How Did the Buddhists Prove Something? The Nature of Buddhist Logic[1]

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PREFACE

BACK IN THE EARLY 1970s when I was a graduate student at the University of Toronto, I was living in a small boys-only dormitory called Massey College on the campus. The master of the college at that time was Robertson Davies. Being a graduate of Balliol College in Oxford himself, he wanted to recreate a sort of British-style college in Canada. So he had a high table night every once in a while and invited some dignitaries as well as some Junior Fellows. I was at a high table one night when Marshall McLuhan (1911–1980) was invited. I was wearing a very flashy shirt with a design of colorful peacocks. Please remember that those were the days of hippies and that I was a student of Indian philosophy.

It happened that McLuhan was just sitting in front of me at the high table. He seemed to be a little astonished by the sight of a young man from the East wearing a very strange-looking shirt under the dark college gown. He asked me where I was from and, having discovered I was from Japan, asked me again: "Do your people wear such a shirt at home?" Half for fun I answered: "Yes, sir; sometimes we do." Then he told me that he was once invited by NHK, Japan's National Broadcasting Company, to come to Japan but he declined to go because he didn't want to appear on TV shows. However, he added, if he had known that Japanese men could dress like that, he might have made it to Japan. I do not know to this date whether I impressed him enough to make him visit my country in the few remaining years of his life.

Whether or not the rapid growth of technologies in media and communications in recent years are transforming us into a sort of

"Children in the Global Village," I do not know. My experience tells me that I should know people personally before I can communicate with them easily through electronic media. For our mutual understanding, I believe, it is important to investigate and to know how people of other cultural traditions feel, think, and reason. I am personally most interested in how people make a point and persuade others. So, this essay concerns how the Indian Buddhists tried to prove something and whether or not their methods are in any way substantially different from what I think the mainstream of thinking and reasoning is in the West.

I. THREE TRADITIONS OF PHILOSOPHIES

Perhaps we can all agree that there are at least three ancient civilizations that have produced at about the same time what we now call by the broad name "philosophy." They are, needless to mention, the Chinese, Indian, and Greek civilizations. One Japanese historian of philosophies, Matao Noda, once distinguished those three traditions of philosophies in the following manner: when it comes down to the issue of how to argue and persuade others, Chinese philosophy may be characterized as "rhetorical," Indian philosophy as "dialectical," and Greek philosophy as "logical." [2]

Apart from very sporadic information about the school of Kung Sun Lung and others, we know very little about the Chinese development of logic or formal methods of persuasion. A typical style of argument among ancient Chinese philosophers may be found in one of the very well-known dialogues between Chuang Tzu and his logician friend, Hui Tzu.[3]

Chuang Tzu and Hui Tzu were taking a leisurely walk along the dam of the Hao River. Chuang Tzu said, "The white fish are swimming at ease. This is the happiness of the fish."

"You are not a fish," said Hui Tzu. "How do you know its happiness?"

"You are not I," said Chuang Tzu. "How do you know that I do not know the happiness of the fish?"

Hui Tzu said, "Of course I do not know, since I am not you. But you are not the fish, and it is perfectly clear that you do not know the happiness of the fish."

"Let us get at the bottom of the matter," said Chuang Tzu. "When you asked how I knew the happiness of the fish, you already knew that I knew the happiness of the fish but asked how I knew it along the river."

I am not sure whether you are easily persuaded by such rhetoric. But that is one of the examples of what Noda called "rhetorical" persuasion/reasoning. I shall discuss the propriety of his characterization of the Indian way of argument as "dialectical" at the conclusion of my talk. However, it is to be noted at the outset that by the words "rhetorical" and "dialectical" Noda is referring to the two methods of argument in Plato's *Protagoras*, namely, the one presented by Protagoras and the other pursued by Socrates.[4]

As all of you know very well, Socrates, being urged by young Hippocrates, comes to visit Protagoras in order to discover what benefit Hippocrates may gain from associating with Protagoras as a teacher. Protagoras's answer suggests a man's excellence (*areté*) in both private life and public affairs. Then Socrates asks him to show clearly that excellence can be taught. Protagoras answers by telling a story. His famous oration begins as follows:

> Once upon a time there were just the gods; mortal being did not yet exist. And when the appointed time came for them to come into being too, the gods molded them within the earth, mixing together earth and fire and their compounds. And when they were about to bring them out into the light of day, they appointed Prometheus and Epimetheus to equip each kind with the powers it required.[5]

From the creation myth, Protagoras moves to the myth of the origins of human society with conscience/sense of shame (*aidos*) and justice (*diké*), and further argues that the very existence of punishment by laws and correction by elders indicates the possibility of excellence being taught. It is such a lengthy speech by Protagoras that is called by Noda a "rhetorical" argument.

