Reflections on the notion of inference in Sino-Asian versions of Dignāgean theory of reason (hetuvidyā, yinming, immyō). Some notes from meta-logical points of view

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Preliminary draft

Yinming 因明 is the established Chinese translation of Skt. hetuvidyā, and like hetuvidyā means "theory of reason". Widespread translations like "Buddhist logic" are misleading, for the discipline of yinming does not only deal with logical issues as for instance the question of formally valid inference but also with other problems, among them ontological and epistemological ones. The name "theory of reason" derives from the goal and core of the logical doctrine of yinming, namely, to formulate the conditions a reason (yin 因) must fulfill to enable a valid logical conclusion. More precisely, yinming raises and answers the question: Which criteria must a reason R fulfill to prove that a proposition "S (zong 宗) is P (suoli 所立)" is valid because "S is R". This question can in turn be phrased as follows: Which relations must exist between (1) R and S and (2) R and P to enable a valid conclusion?

The yinming discussions on logic answer this question in the following way. First of all, and obviously, S must be R. Second, to find out the relation that must exist between R and P, the Buddhist logicians investigate all combinatory possible relations between R and P. Since there are exactly 9 (kinds of) such relations the respective list is called "nine relations [of the reason]" (jiuju[yin] 九句 [因]). Analysis of these 9 cases then leads to the conclusion that only a reason that is of the same kind as P (i.e., that is a species of P) and does not belong to the kind contradictory to P, is a "correct reason" (zhengyin 正因). To expressly designate the difference between P as the property to be proven (i.e. the probandum) (or, as "we" could also say, P as the logical predicate in "S is P") and P as the kind of which P itself is a species, the Dignāgean logicians name the latter "that what is of the same kind [as P]"[i] tongpin 同品, and its contradictory opposite "that what is of a different kind", yipin 异品.[ii]

By further analysis of this result the Buddhist logicians arrive at formulating what they call the "three properties of a [valid] reason" (yin sanxiang 因三相), namely, that (1) "all S

must be R" (e.g. "Every sound is produced"), (2) "only P are R" ("Only what is impermanent is produced"), and (3) "all Non-P must be Non-R" ("Whatever is permanent is unproduced"). This is equivalent to "All S must be R" ("Every sound is produced") and "all R must be P" ("Everything produced is impermanent"), which, if fulfilled, entails "All S are P" ("Every sound is impermanent"). Although not all yinming treatises use the same (rather general) formulations of these 3 properties, those versions that, from a meta-logical point of view, are viable are probably compatible with each other. Further, although the above formalization is only one among others, it is probably logically equivalent to its relevant alternatives. The formalization is strongly reminiscent of the Aristotelian mode of Barbara, the law of transitivity, and the dictum de omni. Critics therefore warn against imposing what they call Western ideas on (Indian or) Sino-Asian thought, and against reducing the 3 properties to the modus Barbara.

However, the most basic notions of the theory of logic as it is put forward in Dignāgean yinming, namely, "property bearer" (youfa 有法) and "property" (fa 法), correspond to such notions as "specific concept" or "species" and "general concept" or "genus" respectively. Moreover, in yinming, S in "S is P" is conceived of as and called a property bearer and P is seen as a property to be proved [being a property of S]. The correct reason R is also named "property of S" (zongfa 宗法). Accordingly, it is not surprising but rather a matter of course that the above interpretation of the criteria of a correct reason as relations of sameness and difference between concepts and concept properties is compatible with, and similar to, an interpretation of Aristotelian syllogistics as a theory of such relations. The more so, since the relations between R, P, and Non-P can be adequately understood as relations between a property bearer, a respective property and this property's contradictory opposite, i.e., as relations of concepts or terms. Seen as a theory of concept relations, logic in yinming is of course a theory of form or formal structures.

