



Relativity in Mādhyamika Buddhism and Modern Physics

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Victor Mansfield Relativity in Mādhyamika Buddhism and modern physics

I praise the perfect Buddha,
The Supreme Philosopher,
Who taught us relativity;

.....

I bow down to him whose insight and speech
Make him unexcelled as Sage and Teacher;
The Victor, who realized (ultimate truth),
Then taught us it as relativity!

Tsong Khapa¹

I. INTRODUCTION

Pioneer scholars and translators of Mādhyamika Buddhism, such as Stcherbatsky² and Murti³ along with modern writers such as Thurman,⁴ translate *pratītyasamutpāda* as relativity. The Mādhyamikas equate *pratītyasamutpāda* with their Ultimate Truth, *Śūnyatā* or emptiness, which is the pivot of both theory and practice; thus, this term is of utmost importance. Inada⁵ notes, “. . . the term [*pratītyasamutpāda*] translated as the principle of relativity with all the overtones of modern science has become very popular and acceptable even by scholars.”

Unfortunately the conceptual import of scientific relativity is often poorly understood; thus, translating this pivotal Buddhist term as relativity almost guarantees incorrect scientific associations. Inada does not favor making associations of scientific relativity with *pratītyasamutpāda*. He says in the sentence following the one just quoted: “This technical term undoubtedly does have ‘strains’ of the relativistic notion but not in the normal nor in the scientific sense.” I claim the problem lies in differences between the meaning of relativity in modern physics and in normal philosophic use. In the Mādhyamika translations and commentaries the fundamental philosophic use of relativity is dependency, interconnectedness, and relation to a knower. However, in modern physics, this is only the smaller part of its meaning. The physical principle of relativity more fundamentally embodies the independence of a particular observer, universality, and a degree of absoluteness—completely antithetical to the use of relativity in Mādhyamika. Conflating these divergent

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meanings of the term relativity can lead to confusion and a misunderstanding of the doctrine of emptiness. The following sections expand and clarify these issues and show the dangers of translating the pivotal term *pratītyasamutpāda* as relativity.

Section II contains a discussion of emptiness and dependent arising in Mādhyamika Buddhism, in particular from the Prāsaṅgika Mādhyamika point of view, which heavily relies on the writings of Tsong Khapa. Section III is a self-contained, nontechnical discussion of special relativity in modern physics. I limit the discussion to special relativity and omit general relativity because of the former's comparative simplicity and because it contains all the ideas necessary for the present discussion. Everything said here about physical relativity holds for both special and general relativity. For clarity I will use dependent arising rather than relativity as the translation of *pratītyasamutpāda*. Section IV discusses parallels and differences between Mādhyamika dependent arising and physical relativity. Section V is a summary and conclusion.

II. EMPTINESS/DEPENDENT ARISING IN PRĀSAṅGIKA MĀDHYAMIKA

The Prāsaṅgika Mādhyamika claims that all suffering and limitation follow on the heels of our inborn belief in the inherent or intrinsic existence of phenomena. They contend that we innately or instinctively believe that objects and subjects exist inherently, intrinsically, independently of conception or designation, from their own side, as they appear, or as inherently findable upon analysis—terms they use interchangeably to describe the principle of concrete, independent reality that we believe pervades our lives.⁶ They assert that this belief in independent or self-standing existence is precisely what chains us to *samsāra*, the beginningless round of birth, aging, sickness, and death; yet for all but the most advanced practitioners, inherently existent objects seem the very touchstone of reality.

Ultimate Truth, *Śūnyatā* or emptiness, is the lack of inherent existence in all phenomena. Showing that phenomena are dependently originated, interdependent upon causes and conditions—that is, void of inherent existence (or, as some would say, relative)—establishes emptiness. In this way Ultimate Truth, emptiness, equals dependent arising in Mādhyamika. Through emptiness the Mādhyamikas avoid the extremes of eternalism and nihilism. “Eternalism” or reification is avoided since all phenomena lack inherent existence or are empty; “nihilism” or deprecation is avoided because all phenomena have a conventional or nominal existence through dependent arising.

At least for the purposes of comparison, let me grant the Prāsaṅgikas their premises. Then, to make the analysis more lively, consider a simple example and apply the Mādhyamika critique to it. Take a thirty-foot aluminum flagpole standing directly before me. It is a paragon of self-standing, concrete, independent reality. What is more obviously existent from its own side or

intrinsically existent—glinting in the sun and sounding musical notes as its rope flaps against it in the breeze?