Being amazed by Protagoras's skill as a speaker, Socrates suggests that he change the style of argument. Socrates says, "Protagoras can not only give splendid long speeches, as he has shown here, but he can also answer questions briefly, and when he asks one himself he waits and listens to the answer, which is a gift that few possess."[6]

With these words Socrates invites Protagoras into a "dialectical" argument, which begins with the following dialogue. Socrates says:

> ". . . many times in your discourse you spoke of justice and soundness of mind and holiness and all the rest as all summed up as the one thing, excellence. Will you then explain precisely whether excellence is one thing, and justice and soundness of mind and holiness parts of it, or whether all of these that I've just mentioned are different names of one and the same thing? This is what I still want to know."
>
> "That's an easy question to answer, Socrates," [Protagoras] said. "Excellence is a single thing, and the things you ask about are parts of it."
>
> "Do you mean in the way that the parts of a face, mouth, nose, eyes, and ears, are parts of the whole," I asked, "or like parts of gold, none of which differs from any of the others or from the whole, except in size?"
>
> "The former, I take it, Socrates; the way the parts of the face are related to the whole face."
>
> "So do some men possess one of these parts of excellence and some another," I asked, "or if someone has one, must he have them all?"
>
> "Not at all," he said. "There are many courageous men who are unjust, or just men who are not wise."
>
> "So are wisdom and courage parts of excellence as well?" I said.
>
> "Most certainly," he replied. "Wisdom is the most important part."[7]

This is followed by a lengthy yes-and-no type of dialogue, in which the oration of Protagoras is examined and analyzed into simple theses to reveal the true positions of Protagoras. The above dialogue is not precisely what Aristotle might call "dialectic"; yet I believe that Noda is correct in suggesting a leap from Protagoras to Socrates, i.e., from a rhetorical argument to a kind of dialectical argument, here in Plato's *Protagoras*.

By "logical argument" Noda is referring to Aristotle's system of logic, which may be characterized as "axiomatic and deductive logic," the mainstream of the Western logic. The great Polish historian of logic I. M. Bochenski summarizes the logical doctrines of Aristotle as follows:

> 1. Aristotle created formal logic. For the first time in history we find in him: (a) a clear idea of universally valid logic law, . . . (b) the use of variables, (c) sentential forms which besides variables contain only logical constants.

> 2. Aristotle constructed the first system of formal logic that we know. This consists exclusively of logical laws, and was developed axiomatically, even in more than one way.
>
> 3. Aristotle's masterpiece in formal logic is his syllogistic. This is a system of term-logic consisting of laws, not rules. In spite of certain weaknesses it constitutes a faultlessly constructed system.[8]

Bochenski says that Aristotle "exercised a decisive influence on the history of logic for more than two thousand years." I would like to say that his discovery and application of axiomatic thinking determined the main direction of philosophies and sciences in the West and now in the East, too. Well, one of the most beautiful applications of Aristotle's axiomatization is found in Euclid's *Elements*,[9] with its definitions (such as those of "point," "line," and so on), postulates, and common notions (or axioms), from which propositions (or, theorems) like Pythagoras's can be deduced through the laws of inference (or deduction).

By now, I hope, it is clear that what Noda meant by those three adjectives—"rhetorical," "dialectical," and "logical"—is the development of the ways of argument in Greek philosophy itself, namely, from Protagoras to Socrates, and from Socrates and Plato to Aristotle. Whether or not those three phases really correspond to the distinct natures of Chinese, Indian, and Greek philosophies is to be examined by specialists in Chinese and Indian philosophies. I would like to pay my debt to my philosophy teacher Noda by examining the three foremost eminent philosophers of Indian Buddhism, namely, Nāgārjuna (ca. 150 CE), Dignāga (ca. 480–530 CE), and Dharmakīrti (ca. 600–660 CE).

II-1. NĀGĀRJUNA AND ARGUMENT BY *REDUCTIO AD ABSURDUM*

Nāgārjuna appeared in India about five hundred years after the *parinirvāṇa* of the Buddha. Between the time of the *parinirvāṇa* and that of Nāgārjuna about twenty schools of Buddhism appeared in various parts of India and tried to interpret the teachings of the Buddha in a systematic way—the results of their efforts on the whole may be called by the general term "*abhidharma* philosophy." From those early schools there seem to have split various dissenting groups of Buddhists who started to promulgate a vast number of Buddhist scriptures that had been unknown to the Buddhist community, claiming that they were the true teachings of the Buddha. Those minority dissenting groups

later got the grandiose name of Mahayana Buddhism, meaning "Great Vehicle."

Nāgārjuna was perhaps the first to articulate the Mahayana Buddhist movement in philosophical terms. He was very critical of *abhidharma* interpretations of Buddha's teachings, especially the realistic one given by the Sarvāstivādin school. He was also very well aware of the potential danger of the non-Buddhist school of logic called Nyāya and attacked them severely by a method which was not acceptable to contemporary Indian logic. As a result, some of Nāgārjuna's typical arguments against Nyāya were classified under what the Nyāya called "sophistic refutations/futile rejoinders" (*jāti*); furthermore, Nāgārjuna was often called by non-Buddhists "a great master of destructive criticism" (*mahāvitaṇḍāvādin*).

Nāgārjuna's strategy is rather simple. First he enumerates all theoretically as well as logically possible propositions; then he examines them one after another and finds some absurdity or error in every case, so that he can deny all of them; thus, he can conclude that reality is beyond our conceptual construction. In his own words, "Everything is empty," that is, empty of and free from our verbal and conceptual fixations. In short, Nāgārjuna enumerates all the possible propositions exhaustively and denies all of them by means of *reductio ad absurdum* (*prasaṅga*).[10]

Now let us see how Nāgārjuna actually argues. The very first verse of his main work, the *Mūlamadhyamakakārikā*, reads as follows: "There is nothing whatsoever anywhere which has arisen from itself, from others, from both, or from no cause."[11] This can be put into the following four negative propositions:

1. It is not the case that there is something somewhere that has arisen from itself.
2. It is not the case that there is something somewhere that has arisen from others, either.
3. It is not the case that there is something somewhere that has arisen from both itself and others.
4. It is not the case that there is something somewhere that has arisen from no cause, either.