The yinming scholars distinguish between the logical features of an argument and problems that must be solved before logical rules can be meaningfully applied in an inference. They make clear that all disputants must have agreed on the meaning of the terms and sentences that make up the argument, particularly the meaning of S, P, and R. This is to say that they were well aware of the distinctions e.g. between logic and the one hand and language grammar, language conventions and semantics, on the other.[iii]

Major problems

The relation between the 9 relations of the reason and the 3 properties of the reason

A possible diagram of Gomyō's formulation of the 9 relations including tentative translations

Tongpin 同品 What is of the same kind	Yipin 異品 … of a different kind [as P]

同品有　　　　異品有

不定 [T 29c20 und 30b–c]

Whatever is of the same kind [as P] has/possesses [the property R].[iv] [Every P is R.]

Whatever is of a different kind has/possesses [the property R].

Not decisive./Inconclusive.

同品有　　　　異品非有

正因 [29c20 und 30b–c]

Whatever is of the same kind [as P] has/possesses [the property R]. [Every P is R./"Whatever is impermanent is produced".]

Whatever is of a different kind, does not have/possess [the property R] [Every Non-P is Non-R./"Whatever is permanent is unproduced."]

Correct reason.

同品有　　　　異品有非有

不定 [29c21 und 30b–c]

Whatever is of the same kind [as P] has /possesses [the property R]. [Every P is R.]

Some things of a different kind have/possess [the property R] and some do not.
[Some P are R, and some are not.]

Not decisive./Inconclusive.

同品非有　　　　異品有

相違 [29c22 und 30b–c]

Nothing of the same kind has/possesses …

Whatever is of a different kind has/possesses …

Contradiction.

同品非有　　　　異品非有

不共不定 [29c22, 30b–c]

Nothing of the same kind has/possesses … ["Nothing permanent is audible."]

Nothing of a different kind has/possesses … ["Nothing impermanent is audible".]

Neither one of the two. Inconclusive.

同品非有　　　　異品有非有

相違 [29c23 und 30b–c]

Nothing of the same kind has/possesses [the property R].

Some things of a different kind have/possess [the property R] and some do not. ["Some impermanent things are produced by effort and some are not."]

Contradiction.

同品有非有　　　　異品有

不定 [29c24 und 30b–c]

同品有非有　　　　異品非有

正因 [29c24 und 30b–c]

同品有非有　　　　異品有非有

不定 [29c25 und 30b–c]

According to Ganeri, the 3 properties of the reason function as criteria for identifying the correct reasons among the 9 reasons. Ganeri thus mistakenly inverts the systematic relationship between the 9 relations and the 3 properties of the reason. This becomes especially clear from a close reading of the *Nyāyamukha,* but also e.g. from Gomyō's treatise. Although formulations of the 3 properties are older than the formulation of the 9 relations (i.e. the *Hetucakraḍamaru*), historical relationship must not be confused with systematic relationship. I am even of the opinion that Dignāga developed his concept of the 9 relations precisely because he wanted to provide an explanation or systematic foundation of the second and third of the 3 reasons, for in his introduction to the "Wheel of reason" he says: "I am expounding the determination of / The *probans* [R] with threefold characteristics," and then adds that he therefore analyses the possible relations between "the *probans* [R] and the *probandum* [P]." (Chi: 2–3) These lines imply that Dignāga already knew, or presupposed knowledge of, the 3 properties, and that he wanted to justify their notion (as he understood it).

Reduction of the yinming notion of inference to the modus Barbara?

Explaining the 9 relations and the 3 properties does not mean covering the whole of yinming logic. Hence, it is misleading to speak of a reduction. This would be justified only, if a comprehensive interpretation of yinming logic which would include e.g. enumerating all logical axioms formulated within the system would end up with, e.g., deriving nothing but the modus Barbara. As I tried to show (in Paul 1994), this is not the case. On the contrary. If I am right, such a comprehensive interpretation leads to the conclusion that the whole of Aristotelian syllogistics and the whole of yinming inference theory are deductively equivalent. That is to say that given identical premises, application of the inference rules of each of the two theories would lead to the same (identical) conclusions.

