogism as a tool of true cognitions. As we see, the *Milindapañha* is unique not only because of its historical context (the only Pāli book directly connected to Gandhāra), but also due to its respect for syllogisms as a part of the method of Buddhists. The point is that the doctrinal difference between the Theravāda and the Mahāyāna teaching is significant, indeed, but the most intriguing difference holds in respect to logic. While in the Mahāyāna there are many logical treatises and logic is regarded as one of the most important Buddhist sciences and arts, in the Theravāda there is no interest in logic as such, there are no logical treatises in the strict sense. That fact is in line with the Buddha's words concerning logical matters in the earliest *sūtra*s (Pāli: *sutta*s). Let us refer to the *Kālāma Sutta* contained in the *Aṅguttara Nikāya* of the *Tipiṭaka*, the Pāli Canon. In this *sutta*, the Buddha sounds a note of caution on the subject of what should be avoided in Buddhism:

> Come, Kālāmas. Do not go upon what has been acquired by repeated hearing; nor upon tradition; nor upon rumour; nor upon what is in a scripture; nor upon **surmise**; nor upon an **axiom**; nor upon **specious reasoning**; nor upon a bias towards a notion that has been pondered over; nor upon another's seeming ability; nor upon the consideration, 'The monk is our teacher.' Kālāmas, when you yourselves know: 'These things are good; these things are not blameable; these things are praised by the wise; undertaken and observed, these things lead to benefit and happiness,' enter on and abide in them [40, p. 5].

> *Etha tumhe kālāmā mā anussavena, mā paramparāya, mā itikirāya, mā piṭakasampadānena, mā* ***takkahetu****, mā* ***nayahetu****, mā* ***ākāraparivitakkena****, mā diṭṭhinijjhānakkhantiyā, mā bhabbarūpatāya, mā samaṇo no garū'ti. Yadā tumhe kālāmā attanā'va jāneyyātha, ime dhammā kusalā, ime dhammā anavajjā, ime dhammā viññuppasatthā, ime dhammā samattā samādinnā hitāya sukhāya saṃvattantī'ti. Atha tumhe kālāmā upasampajja vihareyyātha* (*Tikanipātapāḷi* 66 [*Kālāmasutta* I.189]).

In this short quoted text, the Buddha talks about things which are similar to idols of the mind (*idola mentis*) proposed by Francis Bacon (1561–1626). For example, the Buddha warns us against traditional visions and dogmas including 'repeated hearing' (*anussava*), 'tradition' (*paramparā*), 'rumor' (*itikirā*), 'following a scripture' (*piṭaka-sampadāna*), 'following an authority' (*bhabbarūpatāya* and *samaṇo no garū*). Meanwhile, he warns us against any logical reasoning, too. Namely, first, he talks against 'surmise' (*takkahetu*), which is better to be translated as 'because of (deductive) reasoning'. It means that any truth of *dhamma* (the Buddha's teaching) cannot be proven by inferring from premises. Second, the Buddha warns us against 'an axiom' (*nayahetu*), making an assumption to be verified later. Third, he avoids 'specious reasoning' (*ākāraparivitakka*), accepting something after considering its reasons. Fourth, he criticizes 'a bias towards a notion that has been pondered over' (*diṭṭhinijjhānakkhantiyā*), starting from some view or opinion (*diṭṭhi*).

Hence, according to the *Kālāma Sutta*, logical matters (e.g. the art of debates) are excessive for Buddhism and logical reasoning is not enough for our liberation. Another commentary to this *sutta* is by Watanabe [44, p. 105]. We should just analyze our own action (*kamma*) and its consequences or effects (*phala*). The same attitude towards logical subjects is seen in the Theravāda (i.e. relatively early) Buddhism, as well.

In many other early *sutta*s, such as some in the *Sutta-nipāta*, the Buddha expresses the same sceptical view of logical reasoning, e.g.:

> Buddha:
>
> Indeed, there are not many and varied truths
> differing from perception of the ever-true in the world;
> but they work upon their views with logic:
> "Truth! Falsehood!" So they speak in dualities.
> Based on what is seen, heard,
> On precepts and vows, or what is cognized,
> They look down on others.
> Convinced of their own theories,
> pleased with themselves,
> They say, "My opponent is a fool, no expert."
> [16, p. 279].

Na heva saccāni bahūni nānā,
Aññatra saññāya niccāni loke;
Takkañca diṭṭhīsu pakappayitvā,
Saccaṃ musāti dvayadhammamāhu.
Diṭṭhe sute sīlavate mute vā,
Ete ca nissāya vimānadassī;
Vinicchaye ṭhatvā pahassamāno,
Bālo paro akkusaloti cāha."
(*Suttanipātapāḷi* 892–893 [*Cūḷabyūhasutta*]).

Thus, the word *ñāya*, the Pāli analogue for the Sanskrit *nyāya*, never occurs in the Pāli Canon in the meaning of the school of logic or the *Nyāya Sūtra*. The only case that seems to be a mention of the school of logic is as follows. In the *Milindapañha*, Menander or Milinda was regarded as an excellent expert in all the 19 Hindu sciences and arts:

> Of these two the novice became the King called Milinda in the city of Sagala in India. He was wise, experienced, clever, able; he was one who acted conscientiously at the time of doing all the (magic) devices, ceremonies and observances concerning things past, future and present. Many were the arts he had mastered, that is to say: the revealed tradition, secular lore, the Sankhya, Yoga, Nyāya, and Vaiśeśika systems, accountancy, music, medicine, the four Vedas, the Purāṇas, the oral traditions, astronomy, conjuring, logic, spells, fighting, poetry, reckoning on the fingers, in a word, the nineteen (arts) [10, vol. 1, p. 5].

So, the Greek king was represented as a scholar even in the Hindu philosophy, including the doctrines of the Sāṃkhya, Yoga, Nyāya, and Vaiśeṣika Schools. The problem is that T. W. Rhys Davids and then I. B. Horner have translated this fragment not correctly. Let us quote the same text in Pāli:

> *Tesu sāmaṇero jambudīpe sāgalanagare milindo nāma rājā ahosi. Paṇḍito byatto medhāvī paṭibalo atītānāgatapaccuppannānaṃ mantayogavidhānakiriyānaṃ, karaṇakāle nisammakārī hoti, bahūni cassa satthāni uggahitāni honti. Seyyathidaṃ—suti sammuti* ***saṅkhyā yogā nīti visesikā*** *gaṇikā gandhabbā tikicchā catubbedā purāṇā itihāsā jotisā māyā ketu mantanā yuddhā chandasā buddhavacanena ekūnavīsati, vitaṇḍavādī durāsado duppasaho puthutitthakarānaṃ aggamakkhāyati, sakalajambudīpe milindena raññā samo koci nāhosi yadidaṃ thāmena javena sūrena paññāya, aḍḍho mahaddhano mahābhogo anantabalavāhano* (*Milindapañha* 1.1.4).

We are reading here just *saṇkhyā yogā nīti visesikā*, i.e. the Sāṃkhya, Yoga, Nīti, and Vaiśeṣika Schools, not Nyāya. The fact that the word *nyāya* in the meaning of the Hindu doctrine or school of logic does not occur in the Pāli Canon at all is significant evidence for us that Nyāya did not exist before the 1st century A.D., at time when approximately, but not earlier the Pāli

Canon was finally edited. The translation of *nīti* as *nyāya* is a kind of historical falsification. First of all, *nyāya* is a teaching concerning *pramāṇa* how to verify or falsify logical reasoning. And, as we try to prove, this teaching did not exist before the 1st century A.D.

Let us examine the 19 Hindu sciences and arts for which Menander was said to be a great scholar: (1) *suti veda*—the Hindu holy texts presented by the Vedas; (2) *sammuti*—moral codes and sage advices such as the *Manusmṛti* or *Manu's Code of Law* finally edited after 400 A.D.; (3) *saṅkhyā*—the Sāṃkhya philosophy founded by Kapila, its earliest surviving text is the *Sāṁkhyakārikā* written by Iśvarakṛṣṇa from the 3rd to the 4th century A.D.; (4) *yogā*—the yoga philosophy founded by Patañjali, its basic text is the *Yoga Sūtra* dated from the 2nd to the 4th century A.D.; (5) *nīti*—the *nīti* philosophy or political philosophy including several arts: diplomacy and statecraft (Pāli: *rajanīti*); economics (Pāli: *atthanīti*); morality (Pāli: *lokanīti*); ethics (Pāli: *dhammanīti*); the Buddhist ethics that included didactic stories and maxims on numerous everyday subjects (Pāli: *vaddhananīti*); (6) *visesikā*—the Vaiśeṣika philosophy founded by Kaṇāda, its basic text is the *Vaiśeṣika Sūtra* cited, e.g., the *Jñānaprasthāna-śāstra*, one of the seven books of the Sarvāstivāda *Abhidharma* written from the 1st to the 2nd century A.D.; thus, the *abhidharma* (Pāli: *abhidhamma*) is a Buddhist alternative to *vaiśeṣika*; (7) *gaṇikā*—arithmetics; (8) *gandhabbā*—the Hindu literature on music; (9) *tikicchā*—the Hindu medicine; (10) *catubbedā*—the art of archery; (11) *purāṇā*—the corpus of histories and ancient tales; (12) *itihāsā*—the Hindu chronics saying 'it happened thus', such as the *Mahābhārata*; (13) *jotisā*—the Hindu astrology that was influenced by the Greek astrology in the higher measure, because the *Yavanajātaka* (or the *Greek Jātaka*), a book on astrology translated from Greek in the 2nd century A.D., was one of the earliest sources of the Hindu astrology [22]; (14) *māyā*—the knowledge of stratagem; (15) *ketu* that is traditionally read by the Theravāda as *hetu*—the art of weighing and analyzing the pro et con of the matter in question, in the way it was demonstrated in the *Kathāvatthu*; however, if it is *ketu* indeed, then it means Hindu omens; (16) *mantanā*—the Hindu art of incantations and sacrificial formulas; (17) *yuddhā*—the art of warfare; (18) *chandasā*—the Hindu art of reciting and composing hymns and poetry; (19) *buddhavacanena*—all the words of the Buddha, including the Pāli Canon.

For the first time, *ñāya* was used with the same kind of meaning of the Hindu school of logic, most probably, of Buddhist logic, just in the *Daṭhavansa* or the *History of the Tooth-Relic Gotama Buddha* written not earlier than in the 5th century A.D.:

> Then priests, wise and skilled in the Tipiṭaka, Jātaka, **Logic** [*A.Sch.— ñāya*], Agāma, and the like, and citizens who had their sole refuge in the three treasures, assembled there instantly through curiosity [37, p. 72].

However, the meaning 'the method of Buddhists' was preserved also:

> Who, again, as the hog Tundila, satisfied the people with the taste of the nectar of the Law, and as a sage, composing a **treatise on logic** [*A.Sch.— ñāya*], made his own Law prevail for a long time [37, p. 51].