Furthermore, these are the negations of the following four propositions:

5. Something has arisen from itself [but not from others].
6. Something has arisen from others [but not from itself].
7. Something has arisen from both itself and others.
8. Something has arisen from no cause [i.e., neither from itself nor from others].

If we change the subject of the above four propositions from "something" to "everything," proposition (5) corresponds to the Sāṃkhya view of causation that every result inheres in its cause (*satkāryavāda*)—ultimately, everything originates in the primordial material (*pradhāna*); proposition (6) corresponds to the Vaiśeśika view that a completely new result emerges out of its causes (*asatkāryavāda/ārambhavāda*); proposition (7) corresponds to the traditional *abhidharma* view that everything arises out of its cause and conditions (*hetu-pratyaya-sāmagrī*), or it may represent the Syādvāda of the Jainas who claim that a result occurs from itself in one sense and from others in another sense; and proposition (8) refers to the view of those who deny causation altogether, such as that of the Lokāyata, according to whom everything occurs naturally through its own-nature (*svabhāva*) and without any particular cause. Those four positions seem to have been the representative views of causation at the time of Nāgārjuna.

If we symbolize "having arisen from itself" by "A" and "having arisen from others" by "B," the predicates of propositions (5), (6), (7), and (8) will be represented by A&~B, ~A&B, A&B, and ~A&~B, respectively, which together occupy the four compartments of a Venn diagram. Thus, logically speaking, they exhaust all the possible modes of arising; consequently, it is safe to say that Nāgārjuna succeeds in enumerating all possible theories of causation in *Mūlamadhyamakakārikā* I.1.

Such a method of enumeration is called a "tetralemma" (*catuśkoṭi*), which Nāgārjuna inherited from the Buddhist *abhidharma* tradition. When the concept of ~A&~B has no referent, the tetralemma will be reduced to a trilemma, and when the concepts A and B are complementary to each other, the tetralemma will be reduced to a dilemma by abandoning both the third and fourth lemmas.

In the following portion of *Mūlamadhyamakakārikā*, chapter I, Nāgārjuna does not give the *reductio ad absurdum* type of argument against the above four positions as he usually does in other chapters. So let us reconstruct the probable *reductio ad absurdum* with the help of commentators.

9. If something were to arise from itself, it would follow that there was no merit in arising. It is in fact incorrect that what has already arisen arises again.[12]
10. If something were to arise from others, it would follow that anything would arise from anything else as darkness from a lamp, which is absurd.[13]
11. If something were to arise from both itself and others, it would follow that there resulted both defects mentioned with reference to the above two propositions.[14]
12. If something were to arise from no cause, it would follow that everything would arise from everything all the time, which is impossible.[15]

In this way Nāgārjuna and his followers demonstrate that nothing is predicated by any possible mode of arising. Thus, they conclude that there is no arising[16] or that nothing arises in the ultimate sense (*paramārthata*).

Proof by *reductio ad absurdum*, though despised or disregarded by most of the Indian logicians, continued to be utilized by both Buddhist and non-Buddhist philosophers in their actual doctrinal debates as the most effective means of refuting opponents. Nāgārjuna was at heart against the logical system of his time in India, but, I believe, he himself contributed significantly to the development of logic in India by succeeding in formulating the formal proof of *reductio ad absurdum* (*prasaṅga*) probably for the first time in India.

II-2. DIGNĀGA AND REASONING FROM *ANVAYA* AND *VYATIREKA* (INDUCTIVE REASONING)

About three hundred years after the time of Nāgārjuna, there appeared a Buddhist logician called Dignāga who is regarded as the founder of the "new system of logic" in India. By the time of Dignāga it had become customary among Indian philosophers of any school to argue against each other and to present their doctrines and theories on the basis of logic. Despite the warning of Nāgārjuna against logic, Buddhists, too, adopted the logical methodology, and they were very successful in that. As a matter of fact, the basic system of Buddhist logic together with several innovative theories were established by the

great Buddhist philosopher Vasubandhu (ca. 400–480) even before the time of Dignāga.

The reason why Dignāga is called the founder of a "new logic" is that he was the first Indian logician to combine and systematize the two different traditions of logic in India, namely, the tradition of debate (*vāda*) through the five-membered proof (*pañcāvayava*) and that of epistemology, which was focused upon the valid means/sources of knowledge (*pramāṇa*). Unlike his successor Dharmakīrti, Dignāga does not seem to have been much interested in doctrinal debates. Rather, he appears to have tried to establish a new system of logic that can be utilized by philosophers of any school and with any doctrinal belief or metaphysical conviction, whether they are Buddhists or non-Buddhists.

Dignāga's most important contribution to the development of Indian logic consists of two new theories, namely, the theory of "pervasion" (*vyāpti*) of *probans* (that which is to be proven) by *probandum* (that which proves), which guarantees the successful proof or inference, and the semantic theory of "exclusion" (*apoha*), according to which a word expresses its referent indirectly by excluding the complementary set of the referent. I haven't the space here to explain those theories in detail. Instead, I would like to introduce a set of proof formulae that Dignāga considers to be valid.

