

METALOGICAL CLICHES (PROTO-VARIABLES) AND THEIR
 RESTRICTED SUBSTITUTION IN SIXTH CENTURY
 BUDDHIST LOGIC

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1 *Introduction* In this paper, I wish to consider the twin concepts of 1) the restricted substitution of 2) metalogical cliches (MC) as two of the historically and cross-culturally interesting proto-formal characteristics of early Buddhist epistemology and formalistic logic (nyāya).¹ I shall consider only the early period of Dignāga (circa 450-550 A.D.) and shall refer to a single, but generally representative nyāya text of this early *period*, the *Nyāyapraveśa*.²

I shall not try to answer all the thorny questions as to *all* the necessary conditions of a formal logic; I wish to treat only in passing what I consider to be some necessary conditions of formal logic relevant to this study. It is my presupposition that a theory for the substitution of variables is a necessary condition for both a formal logic and a fully formalized one; here we are dealing with the former but not the latter. This early Buddhist text seems to exhibit features of such substitution which lie somewhere between the informal argumentation (of, say, Plato) and a formalized logic such as the first-order predicate calculus. Since formal logic seemed to appear in full flower with Aristotle and with little *formalized* evidence of it in Plato, we will be able to see in Buddhist Nyāya an interesting example of an early transitional stage of development within the Indian tradition, the scope of which ranges from some of the third century (A.D.) arguments by analogy in the *Nyāya Sūtras* of Akṣapāda to the mind-boggling formal complexities of the later Navya-Nyāya.

To be clear I suggest that these MCs serve much the same *function* as variables do in modern logic today; this is *not* to say that these terms are either the exact functional equivalents of variables, nor are they as efficient or as clear as the use of, say, propositional variables today. It is *only* to say that within this proto-metalogical terminology, there were sets of words, each of which had a clear topic-free meaning, which expressed clearly the assumed second-order metalogical relationships among the

varied possible linguistic components of the inference schema. Each word, then no matter what its content or referent, designated metalogical relationships rather than "material" relationships and functioned as the instruments by which these *relations* were *recognized* and *evaluated*. These metalogical markers were associated with explicit and implicit rules plus *explicit conditions* which, when satisfied, provide one with an explicit set of criteria to evaluate the specific mistakes, if any, in an inference schema.

In the light of the above I first shall give a brief definition of the concept of metalogical clichés or proto-variables,³ variables, and some common examples of the range and rules of their substitution. Then I shall give a brief exposition of, and an example of, an Indian inference schema (*parāthānumāṇa*). Last, I shall offer specific examples which illustrate the rules for a restricted range of substitution of **MCs** within this Buddhist context.

2 Formalized Logic and Formalistic Nyāya In a relatively recent panel discussion⁴ it was noted in passing that there are *at least* three necessary conditions for calling any system of inference a complete *formalized* logic. First is that it possess maximum generality achieved most often by means of explicit variables; certainly this is true in the Anglo-West-European traditions since Aristotle. The second necessary condition is that of recursive rules for the evaluation of inference schemas; the third is that of maximum free substitution within the clearly defined ranges of variables. Because it possesses these characteristics to a great degree, I hold that this early *nyāya* can be considered a formal logic but not a completely formalized one.

With respect to substitution of **MCs** in Indian *nyāya*, there is here a somewhat similar tradition in which there are habitually employed second-order, content-neutral metalogical terms **MCs** and for which a rule-governed restricted range of first-order terms may be substituted. Although this substitution allows one to generate new inferences which are then evaluated by means of a variety of explicit and implicit rules, these early Buddhist logical maneuvers are not strictly formalistic in the manner that contemporary Western logicians have come to expect. The substitution criteria are varied and some appeal to the non-formal. However, I hold that they are *proto-formalistic* because of both the degree and types of restricted substitutions (described below) and the presence of rule-governed theories which are used to evaluate the *proto-formalistic* but not fully formalized inference schemas (*parārthānumāna*).