For the meaning of 'logical inference' there is another Pāli analogue of *nyāya*, presented by *naya*. In this meaning the term of *naya* occurs often together with the term *hetu* in the same way as in the *Kālāma Sutta* quoted above, for example in the *Jātaka*:

> Narada replied:
>
> "Ask me, O king; this is thy business; this doubt of thine which thou feelest, I will assuredly solve it for thee by **reasoning**, by **logic**, and by **proofs**."
>
> *"Pucchassu maṃ rāja tavesa attho, Yaṃ saṃsayaṃ kuruse bhūmipāla; Ahaṃ taṃ nissaṃsayataṃ gamemi,* ***Nayehi ñāyehi*** *ca* ***hetubhī*** *ca"* (*Jātaka*, 544, *Mahānipāto* 1298 [*Mahānāradakassapajātaka*]).

The next instance of the same occurrence is taken from the *Mahāvagga* of the *Aṅguttara Nikāya*, where the Buddha also expresses a kind of scepticism about any logical reasoning:

> Come, Salha, do not be satisfied with hearsay or with tradition or with legendary lore or with what has come down in scriptures or with conjecture or with **logical inference** or with **weighing evidence** or with a liking for a view after pondering it or with someone else's ability or with the thought 'The monk is our teacher' [39].
>
> *Etha tumhe, sāḷhā, mā anussavena, mā paramparāya, mā itikirāya, mā piṭakasampadānena, mā* ***takkahetu****, mā* ***nayahetu****, mā ākāraparivitakkena, mā diṭṭhinijjhānakkhantiyā, mā bhabbarūpatāya, mā samaṇo no garūti* (*Aṅguttaranikāya* I.193, *Tikanipātapāḷi* 66 [*Sāḷhasutta*]).

Thus, the term *nyāya* in the meaning of the Hindu school of logic or the *Nyāya Sūtra* does not occur in the Pāli Canon, actually. Instead of that the Pāli term *ñāya* had the meaning of one or other aspect of the wisest Buddhist method and, according to the *Milindapañha*, the four-step syllogisms are an important part of cognitions within this method.

5. Logical Reconstructions of Some Conclusions in the Kathāvatthu

The *Milindapañha* is organized as a compendium of four-step syllogisms explaining *abhidhamma*. There is else only one similar treatise, *pakaraṇa*, written especially for the purpose of debates with non-Theravādins (more precisely historically, with non-Vibhajjavādins) for teaching the *abhidhamma*. This compendium of logical reasoning for different debates is called the *Kathāvatthu*, it is contained in the *Abhidhamma Piṭaka* of the Pāli Canon. In this Section I will try to show that its author(s) had no competence in logic because of many fallacies, although a lot of syllogisms of the *Kathāvatthu* are correct and really difficult. This is the main difference of that book from the *Milindapañha*, where

there are no logical fallacies at all. For another logical reconstruction of the *Kathāvatthu*, please see [11, pp. 305–368] and [44, pp. 122–126; pp. 154–174].

In this treatise we find many correct complex syllogisms, such as *modus tollens*: 'If A is B, then C is D. But C is not D. Therefore, A is not B' [1, p. xlviii]:

> Adherent.—Is $A\,B$? (*ṭhapanā*)[4]
>
> Opponent.—Yes.
>
> Adh.—Is $C\,D$? (*pāpanā*)
>
> Opp.—No.
>
> Adh.—But if A be B, then [you should have said] C is D. That B can be affirmed of A, but not D of C, is false. Hence your first answer is refuted. (*ropanā*).

Formally:

$$\frac{(A \Rightarrow B) \Rightarrow (C \Rightarrow D); \neg(C \Rightarrow D)}{\neg(A \Rightarrow B).}$$

Another example of correct syllogism as a modification of *modus tollens* is logically formulated in the *Kathāvatthu* as follows: 'If D be denied of C, then B should have been denied of A. But you affirmed B of A. Therefore, that B can be affirmed of A, but not D of C, is wrong,' or in the simpler way: 'If C is not D, then A is not B. But A is B. Therefore C is D' [1, p. xlviii]. Formally:

$$\frac{\neg(C \Rightarrow D) \Rightarrow \neg(A \Rightarrow B); (A \Rightarrow B)}{(C \Rightarrow D).}$$

One of the most interesting items of evidence for the genuine role that logic plays in Theravāda Buddhism is contained in the first chapter of this text, called the *Puggalakathā*; the latter describes a debate between a Theravādin (more precisely historically, Vibhajjavādins), who is considered an orthodox Buddhist in the text, and a Puggalavādin, another Buddhist who believes in the existence of a soul-like personal entity (*puggalo*). The point is that the reasoning involved in the debate from the opposite sides shows that the Theravādin as well as the Puggalavādin do not understand the subject of logic as ultimate inferring, although they use correct syllogisms sometimes.

Let us introduce some symbolic notations to make their debate more transparent:

> A is B := "'The person" (*puggalo*) is known in the sense of a real and ultimate fact.'

[4]Let us notice that in symbolic logic the proposition "A is B" always has the formal meaning of implication: "if A, then B" ($A \Rightarrow B$) or "if something is A, then it is B, too" ($A \Rightarrow B$). This formal treatment of affirmative propositions in the way of implications was well known by Indian logicians such as Dharmakīrti (he was a representative of Yogācāra school). He exemplifies this relationship as follows: "Dalbergia is a tree". As a consequence, it means that if something is a Dalbergia, then we can conclude that it is a tree, too, but not vice versa.

Puggalo upalabbhati saccikaṭṭhaparamatthenāti (*Kathāvatthu* 1).

A is C := 'Is "the person" known *in the same way* as a real and ultimate fact is known?'

Yo saccikaṭṭho paramattho, tato so puggalo upalabbhati saccikaṭṭhaparamatthenāti? (*Kathāvatthu* 1).

Then their debate is taking place in the following manner:

Theravādin.—Is $A\,B$?

Puggalavādin. —Yes.

Ther.—Is $A\,C$?

Pugg.—No.

Ther.—However, 'if A is B, then A is C.' Then that which you say here is wrong, because you state that 'A is B' is true, but 'A is C' is false. But if 'A is C' is false, then 'A is B' is false.

Symbolically:

$$(A \Rightarrow B) \Rightarrow (A \Rightarrow C); \neg(A \Rightarrow C)$$

$$\neg(A \Rightarrow B).$$

It is an *ad absurdum*, because $A \Rightarrow B$ is held by the Puggalavādin to be true. The Theravādin holds that this should mean that that $A \Rightarrow C$ is true, too. Hence, we see that the final refutation is logically correct, according to the Theravādin understanding of the terms A and B, here: 'If A is B, then A is C.' So, if 'A is B' is true, 'A is C' should be true, too. The Puggalavādin maintains that 'A is C' is false. However, it means, as the Theravādin truly claims, according to their analysis that 'A is B' should be false, also. This syllogism is a classical *modus tollens*. Hence, the Theravādin has just refuted the Puggalavādin's opinion. But, let us look at the continuation of this dialogue:

Puggalavādin.—Is A not B?

Theravādin.—Yes, it is not.

Pugg.—Is A not C?

Ther.—No, it is.

Pugg.—However, 'if A is not B, then A is not C.' Then that which you say here is wrong, namely, that 'A is not B' is true, but 'A is not C' is false. But if 'A is not C' is false, then 'A is not B' is false, also. Thus, you are wrong.

Pugg.—So, if 'A is not B' is true, then 'A is not C' is true. Now we, who admitted these propositions, do not consider ourselves to have been refuted. You say you have refuted us; anyway we are not well refuted.

Symbolically:

$$\neg(A \Rightarrow B) \Rightarrow \neg(A \Rightarrow C); \neg\neg(A \Rightarrow C)$$

$\neg\neg(A \Rightarrow B)$.

It is an *ad absurdum*, as well, because $A \Rightarrow C$ is true for the Puggalavādin. From this it follows that $A \Rightarrow B$ is true, also. So, the Puggalavādin puts forward another implication, namely: 'if A is not B, then A is not C' [$\neg(A \Rightarrow B) \Rightarrow \neg(A \Rightarrow C)$]. The Theravādin states that 'A is not C' is false. From this it should follow according to the same *modus tollens*, as the Puggalavādin notes now, that 'A is not B' is false. It means that the Puggalavādin has just refuted the Theravādin's opinion.

Thus, we have the following opposite sides:

Theravādin:	'A is B' is false, 'A is not B' is true; 'A is C' is true, 'A is not C' is false; if 'A is B', then 'A is C.'
Puggalavādin:	'A is B' is true, 'A is not B' is false; 'A is C' is false, 'A is not C' is true; if 'A is not B', then 'A is not C.'

In order to apply the same *modus tollens*, the Theravādin appeals to the implication 'if A is B, then A is C' as the first premise of his syllogism and the Puggalavādin to the same implication, but with negations 'if A is not B, then A is not C' as the first premise of his syllogism. Who is right? Nobody! The problem is that the Theravādin as well as the Puggalavādin cannot agree on the first premise of their reasoning. Their dialogue looks like a logical paradox: the same propositions are true and false at the same time. One opposite side puts forward one implication to prove a contradictory statement. Another side puts forward the same implication, but with negations to prove another statement. Such a dialogue can become interminable. Indeed, we face many modifications of the first dialogue in the *Puggalakathā*.

Formally:

Theravādin:	if 'A is B' is true by the Puggalavādin, then 'A is C' should be true by the Puggalavādin also, but it is not.
Puggalavādin:	if 'A is not B' is true by the Theravādin, then 'A is not C' should be true by the Theravādin also, but it is not.

The problem is that the author of the *Kathāvatthu* does not know how the implication $A \Rightarrow B$ can be verified. In the Nyāya and Yogācāra logic, there are the following three ways of verifying the implication: (i) the (Aristotelian) way by showing that B is a general (genus) for A; (ii) the (Stoic or Chryssipus) way by checking that A is a cause for B; (iii) the (Stoic or Chryssipus) way by checking that B is a sign for A if A is a cause for B. Hence, the sentence $A \Rightarrow B$ means, according to Nyāya and Yogācāra, that A implies B as a genus for A or a causal consequence from A. There is the third possibility as well that there can be the sentence $B \Rightarrow A$ telling us that the sign B exists for occurring its cause A. This semantics for conditional sentences is unknown for the author of the *Kathāvatthu*. But without a verified implication, *modus tollens* plays just a rhetorical role.

Thus, on the one hand, the Theravādin as well as the Puggalavādin apply the formally correct modifications of *modus tollens* mentioned above, but, on

the other hand, they do not give true inferences, but sophisms in fact, because the Theravādin uses the implication 'if A is B is true, then A is C is true' where the antecedent occurs he considers false and the Puggalavādin uses the implication 'if A is not B is true, then A is not C is true' where there is the antecedent he examines as false, too. However, we cannot infer from the false premises! This significant fact that *modus tollens* is a sophism because of the unverified implications is ignored by Jayatilleke [11] and Watanabe [44]. A complicated reasoning with many formulas does not mean immediately that its author is a logician. The matter is that this reasoning should be correct formally with, necessarily, correct verifications of all premises.

Let us introduce the following new notations:

A is B := "'The person" (*puggalo*) is known in the sense of a real and ultimate fact.'

C is B := 'Material quality[5] is known in the sense of a real and ultimate fact.'

Then we have the following next dialogue:

Theravādin.—Is A B, and is C B?

Puggalavādin.—Yes.

Ther.—Is C one thing and A another?

Pugg.—No, that cannot truly be said.

Ther.—However, if 'A is B, and C is B', then 'A and C are distinct things.' You are wrong to admit 'A is B, and C is B' and not 'A and C are distinct things.' If the latter is false, then the first is false.