13. Thesis: Sound is impermanent.
    Reason: Because it is produced.
    Example: Whatever is produced is seen to be impermanent like a pot, and whatever is permanent is seen to be not produced like ether.

Those formulae clearly show the reminiscence of a possible debate procedure in India. First, a proponent presents a thesis that he or she wants to prove, then he or she gives a reason as well as an example to support his or her argument, further he or she applies his or her reason to the topic of his or her thesis and repeats the original thesis as a conclusion. The same procedure will be taken by the opponent as well. We should not take Indian proof formulae to be a kind of syllogism, as a great Russian scholar of Buddhist logic, Stcherbatsky, and others have misunderstood. Of course, we can write a syllogism that resembles the above proof (13) in the following way:

14. Major premise: Whatever is produced is impermanent. Minor premise: Sound is produced. Conclusion: Therefore, sound is impermanent.

Syllogism (14) represents a typical case of deductive reasoning, which I regard as the mainstream of Western logic begun by Aristotle. I would like to suggest that the proof formulae (13) are fundamentally the results of an inductive reasoning, which I consider to be the essential nature of not only Buddhist logic but also Indian logic in general.

The presence of the formula called "example" in (13) is the most characteristic feature of the Indian proof. At first glance the example formula may resemble the major premise of (14). However, the fact that it contains an expression 'is seen to be' suggests that it is a statement of a general rule derived from observation/experience of particular examples, both positive as well as negative.

Following the lead of Richard Hayes, let us call the world of our experience the "inductive domain." The inductive domain may be divided into two complementary sets, such as the set of impermanent objects and that of permanent objects. We observe that among impermanent objects there are produced items, such as a pot. We also observe that among permanent objects there is an unproduced item, such as ether/space. If we symbolize the property of "being impermanent" by P and that of "being produced" by Q, then we may be able to put the matter in a simpler manner. For example,

15. Where there is P, there is Q, and
16. Where there is ~P, there is ~Q.

Those two formulae are respectively called *anvaya* and *vyatireka* in India, which are variously translated into modern languages as "positive concomitance" and "negative concomitance," and "continued presence" and "continued absence." George Cardona once called those formulae the Indian principle of inductive reasoning and understood them as the means to discover a certain relationship between two items.

> Indian thinkers have used a mode of reasoning that involves the related presence (*anvaya*, "continued presence") and absence (*vyatireka*) of entities as follows:
>
> (1) a. When X occurs, Y occurs.
> b. When X is absent, Y is absent.

(2) a. When X occurs, Y is absent.
b. When X is absent, Y occurs.

If (1 a, b) hold in all instances for X and Y, so that these are shown consistently to occur together, one is entitled to say that a particular relation obtains between the two. Either (1a) or (1b) alone will not justify this, and a claim made on the basis of either can be falsified by showing that (2a) or (2b) holds. One relation that can be established by (1) is that X is a cause of Y.

A special instance of the cause-effect relation involves the use of given speech units and the understanding by a hearer of given meanings. If (1 a, b) hold, the speech unit in question is considered the cause of one's comprehending a meaning, which is attributed to that speech element. [17]

Let us take an example from our linguistic experience. When we learn a foreign language, we may be able to find the meaning of a particular expression by inductive reasoning. For example, here are four strings of utterance in Japanese:

17. "*otoko no ko*,"
18. "*onna no ko*,"
19. "*otoko no hito*," and
20. "*onna no hito*."

They may be taught to correspond to the following four phrases in English, respectively:

17.' "a male child,"
18.' "a female child,"
19.' "a male adult,"
20.' "a female adult."

We can observe that the Japanese expression *otoko* is present in both (17) and (19), while absent from (18) and (20), and that the English phrase "male" is present in both (17') and (19'), while absent from (18') and (20'). In short, when the Japanese word *otoko* is uttered, we understand its referent to be a male, and when it is not uttered, we do not understand so. Therefore, we can conclude by reasoning from *anvaya* and *vyatireka* that the Japanese expression *otoko* corresponds to "male" in English.

A similar procedure will reveal that *onna* corresponds to "female," that *ko* corresponds to "child," and that *hito* corresponds to "adult." One remaining problem might be whether or not the Japanese expression *no* corresponds to the indefinite article "a" in English. Both appear in all the cases. The answer is, No, it does not. Japanese *no* is not an article of any sort but a postposition with the function of putting the two phrases in apposition. Thus it is impossible to match the word and its correspondence on the basis of the positive concomitance only. We need the negative concomitance, too, in order to establish the one-to-one relationship between a word and its correspondence.