By "proto-metalogical relationships," I mean that the evaluative concepts and terminology used in these tests to determine the legitimacy of an inference schema are clearly "metalogical" in that they are rule-governed, *second-order*, content-neutral concepts and refer primarily to internal first-order terms and relations within the inference schema itself and only secondarily to external first-order material or metaphysical presuppositions. By "proto" I mean that here we are near the beginning of a long tradition of formal description and evaluation of internal inferential relations not yet at its developmental formalistic zenith. It is part of the long process of continuous historical development of Indian *nyāya* but which, in

comparison with Aristotle's syllogistic, and *a fortiori*, of modern ideal-language theory, is still *technically* rather primitive. An examination of the gradual transitional development of ancient MCs into true variables offers then, both a contribution to the comparative history of logic, and a glimpse of a mid-point in such a development which exhibits a proto-formal perspective largely lacking in the Western-European-Greek development of formal logic. Functionally, these MCs are *somewhat* analogous to the difference between saying 1) "the referent of the antecedent of the second first-order implication and the consequent of the first first-order implication," and 2) saying "B" in the expression $((A \supset B) \supset (B \supset C)) \supset (A \supset C)$.⁵ Thus the logician's universal quest for brevity and formalism is instantiated in India, too; a glance at the history of "Western" logic will bring to mind the limping, sometimes involuted development prior to 1847.

That the nyāya tradition *does* have *explicit* variables is sometimes asserted by those who wish to make a case for the formalized sophistication of ancient Indian nyāya (prior to Navya-Nyāya) by suggesting that nyāya utilizes and exhibits the *same* functional equivalents of one of the desirable features of modern logic, i.e., variables with maximum *free* substitution. Such a simple statement, however does not fit (at least) the Buddhist case at this early period; on the other hand, neither a flat unqualified negation of this assertion would be appropriate in the case of this sixth century text. Simply stated, what we find here are implicit and explicit rules of the nyāya inference-game which restrict the range of substitutions of these MCs. When these rules are made explicit they yield ranges of substitution somewhat *more restrictive* than the ranges of substitution associated with the contemporary metalogical developments and the habitual uses of variables, say, in the predicate calculus. In short, we do not have *totally free* substitution and thus the case (above) fails.

3 Metalogical-Cliches or Proto-Variables "A variable is a symbol that under the (correct) interpretation is not the name of any particular thing but is rather the ambiguous name of any one of a class of things."⁶ Thus variables are letters or symbols which are formalized abbreviations for designatables within a specific range of reference. For example, the range of a given set of variables might be predicates, a designated *class* of substances, triadic relations, or sentences, etc. A variable has a finite range of *possible* substitutions; in Buddhist Nyāya the content and extent of the different ranges appealed to and the implicit criteria of substitution *are* the crucial considerations. In general, the possible substitutions of modern variables ranges over the names of those entities denoted as a function of the implicit or explicit rules which govern the second-order uses of words or classes of words in any formal system. Therefore the "correct" substitution of variables means that one conforms to the explicit rules which designate the allowable range of possible substitutions presupposed in a particular universe of logical discourse and its metalogical theory; Nyāya does this also, but it is both the presuppositions of different metaphysical systems and the vestiges of debating rules (vāda) which generate different (additional) substitution criteria at this early period. Thus to generalize,

in contemporary logic the ranges of possible substitutions are governed by and formal syntactic criteria; in early nyāya the substitution criteria for **MCs** are (partially) so governed but are also subject to non-formal material and metaphysical criteria. Thus the differences in ranges of substitution between the two are differences in degree, but not wholly differences in kind (of criteria) although additional criteria are held relevant in the sixth century inference schema (parārthānumāṇa).

The use of explicit variables frees one from relying solely on the semantic and material relationships which may exist between both first-order linguistic and epistemic entities rather than second-order patterns of rule-ordered justifications, etc. The early Indian logicians also became gradually aware that this use of specific content-neutral second-order terms (**MCs**) does free one from the potential confusion between first-order material, semantic and epistemic relationships and second-order inferences. Hence, **MCs** enabled them to minimize these confusions by focusing upon the second-order relationships of the pattern of the argument by using second-order clichés rather than by appealing to the material relations in the first-order terms. We find in the *NP* that such terms as “pakṣa” (“thesis-property”), “sādhya” (“inferendum” or “justification property”), “sapakṣa” (similar examples) and many specific fallacies, function in a somewhat similar manner to modern variables.