Pugg.—Is A B?

Ther.—It is not.

Pugg.—Is C B?

Ther.—Yes.

[5] Then they have used the same reasoning where for 'material quality' they have substituted the following new items: feeling; perception; coefficients (*saṅkhāra*s); consciousness; the organ of sight; the organ of hearing; the organ of smell; the organ of taste; the organ of touch; visible object; sound; odour; taste; tangible object; mind (*sensis communis*); cognizable object; eye as subjective element; sights as subjective element; visual cognition as subjective element; ear as subjective element; sounds as subjective element; auditory cognition as subjective element; nose as subjective element; odours as subjective element; olfactory cognition as subjective element; tongue as subjective element; tastes as subjective element; gustatory cognition as subjective element; body as subjective element; touches as subjective element; tactile cognition as subjective element; mind as subjective element; mind-cognizing as subjective element; cognizables as objective element; eye as controlling power; ear as controlling power; nose as controlling power; tongue as controlling power; body as controlling power; mind as controlling power; female sex as controlling power; male sex as controlling power; life as controlling power; pleasure as controlling power; pain as controlling power; joy as controlling power; grief as controlling power; hedonic indifference as controlling power; faith as controlling power; energy as controlling power; mindfulness as controlling power; *samādhi* as controlling power; understanding as controlling power; the thought: "I shall come to know the unknown" as controlling power; the coming to know as controlling power; the having known as controlling power.

> Pugg.—Is C one thing and A another?
>
> Ther.—No, that cannot be truly said.
>
> Pugg.—If 'C is B', then you should also have admitted that 'A and C are distinct things.' You are wrong in admitting the truth of 'C is B' while you deny that of 'A is B.' If A and C are not distinct things, then A is B. Thus, your position is false.

Symbolically:

Theravādin:

$$((A \Rightarrow B)\&(C \Rightarrow B)) \Rightarrow (A \vee C); \neg(A \vee C)$$

$$\neg(A \Rightarrow B)\&\neg(A \Rightarrow C).$$

Nevertheless, it is an incorrect form. The logically corrected form is thus:

$$((A \Rightarrow B)\&(C \Rightarrow B)) \Rightarrow (A \vee C); \neg(A \vee C)$$

$$\neg(A \Rightarrow B) \vee \neg(A \Rightarrow C).$$

Puggalavādin:

$$(\neg(A \Rightarrow B)\&(C \Rightarrow B)) \Rightarrow (A \vee C); \neg(A \vee C)$$

$$(A \Rightarrow B)\&\neg(C \Rightarrow B).$$

It is an incorrect form, also. The logically corrected form is as follows:

$$(\neg(A \Rightarrow B)\,\&\,(C \Rightarrow B)) \Rightarrow (A \vee C); \neg(A \vee C)$$

$$(A \Rightarrow B) \vee \neg(C \Rightarrow B).$$

We deal here with two modifications of *modus tollens* again and in the same manner the Theravādin and the Puggalavādin demonstrate that they do not know how implication can be verified. So, they apply different implications to infer contradictions, since they do not have a procedure for verifying conditional propositions as well as other propositions at all. The Theravādin is based on the scheme: 'If A is B and C is B, then A and C are distinct things.' If it is false that 'A and C are distinct things,' then it is false that 'A is B and C is B.' The Puggalavādin offers the following scheme: 'If A is not B and C is B, then A and C are distinct things.' If it is false that 'A and C are distinct things,' then it is false that 'A is not B and C is B.'

The main problem of the author(s) of the *Kathāvatthu* is that its author(s) does not know what the subject of logic is, but its subject is to infer automatically from premises which are verified as true sentences. In the Hindu terms, they do not know what *pramāṇa* (Sanskrit: 'means of knowledge') is—how we can verify sentences. Notice that an appropriate Pāli word *pamāṇa* occurs several times in the Pāli Canon, but never in the meaning of 'means of knowledge'. The teaching on *pramāṇa* appeared in India much later than all the texts of the Pāli Canon were composed. In this teaching all the sources of the true knowledge are classified: *pratyakṣa* (Pāli: *paccakkha*; 'evidence,' 'first premises,' 'axioms' or 'underlying things', ὑποκείμενον in the Aristotelian meaning), *anumāna* (Pāli: *anumāna*; 'inference'), *upamāna* (Pāli: *upamāna*; 'comparison,' 'analogy'), *arthāpatti* (Sanskrit: 'postulation, derivation from

circumstances' there is not this word in the Pāli Canon), *anupalabdhi* (Sanskrit: 'non-perception, negative proof;' there is not a common word in the Pāli Canon, but in the *Milindapañha* (I.138) it is claimed that a real self is *anupalabbhamāne* —it is not being apprehended) and *śabda* (Pāli: *sadda*; 'word, testimony of past or present reliable experts'). In the European logic *pramāṇa* is a logical semantics and a logical epistemology, i.e. the rules of how to ascribe meanings to logical propositions.

The Theravādin as well as the Puggalavādin are not familiar with any logical semantics. Therefore, they cannot agree on using premises. They do not know how to verify or falsify atomic propositions and how to build up true composite propositions on the basis of atomic ones. Although they know some correct syllogisms, they have no idea how these syllogisms can be verified or falsified.

Hence, the *Kathāvatthu* cannot be evaluated as a logical treatise in fact. There is not even a hint of *pramāṇa* in this text. Meanwhile, there are many sophisms presented as true inference rules, such as:

> Theravādin.—Is the concept of soul derived from feeling?
>
> Puggalavādin.—Yes.
>
> Ther.—Is the concept of good soul derived from good feeling?
>
> Pugg.—Nay, that cannot truly be said [1, pp. 33–34].
>
> *Vedanaṃ upādāya puggalassa paññattīti? Āmantā. Kusalaṃ vedanaṃ upādāya kusalassa puggalassa paññattīti? Na hevaṃ vattabbe . . . pe . . .* (*Kathāvatthu* 192).
>
> Ther.—If the concept of soul is derived from feeling, is the concept of bad soul derived from bad feeling?
>
> Pugg.— Nay, that cannot truly be said [1, pp. 33–34].
>
> *Vedanaṃ upādāya puggalassa paññattīti? Āmantā. Akusalaṃ vedanaṃ upādāya akusalassa puggalassa paññattīti? Na hevaṃ vattabbe . . . pe . . .* (*Kathāvatthu* 193).

This text contains also a lot of references to authority (*śabda* of the *nyāya*) as an ultimate argument: 'it was not said by the Exalted One [*A.Sch.*—i.e. by the Buddha]' and 'it was said by the Exalted One.'

In the *Kathāvatthu* there is a dispute with, probably, a follower of an idea according to that all real things are momentary. In other words, the Sautrāntikas ('those who rely upon the sutras [*A.Sch.*—and avoid the *Abhidhamma*]') think that items can exist for only one instantaneous moment:

> Controverted Point: That all things are momentary conscious units.
>
> Theravādin: Do you imply that a mountain, the ocean, Sumeru chief of mountains, the cohesive, fiery, and mobile elements, grass, twigs, trees, all last only so long in consciousness? You deny. . . [1, p. 363].
>
> *Ekacittakkhaṇikā sabbe dhammāti? Āmantā. Citte mahāpathavī saṇṭhāti, mahāsamuddo saṇṭhāti, sinerupabbatarājā saṇṭhāti, āpo*

> *saṇṭhāti, tejo saṇṭhāti, vāyo saṇṭhāti, tiṇakaṭṭhavanappatayo saṇṭhahantīti? Na hevaṃ vattabbe ... pe ...* (*Kathāvatthu* 906).

This dispute is attributed to the 'Sautrāntikas' by the Pāli commentary, but it is unusual and unexpected, since the Sautrāntikas existed from the 2nd to the 3rd century A.D. in the Hellenized region of Gandhāra and they represented a North-Western branch of the Sarvāstivāda School whose ideas are contextually mentioned in the *Kathāvatthu*, also. The Sautrāntikas proposed the doctrine of momentariness (*kṣaṇikavāda*) mentioned in the verse above. After the 4th century A.D. the Sautrāntikas were transformed into the Yogācāra School—the most influential school of Gandhāran Buddhism. The idea of extreme momentariness was then adopted by the greatest Buddhist logicians and epistemologists, such as Dignāga (ca. 480–540) and Dharmakīrti (ca. 600–660).

The disputation with, possibly, an intended Vaibhāśika-Sarvāstivādin is as follows:

> Controverted Point: That a past or future experience is actually possessed.
>
> Theravādin: But is not the past extinct, departed, changed, come to an end, finished? And is not the future unborn, not yet become, not come into being, not produced, not brought to pass, not manifested? How then can you call either something that is actually possessed? [1, p. 242].

> *Atītena samannāgatoti? Āmantā. Nanu atītaṃ niruddhaṃ vigataṃ vipariṇataṃ atthaṅgataṃ abbhatthaṅgatanti? Āmantā. Hañci atītaṃ niruddhaṃ vigataṃ vipariṇataṃ atthaṅgataṃ abbhatthaṅgataṃ, no ca vata re vattabbe—"atītena samannāgato"ti* (*Kathāvatthu* 568).

The Vaibhāśikas represented a North-Eastern branch of the Sarvāstivāda School that took root in Kashmir from the 2nd to the 3rd century A.D.

Hence, the *Kathāvatthu* as one of the most important texts of the *Abhidhamma* of the Pāli Canon contained some disputes with the intended Sautrāntikas who had avoided the *Abhidhamma* as such and the Vaibhāśikas who had proposed another approach to the *Abhidhamma* which differs a lot from the Theravāda approach. Later, the Vaibhāśika ideas on the *Abhidhamma* were partly used in the *Abhidharmakośa-bhāṣya*—the greatest work written by Vasubandhu (ca. the 4th to the 5th century A.D.), who went on to be one of the most famous representatives of the Yogācāra School. Let us notice that Dignāga and Vasubandhu's texts are contained recently in the *Tengyur*, serving as the Tibetan Buddhist Canon.

To sum up, the logical fragments of the *Kathāvatthu* are not connected to the *pramāṇa* doctrine as a whole and then, most probably, they were transposed from disputes with some representatives of Northern Buddhism (e.g. the Gandhāran Buddhism), because the logic is applied in the *Kathāvatthu* mechanically, without understanding logical semantics or logical foundations.

This feature distinguishes the *Kathāvatthu* from the *Milindapañha*, which proposes the four-step syllogisms, where the third step is used especially for verifying premises and inferences.

6. Historical Context of Milindapañha

The *Milindapañha* text is organized as a recorded conversation between the Buddhist monk Nāgasena and the Greek king Menander I Soter (Pāli: *Milinda*; Greek: Μένανδρος Α′ ὁ Σωτήρ; 165/155—130 B.C.), the ruler of Arachosia, Gandhāra, Punjab, and Mathura (today's Afghanistan, Pakistan, Tajikistan, and some nothern states of India) [38]. It is worth noting that Greek clans/dynasties had ruled Bactria since the beginning of Alexander the Great's Indian campaign, i.e. since 326 B.C. First, they ruled this land as satraps of Seleucid kings. But then around 250 B.C. Diodotus I Soter (Greek: Διόδοτος Α' ὁ Σωτήρ), the governor of the Seleucid province of Bactria, proclaimed independence. Since that time, Greek kings advanced from Bactria in the east and south, taking control over Arachosia, Gandhāra, Punjab, and Mathura. Since ca. 130 B.C. the Greek clans mainly left Bactria, their homeland, and concentrated mostly in Gandhāra, where there was the capital of their Empire, Taxila. At the end, the Greek clans controlled only eastern Punjab and, probably, Strato III (Greek: Στράτων Γ′) was the last Greek king who ruled from ca. 25 B.C. to 10 C.E. So, the time of Menander was a culmination point of the Greek power in India. To sum up, from the time of Alexander the Great, the Greek rule in some parts of India took over ca. 336 years.