Further, close analysis of the (formulations of the) 9 relations of the reason reveals that the authors presupposed the validity of the laws of non-contradiction, excluded middle and transitivity. Otherwise these authors would not have outrightly rejected contradictions or based their arguments on such dichotomies as those between *tongpin* and *yipin*. They applied the three principles to find out which cases among the 9 relations constituted a valid reason. In most cases this meant that they excluded what they thus identified as invalid reasons.[v] This is also to say, that the authors of the 9 relations regarded, and applied, the principles of non-contradiction, excluded middle and transitivity as axioms,

as it is also the case in Aristotelian syllogistics. Whether, or how, Buddhist logicians explicitly justified the validity of these axioms, I do not know. Aristotle and the Chinese Later Mohists provided pragmatic justifications. They pointed out that it would be impossible to think or communicate in an understandable way if one would not abide by the axioms.

How is the 5th case of the 9 relations to be understood? Does yinming presuppose bipartition or tripartition of the universe of discourse?

According to the 5th case, the reason is neither present among the elements of the same kind nor among the elements of the different kind. The standard example reads: "Sound [S] is permanent [P] because it is audible [R]." A common explanation for the exclusion of the reason "to be audible" from tongpin and yipin is that Dignāga presupposed what is called a tripartite universe, according to which the realm of discourse is divided into (1) S (zong), (2) what is of the same kind as P (tongpin) and (3) what is of the kind of Non-P (yipin) (Oetke 1994: e.g., 50 f., Katsura 2004/Hōrin, Tillemanns 2004b/Horin). In my opinion, however, this is at best an irritating explanation.

First of all, since the "Wheel of reason" had to take into account all combinatory possible relations between R, P (or tongpin), and Non-P (or yipin), case 5 had to be included independent of the question of whether or not there are actually instances of case 5. Since this point is of utmost importance, I should like to also put it as follows. From a methodological point of view, case 5 must be explicitly listed, for otherwise the "Wheel of reason" would not be complete (not exhaustive). The listening of case 5 results, so to say, from an automatism that is independent from whether or not there are actually instances of this case or instances that make reasonable sense. Further, from a meta-logical, and formal, point of view, case 5 cannot permit for a correct reason simply because, according to this case, no P is R *and* no R is P. The question of whether there actually exists such P and/or R, is no logical problem.

Second, "S is P" cannot be proved by "S is S", since S (zong) cannot function as reason, for this would presuppose that "All S are P" and thus amount to a petitio principii, *S as R* had to be excluded from the domains of P (tongpin) and Non-P (yipin). (In other words: S cannot be used as one of the 9 reasons, which is also to say that it cannot be included in the tongpin or yipin.) Further, since sound is the only property bearer that has the property of audibility and vice versa, "Sound is audible" ultimately amounts to saying

"Sound is sound". Dignāga therefore calls the reason "audibility" "unique". If one looks for an instance of case 5 – to illustrate this case – one has to look for such an example. Whether the inference "Sound is eternal, because sound is audible" was ever used in actual debate, I do not know (although e.g. Kuiji (CHI: 6) and Gomyō introduce the inference (30a19–21) by the phrase "For example, when a Śābdika [Chin. shenlunshi, Jap. shōronshi 聲論師, an adherent of the Mīmāṃsā] says …") . However, this is of no importance for an understanding of case 5. I need not emphasize that acceptance of "S is P, because S is S" would permit for contradictory interpretations of P such as "Sound is eternal" and "Sound is non-eternal", thus ultimately even allowing ex falso quod libet conclusions, which of course would be incompatible with the character of the theory of reason as a term logic.