We can apply the reasoning from *anvaya* and *vyatireka* to other cases. As mentioned by Cardona, we can discover the causal relation between two items. For example, when there is a fire, there is smoke, and when there is no fire, there is no smoke. Thus there are both positive and negative concomitances between a fire and smoke. Therefore, we can conclude that a fire is a cause of smoke. In this connection, K. N. Jayatilleke[18] and others are right in pointing out a certain similarity between the reasoning from *anvaya* and *vyatireka* and J. S. Mill's methods of agreement and difference. Mill says:

> The simplest and most obvious modes of singling out from among the circumstances which precede or follow a phenomenon, those with which it is really connected by an invariable law, are two in number. One is, by comparing together different instances in which the phenomenon occurs.
>
> The other is by comparing instances in which the phenomenon does occur, with instances in other respects similar in which it does not. These two methods may be respectively denominated, the Method of Agreement, and the Method of Difference.[19]

Logicians in India, even before Dignāga's time and as early as in the fourth century CE, started to apply inductive reasoning in order to discover the proper relationship between *probans* and *probandum* or between reason and what is to be proven by the reason. Let us symbolize two properties by H and S. If the following two conditions, namely,

15. Where there is S, there is H, and
16. Where there is ~S, there is ~H

hold between S and H, then H is regarded as the proper *probans*/reason that can prove the *probandum* S.

Dignāga modifies the above two formulae by adding the restrictive particle *eva*, meaning "only," in the following manner:

21. Only where there is S, there is H, and
22. Where there is ~S, there is ~H only.

Statement (21) indicates that the domain of H is restricted to and included in the domain of S; in other words, the domain of H is completely pervaded by the domain of S. Dignāga calls such a relation between H and S "pervasion" (*vyāpti*), that is, the pervasion of H by S, and he regards it as the most essential prerequisite for a valid proof or inference. This is the gist of Dignāga's theory of "pervasion."

Statement (22) indicates that the domain of ~S is restricted to and included in the domain of ~H. Since the pervasion of ~S by ~H is logically equivalent to the pervasion of H by S, both statements (21) and (22) are also logically equivalent. The two statements can be rephrased into the following universal propositions:

23. Whatever is H is S, and
24. Whatever is ~S is ~H.

In this way reasoning by *anvaya* and *vyatireka* or inductive reasoning leads to the statement of a general law that can be applied to a particular case under dispute.

If we go back to Dignāga's proof formulae (13) again, we can reconstruct the following process of reasoning: First, we look around and find some produced objects among impermanent objects but no produced objects whatsoever among permanent objects; from such an experience, we reach a general law that whatever is produced is impermanent within our inductive domain. Then we apply that law to a particular object "sound" with regard to which a dispute whether or not it is permanent is undertaken. Considering the fact that sound is produced, we conclude that sound is impermanent. That is the essence of reasoning or proof adopted by Indian Buddhist as well as non-Buddhist logicians and philosophers.

Now, I would like to remind you of the so-called "problem of induction," that is, the question whether inductive reasoning can be justified, and if justified, under what conditions. Let me quote from one of the most severe modern critics of inductive methods, Karl Popper. In

one of the appendices of *The Logic of Scientific Discovery*, he points out the problem, by referring to Hume's criticism of induction:

> Hume argues, "even after the observation of the frequent constant conjunction of objects, we have no reason to draw any inference concerning any object beyond those of which we have had experience." If anybody should suggest that our experience entitles us to draw inferences from observed to unobserved objects, then, Hume says, "I would renew my question, why from this experience we form any conclusion beyond those past instances, of which we have had experience." In other words, Hume points out that we get involved in an infinite regress if we appeal to experience in order to justify any conclusion concerning unobserved instances. [20]

Was Dignāga aware of the problem of induction? When he discusses how a word expresses its meaning, he acknowledges the positive and negative concomitances between them. Namely, where there is a quadruped animal with two horns, dewlap, and so on, a word "cow" is used, and where there is no such animal, the word "cow" is not used. In this connection, he recognizes that it is impossible to enumerate all the positive instances of application of a certain word, for they can be infinite in number; however, as long as that word is not observed in negative/dissimilar instances (*adarśanamātreṇa*), he thinks, it is perfectly justified to apply it in a conventional way.[21] In short, a certain linguistic expression can be applied to a group of similar objects, as long as it is not observed to apply to dissimilar groups. A mere non-observation of violation of a linguistic convention seems to be considered by Dignāga to justify the latter. The word "cow" continues to be applied to cows as long as it is not applied to something else.

Since Dignāga regards the process of linguistic communication as a kind of inference, the above argument may also apply to his theory of inference and proof in general. If that is the case, we may be able to characterize general statements in Dignāga's proof formulae, such as "Whatever is produced is impermanent," as hypothetical propositions derived from our past observations of the inductive domain. The proposition is true as long as we do not encounter an object which is produced but permanent. But one single observation of a counter-example or an exceptional case will falsify the proposition. If our interpretation is right, we can further characterize Dignāga's logic as hypothetical reasoning based on induction.

II-3. DHARMAKĪRTI AND REASONING BY ANALOGY

Dignāga's impact upon Indian logic was so great that his system of logic became a kind of model for succeeding logicians and philosophers in India. The theory of pervasion as the foundation of inference and proof was adopted by almost all Indian logicians and became the central doctrine of Indian logic. Nonetheless, Dignāga's overwhelming influence upon Indian logicians did not last for long due to the appearance of another great Buddhist logician called Dharmakīrti.

Although Dharmakīrti was the true successor of the Dignāgian tradition of Buddhist logic, his approach towards logic was quite different from Dignāga's. As I mentioned earlier, Dignāga seems to have tried to establish a kind of logic open to any philosophical belief, whether Buddhist or non-Buddhist. Therefore, we have no record of his debates with non-Buddhist philosophers. Dharmakīrti, on the other hand, seems to have been eager to defend Buddhist doctrines of momentariness, mind-only, omniscience of the Buddha, existence of other world, and so on. In order to do so, he had to modify the logical system of Dignāga.