The people of the Greek dynasties (Pāli: *Yona*; Sanskrit: *Yavana*) were replaced by Indo-Scythians or Śakas (Sanskrit: *Śaka*) who at first continued the Greek Hellenization in India—at the beginning they continued to use the Greek language as official and to worship some Greek deities (Heracles, Zeus, Athena, Apollo and so on) [6,9]. At first, Śakas occupied Sogdiana and Greek Bactria, then Arachosia, Gandhāra, Sindh, Kashmir, Punjab, Haryana, Uttar Pradesh, Rajasthan, Gujarat, and Maharashtra. There were different Indo-Scythian clans—which were more or less Hellenized. The following two dynasties were the most powerful and, at the same time, the most Hellenized of the Indo-Scythian clans: (i) the Western Kṣatrapas (ca. 35–400 A.D.) who ruled the western and central part of India (modern states of Gujarat, Maharashtra, Rajasthan, and Madhya Pradesh); (ii) the Kuṣāṇas (Bactrian: Κυϸανο; Sanskrit: *Kuṣāṇa*) (ca. 35–375 A.D.) who at their peak ruled present-day Afghanistan, Pakistan, Tajikistan, south of Uzbekistan, and some northern parts of India up to Varanasi. But at the end of their power, the Kuṣāṇas controlled only eastern Punjab, while the Greeks controlled the same region at the time of the decline of their power 350 years previously.

Thus, the date of ca. 400 C.E. was an end of all Hellenized dynasties in India. The Western Kṣatrapas and the last Kuṣāṇas in eastern Punjab finally fell and their territories were invaded by the Gupta Empire. Quite later the Kidarites and Hephthalites expelled the Guptas and other clans from the territory once controlled by the Kuṣāṇas in their greatest period. The

Hephthalites were primarily Zoroastrian in the Sassanian meaning—neither Hindu, nor Buddhist certainly.

Greek was used as an official language in Afghanistan, Pakistan, and the northern parts of India at least for three-four centuries; first of all, it was used for edicts, trading and receiving taxes. One of the taxable documents was found at Aï Khanum (today's Afghanistan) and it is dated to the 2nd century B.C. The writing appears only on its one side and it is made in black ink, presumably carbon-based. The writing material is prepared from skin. And this document is one of the oldest examples of texts on skin found until now in India. The text is as follows:

> In the reign of God *Antimachus* (Ἀντίμαχος) and *Eumenes* (Εὐμένης) and *Antimachus* (Ἀντίμαχος).... year 4, month of *Olöus*, in *Asangorna*(?), when NN was guardian of the law. *Menodotus*, tax-gatherer, in the presence of NN, who was sent out likewise by *Demonax* the former ..., and of *Simus*(?), who was ... by agency of *Diodorus*, controller of revenues, acknowledges receipt from(?) NN the son(?) of *Dataes*(?), ... of the payments due in respect of the purchase ... [25].

'God *Antimachus*' mentioned in the inscription is a Greco-Bactrian king, named Θεός Ἀντίμαχος, whose rule generally dated from around 185 B.C. to 170 B.C. On the Indian coins like silver tetradrachms he was depicted by the diademed bust of king on the obverse. On the reverse of these coins there was the following inscription: ΒΑΣΙΛΕΩΣ ΘΕΟΥ // ΑΝΤΙΜΑΧΟΥ, round the Greek deity Poseidon, standing to front, holding trident in right hand and palm in left hand [14,17,29].

The second name '*Antimachus*' perhaps belongs to Ἀντίμαχος Β′ or Νικηφόρος , the son of Θεός Ἀντίμαχος. That Antimachus was a next Greco-Bactrian king, who ruled on a vast territory from the Hindu-Kush to the Punjab around 170 B.C.

Since the territorial conquest of Arachosia, Gandhāra, Punjab, and Mathura by the Greek kings, there have been used the following two official languages: (i) Greek for edicts, trading, taxes and all other things related to secular and political matters; (ii) Gāndhārī (one of the Prakrits) in the Kharoṣṭhī script (this script is obviously of the Aramaic origin) just for religious matters: hymns and philosophy [38]. This was particularly visible on the Indo-Greek coins including the coins of Menander. On obverses we see usually a king portrate, a royal sign or a Greek deity with a Greek legend around it. On reverses we observe a Greek deity or a royal sign with a Gāndhārī legend in the Kharoṣṭhī script [14,17,29].

Please see the two examples of Menander's coin in Figs. 1 and 2. On the Indo-Greek coins we can find out sometimes some Buddhist symbols, also, such as *dharmacakra* (Pāli: *dhammacakka*). In Gandhāra there were built many Buddhist *stūpa*s and temples by the Greeks: Dharmarajika stupa and monastery, Double-Headed Eagle Stupa and Apsidal Temple at Sirkap, etc. The Buddha was often depicted as a character accomponied by some Greek deities: first of all, by Heracles and Erotes (Cupids), see Figs. 3, 4 and 5. All these facts testify

FIGURE 1. Menander I Soter square chalkous (160–130 B.C.). *Obverse*: head of elephant right wearing bell around neck, Greek legend around: ΒΑΣΙΛΕΩΣ/ΣΩΤΗΡΟΣ/ΜΕΝΑΝΔΡΟΥ. *Reverse*: club of Heracles, monogram at right, Kharoṣṭhī legend around: *Maharajasa / tratarasa / Menamdrasa. Material*: dark green patina. *Weight*: 1.7 gr. *Size*: 15 × 15 mm. The square coin reflects the preference of their Indian subjects for this shape, similar to the punchmarked coins of the Mauryan Empire

FIGURE 2. Menander I Soter silver drahm (160–130 B.C.). *Obverse*: diademed bust of king left, seen from behind, holding spear in thrust position in right hand, aegis on left shoulder, Greek legend around: ΒΑΣΙΛΕΩΣ ΣΩΤΗΡΟΣ // ΜΕΝΑΝΔΡΟΥ. *Reverse*: Athena Alkidemos standing left, holding sloping shield on outstretched left arm, hurling thunderbolt with right hand, monogram at right, Kharoṣṭhī legend around: *Maharajasa tratarasa // Menamdrasa. Material*: silver. *Weight*: 2.4 gr. *Size*: 17 mm

to accepting the Buddhist doctrine by the Greeks before the growth of their Empire.

Hence, from the archeological point of view we can conclude that the Greek king Menander might have been a Buddhist follower in fact. The talking of Nāgasena to him was possible, indeed. The only problem is that this conversation should have been in Gāndhārī, not Pāli. Nevertheless, there were excavated some texts in Gāndhārī, such as *Dhammapada*, which are known to be written in Pāli, too. Therefore, the *Milindapañha* theoretically can be first

FIGURE 3. Fragment of a panel showing Vajrapāṇi (Heracles) and other figures attending the Buddha. *Museum number*: 1970,0718.1 British Museum. *School/style*: Gandhāra School. *Culture/period*: Kuṣāṇa. *Date*: 2nd century –3rd century A.D. *Materials*: schist. *Technique*: carved. *Dimensions*: 54 cm (height); 25 cm (width); 7.5 cm (thickness); 61.5 cm (height, with mount); 25 cm (width, with mount); 12.5 cm (thickness, with mount). *Acquisition date*: 1970. http://www.britishmuseum.org/

in Gāndhārī, in the sacral language of Greco-Buddhists, and then translated into Pāli.

FIGURE 4. Winged Cupids holding a wreath over the Buddha. *Museum number*: MG21810 Musée Guimet. *School/style*: Gandhāra School. *Culture/period*: Kuṣāṇa. *Date*: 3rd century A.D. *Place*: Tapa Kalan, Haḍḍa. *Technique*: painting. *Acquisition date*: La Délégation archéologique française en Afghanistan led by Jules Barthoux in 1926–1927. https://commons.wikimedia.org/wiki/File:CupidsAndBuddha.JPG

The Bactrian Greeks were well educated and have contributed to a philosophical conversation on a Buddhist subject. So, in Aï Khanum there was found a philosophical dialogue (written on skin), close to some Buddhist matters:

col. II.

1 [— — —] / [— — — οὐμόνον] / [— — — τῶν ἰδεῶν φάμ]εγ / [— — — τὰ]αἰσθητὰ

5 ἀλλὰ [κ]αὶ τὰς ἰδέας αὐ- / τὰς ἀλλήλων — φαμέγ / γὰρ εἶπεν — οὐκοῦν [ὡς] / [αὐ]τὸ αἴτιον τῶ[ν α]ὐ- / [τῶ]ν ου[. . .] μετίσχει

10 τῶν ὄντων τ[ὰ]ς ἰδέας / ὅπερ καὶ τ[ο]ῦ μετέσχειν / τὄλλ[α .]ε τ[ο]ύτ[ων] αἴτια / [. .]νο[. .]ω[. . .] / [αἴ]τιον [. . . . . —]

15 [. .]ς ἑτέρ[αις] καθ᾽ ἑ- / [κά]στην [ἰδέα]ις εἰ μ[. .] / [. . . . . .] πρὸς τ[. .] / [. . . . .]α[. . . .]λα / [. . . . . .]νειδ[.]ων

20 [. . . . ἑκά]στην [. . .] / [. . . . . .]ω[. . . .] / [. . . . . .]ότητος / [. . . . . .]π ο[. .] / [. . . . . αἰσ]θητῶν

25 [. . . . . .]α[.] εἰδῶν / [. . . . . .]νους

col. III.

1 [— — —] / [— — —] / [— — —] ὥ[στ]ε / διὰ [τούτων τ]ῶν [αὐ]τῶν

5 αἰτίω[ν — — —]ον α- / ναγκαῖον ε[ἶναι] τὸ τῆς / μεθέξεως αἴ[τι]ον ἀκί- / νητον γὰρ ἕκαστον / τῶν εἰδῶν διὰ ταῦτὰ

10 τε καὶ τὸ τὴγ γένεσιν / εἶναι καὶ τὴν φθορὰν / ἀΐδιον τὴν τῶν αἰσθη- / τῶν ἀναγκαῖον — εἶπεν — / ἀλλὰ μὴγ καὶ κυριώ-

15 τατόγ γε καὶ πρῶτον / τῶν αἰτίων δόξειεν / ἄν του[το] δικαίως [—] / τοῦτο μὲγ γὰρ [αἴτι]ον / πᾶσι καὶ πάσαις ταῖς

FIGURE 5. Stele with scenes from the life of the Buddha and playing Cupids. *Museum number*: G-109 Lahore Museum. *School/style*: Gandhāra School. *Culture/period*: Kuṣāṇa. *Date*: 3rd century A.D. *Place*: Pakhtunkhwa province. *Materials*: schist. *Technique*: carved. *Dimensions*: 118 cm (height); 13 cm (width); 8.5 cm (thickness). http://www.lahoremuseum.gov.pk

20 ἰδέαις [. .] ἀ[λλ]ήλων / [. . .]ω[. . .]ωι[. . .] / [.]ε οὐθὲν οὐθενὸς τ[.] / [. . .]ει[.]αρ[. . . . . .] / [. . . . .] αὐτω[.— —]

25 [.]ε[.]ειν τω [. .— —] / [. . .]ων κ[.— —] / [.]. . .[. . — —] / [. . — — —]

col. IV.