Where might one find explicit rules which denote the legitimate universes of discourse and thus the substitution rules for nyāya **MCs**? The three sources from which answers to this question may be found are: first, there are *models* for inferences; second, in the single explicit *evaluation rule* of the nyāya inference game, i.e., the trirūpahetu; third, they may be also found *implicitly* in the sections called “*fallacies*” (ābhāsas). We shall now turn to an inference schema and to the only *explicit* metalogical rule for evaluation, the “Three forms of the Justification” (trirūpahetu).

4 A Model Nyāya Inference Schema

A Representative Example (from the *Nyāyapraveśa*):

Thesis: (Pakṣa) ¹	“SOUND (IS) IMPERMANENT” ⁷ śābdo'nityam
Justification: (hetu) ¹	BECAUSE (IT POSSESSES THE PROPERTY ² OF) CREATEDNESS: Kṛtakatvāt i.e., the property (hetu ²) is the dharma; the property-locus (pakṣa ²) is in the entity “sound”; the whole “because... createdness” is the sāadhanam.
Exemplification: (dṛṣṭānta)	WHATEVER (IS A) CREATED (THING), THAT (IS) WELL KNOWN (AS AN) IMPERMANENT (THING). yat kṛtakam tad anityam dṛṣṭam.
Similar Example: (sapakṣa)	. . . AS (IN THE) CASE OF A POT, ETC. yathā ghata ādis

Dissimilar Example: . . . AS NOT IN THE CASE OF SPACE, ETC.

(vipakṣa) na yathā ākāśam.

(Pakṣa¹ and hetu¹ with superscripts refer to a *proposition* in pakṣa¹ and the *ascription* “because (it. . .) createdness” in hetu¹; pakṣa² and hetu² refer respectively, to the locus or the property-possessor (dharmin), here sound (śabda) and to the property (dharma) of createdness (kṛtakatva) alone. That is, the superscript¹ refers to grammatical or syntactic categories, e.g., propositions or ascriptions; superscript² refers to properties or the loci of such dharmas. These distinctions have been much equivocated upon in some nyāya texts.⁸)

We should note two features of this example.⁹ First, there is the crucial *explicit* metalogical rule, the *Trirūpahetu*, which authorizes one, given the satisfaction of this rule, to conclude that the inference schema is a legitimate one (not a “valid” one). That is, if a schema conforms to this explicit metalogical rule, i.e., trirūpahetu, the “Three Forms of the Justification” this constitutes (at least) a necessary condition for its acceptance. This rule and others devised for similar metalogical purposes in other texts were the subject of the ongoing controversies in the long history of nyāya; this particular rule was superceded by other more precise criteria and was strongly criticized by other darśanas.¹⁰ This *Trirūpahetu* rule states that the justification-property (hetu² dharma) must be: A) concomitantly present with the thesis-property (pakṣadharmatvam), B) present in the similar example (sapakṣe sattvam), and C) absent in the dissimilar example (vipakṣe cāsattvam).

Secondly, one should notice that such terms as pakṣa¹ (“thesis”), hetu¹ (“justification”), dṛṣṭānta (“exemplification”), sapakṣa (“similar example”), vipakṣa (“dissimilar example”), sādhya (“Property-to-be-inferred”), pakṣa² and dharma-dharmin, sādhana (hetu¹ & ²) (“property” and “property-locus”) are some examples of second-order MCs.