Although there are a variety of arguments used by the Mādhyamikas to establish that phenomena lack intrinsic existence, the arguments can be conveniently grouped into three primary forms: the dependency of phenomena upon causes and conditions, the relation of parts to wholes, and the dependency of phenomena upon mental designation or naming.⁷ The following argument is not one of these classical arguments, but it is in harmony with them. Like the classical arguments, it assumes a “commonsense” view of objects which, according to Mādhyamika, always captures our deepest pragmatic and emotional responses—despite any conflicting philosophical views we might claim to hold.

The flagpole must have light upon it and be a moderate distance away for me to view it. The pole did not always exist—its prior causes are its extrusion at the foundry, its being put in place by the owner, and so on. But this level of “causes and conditions” for the pole’s appearance does not generate the slightest doubt about its concrete, inherent existence as it stands stolidly before me at this moment.

Galileo, Locke, and others claim that the human perceiver’s interaction with the object provides the secondary qualities of the pole—its peculiar shine of polished aluminum, color, musical sounds, cool hardness to touch, and so on. (My dog hears higher frequencies than I do; bees see ultraviolet missing from my view, but they do not see red; and so on.) The basis for the secondary qualities are the primary qualities studied in the physical sciences: physics, chemistry, and so on. The pole believed to exist inherently is usually considered the bearer of primary qualities such as space and time location, mass, length, diameter, and so on.

Admitting all the subjective contributions provided by sense functioning, most persons still have no doubt that a “real” pole exists, localized in space and time, causing these secondary qualities, and providing for the common base of shared experience. The attribute which seems most essentially to account for the phenomenon’s reality is its independence—independence of other phenomena, observation, or conceptualization. In other words, we normally believe that inherent existence is the wellspring of reality. Clearly identifying the nature of inherent existence, the object of negation, is always the first step of the Mādhyamika analysis.⁸ Now let us examine this nature more closely.

For an object inherently to exist during a given period of times, it must equally have been inherently existent in any portion of that period. Indifference to the lapse of time means the object is fully itself in any subinterval, no matter how short. In accord with the Buddhist view, instants or moments of time are considered atomic, without internal transitions or movement. Temporal transition or the flow of time is the succession of instants.

Inherent existence is an essential property and must always pertain to the entire object without qualifications.⁹ Since the object is fully contained and self-sufficient in any one moment, the object at one instant has, by definition, no intrinsic or essential reference to any other objects at any other time. Because the intrinsically existent object has no essential references to other times and yet endures for more than one instant, it must be intrinsically changeless, unable to produce or be acted upon. It is impervious and impotent, locked in its immutable self-nature.¹⁰ An inherently existent flagpole must be frozen in eternity—a contradictory conclusion even the most ardent patriot cannot accept.

An analogous argument can be made using the object's localization in space. Inherently existent objects must exist complete and self-contained in a limited region of space, independent of interaction with other regions. Just as in the argument based on time, this inevitably leads to unacceptable isolation and immutability. Considering inherent existence as the reality principle leads inevitably to isolated and inert objects.

The critical point is the total independence of inherent existence. As Hopkins puts it, "The pivot of the practice of emptiness and of the generation of the wisdom that realizes emptiness is the identification that objects appear as if they exist in and of themselves."¹¹ Or later he says, "The Prāsaṅgikas, however, answer that the very words, 'inherent existence' or 'own mode of being,' imply independence."¹² This independence which seems to make objects so substantial and real is just what makes inherent existence contradictory and self-condemned. Since phenomena lack independence they must be dependent. What do they depend upon?

Phenomena are defined by and depend upon their interconnections. We normally believe that relatedness is an accidental or nonessential property which occurs between inherently existent phenomena. In fact, the Mādhyamikas claim that the essence of phenomena, their most profound nature, is their relatedness and dependency (*pratītyasamutpāda* is dependent arising) and lack of isolated identity (emptiness is voidness of independent existence). (The next section gives a dramatic illustration of this point within special relativity.) We usually assume inherent existence is essential for appearance, but according to Mādhyamika an object's lack of inherent existence, its emptiness, its dependency, is what makes phenomena both possible and functional.

It is not too difficult to accept that secondary qualities, the subjective contributions due to sense functioning, are a combination of the perceiver's interaction with the object and conceptual designations or imputations, as the Prāsaṅgika Mādhyamika stresses. More difficult and more important is the principle that the very notion of independently existent objects is an imputation. In other words, inherent existence is merely a conceptual designation or imputation—it never has and never will exist. Not only is there no access to a

mind-independent world; such a world does not exist. Prāsaṅgikas claim we are deeply committed to nonexistents, to conceptual designations or fabrications, attributions in thought which we instinctively and compulsively make. This continuous imputation of inherent existence pervades all objective and subjective phenomena. We ascribe good or evil to objects where none actually exists in them, generate powerful attachments with consequent suffering—spin the wheel of *samsāra* on the axle of inherent existence.