Third. According to Glashoff's (1999) explanation, case 5 can be reconstructed as (1) "No P is R" *and* (2) "No Non-P is R". (1), as a matter of consequence, then entails (3) "No R is P". (2) entails (4) "All R are P". Since (3) and (4) contradict each other, case 5 cannot constitute a correct or valid reason (Oetke, 1994: 50, argued in a similar way). From a meta-logical point of view, Glashoff's explanation is of course an adequate one. Glashoff himself, however, is not satisfied with this explanation for he wants to provide an interpretation that describes the way Dignāga himself understood case 5. It need not be emphasized that both approaches are compatible with each other. Independent from this point, Glashoff's reconstruction can perhaps be understood as also demonstrating that case 5 implies rejection of the principle of ex falso quod libet.

Tillemans (2004: 261, note 12) and Ganeri (p. 347) also pointed out that the reason in case 5 cannot be a valid one, for it enables ex falso quod libet inferences.

As I tried to show above, the explanation that the reason in case 5 is an invalid one because it permits for both, namely the inference that, e.g., "sound is impermanent" and "sound is permanent", can perhaps be understood as a correlate of the tautological character of "Sound is P, because it is sound".

Forth. If one speaks of bipartism ('S' or 'Non-S or not S') and tripartism ('S', 'P', or 'Non-P or not P', or, respectively, 'S', 'tongpin' or 'yipin'), one should, as some scholars especially in Tibet did, differentiate between epistemological and logical distinctions. From an epistemological point of view, it is an open question whether 'S' has the

property 'P' or 'Non-P', whereas, from a logical point of view, 'S' must have one of these two properties. In the given context, "S is P" is a (yet) unproved proposition. Nevertheless, tongpin and yipin must be contradictories for otherwise a safe inference would not be guaranteed. Chinese and Japanese Buddhist logicians repeatedly emphasized that proponents and opponents had to agree on the meaning of S, P and R, but must not agree on the question of whether or not S has the property P. They even developed an elaborate and detailed system of quantifiers which they called jianbieyu 简 別語, "limitators" (Frankenhauser: 38), to enable disputants to make explicit the respective relevant agreements. This is again to say that the question of whether S is of the same kind as P or Non-P is not regarded as an issue of logical bipartition or tripartition, but simply as a question of knowledge. Thus, from a logical point of view, Dignāga had to presuppose a bipartite universe. One could of course argue that such an interpretation presupposes existence of S. Leaving aside the problems of an adequate understanding of "existence", this again is an epistemological issue. If proponent and opponent agree on the question that S does not exist or if they disagree on this question, according to yinming, trying to logically prove "S is P" (i.e., attempting a logical inference) would be pointless.

To repeat, in my opinion, the whole discussion about bipartition or tripartition is somewhat irritating. Perhaps, the issue could be summed up as follows.

(I) From a logical point of view, all "things" are either P or Non-P (or not P). That is to say that the law of excluded middle holds. In this respect, "the universe" is a bipartite one. (II) From an epistemological point of view, there are (1) things of which we know that they are (1.1) either P or (1.2) Non-P (or not P), and (2) things of which we do not know (yet) whether they are P or Non-P (or not P). (1) and (2) indicate bipartition, (1.1), (1.2), and (2) indicate tripartition. (I) and (II) are compatible with each other.

Or should "tripartition" be understood, or characterized, as follows? Namely, as a tripartition in the sense that the bipartite 'universe' of S (zong) and Non-S (or not S) is further divided into (1) zong (S), (2) tongpin without S, and (3) yipin without S, irrespective of whether zong is or could be included in tongpin or yipin.

Most important, however, is the conclusion that case 5 need not be explained as a consequence of epistemological tripartition, but can (also) sufficiently be explained as resulting from merely logical presuppositions.

Deductive or inductive logic?

Another interesting controversy is about the question of whether Dignāgean logic is a deductive or inductive one (as e.g. Katsura 2004, Tillemans 2004a, and Ganeri: 349 maintain). In my opinion, this logic must be considered a deductive logic, for it is not the example in a well-formed syllogism that is the criterion of a valid reason and inference, but the 3 properties of the reason. Further, the so-called example actually often includes an explicitly general and law-like statement as for instance the sentence that "whatever is permanent is unproduced". I often wonder whether "example" is a misleading expression. Finally, the notion of an inseparable connection or necessary concomitance between the relevant concept-terms of an inference is probably incompatible with conceiving of such an inference as characterized by 'uncertainty' or lack of necessity.