B One possible formalized translation of the Parārthānumāna follows:

					Implicit
	Drstanta-Warrant	Hetu-Data	Conclusion	Assumption	
(x), (∃y)	((Sx ⊃ Lx)	(Sy))	\supset	((Iy)	(y ∈ x))

Where:

Properties: S =_{df} Kṛtakatva (createdness)

(Arguments) I =_{df} anityam (impermanence) the preferred property (dharma) of the thesis (pakṣa¹)

Variables: x =_{df} the class of all conditioned things

∃x =_{df} restricted variable (matrix) denoted by the term “śabda,” the locus of property-to-be-demonstrated (sādhya)

Functors: . =_{df} (conjunction, “and”)

\supset =_{df} the Sanskrit Ablative case *interpreted* as interchangeable with “if . . . then”¹¹

∈ =_{df} Class Inclusion, as in (y ∈ x): = y is a member of the class of x.

The partial similarity (but not isomorphism) of this formalized translation to the above Indian inference schema suggests a great many controversial metalogical issues for discussion, however, I shall confine myself here to that of the metalogical presuppositions concerning the use of **MCs** and the rules for their substitution.

5 Sources and Implicit Rules for MCs When we consider the terminology and relationships of the explicit necessary conditions in the *trivṛūpahetu*, it is clear that there is a form of evaluation and restricted substitution occurring here by means of these **MCs**, e.g., *sādhya* (“inferendum”) *dharma-dharmin* (property, property-possessor) relationships, *sapakṣa* (similar example, *hetu*² (justifier), etc. For example, note that the words “*sādhya*” and “*hetu*²” (justification-property) refer to properties (*dharma*) which stand in a postulated relation of concomitance; if the properties (*dharma*s) in each (i.e., the *sādhya* and *hetu*²) are known to be present together in the similar example (*sapakṣa*), then the second aspect of the *trivṛūpa* rule is satisfied. It is most important to note that it is satisfied *without* reference to or appeal to the specific content of the properties (*dharma*s) of either the *sādhya* or *hetu*². Thus when such criteria have been met, such as in the *trivṛūpahetu*, at least the necessary formalistic conditions for the conclusion would have been established. Thus we see here an *explicit* role of metalogical evaluation.

In the section concerning fallacies (*ābhāsa*) the formulation and evaluation of inference-schemas, the text offers *implicit* criteria which reject certain possible forms of the schema which violate non-formal prerequisites, e.g., non-contradiction of one’s own words (*svavaccana*, 3.1.5., p. 141) and conformity (i.e., non-contradiction (*viruddha*)) to the presupposition of one’s own school or *darśana* (*āgamaviruddha*, 3.1.3., p. 141). Also, in the fallacies of the justification (*hetu*¹) there is the *implicit* presupposition that both parties of the debate examining the thesis (*pakṣa*¹) must agree that the justification property (*hetu*²) the *dharma*-property, is acceptable to both parties (3.2.1.1., p. 141). The discussion attempting to reconcile such a disagreement is generally called “*tarka*.”¹²

The justification (*hetu*¹) as ascription-member along with the *pakṣa*¹ and *drṣṭānta* justification property (*hetu*² *dharma*) is also the inferendum *sādhya* = *dharma* (property) of the thesis (*pakṣa*², *pratijñā*). This specific property or quality of an epistemological object (*viśeṣa*) is asserted to be continually (past, present and future) concomitant with the specific *dharma* (property) of the *hetu*² (justifier) as exemplified in the general *drṣṭānta*-warrant, e.g., “where there is a created *x* there is an impermanent *y*, as in a *p*,” etc. In this context, if there is a metaphysical or epistemological assumption which is *incompatible* with the presuppositions of either of the debaters, or contradicts either the thesis (*pakṣa*¹) or the justification member (*hetu*¹) then the inference schema may be ruled as illegitimate and¹³ rejected (3.2.1.1., p. 141). Such metalogical designations are prerequisites for discussing the general truth value of the thesis such that both parties agree upon the metaphysical acceptability of such metalogical relationships; this is accomplished by means of such **MCs** as the *dharma-dharmin*,