The importance of conceptual imputation for generating both conventionally existent objects and their usual contaminate, inherent existence is what justifies the Prāsaṅgika Mādhyamika saying that dependent arising, the king of reasonings, in its most powerful form is: “All phenomena do not inherently exist because of being dependently imputed.”¹³ They claim that all other reasonings proving lack of inherent existence derive from this king of reasons which can, without residues, overcome the extremes of eternalism and nihilism.¹⁴

This ancient and austere Prāsaṅgika view has a strikingly modern ring. Nelson Goodman, along the way to denying a mind-independent world, makes a similar point in his celebrated *Ways of Worldmaking*¹⁵:

Although conception without perception is merely *empty*, perception without conception is *blind* (totally inoperative). Predicates, pictures, other labels, schemata, survive want of application, but content vanishes without form. We can have words without a world but no world without words or other symbols.

Or, as Goodman says in a later work¹⁶: “The worldmaking mainly in question here is making not with hands but with minds, or rather with languages or other symbol systems.” (Thurman¹⁷ makes more extensive connections between Prāsaṅgika and modern Western linguistic analysis by developing parallels with L. Wittgenstein.) Prāsaṅgika fully agrees with Goodman in denying an independent world, but despite the importance of mind, they both scrupulously avoid idealism. For Prāsaṅgika, mind also lacks independent existence and there must be conventionally existent objects external to consciousness¹⁸ so that the interdependent minds and objects can conventionally exist.

In the most inclusive sense nothing inherently exists for the Prāsaṅgika, yet phenomena have a conventional or nominal existence and perform functions through dependent arising. They are efficient. Though phenomena do not inherently exist, they certainly exist conventionally and their empty nature prevents them from being inert and nonfunctional. There is valid knowledge of conventional realities and right action; to believe otherwise implies that true knowledge is only about inherently existent objects. Mādhyamika analysis attacks our belief in inherent existence, but does not replace it by some higher principle; hence emptiness also lacks intrinsic existence. Denying inherent existence does not imply some higher affirmation.¹⁹ Mādhyamika dialectic culminates in a nonaffirming negation—the emptiness of inherent existence—the Ultimate Truth of phenomena.

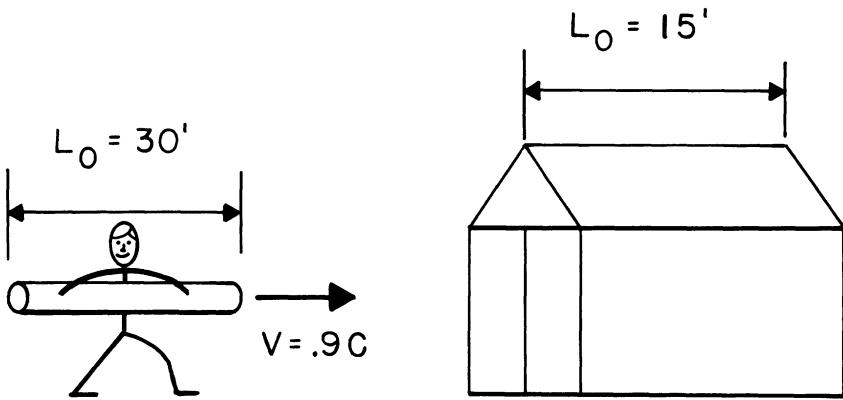


Figure 1: Pole, runner, and garage as seen by an earth-based observer. L_0 denotes rest lengths.

The essence of phenomena is their voidness of intrinsic existence, and they exist through dependent arising. Phenomena abide in the “middle way”—neither inherently existent nor nonexistent, but as interconnected, as varieties of dependent arising.

III. RELATIVITY IN MODERN PHYSICS

Rather than give a formal presentation of special relativity,²⁰ it is more informative for me to return to the thirty-foot aluminum flagpole and use it in a popular relativity example. The pole is twice the length of a fifteen-foot garage equipped with extraordinarily high-speed doors at both ends. At this point all lengths are rest-frame values, measured with no relative motion between the object and the observer. When a very fast runner carries the pole parallel to the ground at a speed of $.9C$, or ninety percent the speed of light, the pole can truly get entirely within the garage for a short time (see figure 1). In other words, the garage attendant can quickly close (and then quickly open) the doors at each end, so the entire pole is physically within the garage at one time. This occurs because the pole, moving at $.9C$ relative to the garage, has a length of thirteen feet, as measured from the point of view of the garage. A strange result, but diverse experiments confirm special relativity’s predictions for events that occur thousands of times each day all over the world at speeds well above and below $.9C$. Special relativity is an essential and integral part of modern physics. There is little doubt about the validity of the theory.