However, even granted that hetuvidyā/yinming logic is inductive logic, this is not as important a difference from so-called Western logic as often thought, for orthodox Marxism (also) regards even basic logical rules as inductive principles. Further, one should remember Hume's argument against the certainty of causal laws and their formulation in terms of universally valid logical relations. Moreover, even if a principle is gained inductively this does not exclude the possibility of normative validity. Finally, I doubt that any adherent to the theory of reason or any Marxist logician would maintain that the fundamental logical rules they believe in would constitute a system not deductively equivalent to, say, fundamental Aristotelian syllogistics, although they could perhaps maintain that conclusions cannot be 'absolutely' certain.

Finally, I should like to add that, in sharp contrast to medieval Christian Aristotelism, Dignāgean logic does not at all permit for contradictions (cf. Maywald) or such strange comparisons as e.g. Lullus' comparison of the Holy Trinity and the Aristotelian syllogism (Lullus: LI–LII). As to the character and role of logic in Islamic scholastics, e.g. even Averroes' comes close to justifying a doctrine of two truths. Although he argues in favor of a logical interpretation of the *Quran,* he insists that the existence of Allah must not be called into question, and that uneducated people (who are not able to understand interpretation) must believe in the literal meaning of the *Quran.* (Averroes 2010[vi]) Such differences also testify to what I call the Dignāgean attempt to put forward a valid theory that in every relevant respect is independent of one's own religious or soteriological beliefs.

Bibliography

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[i] More precisely, as Tachikawa explains [1971: 117]: "The *sapakṣa* [Chin. *tongpin*] means anything which is similar to the *pakṣa* [which is of the same kind as S] insofar as it possesses the *sādhya* [the property P]." That is to say that the *sapakṣa* is a 'genus' of the *pakṣa,* and that the *pakṣa* is a species of the *sapakṣa*.)

[ii] The importance of these distinctions can be illustrated by the following example: In "S is impermanent, because S is produced by effort", the dichotomy of "permanent" and "impermanent" must be distinguished from the dichotomy of "produced by effort" and "produced without effort". Both properties are species of the property of "being produced" and thus of "being impermanent." However, complete or exhaustive analysis of the logically relevant relations demands to also taking into account the property of "being permanent."

[iii] As to the interesting differences, intriguing details, and controversies within yinming, its specific interpretations and reconstructions, among Western publications, translations and studies such as those by Tucci (1929 and 1939), Chi (1969), Frauwallner, Tachikawa (1973), Hayes (1988), Steinkellner, Katsura, Paul (1993 and 1994), Harbsmeier (1994), Oetke (1994), Frankenhauser (1996), Glashoff (1999), Tillemans, Hugon, or Ganeri (2004) provide information. They also add some qualification to the above general characterization of yinming that, at least at first sight, may be rejected as inacceptable simplification. One may for instance ask whether tongpin rather refers to a set, class or to a notion's domain than to the intension of a concept or to a conceptual property, or one may doubt that the above statements about logical compatibility and equivalences can be proven.

[iv] One alternative could be: The whole realm of things which are of the same kind [as P] includes [the whole realm of R].

[v] In my opinion, it deserves particular interest that Dignāga, in eliminating cases such as case 4, also provides examples of inferences (E.g. "Sound is permanent, because it is produced.") which, because of a *semantic* contradiction (an interpretation that displays a contradiction), cannot function as *formally valid* relations.

[vi] According to the German translation of *Faṣl al-maqāl* by Patric O. Schaerer: *Averroes: Die entscheidende Abhandlung: Die Untersuchung über die Methoden der Beweise,* Stuttgart: Reclam 2010. English trans.: Butterworth, Charles E.: *The Book of the Decisive Treatise Determining the Connection Between the Law and Wisdom and Epistle Dedicatory,* Provo 2001.