pakṣa¹-pratijñā, etc., relationships. For example, the latter relations explicitly describe the property (“sound”), and the properties, “impermanent” and “being a product,” in certain particular second-order *explicit* relationships, the agreement of which depends on the metaphysical presuppositions assumed by the debators (vādi, prativādi). When such assumptions are agreed upon or are debated upon, the second-order function of the MCs becomes operative in the evaluation of the inference schema itself, i.e., that it well known (dr̥ṣṭa, prasiddha, “established”) that the pakṣa² “sound” (śabda) is, by definition, eternal (nityam). The two above terms are contrasted with the pakṣa¹ & ² in relationships which refer solely to the inherent non-metaphysical relationships within the inference schema; and as such they describe the relevant metalogical schematic positions and formal relationships without recourse to external semantic or material relationships. “Well-known” (dr̥ṣṭa) and “established” (prasiddha) do refer to external epistemological evaluations, i.e., of being well known or established by the speech community in the debate (vāda).

Other relevant non-formal restricted substitutions may also be found in the fallacies of the thesis (pakṣa, p. 122, 3.1). For example, 1) a contradicted thesis where a *Vaiśeṣaka* disputant, who holds by his philosophical position that sound (śabda) is impermanent, and would thus posit that sound is permanent (3.1.3), and 2) where a Sāṃkhyist disputant arguing with a Buddhist, the latter holds that one cannot apprehend a non-causal, enduring *ontological* entity called “self” (ātman), and thus rejects the thesis (pakṣa) that the self is sentient; metalogically, the Buddhist claims that the locus of the qualifier (viśeṣya) is non-existent. That is, the self (ātman), the locus (viśeṣya) of the self is incorrectly qualified (viśeṣa) as being sentient (3.1.7). Thus these theses would be ruled illegitimate (i.e., fallacious—ābhāsa) because the claims made about the world, which are denoted by such proto-variable terms as “thesis,” “qualifier,” etc., are rejected by at least one disputant; they are rejected not because of public counter-examples or by rigorous empirical falsification, but because of prior but incompatible (here) metaphysical presuppositions. Thus, in discussing these MCs, the terms “pakṣa” (thesis) and “viśeṣya” (qualifier) do function somewhat as variables function only in that they allow one to evaluate the illegitimacy of the inference schemas by reference to the special non-formal relationships denoted by these special MC terms and for which explicit and implicit rules apply.

Other more or less formalistic but implicit rules for evaluation are made by means of the fallacies, e.g., “contradicted marks” (Viruddhaḥ hetu, 3.2.3.1., p. 142) whereby metalogical relationships are denoted. A “mark,”¹⁴ (hetu¹) that proves the opposite of the sādhyā (inferendum), i.e., the *permanence* of sound (śabda) is “sound is permanent because it is produced (kṛtakatvāt).” That is, whatever is an effect of casuality (i.e., produced, kṛtakatva) because of human effort (prayatnānantartyakatvāt) is subject to change; this is incompatible with the *Mīmāṃsā* presupposition that “sound” (śaba) is external and non-produced (3.2.3.1, p. 142). If one who posits the above schema wishes to demonstrate the permanence of śabda, his hetu² (“produced”) constitutes evidence that sound is imperma-

nent; thus because of the non-formal fallacy in his justification (hetu¹), he fails to make his case uncontroversially. Note that these relations are named and evaluated by *means* of the MC hetu¹ & ² and the “inference-property-to-be-inferred” (sādhyā). Thus by means of MCs metalogical relationships are designated and fallacies are so evaluated.

The whole section in the *Nyāyapraveśa* on fallacies¹⁵ is resplendent with such examples of the uses of MCs to denote terms and proto-formal, material and controversial metaphysical relationships. The acceptability of statements using such MC terms and thus the controversial substitutions, depend (partially) upon their compatibility with prior non-formal metaphysical and ontological presuppositions. However, it is important to note that the MCs here refer solely to the *names* of components (MCs) of the patterns of the inference schemas; it is only the explicit denotation of these terms which bring into play non-formal metaphysical considerations for such metalogical evaluation. Such substitutions and discussions may ultimately bring non-formal considerations into play, but the obvious instruments of such metalogical discussions do utilize these second-order MCs and that is my thesis in this article.¹⁶