To the garage attendant’s amazement, once the runner stops and brings the flagpole up alongside the garage they both see it is twice as long as the garage. The rest-frame lengths are truly thirty and fifteen feet, respectively. Nevertheless, thanks to relativistic length contraction, the attendant did get the entire pole within the garage for a brief moment. But there is no absolute standard

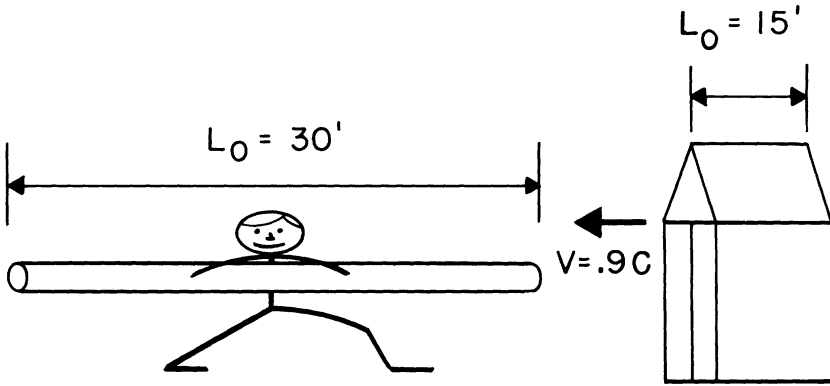


Figure 2: Pole, runner, and garage as seen by the runner. L_0 denotes rest lengths.

of rest in physical relativity; therefore, as the runner approaches the garage, he observes, from his point of view, that the garage is coming toward him at $.9C$. In the runner's reference frame, the garage is therefore contracted to 6.5 feet while his pole is still thirty feet long (see figure 2). The genuinely bizarre problem is: how do both doors close simultaneously so that a thirty-foot pole gets inside a 6.5-foot garage? I emphasize that the runner's perspective on the event is in every way just as legitimate and "real" as the garage attendant's. The psychology of human perception is also irrelevant here. The measurements can be made photographically or by any other piece of apparatus and stored in a computer for later puzzlement. Take a moment to relish the paradox.

It is difficult to accept that lengths, times, and masses of objects are relative to the reference frame from which the measurements are made. But even accepting this does not resolve the paradox. Resolution comes from understanding the relativity of simultaneity. Both doors shut and enclose the flagpole for the garage attendant simultaneously (at one instant); but the doors never close at the same instant for the runner. The simultaneous events of the doors closing in the garage attendant's reference frame are far from simultaneous in the runner's reference frame. For the runner, the pole can never get entirely inside the garage at any one time. Thirty feet is truly larger than 6.5 feet!

This example quickly illustrates some important points of special relativity. The lengths (in the direction of motion), masses, and time intervals of moving objects change by a simple multiplicative factor relative to the values measured by a stationary observer (the rest-frame values). The pole has a larger mass for the garage attendant than for the runner. The ticks of a watch fixed to the pole would come further apart for the garage attendant than when the pole's watch is brought to rest relative to the attendant. All these effects are

completely symmetric for each observer. There is no preferred reference frame—the garage attendant is not in a privileged position, nor is the runner. Many physical attributes, generally considered primary qualities, suffer relativistic changes. But, as I stress later, not all attributes do.

What then are the intrinsic or inherent mass and length of the flagpole? Does it truly possess an intrinsic mass and length? We conventionally take them as the values measured in the rest frame and implicitly assume that these are the “real” mass and length of our inherently existent pole. The message of relativity is emphatic: it is equally valid to take the measurements of an observer who moves at .9C (or at some other speed) relative to the pole. There is no preferred reference frame and hence no value of the mass, length, or time which is inherently more real or fundamental than any other values measured in a different frame. Thus, there is no length or mass of the pole separate from or independent of a particular reference frame. Reference frame independent or intrinsic lengths, masses, and other relativistic properties are meaningless. Relativistic attributes connect to the rest of the universe and never stand alone like stars in the dark night sky—they are part of an extended constellation. The world of classical physics was badly shaken because some of the most fundamental (most “real”) primary qualities of objects lost their inherent existence in physical relativity. On the other hand, as I stress in the next section, physical relativity has not reduced everything to dependence upon the reference frame in which measurements are made.