1 [.]εε[. . . . . — —] / τ[. . .]αλλ[.]λ[.— —] / [. . .]μερ[.]νω[. .— —] / [. .]νε[.]ταξ[.]με[. .— —]

5 γονωστε κα[. .]ε[. . .] / μανθάνεις γάρ [— — —] / πάνυ γε εἶπε[ν — — —] / μὴν εἰ γε [. . . . με]- / τέχει τω[.— — —]

10 ἔσται προω[.— — —] / μὴ μετέχοι [— — —] / ἄλλω [. .— — —] / λ[. .— — —] / εἶπ[εν — — —]

15 τ[— — —]

[24].

This text contains some abstract notions such as 'ideas' (ἰδέαις), 'reason' (αιτία), 'each individually' (καΰ′ ἑκάστην), 'equalities' (ίσότητος), 'the first reason of reasons' (πρῶτον τῶν αἰτίων), etc. Also, there is the following quite Buddhist description: γένεσιν εἶναι καὶ τὴν φθορὰν ἀΐδιον τὴν τῶν αἰσθη τῶν ἀναγκαῖον, 'generating and destructing all the intelligent entities are forever,' which hints at the wheel of reincarnation. The phrase 'nothing of nothing' (οὑΰἑν οὑΰενός) hints at the concept of *śūnyatā*. So, the Early Buddhism influences on this text are not excluded. Then this text is the earliest eclectic document of Greco-Buddhism.

Till now we have no archeological evidences of a direct Greek influence on Nyāya, but there are some direct evidences of their impact on astrology and geometry in India. So, in Buddhist inscriptions, written in the Kharoṣṭhī script and in the Gāndhārī language, excavated in Gandhāra, and dated to from the 1st century A.D. to the 3rd century A.D., the following eight Greco-Macedonian months have been recently identified after decoding: 'Αρτεμίσιος, Δαίσιος, Πάνημος, Λώιος, Γορπιαῖος, 'Απελλαῖος, Αὐδυναός, and Ξ ανδικός [27]. It means that at that time the Greco-Macedonian calendar and astrology was accepted by the Gandhāran Buddhists.

In Medieval Hindu astrology there were some loanwords from Greek: (i) an angular sign: κέντρον (Sanskrit: *kendra*; Syriac: *qanṭrōn*); (ii) Sun: ἥλιος (Sanskrit: *heli*); (iii) diameter: διάμετρον (Sanskrit: *jāmitra*; Syriac: *jaθra*), (iv) the planet Jupiter: Ζεύς (Sanskrit: *jyau*); (v) the planet Mars: 'Αρης (Sanskrit: *āra*), etc. More technical terms: (i) a succedent house: *epanaphora* (in Greek), *panaphara* (in Sanskrit); (ii) a cadent house: *apoklima* (in Greek), *apoklima* (in Sanskrit); (iii) a void of course Moon: *kenodromia* (in Greek), *kemadruma* (in Sanskrit); (iv) an application: *sunaphe* (in Greek), *sunapha* (in Sanskrit); (vi) the 10° segments of the ecliptic: *dekanos* (in Greek), *drekanas* (in Sanskrit), etc.

In the *Yavanajātaka* (one of the first books on Hindu astrology that was written by a Greek author, '*Yavana*') reconstructed by David Pingree [21,22], we can observe some Greek patterns of thinking, e.g. a mathematical

calculation is called 'inference' (*anumāna*), although in the Hindu tradition mathematics was never based on logic:

> One should find that the number of (lapsed) *tithis* diminished by the number of lapsed *avamas* equals the number of (civil) days which have passed in the *yuga*. There is a seven-fold measure of the planetary week-days; in seeking the answer to this, one desires (the use of) inference (*anumāna*) ([22], vol. 1).

The *Yavanajātaka* was a translation from a book written first in Greek and devoted to astrology, and it is considered that this translation was made in the Western Kṣatrapa Empire in the 2nd century A.D. by Yavaneśvara and versified by Sphujidhvaja in the 3rd century A.D. [21].

The Greek culture had an effect, first of all, on the social organization of communities in Bactria and Gandhāra. Therefore, in the Gāndhārī language there were some administrative terms loaned from Greek, e.g.: (i) *stratega* 'general, commander' (στρατηγός); (ii) *meridarkha* 'meridarch' (εριδαρχη), etc.

As I said above, the Western Kṣatrapas and the Kuṣāṇas continued the Greek Hellenization of India [12,33]. Nevertheless, they stopped using the Greek language officialy in the 1st–2nd century A.D., but continued to use the Greek alphabet: the Western Kṣatrapas for a Prakrit and the Kuṣāṇas for Bactrian. There was found the Rabatak inscription of 127 A.D. that contains a very important statement concerning the change of the official language in the Empire from the Greek language to the Bactrian one. So, Kaniṣka the Great (Greco-Bactrian: Κανηþκε) (his accession to the throne is estimated between ca. 90 and 140 A.D.) was the first who replaced the use of Greek by the "Aryan" language after the 400-years history of the Greek and Greco-Scythian communities in the North-West of India. In fact, this "Aryan" language was Bactrian—one of the Old-Iranian dialects with many loanwords from Greek. The fragment of this Edict:

> [— — —]νο βωγο στοργο Κανηþκε κοþανο ραþτογο λαδειγο χοαζαοαργο βαγο
>
> εζνογο κιδι ασ[ο] Νανα οδο ασο οισποανο μι βαγανο ι Ραοδανι αβορδο κιδι ιωγο χþονο
>
> νοβαστο σαγωνδι βαγανο σινδαδο οτηια ι **ιωναγγο** οασο οζοαστο ταδηια **αριαο** ωσ-
>
> ταδο αβο ιωγο χþονο αβο [ι] Ιυνδο φροαγδαζο αβο þατριαγγε þαορε αγιτα κοο-
>
> αδηανο οδο ι ωζοπο οδο [ι Ζ]αγηδο οδο ι Κωζαμβο οδο ι Παλαβ οτρο οιδρα αδα αβο ι Ζιριτ-
>
> [34].
>
> 1–3 The year one of Kaniṣka, the great deliverer, the righteous, the just, the autocrat, the god, worthy of worship, who has obtained the kingship from Nana and from all the gods, who has laid down (i.e. established) the year one as the gods pleased.

> 3–4 And it was he who laid out (i.e. discontinued the use of) the **Ionian** speech and then placed the **Arya** (or Aryan) speech (i.e. replaced the use of Greek by the Aryan or Bactrian language).
>
> 4–6 In the year one, it has been proclaimed unto India, unto the whole realm of the governing class including Koonadeano (Kaundinya) and the city of Ozeno (Ozene) and the city of Zageda (Saketa) and the city of Kozambo (Kausambi) and the city of Palabotro (Pataliputra) and so long unto (i.e. as far as) the city of Ziri-tambo (Śri-Campa) [18].

Since that Kaniṣka edict, the Bactrian language in the Greek script has been used as official for many centuries, even at the Hephthalite time there were some inscriptions in Bactrian. So, many legal documents in Bactrian are found, including (i) the judgments concerned with the sale of agricultural lands, deeds of manumission, and undertakings to solve conflicts; (ii) the land sale contracts written in two copies, an upper and a lower copy, usually on the same sheet; (iii) the tax receipts presented by storekeepers and millers to the people who had brought in goods. These documents were composed on skin in the way the Greeks had done before [35]. Also, there are some Buddhist texts in Bactrian in the Greek script, made on skin which is untypical for the Indian civilization as such [36].

The main feature of Indian culture is that there is a huge gap and contrast between the traditional Sanskrit texts and the Indian archeology. On the one hand, many descriptions, such as the *Mahābhārata*, are not confirmed by archeology at all. On the other hand, archeological data reconstructed after excavations have no parallel in Sanskrit texts. For instance, it is unclear why the Buddha was often accompanied by Cupids, see Figs. 4 and 5. What was the tantra for these images?

Hovewer, in the case of the Pāli tradition the phenomenon of Greco-Buddhism in Gandhāra is confirmed textually. This fact supports the authenticity of the *Milindapañha*—in the meaning that this text was created in Gandhāra indeed. In Sanskrit there are no phrases on Yavanas in respect to their Buddhist faith. In contrast, the *Mahāvaṃsa* or the *Great Chronicle of Sri Lanka*, composed in Pāli in the late 5th or early 6th century A.D., mentions '*Yonas*' (the Greeks) as Buddhists many times. In particular, in this book, there is a description how Aśoka (ca. 268 B.C. to 232 B.C.), the great Indian emperor of the Maurya Dynasty, has supported Moggaliputta-Tissa (ca. 327 B.C.–247 B.C.), his advisor and spiritual teacher, in organizing the Second Buddhist Council and sending theras to the following countries, among which there are mentioned *Yona* (Greco-Bactria), *Kasmīra* (Kashmir), and *Gandhāra*, where later the Greco-Buddhism was founded:

> When the thera Moggaliputta, the illuminator of the religion of the Conqueror, had brought the (third) council to an end and when, looking into the future, he had beheld the founding of the religion in adjacent countries, (then) in the month Kattika he sent forth theras, one here and one there. The thera Majjhantika he sent to **Kasmīra**

> **and Gandhāra**, the thera, Mahādeva he sent to **Mahisamaṇḍala**. To **Vanavāsa** he sent the thera named Rakkhita, and to **Aparantaka** the Yona named Dhammarakkhita; to **Mahāraṭṭha** (he sent) the thera named Mahādhammarakkhita, but the thera Mahārakkhita he sent into the country of the **Yona**. He sent the thera Majjhima to the **Himalaya country**, and to **Suvaṇṇabhūmi** he sent the two theras Soṇa and Uttara. The great thera Mahinda, the theras Iṭṭhiya, Uttiya, Sambala and Bhaddasāla his disciples, these five theras he sent forth with the charge: 'Ye shall found in the lovely **island of Laṅkā** the lovely religion of the Conqueror' [8, p. 82].

This quote is especially interesting, as the '*Yona* named Dhammarakkhita,' i.e. a Greek, is been mentioned among the important Buddhist leaders and teachers at the time of Aśoka (the 3rd century B.C.). This is quite early, because the Greeks had come to the region of India only since the Indian campaign of Alexander the Great, starting in 326 B.C.

It is said further that the mission of Maharakkhita was really successful among the Greeks of Greco-Bactria:

> The wise Maharakkhita who went to the country of the **Yona** delivered in the midst of the people the Kalakarama-suttanta [A.Sch.—the *Kāḷakārāmasutta*, *Aṅguttara-nikāya* 4.24]. A hundred and seventy thousand living beings attained to the reward of the path (of salvation); ten thousand received the pabbajja [8, p. 85].