To summarize, the criteria for substitution of early Buddhist MCs was determined by considerations which are partially external to those of a fully formalized logic. These criteria implicitly and explicitly appeal to rules which were rooted in and generated out of certain debating conventions, certain metaphysical assumptions which govern the range of the universe of discourse and so restrict the possibility of totally free substitution of nyāya MCs. One only need refer to the restrictions explicitly stated in the fallacies of the thesis (ābhāsas-pakṣa) to see that the suitability of any given term for possible substitution in a nyāya MC is a function of not only its semantic and syntactic suitability, but also of its metaphysical role and as a possible source of incompatibility of one of the darśana positions; such an incompatibility may be presupposed by one who challenges such a hetu or pratijñā, not always on formal or structural grounds, but (perhaps) because he holds conflicting metaphysical presuppositions.

Thus by examining MCs in this text we see a developing but *formally primitive* system of describing, evaluating and challenging inferential relations within a proto-formalized system of logic and metalogical theory.

NOTES

1. The generic term “nyāya” refers to a post third century more formalistic rigorous style and methodology of treating Indian religio-philosophical issues, i.e., pramāṇa vāda, which refers to the doctrines concerning the means and legitimacy—not validity, a property of deductive arguments—of knowledge. “Anumāna,” one of the pramāṇas, refers to inference, inference models and the theories of their evaluation, as in the parārthānumāna (inference-for-others, not one’s self). The Buddhist pramāṇa vādins held that there are only two legitimate pramāṇas, namely pratyakṣa (perception) and anumāna; this is in line with their epistemological and ontological assumptions that (roughly) there are 1) the flashing staccato svalakṣaṇas, ever-changing and thus unique epistemological objects, and the 2) samānyalakṣaṇas which are the generic universal web-like concepts “we” project to describe/evaluate both our first-person and third-person experiences. The implicit circularity here should not be overlooked.

2. Sanskrit editions of the *Nyāyapraveśa* (hereafter cited as *NP*) may be found in: Dhruva, A. B., *The Nyāyapraveśa*, Part I, Gaekwad's Oriental Series, Baroda, 1930; Ui, H., *Bukkyo Ronrigaku* (Buddhist Logic), Tokyo, 1944; Mironov, N. D., "Nyāyapraveśa, I, Sanskrit Text, edited and reconstructed," in *T'oung Pao*, Leiden, 1931, pp. 1-24; Tachikawa, M., "A Sixth-Century Manual of Indian Logic," in *Journal of Indian Philosophy*, I (1971), pp. 111-145, Toronto. A Chinese translation of this text may be found in the *Taishō Shinshū Daizōkyō*, Buddhist Triṭaka, vol. 32, No. 1630, 11-13. The Tibetan translation has been edited by V. Bhattacharya in *The Nyāyapraveśa*, Part II, Gaekwad's Oriental Series, Baroda, 1927, and in the *Tibetan Triṭaka*, Peking edition, Reprint, edited by D. T. Suzuki, Tokyo, 1962, No. 5706, 130, 74-76. I refer to the numbers subdividing Tachikawa's edition (with translation) for an easy reference.
3. I had wished to use the term "proto-variable" to name these metalogical cliches; however, after reading parts of this paper at the University of California at Berkeley on March 11, 1976, I received sufficient feedback that such naming would 1) create excessive confusion given understandable contemporary expectations, and because 2) the degree of flexibility in the substitution of these **MCs** is too restricted to warrant the term "proto-variables." I tentatively hold that in Indian nyāya it was these **MCs** that were the conceptual source of the development of explicit variables found in Navya-Nyāya. In later Nyāya and in Navya-Nyāya such terms as *anyonyabhāva* and *pratiyogi* do function as proto-variables or perhaps as actual variables, but that is beyond the scope of this article. No one (to my knowledge) has ever attempted to examine and trace this question over the active 1500 year development of nyāya—no small task!
4. The East-West Philosopher's Conference on "The Development Logic: East and West," The University of Hawaii, June 25-30, 1973. Papers from this conference may be found in *Philosophy East and West*, Vol. 24, No. 3, July 1974.
5. For an example of Buddhist nyāya in a somewhat more mature stage of emic development see the *Nyāyabinduṭīkā*; somewhat dated studies of its inferential use and theory may be found in Stcherbatsky, Th., *Buddhist Logic*, New York, 1962, 2 volumes (a reprint of the original 1929-30 publication); for a sophisticated contrast the logician is referred to R. S. Y. Chi's *Buddhist Formal Logic*, London, 1967 (and my review article of it in *Philosophy East and West*, Vol. XXIII, No. 4 (October 1973), pp. 525-535).
6. *Encyclopedia of Philosophy*, Vol. V, p. 77.
7. Sādhyā, the **MC** "property-to-be-inferred" is "impermanence".
8. I have noted the above equivocations in my "Remarks on Early Buddhist Proto-Formalism (logic) and Mr. Tachikawa's translation of the *Nyāyapraveśa*," in *Journal of Indian Philosophy*, Vol. 3, nos. 3/4, September/December 1975, pp. 383-397.
9. Likewise and obviously in (so-called) "Aristotelian" or "Classical" (post-Renaissance) logic, but not the true logic of Aristotle, terms such as "middle, major" term(s) were *also* designated by the somewhat confusing names of "subject term, predicate term" which were derived from grammatical/syntactic presuppositions.
10. See e.g., the famous Buddhist *Nyāyabindu*, in *Vinītadeva's Nyāyabinduṭīkā*, edited and translated by M. Gangopadhyaya, Calcutta, 1971, p. 122 ff and my review of it in *Philosophy East and West*, Vol. 27, no. 1, Jan. 1977, pp. 115-117, for a Jaina refutation see e.g., Vadi Devasuri's *Pramāṇa-Naya-Tattvālokaṅkāra*, translated by H. S. Bhattacharya, Bombay, 1967, p. 193 ff and my review in *Philosophy East and West*, Vol. 26, no. 4, Oct. 1976, pp. 479-480.
11. I have noted some of the incompatibilities of this interpretation with this example such as non-truth functionality and the non-reversability of "If *p* then *q*", and "*q* because of *p*" in