Although Dignāga advocated the theory of pervasion, he never really discussed on any metaphysical ground how to justify the relation of pervasion between two items within his inductive domain. He seems to have assumed that the inductive domain consists of a kind of hierarchy or a tree of universals/concepts which was more or less commonly accepted by Indian philosophers of his time. The highest universal is "being" or "existence" (*sattā*), which is followed by the three categories of "substance" (*dravya*), "quality" (*guṇa*), and "action" (*karman*); "substance" is further subdivided into those that are made of the earth elements, the water elements, the fire elements, and the wind elements, and so on and so forth. It resembles the system of categories held by the Vaiśeśika school and the hierarchy of terms assumed by the Indian grammarians, such as Bhartṛhari. Perhaps Dignāga's final resort in determining the relation of pervasion is the way people use a language, in other words, the verbal convention among people. We say, "Whatever is produced is impermanent," because people call produced things "impermanent."

As I discussed above, Dignāga's logic may be characterized as hypothetical reasoning based upon induction—his reasoning is valid as long as there is no counter-example observed. Now, Dharmakīrti was not

very happy with Dignāga's hypothetical argument and criticized the latter tacitly but precisely on the point that mere non-observation of a counterexample could justify the reasoning. Dharmakīrti newly introduced the concept of "essential connection" (*svabhāvapratibandha*) between two items in order to guarantee the relation of pervasion between them. Thus without resorting to commonsense philosophy or people's usage of a language, Dharmakīrti relies upon what he calls an "essential connection," which consists of "causality" and "identity." According to him two items are essentially connected if one is a result of another, or if one is a subset of another. In this way Dharmakīrti sought to remove the hypothetical characteristic of Dignāga's reasoning. As long as either causality or identity is established between two items, we are guaranteed to make a correct inference from one to another, which will not be falsified by our future experience.

Unlike Dignāga, Dharmakīrti was a strong defender of Buddhist doctrines. Doctrinal debates between different schools of philosophy are usually not concerned with our daily experience but with some doctrinal entity, such as the primordial matter of the Sāṃkhya school, which is beyond our experience. Thus, Dharmakīrti recognizes two kinds of inference, namely, inference derived from reality (*vastubalapravṛttānumāna*) and inference based upon scripture (*āgamāśritānumāna*). He often takes recourse to the latter when he is engaged in doctrinal debate. When he tries to prove the existence of something beyond our ordinary experience, he uses what we may call an argument from analogy. For example, he tries to prove the existence of another world, which, for him, is nothing but the continuation of a stream of consciousness after one's death, by arguing that there must be another life after death just as there is consciousness after consciousness every moment during this life time.

Let us look at another argument from analogy in Dharmakīrti. In one of his small treatises called *Establishment of Other Streams of Consciousness* (*Santānāntarasiddhi*), Dharmakīrti tries to defend the existence of other minds even in the idealistic philosophy of the Yogācāra school. There he first presents an argument from the point of view of the realistic school of the Sautrāntikas in the following manner: "Having observed that one's physical or verbal activity is preceded within one's own stream of consciousness by the awareness or intention to move or to speak, one will know the awareness in others because one sees a similar activity of moving or speaking in the others." [22] As you

can easily see, this is a typical case of argument from analogy, and in the rest of the treatise Dharmakīrti demonstrates that the same argument can safely be adopted by the idealistic school too, without abandoning their doctrine of mind-only. He refers to one interesting case: Suppose I am pushing from behind a boy on a swing; my intention of giving him a push will result in a certain movement of his body on the swing. Similarly, suppose I am sitting on a swing; my body may move/swing without my intention of moving/swinging it; consequently, we can conclude that not my own but someone else's awareness or intention has resulted in the movement of my body on a swing.

Perhaps it may be interesting to quote in passing again from J. S. Mill a rather lengthy passage which Norman Malcolm once referred to as still the typical argument of knowing other minds from analogy.

> By what evidence do I know, or by what considerations am I led to believe, that there exist other sentient creatures; that the walking and speaking figures which I see and hear have sensations and thoughts, or in other words, possess Minds? . . . I conclude that other human beings have feelings like me, because, first, they have bodies like me, which I know, in my own case, to be the antecedent condition of feelings; and because, secondly, they exhibit the acts, and other outward signs, which in my own case I know by experience to be caused by feelings. I am conscious in myself of a series of facts connected by a uniform sequence, of which the beginning is modifications of my body, the middle is feelings, the end is outward demeanour. In the case of other human beings I have the evidence of my senses for the first and last links of the series, but not for the intermediate link. I find, however, that the sequence between the first and last is as regular and constant in those other cases as it is in mine. In my own case I know that the first link produces the last through the intermediate link, and could not produce it without. Experience, therefore, obliges me to conclude that there must be an intermediate link; which must either be the same in others as in myself, or a different one: I must either believe them to be alive, or to be automatons: and by believing them to be alive, that is, by supposing the link to be of the same nature as in the case of which I have experience, and which is in all other respects similar, I bring other human beings, as phenomena, under the same generalizations which I know by experience to be the true theory of my own experience.[23]

I find it very interesting to see the parallelism between the nineteenth-century British scholar J. S. Mill (1806–1873), and Indian Buddhist logicians, such as Dignāga and Dharmakīrti, here with reference to the

proof of existence of other minds by means of argument from analogy and above with reference to the methods of inductive reasoning.