The next significant evidence in the *Mahāvaṃsa* about the Greco-Buddhists and their influence and spiritual power among all the Buddhist communities is as follows. One Sinhalese king of Sri Lanka, called Duṭṭhagāmaṇī or Gāmaṇī Abhaya ('fearless Gamini'), who reigned from 101 B.C. to 77 B.C., decided once to build up the Great Stūpa (Pāli: *thūpa*) that is known now as the Ruwanweliseya and Swarnamalee Chetiya and in order to celebrate the festival devoted to opening the Thūpa he invited many hundred thousand representatives of Buddhist communities from different places, including *Kasmīra* (Kashmir), *Alasanda* (the Greek city of Alexandria, a capital of Bactria), *Pallavabhogga* (Wilhelm Geiger means that it is Persia, but it is, most likely, Margiana in today's Afghanistan):

> From various (foreign) countries also did many bhikkhus come hither; what need to speak of the coming of the brotherhood living here upon the island? With eighty thousand bhikkhus from the region of **Rājagaha** came the thera Indagutta, the head of a great school. From **Isipatana** came the great thera Dhammasena with twelve thousand bhikkhus to the place of the cetiya.
>
> With sixty thousand bhikkhus came hither the great thera Piyadassi from the **Jetārāma-vihāra**. From the **Mahāvana** (monastery) in Vesālī came the thera Urubuddharakkhita with eighteen thousand bhikkhus. From the **Ghositārāma** in Kosambī came the thera Urudbammarakkhita with thirty thousand bhikkhus. From the

> **Dakkhiṇāgiri** in Ujjenī came the thera Urusaṃgharakkhita with forty thousand ascetics.
>
> With a hundred and sixty thousand bhikkhus came the thera named Mittiṇṇa from the **Asokārāma** in Pupphapura. From the **Kasmīra** country came the thera Utiṇṇa bringing with him two hundred and eighty thousand bhikkhus. The wise Mahādeva came from **Pallavabhogga** with four hundred and sixty thousand bhikkhus, and from **Alasanda** the city of the Yonas came the thera Yonamahādhammarakkhita with thirty thousand bhikkhus [*A.Sch.—Yonanagarā'lasandāso, yona mahādhammarakkhito; Thero tiṃsa sahassāni, bhikkhū ādāya āgamā.*].
>
> From his dwelling by the road through the **Viñjhā** forest mountains, came the thera Uttara with sixty thousand bhikkhus.
>
> The great thera Cittagutta came hither from the **Bodhimaṇḍa-vihāra** with thirty thousand bhikkhus. The great thera Candagutta came hither from the **Vanavāsa** country with eighty thousand ascetics. The great thera Suriyagutta came from the great **Kelāsa-vihāra** with ninety-six thousand bhikkhus. As for the number of the bhikkhus dwelling in the island who met together from every side, no strict account has been handed down by the ancients. Among all these bhikkhus who were met in that assembly those alone who had overcome the āsavas, as it is told, were ninety-six koṭis.
>
> These bhikkhus stood according to their rank around the place of the Great Thūpa, leaving in the midst an open space for the king [8, pp. 193–194].

So, in this narration we are reading how the 30 thousand Greco-Buddhists came from Bactria to take part in the festival at Sri Lanka. We should pay attention that Duṭṭhagāmaṇī who organized this festival was almost a contemporary of the same Menander, the king of Greco-Indian Empire with the capital in Gandhāra who became one of the two main characters of the *Milindapañha.* Due to coins and other archeological facts, we know also that Menander as well as the majority of Hellenized elite of Greco-Bactria at that time or even earlier converted to Buddhism.

If we trust the *Mahāvaṃsa*, then the Greco-Buddhists can have influenced the Pāli Buddhists (Theravādins) since the 3rd century B.C.

As a consequence, the *Milindapañha* can be a result of direct influences from Gandhāra, indeed: there are some old narrations in Pāli about close contacts among the Pāli theras and the Bactrian-Gandhāran Greco-Buddhists at the time of Menander.

The sacred language of the theras of Sri Lanka was Pāli, while the sacred language of the Greco-Buddhists was Gāndhārī. In the *Mahāvaṃsa,* it is stated that the Pāli Canon was first written down at the time of the ruler of Sri Lanka, Vaṭṭagāmaṇi Abhaya (reigned from 29 B.C. to 17 B.C.), and due to his direct support:

> He (the king) built the cells of the vihara so that a greater number were joined together, for he reflected: 'In this way it will be possible to restore them.'
>
> The text of the three piṭakas and the aṭṭhakathā thereon did the most wise bhikkhus hand down in former times orally, but since they saw that the people were falling away (from religion) the bhikkhus came together, and in order that the true doctrine might endure, they wrote them down in books.
>
> Thus did the king Vaṭṭagāmaṇi Abhaya reign twelve years, and, at the beginning, five months beside [8, p. 237].

This event is traditionally interpreted as the so-called Third Buddhist Council that was held in Sri Lanka in the late 1st century B.C. However, it is known that there was another concurrent Third Buddhist Council that held in Kashmir (Sanskrit: *Kaśmīr*) from the late 1st century A.D. to the early 2nd century A.D. and this council was supported by the emperor of the Kuṣāṇa dynasty, Kaniṣka the Great:

> Lately the king, Kaniṣka, with the honourable Pārśvika, summoning a council of five hundred saints and sages in the country of **Kaśmīr**, they drew up the Vibāshā Śāstra. These were the five hundred bats who formerly dwelt in that decayed tree [4, p. 117].

The centre of the Kuṣāṇa Empire was located in Gandhāra and the political elite of this empire remained Hellenized still [2]. At the sites of Bactria and Gandhāra there were excavated many fragments of the Buddhist manuscripts dated from the 1st to the 5th century A.D. and these texts were written in Gāndhārī and Bactrian. As a consequence, we can assume that during the Third Buddhist Council in Kashmir the Gāndhārī Canon was founded as a parallel to the existed Pāli Canon. It is an evidence that the Greco-Buddhism was really influential at that time and the *Milindapañha* can have appeared due to some borrowings from the Gandhāran Buddhism in fact.

There is else another fact supporting the authenticity of the *Milindapañha*. In ca. 400 A.D., all the Hellenized Śaka dynasties (the Western Kṣatrapas and the Kuṣāṇas) fell. But they had sponsored Buddhism and after their fall Buddhism in India faced many troubles: a lot of monasteries were closed and many Buddhist temples were transformed into Hindu temples, first of all into Shaivite ones. Archeologically, it can be readily seen that Buddhist images started to be replaced by Hindu deities since 400 A.D. and Shaivism became especially popular in the Buddhist regions, such as Kashmir. At the same time, Shaivism extended through the Gupta Empire and became popular among the Tamils, as well.

Since then all mentions of the Greeks (Yavanas) and Indo-Scythians (Śakas) and all attitudes towards them in Sanskrit were extremely negative. The Yavanas and Śakas are characterized as Kṣatriyas who have fallen to the level of Śūdras or even should be regarded as outcaste:

> *śanakais tu kriyālopād imāḥ kṣatriyajātayaḥ /*

vṛṣalatvaṃ gatā loke brāhmaṇādarśanena ca //
pauṇḍrakāś coḍadravidāḥ kāmbojā ***yavanāḥ śakāḥ*** */*
pāradāḥ pahlavāś cīnāḥ kirātā daradās tathā //
(*Mānavadharmaśāstra* 10, 43–44; [32])

By neglecting rites and by failing to visit Brahmins, however, these men of Kṣatriya birth have gradually reached in the world the level of Śūdras – Puṇḍrakas, Coḍas, Draviḍas, Kāmbojas, **Yavanas**, **Śakas**, Pāradas, Pahlavas, Cīnas, Kirātas, and Daradas [20].

From this it follows that the *Milindapañha* cannot be written after 400 A.D.—in an atmosphere of hatred in relation to the Yavanas and Śakas [13]. Most probably, taking into account the historical context considered above, this text should have appeared between 130 B.C. and 120 A.D., i.e. between the time of Menander and the time of Kaniṣka the Great.

Before the date of 400 A.D. the Greeks were considered a prestigious caste within the Kṣatriyas who patronate Buddhism. So, the word *Yavana* or *Yona* often occurs among names of donators at Junnar, Karla, Nasik, and Junagadh caves (the territory controlled by the Western Kṣatrapas). For instance, the Karla cave:

dhenukākaṭā ***yavanasa*** *sihadhayāna thaṃbho dānaṁ*

(This) pillar (is) the gift of the **Yavana** Sihadhaya from Dhenukākaṭa [30].

Another example from the same cave:

1. *umēhanākaṭā* ***yavanasa*** 2. *viṭasa*[*m**]*gatānaṁ dānaṁ thabho*

(This) pillar (is) the gift of the **Yavana** Viṭasaṁgata from Umēhanākaṭa [42].

The Nashik cave:

1. *sidhaṁ otarāhasa dātāmitiyakasa* ***yoṇakasa*** *Dhaṁmadevaputasa Īdrāgnidatasa dhaṁmātmanā* 2. *imaṁ leṇaṁ pavate tiraṁṇhumhi khānitaṁ abhaṁtaraṁ ca leṇasa cetiyagharo poḍhiyo ca mātāpi* 3. *taro udisa ima leṇa kāritaṁ savabudha-pujāya cātudiśasa bhikhūsaṁghasa niyātitaṁ sa* 4. *ha putena Dhaṁmarakhitena*

Success! (The gift) of Indrāgnidatta, son of Dhammadeva, the **Yavana**, a northerner from Dattāmitrī. By him, inspired by true religion, this cave has been caused to be excavated in mount Tiraṇhu, and inside the cave a Caityagṛha and cisterns. This cave made for the sake of his father and mother has been, in order to honour all Buddhas, bestowed on the universal Saṁgha of monks, together with his son Dhammarakhita [30].

Let us pay attention that a Greek donator is designated in these inscriptions in the following two forms: either *yoṇakasa* (the plural Prakrit form) or *yavanasa* (the plural rather Sanskrit form). In these caves, only the class of Greek men has a plural form to desigate its singular representative. There is only one other class of people, who is mentioned in the plural form, too, it

is a class of religious leaders, such as *thera*s. Hence, the plural form is used rather to express a deep respect to a man. Therefore, we can assume that the word *yavanasa* (or *yoṇakasa*) was used in these inscriptions to indicate a prestigious caste of Greeks. Since 400 A.D. it would be impossible absolutely. It is worth noting that in the *Milindapañha*, it is assumed that *yonaka* (i.e. *yoṇakasa* or *yavanasa*) is the highest *varṇa*. This statement is drawn from the following order of *varṇas*: Yavanas (*yonaka*), Kṣatriyas (*khattiya*), Brāhmaṇas (*brāhmaṇa*), Vaiśyas (*gahapati*), please see:

> ***yonaka****sukhumāliniyopi* ***khattiya****sukhumāliniyopi*
> ***brāhmaṇa****sukhumāliniyopi* ***gahapati****sukhumāliniyopi* (*Milindapañha* 3.4.6).

Thus, the *Milindapañha* is an authentic book, indeed: first, Menander (one of its two main characters) was real; second, its narrative satisfies all the historical contexts, e.g. to be *yavanasa* before the 2nd century A.D. was honorable for Buddhist communities in fact.

7. The Proto-Nyāya Doctrine of pramāṇa in the Milindapañha

Let us show now that the *Milindapañha* or the *Questions of King Milinda* contains some obvious contextual references to the *pramāṇa* teaching. The monk bearing the name of Nāgasena has talked to the Greek king Menander I Soter, the ruler of Indo-Greek Empire, and he has explained before Menander all the aspects of Buddhism by using different syllogisms.