- the parārthānumāṇa, in my article “Methodological incompatibilities in the formal description of Buddhist logic (Nyāya), *The Notre Dame Journal of Formal Logic*, vol. XVIII (1977), pp. 221-231.
12. Cf. my article “Tarka (inductive reasoning), as pramāṇa,” is to be published in *The Proceedings of the 30th International Congress of Orientalists* (Mexico City, August 1976); also my article “Circularity in the inductive justification of formal arguments (Tarka) in 12th century Indian Jaina logic,” *Philosophy East and West*, Vol. 29, no. 2, April 1979. Also see *Advanced Studies in Indian Logic and Metaphysics*, by R. S. Sanghvi, Indian Studies: Past and Present, Calcutta (1961), p. 82 ff.
 13. Clearly the concept of deductive validity is wholly inappropriate here; thus I would suggest, in passing, that Indologists *stop* using the term; *arguments* may be valid, or invalid, propositions cannot.
 14. Tachikawa, *ibid.*, uses the term “mark” as a translation substitute for “hetu” which I translate as “justification”; “mark” has been a common translation for “linga” but which is *not* used in the NP.
 15. 3.1-3.4, pp. 122-128.
 16. I have carried these analyses further. In an article forthcoming in *Logique et Analyse* entitled “Empirical falsifiability and the frequency of Darśana relevance in the sixth century logic of Sāṅkarasvāmin,” I have: 1) counted all the uses of such MCs as pratijñā/pakṣa, hetu², dṛṣṭānta, sapakṣa and vipakṣa, 2) determined the percentage of MCs subject to darśana legitimization, 3) the percentage which are *prima facie empirically* falsifiable and 4) the percentages which would probably be considered true, false or undecideable by the readers of *Mind* or *The Journal of Symbolic Logic*; I draw some etic ontological and epistemological conclusions. This forms one chapter in my *Comparative Issues in Buddhist, Jaina, and Twentieth Century Logic*.

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