I do not have enough time to elaborate on the rather complicated system of logic proposed by Dharmakīrti. I just want to add one final remark on his method of argument. Perhaps the most famous proof given by Dharmakīrti is his proof of momentariness (*kśaṇabhaṅgasiddhi*)—the defense of one of the fundamental doctrines of Buddhism, namely, that everything is impermanent. He seemed to be much concerned with the proof of that thesis, and went back to the problem again and again, finally developing the four sets of proof formulae in order to prove momentariness. His first proof reads as follows:

25. Whatever is existent is momentary just as a pot and others;
Sound is existent;
[Therefore, sound is momentary].

Here the first statement, being a universal proposition, does not necessarily sound true at first. It needs to be demonstrated by further proofs. Well, a universal proposition like the above cannot be proven directly because it is by no means possible for a single individual or even for a group of individuals to experience all existent things in the world. Therefore, inductive reasoning cannot help us to establish the first statement above. It can be proven only indirectly. In this connection, Dharmakīrti introduced the good old method of *reductio ad absurdum* (*prasaṅga*), which, as we have seen, was initiated by Nāgārjuna, and which was rejected or disregarded by most Indian logicians, including Dignāga. Thus, with respect to how to treat *reductio ad absurdum* type of argument, the two great masters of Buddhist logic take different paths again.

III. CONCLUSION: WHO STARTED INDUCTIVE REASONING IN INDIA?

So far I have tried to show you how the Indian Buddhists argued and proved something, by taking examples from the three eminent Buddhist philosophers: Nāgārjuna (second century CE), Dignāga (fifth to sixth century CE), and Dharmakīrti (seventh century CE). Nāgārjuna's argument is characterized by his frequent use of *reductio ad absurdum*. Dignāga tried to establish a system of logic that could be accepted by logicians and philosophers of any school. His method of argument

and that of Indian logic in general is essentially a form of inductive reasoning comparable to, for example, J. S. Mill's system of induction. Dharmakīrti succeeds Dignāga's logic but with some essential modifications. When Dharmakīrti argues for the defense of Buddhist doctrines, he often resorts to argument from analogy, which is again comparable to the usage of J. S. Mill. Dharmakīrti further re-introduces the argument by *reductio ad absurdum* in order to defend the Buddhist doctrine of impermanence.

In short, I would like to characterize Buddhist logic as well as Indian logic in general as inductive reasoning, and to conclude that the most fundamental difference between Indian and Western logic lies in the fact that the former is inductive while the latter is deductive in nature. So, this is my answer to my former philosophy teacher, Noda-sensei, who suggested that Indian logic may be characterized as "dialectic." He was absolutely right to point out that Indian logicians had not developed deductive logic as established by Aristotle, but he did not seem to be aware of the fact that Indian logic was essentially inductive and that it was developed in the seventh century CE to a point comparable to that of a nineteenth-century British scholar.

Now, the last question may be: who was the one who first developed inductive reasoning in India? My quick answer will be: it was either a group of medical doctors who, instead of the magico-ritualistic treatment, started a kind of scientific treatment of patients around the time of the Buddha, or perhaps the Buddha himself. The possible close connection between the rise of a scientific, I mean Ayurvedic, medicine in India and the early Buddhist community has been recently demonstrated by Kenneth Zysk with abundant pieces of evidence.[24]

Let me finish by quoting one passage from the *Book of the Kindred Sayings* (*Saṃyutta-nikāya*) of the Buddha, which clearly shows reasoning from *anvaya* and *vyatireka* in the context of the well-known doctrine of the twelve chains of dependent origination.[25]

> At Sāvatthī the Exalted One addressed the brethren, and said: "The well taught Ariyan disciple, brethren, does not [wonder]: How now? What being, what comes to be? From the arising of what, what arises? There being what, does name-and-shape come to be? There being what, does sense come to be? There being what, does contact come to be? . . . or feeling? or craving? or grasping? or becoming? or birth? or decay-and-death?
>
> "Nay, brethren, the well taught Ariyan disciple has come to know, without depending upon another, that here: this being, that comes to

be; from the arising of this, that arises. There being consciousness, name-and-shape comes to be. There being name-and-shape, sense comes to be. There being sense, contact comes to be. Thus too comes feeling to be, and craving, grasping, becoming, birth, decay-and-death. Thus it is he knows that of such is the arising of the world.

"Nor does the Ariyan disciple, brethren, [wonder]: How now? There not being what, what does not come to be? From the ceasing of what does what cease? There not being what, does name-and-shape not come to be? There not being what, does sense not come to be? There not being what, does contact not come to be? . . . or feeling? or craving? or grasping? or becoming? or birth? or decay-and-death? Nay, brethren, the well taught Ariyan disciple has come to know, without depending upon another, that here: this not being, that does not come to be. From the ceasing of this, that ceases. That there not being consciousness, name-and-shape does not come to be. That there not being name-and-shape, sense does not come to be. That there not being sense, contact does not come to be. That thus too feeling does not come to be, nor craving, nor grasping, nor becoming, nor birth, nor decay-and-death. Thus it is he knows that thus this world ceases.