One of the main differences of the *Milindapañha* and its syllogisms from the *Kathāvatthu* and its syllogisms is that each premise used for drawing conclusions and mentioned in the *Milindapañha* has or supposes an illustration to give a verification. Let us provide an example from this text:

> The King said: 'Revered Nāgasena, have you seen the Buddha?'
> 'No, sire.'
> 'Then have your teachers seen the Buddha?'
> 'No, sire.'
> 'Well then, revered Nāgasena, there is no Buddha.'
> 'But have you, sire, seen the river Ūhā in the Himalayas?'
> 'No, revered sir.'
> 'Then has your father seen it?'
> 'No, revered sir.'
> 'Well then, sire, there is no river Ūhā'
> [10, vol. 1, p. 95].

In this fragment, Menander affirms that the Buddha does not exist, because he has not been seen by Nāgasena or his teachers, i.e. he is not given by our perceptions in the meaning of *pratyakṣa* ('underlying things,' 'evidence') of the Nyāya philosophy. However, Nāgasena exemplifies by illustration that there is a knowledge that is obtained by inferences in the meaning of *anumāna*

of Nyāya. For instance, as he said further, if somebody sees a pleasant city, well planned out, he knows just by inference, how great the founder was, but he has never seen this founder. Hence, the knowledge that the Buddha exists (existed) is given by inference, not perception. And Nāgasena appeals to this term, *anumāna*, to prove the Buddha's existence.

It is worth noting that according to Dignāga there are only the following two real sources of knowledge: *pratyakṣa* ('evidence'; Pāli: *paccakkha*) and *anumāna* ('inference'). This thesis is assumed in the *Milindapañha*, also. For instance, the existence of the Buddha is deduced and in this deduction we do not need recourse to *śabda* ('authority') or perception. So, the author of the *Milindapañha* is focused on the problem of the Buddha's existence to show that there are the two sources of our knowledge: perception and inference, e.g. the Buddha is not given to our perception, but he is deduced logically.

The term of *paccakkha* occurs quite often in the Pāli Canon, but never in the logical meaning of the Nyāya philosophy. In most cases, its meaning is 'this is evident' or 'this is known.' For instance:

> At Savatthi. "Bhikkhus, I will teach you the all. Listen to that...
>
> "And what, bhikkhus, is the all? The eye and forms, the ear and sounds, the nose and odours, the tongue and tastes, the body and tactile objects, the mind and mental phenomena. This is called the all.
>
> "If anyone, bhikkhus, should speak thus: 'Having rejected this all, I **shall make known** [*paccakkhāya*] another all'—that would be a mere empty boast on his part. If he were questioned he would not be able to reply and, further, he would meet with vexation. For what reason? Because, bhikkhus, that would not be within his domain" [5, vol. 2, p. 1140].
>
> *Sāvatthinidānaṃ. "Sabbaṃ vo, bhikkhave, desessāmi. Taṃ suṇātha. Kiñca, bhikkhave, sabbaṃ? Cakkhuñceva rūpā ca, sotañca saddā ca, ghānañca gandhā ca, jivhā ca rasā ca, kāyo ca phoṭṭhabbā ca, mano ca dhammā ca—idaṃ vuccati, bhikkhave, sabbaṃ. Yo, bhikkhave, evaṃ vadeyya: 'ahametaṃ sabbaṃ* ***paccakkhāya*** *aññaṃ sabbaṃ paññāpessāmī'ti, tassa vācāvatthukamevassa; puṭṭho ca na sampāyeyya, uttariñca vighātaṃ āpajjeyya. Taṃ kissa hetu? Yathā taṃ, bhikkhave, avisayasmin"ti* (*Saṃyuttanikāya*, 1 *Saḷāyatanasaṃyuttaṃ* 23 [*Sabbasuttaṃ*]).

In the *Kathāvatthu*, premises involved in reasoning are not evident (in the common meaning as well as in the meaning of the *nyāya* word *pratyakṣa*), i.e. their semantics remains unclear for us. In both the *nyāya* logic and in the Buddhist logic, well-expressed by Dignāga and Dharmakīrti, there is a requirement to illustrate reasoning by an example. This requirement to give an illustration is called *udāhārana* in Sanskrit. The comparison between the axiom, *upanayana* (observed phenomenon), and the provided example is called *upamā*. In turn, the comparison allows us to generalize the reason or condition for the observed

phenomenon that is called *hetu* and to draw a conclusion that is called *nigamana*, by which we have applied the condition to the observed phenomenon to explain the latter. Let us consider the following classical example of the Hindu logic, also found in Mahāyānist logic:

(1) The *udāhārana*:
Yo yo aggimā so so dhūmāva.—Whatever is fiery, is smoky.
(2) the *upamā* (metaphor) may be introduced:
Smoky like a hearth.
(3) The *upanayana*:
Ayam pabbato dhūmāva.—This hill is smoky.
(4) The *niggamana*:
Tasmādayam aggima.—Therefore it is fiery.
(5) Smoky in (1), (2), and (3) is the *hetu* (condition or reason).

This reasoning differs a lot from all the syllogisms of the *Kathāvatthu*, because it assumes a verification procedure by *udāhārana* and *upamā*, i.e. by an illustration and example, respectively.

Let us notice that the term *udāhārana* as a requirement to give an example in proofs occurs in the *Milindapañha* among the standard terms *naya* and *hetu* denoting logical reasoning as such:

> And those monks, sire, who teach and recite, speak and repeat the nine-limbed speech of the Buddha in its literal senses and developed meanings, with its **methods** and **reasons** and **causes** and **examples**—monks such as these, sire, are called sellers of Dhamma in the Lord's City of Dhamma [10, vol. 2, p. 197].

> *Ye pana te, mahārāja, bhikkhū navaṅgaṃ buddhavacanaṃ atthato ca byañjanato ca* ***nayato*** *ca* ***kāraṇato*** *ca* ***hetuto*** *ca* ***udāharaṇato*** *ca vācenti anuvācenti bhāsanti anubhāsanti, evarūpā kho, mahārāja, bhikkhū bhagavato dhammanagare 'dhammāpaṇikā'ti vuccanti* (*Milindapañha* 5.4.1).

However, instead of *udāhārana* and *upamā* mentioned in the introducing words of the *Milindapañha*, in the main body of the book the author just uses one term denoting a requirement to give illustrations and examples—*opamma* that is exposed in the very beginning of the text:

> Plunging into Further-Dhamma and Vinaya, deliberating the net of the Suttas,
> Nāgasena's talk was varied with **similes** and in the **method**.
> Aspiring to knowledge herein while gladdening the mind,
> Hearken to the abstruse questions, dissipating occasions for doubt [10, vol. 1, p. 1].

> *Abhidhammavinayogāḷhā,*
> *suttajālasamattitā;*
> *Nāgasenakathā citrā,*
> ***opammehi nayehi*** *ca.*

Tattha ñāṇaṃ paṇidhāya,
hāsayitvāna mānasaṃ;
Suṇātha nipuṇe pañhe,
kaṅkhāṭṭhānavidālaneti
(*Milindapañha* 1.1.1).

Also, it is important to point out that 'fiery' is regarded as a sample for *hetu* in the *Milindapañha*:

> "Suppose, sire, there were no (lower) piece of wood for making fire, no twirling-stick, no cord for the twirling-stick, no upper piece of wood for making fire, no little piece of cloth (for tinder), and no proper effort on the part of a man—would a fire be produced?"
>
> "O no, revered sir."
>
> "But if, sire, there were a (lower) piece of wood for making fire, a twirling-stick, a cord for the twirling-stick, an upper piece of wood for making fire, a little piece of cloth, and proper effort on the part of a man—would that fire be produced?" "Yes, revered sir, it would be produced" [10, vol. 1, pp. 74–75].

Later this 'fiery' became classical for the Hindu logic. It turned into the most popular example for *hetu* in the Indian thought.

Hence, the *Milindapañha* is the only book of the whole Pāli Canon where we can find some references to a true proto-Nyāya logic with a kind of semantics. Nevertheless, this 'Hindu' logic of the *Milindapañha* is much more archaic than the logic of the *Nyāya Sūtra*, because it only contains hints of the following two *pramāṇa*: *paccakkha* ('evidence') and *anumāna* ('inference'), and instead of the two ways of verification called *udāhārana* and *upamā* there is just one way for verification called *opamma*. The existence of the Buddha is the main example for *anumāna* provided in the *Milindapañha*. It is quite surprising, as his existence is not established by authority, which is what might be expected, but by inference, just logically.

In the *Milindapañha*, as well as it being in accordance with Dignāga's doctrine, all the first data are being collected by the *pratyakṣa* or *paccakkha*—evidences. In the Pāli text, this mechanism of collecting facts is quite sophisticated and it corresponds to the Pāli *abhidhamma* that may be considered the Buddhist way to epistemology. There are the following five means of sense: 'eye-door' (*cakkhu-dvāra*); 'ear-door' (*sota-dvāra*); 'nose-door' (*ghāna-dvāra*); 'tongue-door' (*jivhā-dvāra*); 'body-door' (*kāyadvāra*). These five groups of the characteristic marks of individuality (*upādānakkhandhā*) are united in a form of object (*rupakkhandhā*). This form can give rise to sensory contact, leading to feeling (*vedanā*). Due to this, we can develop an idea of object (*saññā*). From this, some mental potentialities or conditions (*saṅkhāra*) can grow up. At the end, a consciousness (*viññāṇa*) takes all this in:

> And again, sire, the cat seeks after its food only in what is near; even so, sire, the yogin, the earnest student of yoga must dwell beholding the rise and fall among the five groups of grasping, thinking: 'This

> is material shape, this the arising of material shape, this the going down of material shape; this is feeling, this the arising of feeling, this the going down of feeling; this is perception, this the arising of perception, this the going down of perception; these are the habitual tendencies, this the arising of the habitual tendencies, this the going down of the habitual tendencies; this is consciousness, this the arising of consciousness, this the going down of consciousness.' This, sire, is the second quality of the cat that must be adopted. And this, sire, was said by the Lord, the deva above devas:
>
> "One should not be far from here (or) how will one produce the Acme of Becoming?
>
> In the actual present, know your own body" [10, vol. 2, p. 269].

This epistemology is very similar to the transcendental-phenomenological reduction proposed by Edmond Husserl (1859–1938) so much later: we should start with analyzing pure phenomena and, as a result, we move to ourselves. '*Zu den Sachen selbst*' (go back to pure items as go home to ourselves) was an appropriate famous philosophical motto in German.

Thus, on the basis of the textual analysis of the Pāli Canon we can draw the following conclusions:

1. Until the 1st century A.D., i.e. at the time, when the Pāli Canon was established in its present form, the *Nyāya Sūtra* was not written yet and the Nyāya School of Hindu philosophy did not exist. Reasons: (i) there are no references to this school at all; (ii) the term *nyāya* (*ñāya*) is used in the meaning of the method of Buddhists distinguishing them from non-Buddhists; (iii) in the *Milindapañha*, the most logical book of early Pāli literature there are logical ideas which are more archaic than the ideas of the *Nyāya Sūtra* (the requirement of illustration is simpler in the *Milindapañha* and there are only two sources of knowledge: *paccakkha* ('evidence') and *anumāna* ('inference')).
2. At the time of the early *suttas* of the Pāli Canon, such as the *Kālāma Sutta*, the *Sutta Nipāta*, the *Jātaka*, and the *Mahāvagga* there was an art of debates (the so-called proto-logic) with the following two aspects of logical reasoning which were preserved later in Hindu logic, as well: (i) *naya* or defining premises for inferring; (ii) *hetu* or defining reasons or conditions for inferring.
3. In the early *sutta*s of the Pāli Canon all the attitudes towards this art of debates is rather sceptical and negative.
4. For the first time, some well-done logical syllogisms occurred in the *Kathāvatthu*. But this treatise also contains evident sophisms and there is no semantics for logical reasoning, i.e. there are no illustration (*udāhārana*) and example (*upamā*) for verifying propositions. The *Kathāvatthu* includes debates with possible Sautrāntikas and Vaibhāśikas (the Buddhists from Gandhāra and Kashmir). This means that this text can have appeared quite late, e.g. it can be dated to the 1st century A.D.,

and it can be written under the influence of discussions with the northern (Gandhāran) Buddhists.

5. The only book of early Pāli literature that is logical indeed in all meanings is the *Milindapañha*. It is an absolutely unique document, because it represents a dialogue with Menander, the king of the large empire in the North and the political leader of all Bactrian-Gandhāran Buddhists. Taking into account the fact that this book is so entirely different to any other book from the Pāli Canon, we can safely claim that it was written under a direct influence of the Greco-Buddhists or Bactrian-Gandhāran Buddhists. Reasons: (i) we can detect a strange dynamics in attitudes towards logic from negative ones in early texts to a neutral attitude in the *Kathāvatthu* and even to a positive attitude in the *Milindapañha*; (ii) the *Milindapañha* demonstrates a real logic that cannot be deduced from the other Pāli books even terminologically and has no analogues with the classical *nyāya*. So, the *Milindapañha* can have a non-Indian influence defined by us as the Greco-Buddhist one.

As we see, the Buddhist logic of the *Milindapañha* with the two sources of knowledge: *paccakkha* and *anumāna*, and with *opamma* as one way for verifying propositions came from the Greco-Buddhist syncretic culture that flourished in Gandhāra.

8. Conclusions

As a result of the structuralist analysis of logical competence in early Pāli literature, the following statements can be inferred:

1. In the Pāli Canon there was a tradition of Buddhist logic, but this tradition was weak, and the proto-logic, we can reconstruct on the basis of the Pāli texts by means of the historical reconstructive hermeneutics, can be evaluated as a predecessor of the *nyāya* and *yogācāra* logic.
2. At the time of the Pāli Canon there did not exist the *nyāya* philosophy known by the *Nyāya Sūtra*.
3. The *Milindapañha*, the best logical source of the Pāli Canon, can have been written under a direct influence of the Greco-Buddhists.
4. From the viewpoint of the Pāli Canon, the origin of Indian logic is connected to the community that the author of the *Milindapañha* belonged to, and this community was Greco-Buddhist. Therefore, we can claim that the first correct application of inference rules in the early Indian logic may be explained by a Gandhāran influence.

Acknowledgements

I would like to express my deep gratitude to Prof. Peter Harvey for his significant suggestions for improving some aspects of my paper and to Prof. Andrey Paribok for discussing the topic of Indian philosophy and logic.

References

[1] Aung, S.Z., Davids, R. (tr.): Points of Controversy or Subjects of Discourse Being a Translation of the Kathā-vatthu. Oxford University Press, London (1915)

[2] Banerjee, G.N.: Hellenism in Ancient India. Munshi Ram Manohar Lal, Delhi (1961)

[3] Beal, S.: Si-Yu-Ki. Buddhist Records of the Western World, vol. I. Paul, Trench, Trübner & co., London (1884/1981)

[4] Beal, S.: Si-Yu-Ki. Buddhist Records of the Western World, vol. II. Paul, Trench, Trübner & co., London (1906)

[5] Bodhi, B.: The Connected Discourses of the Buddha, vol. 1-2. Wisdom Publications, Boston (2000)

[6] Bopearachchi, O.: Indo-Greek, Indo-Scythian and Indo-Parthian Coins in the Smithsonian Institution, Washington DC (1993)

[7] Falk, H., Karashima, S.: A first century Prajñāpāramitā manuscript from Gandhāra—parivarta 1 (texts from the split collection 1). Annu. Rep. Int. Res. Inst. Adv. Buddhol. Soka Univ. **15**, 19–61 (2012)

[8] Geiger, W.: The Mahavamsa, The Great Chronicle of Sri Lanka. Composed in the late 5th or early 6th Century CE, by Ven. Mahanama Thera. Asian Educational Services (1912/1996)

[9] Hoover, O.D.: Handbook of Coins of Baktria and Ancient India. Classical Numismatic Group, London (2013)

[10] Horner, I.B.: Milinda's Questions, vol. 1-2. Luzac & Company Ltd., London (1969)

[11] Jayatilleke, K.N.: Early Buddhist Theory of Knowledge. George Allen & Unwin Ltd., London (1963)

[12] Jongeward, D., Cribb, J., Donovan, P.: Kushan, Kushano-Sasanian, and Kidarite Coins: a Catalogue of Coins from the American Numismatic Society. The American Numismatic Society, New York (2015)

[13] Karttunen, K.: Yonas and Yavanas in Indian Literature. Studia Orientalia, vol. 116. Finnish Oriental Society, Helsinki (2015)

[14] Lahiri, A.N.: Corpus of Indo-Greek Coins. Calcutta (1965)

[15] Levi, S.: Notes sur les indo-scythes. Journal Asialique, pp. 444-484. Levi's article is translated in: Philips, W.R. 1903. 'Notes on the Indo-Scythians'. Indian Antiquary **32**, 381–389 (1896)

[16] Mill, L.K.: Sutta Nipāta, Smaller Discourse on Quarrelling. SuttaCentral (2015)

[17] Mitchiner, M.: Indo-Greek and Indo-Scythian Coinage. London (1975–1976)

[18] Mukherjee, B.N.: The great Kushana testament. Indian Mus. Bull. **30**, 1–105 (1995)

[19] Nārada, U., Kumārābhivamsa, U. (tr.): The Sixth Book of The Abhidhamma Piṭaka. The Book on Pairs (Yamaka), vol. 1. Malaysia (1998)

[20] Olivelle, P.: Manu's Code of Law. Oxford University Press, Oxford (2006)

[21] Pingree, D.: Jyotiḥśāstra. In: Gonda, J. (ed.) A History of Indian Literature, Fasc. 4, vol. VI. Otto Harrassowitz, Wiesbaden (1981)

[22] Pingree, D.: The Yavanajātaka of Sphujidhvaja. 2 vols. Harvard Oriental Series 48 (1978)

[23] Potter, K.H. (ed.): Encyclopedia of Indian Philosophies. Volume II: Indian Metaphysics and Epistemology: The Tradition of Nyāya-Vaiśesika up to Gangeśa. Princeton University Press, Princeton (1977)

[24] Rapin, C.: La Trésorerie du palais hellénistique d'Aï Khanoum. L'apogée et la chute du royaume grec de Bactriane (Fouilles d'Aï Khanoum VIII, Mémoires de la Délégation archéologique française en Afghanistan 33), Paris, De Boccard. Chapitre XII sur les textes littéraires: pp. 115–130. Sur le papyrus philosophique: pp. 115–121, dessins pl. 52, photographie couleur pl. 125. Bibliographie sur les textes littéraires d'Aï Khanoum: p. 387 (1992)

[25] Rea, J.R., Senior, R.C., Hollis, A.S.: A tax receipt from Hellenistic Bactria. Zeitschrift für Papyrologie und Epigraphik **104**, 261–280 (1994)

[26] Ronkin, N.: Early Buddhist Metaphysics. The Making of a Philosophical Tradition. Routledge Curzon, London (2005)

[27] Salomon, R.: The Macedonian Month Xandikos in Gandhāran Inscriptions. Stud. Orient. **110**, 165–170 (2011)

[28] Schlosser, A.: On the Bodhisattva Path in Gandhāra Edition of Fragment 4 and 11 from the Bajaur Collection of Kharoṣṭhī Manuscripts. In: Zur Erlangung des Doktorgrades eingereicht am Fachbereich Geschichts- und Kulturwissenschaften der Freien Universität Berlin im Dezember 2013. Überarbeitete Fassung (2016)

[29] Sear, D.: Greek Coins and Their Values, Volume 2, Asia and Africa. Seaby, London (1979)

[30] Senart, É.: The Inscriptions in the caves at Nasik. Epigr. Indica Rec. Archaeol. Surv. India **8**, 59–96 (1905–1906)

[31] Sharma, P.: Caraka-saṃhitā: Agniveśa's treatise refined and annotated by Caraka and redacted by Dṛḍhabala: text with English translation, vol. 1. Chaukhambha Orientalia, Varanasi (2014)

[32] Shastri, J.L. (ed.): Shastri Mānava-Dharmaśāstra. Manusmṛti, With the Sanskrit Commentary Manvartha-Muktāvalī of Kullūka Bhaṭṭa. Delhi (1983)

[33] Shrava, S.: The Dated Kushāṇa Inscriptions. New Delhi (1993)

[34] Sims Williams, N., Cribb, J.: A new Bactrian inscription of Kanishka the great. Silk Road Art Archaeol. **4**, 75–142 (1996)

[35] Sims Williams, N.: Bactrian Documents from Northern Afghanistan I: Legal and Economic Documents. Oxford University Press, Oxford (2001)

[36] Sims-Williams, N.: Bactrian Documents from Northern Afghanistan II: Letters and Buddhist Texts. The Nour Foundation, London (2007)

[37] Swamy, M.C. (tr.): The Daṭhavansa or, The History of the Tooth-Relic Gotama Buddha. Trübner & co., London (1874)

[38] Tarn, W.W.: The Greeks in Bactria and India. Cambridge University Press, Cambridge (1951)

[39] Thera, N.: Salha Sutta: To Salha. Buddhist Publication Society, Kandy (2013)

[40] Thera, S. (tr.): Kālāma Sutta. The Buddha's Charter of Free Inquiry. The Wheel Publication No. 8. Buddhist Publication Society, Kandy Sri Lanka (1981)

[41] Tversky, A., Kahneman, D.: Judgments under uncertainty: heuristics and biases. Science **185**(4157), 1124–1131 (1974)

[42] Vats, M.S.: Unpublished votive inscriptions in the Chaitya Cave at Karle, Epigraphia Indica and Record of the Archaeological Survey of India **18**, 325–329 (1925–1926)

[43] Vidyabhusana, S.C.: A History of Indian Logic: Ancient, Mediaeval, and Modern Schools. Motilal Banarsidass, Delhi (1921)

[44] Watanabe, F.: Philosophy and its Development in the Nikayas and Abhidhamma. Motilal Banarsidass, Delhi (1983)

Andrew Schumann
Department of Cognitive Science and Intelligent Systems
University of Information Technology and Management in Rzeszow
Sucharskiego 2
35-225 Rzeszow
Poland
e-mail: andrew.schumann@gmail.com

Received: February 7, 2019.
Accepted: June 17, 2019.