"When, brethren, the Ariyan disciple thus knows as it really is the coming to pass and the passing away of the world, he is what we call Ariyan disciple who has won the view, won vision, has arrived at this Norm, sees this Norm, his is the knowledge of the trained man, the lore of the trained man, has won to the stream of the Doctrine; he is Ariyan with insight of revulsion, he stands knocking at the door of the Deathless."[26]

NOTES

1. I would like to thank Profs. Jonathan Silk, Richard Hayes, and Tom Tillemans for checking my English as well as giving many invaluable suggestions. I shall discuss in a future paper the nature of Indian logic, following their suggestion to compare it with Toulmin's ideas in *The Uses of Argument* (Cambridge University Press, 1958).

2. M. Noda, "The Three Traditions of Philosophers" (in Japanese), *Tetsugaku no Mittsuno Dento* (Tokyo: Chikuma Shobo, 1974), 56–73.

3. Wing-Tsit Chan, trans. and ed., *A Source Book in Chinese Philosophy*, 4th printing (Princeton, NJ: Princeton University Press, 1973), 209–210.

4. C. C. W. Taylor, trans., *Plato Protagoras* (Oxford: Clarendon Plato Series, 1976); B. A. F. Hubbard and E. S. Karnofsky, *Plato's Protagoras, A Socratic Commentary* (London: Duckworth, 1982).

5. Taylor, *Plato Protagoras,* 13.

6. Ibid., 21.

7. Ibid.

8. Ivo Thomas, trans. and ed., *A History of Formal Logic* (Notre Dame, IN: University of Notre Dame Press, 1961), 98.

9. Sir Thomas L. Heath, trans., *The Thirteen Books of Euclid's Elements* (New York: Dover Publications, 1956).

10. A similar method of argument was utilized by non-Buddhist schools of Indian philosophy. They called it "method of elimination" (*pariśeṣa*).

11. *na svato nāpi parato na dvābhyāḥ nāpy ahetuta. | utpannā jātu vidyante bhāvā. kva cana ke cana ||*

12. *Prasannapadā*, 13.7–8. L. de la Vallée Poussin, ed., *Mūlamadhyamakakārikās de Nāgārjuna avec la Prasannapadā Commentaire de Candrakīrti*, Bibliotheca Buddhica IV (Osanabrück: Biblio Verlag, 1970).

13. Ibid., 36.6ff.

14. Ibid., 38.1.

15. Ibid., 38.10–11.

16. Ibid., 39.6: *nāsty utpāda.*

17. George Cardona, "On Reasoning from Anvaya and Vyatireka in Early Advaita," in *Studies in Indian Philosophy, A Memorial Volume in Honour of Pundit Sukhalji Sanghvi*, eds. D, Malvania and N. J. Shah (Ahmedabad: Navajivan, 1980), 79.

18. K. N. Jayatilleke, *Early Buddhist Theory of Knowledge* (London: George Allen & Unwin, 1963), 146–147.

19. John Stuart Mill, *A System of Logic, Ratiocinative and Inductive: Being a Connected View of the Principles of Evidence and the Methods of Scientific Investigation*, 2 vols. (London: John W. Parker, West Strand, 1843), 1:450.

20. Karl Popper, *The Logic of Scientific Discovery* (London: Hutchinson & Co. Ltd., 1959), 369. Cf. David Hume, *Treatise of Human Nature* (Oxford: Clarendon Press, 1960), 91, 139.

21. Richard Hayes, *Dignāga on the Interpretation of Signs*, Studies of Classical India 9 (Dordrecht, Boston, and London: Kluwer Academic Publishers, 1987), 297–298:

> Association (*anvaya*) and dissociation (*vyatireka*) are the two ways that a verbal symbol expresses its object. They consist respectively in applying to what is similar and in not applying to what is dissimilar.
>
> It is not necessary to say that a verbal symbol applies to every instance of what is similar, because in some cases it is not possible to express an extension that is unlimited. But it is possible to say that it does not occur in the dissimilar—although it too is unlimited—simply on the basis of its not being observed to apply to any dissimilar instance. For this reason, because a term is not observed to apply to anything other than that to which it is related, its expression of its own object is said to be a negative inference. . . .

22. See Hidenori Kitagawa, "A Refutation of Solipsism (Annotated Translation of the *Santānāntarasiddhi*)," in *Indo Koten Ronrigaku no Kenkyu – Jinna no Taikei* – (A Study of Classical Indian Logic—A System of Dignāga) (Tokyo: Suzuki Gakujutsu Zaidan, 1965), 405–579.

23. Norman Malcolm, "Knowledge of Other Minds," *The Journal of Philosophy* 55, no. 23 (1958): 969; J. S. Mill, *An Examination of Sir William Hamilton's Philosophy and of the Principal Philosophical Questions Discussed in His Writings*, 3rd ed. (London: Longmans, Green, Reader, and Dyer, 1867), 237–238.

24. Kenneth Zysk, *Asceticism and Healing in Ancient India, Medicine in the Buddhist Monastery* (Oxford and New York: Oxford University Press, 1991).

25. C. A. F. Rhys Davids, trans., *The Nidāna Book*, vol. 2 (London: Pali Text Society, 1952), 54–55.

26. C. A. F. Rhys Davids, trans., *The Book of the Kindred Sayings (Saṃyutta Nikāya) or Grouped Suttas*, vol. 2 (London: Pali Text Society, 1922), 54–55.