IV. PARALLELS AND DIVERGENCES

So far there is a striking similarity between certain aspects of physical relativity and Mādhyamika dependent arising, although one only applies to physical phenomena while the other applies to inner and outer phenomena on all levels. But conceptual discussions of physical relativity often fall into the serious error of only stressing the dependency of space, time, and certain other physical attributes upon a particular reference frame. This dramatic dependency upon reference frame is what many consider to be the fundamental import of physical relativity, but from the point of view of developments in theoretical physics after the advent of special relativity in 1905, it is more important that physical relativity discovered numerous invariants—attributes identical in all reference frames. The simplest example is the speed of light in a vacuum, which is the same for all observers regardless of their state of motion. There is also a large number of other physical attributes which are frame independent. More fundamentally, the laws of physics take the same form in all reference frames. For example, although the runner violently disagrees with the garage attendant about values of certain physical attributes, two fleas playing billiards on the moving flag pole find their game is exactly the same as when they are at rest on the garage floor because of the frame invariance of

the laws of mechanics. Or, all the electrical equipment in an airplane works the same whether it is on the ground or flying at Mach II or .9C, because the laws of electromagnetism and quantum mechanics are frame-invariant.

Given the most sophisticated laboratory imaginable, it is experimentally impossible to tell which frame is at rest and which is in uniform motion because the laws of physics, and thus all physical experiments, are identical in all reference frames. The very notions of “rest” and “motion” are relative, yet *all things are not relative in physical relativity—the invariants are more important than the relative*. In fact, since the 1920s the most important physical theories have been explicitly constructed to be relativistically invariant. This means that, whether the theories deal with the largest scales, as in cosmology, or the smallest, as in high energy physics, they must take the same form in any reference frame.

Another way of appreciating the importance of invariants is to recall that the derivation of special relativity only requires two assumptions: first, that the speed of light in a vacuum is the same for all observers, and second, that the laws of physics take the same form in all reference frames. (These two assumptions require suitable generalization only in general relativity.) The entire theory with all its counterintuitive dependencies of length, mass, and time stems from these two assumptions—which explicitly embody invariance right from the beginning.

Although measurements made in any particular reference frame are relative, this is not true of the physical theory of relativity itself. The theory relates measurements in different reference frames in a fully determined and precise manner and embodies the invariance of the laws of physics. Within physical relativity theory, detailed knowledge of the relative is not relative knowledge. Peaks of invariants tower above the ocean of the relative. Does dependent arising in Mādhyamika similarly point to principles superior to it? Is there a parallel movement of thought in Mādhyamika?

In Mādhyamika, phenomena always have been and always will be devoid of independent existence, and thus emptinesses are not produced phenomena—not something which comes and goes due to causes and conditions. Emptinesses are not brought about or produced by the causes of the individual transient phenomena, which lack inherent existence; thus emptinesses are permanent phenomena.²¹ In distinguishing emptiness from the merely “occasionally permanent,” Hopkins writes, “However, emptiness in general, though not existing as a separate entity from its specific instances, is always existent because there never is a moment when there is no instance of emptiness.”²² Although emptinesses are particular in that each phenomenon lacks a specific inherent existence, nonetheless, a profound realization through direct cognition of the emptiness of a single phenomenon can lead to a realization of the emptiness of all world systems.²³ This permanence, degree

of independence, and seeming universality of emptiness might therefore incorrectly suggest that it, in analogy with the laws of physics, towers above the dependently related phenomena.

But the *Prāsaṅgika Mādhyamikas* are adamant—the entire universe, both objective and subjective, lacks inherent existence and hence nothing is superior to dependent arising, including emptiness itself. This is the meaning of a nonaffirming negation—the denial of inherent existence implies no other superior principle or existent. The parallels between physical relativity and *Mādhyamika* come to a rude halt on this point. Although it is true that emptiness is a permanent phenomenon, it still depends upon the phenomenon it qualifies and an imputing consciousness.²⁴ This dependency of emptiness guarantees its lack of a self-standing nature. Furthermore, the particularity of emptiness, it being the lack of independent existence of a unique phenomenon, does not conflict with the emptiness that qualifies all phenomena. Just as a particular whole number embodies the nature of integers, so does the mathematical-type integer.

Given this permanence, degree of independence, and seeming universality of emptiness, it is natural to seek a parallel in *Mādhyamika* with the development of higher forms of independence as in physical relativity. But this would be another example of the inveterate tendency of the mind to reify, to impute incorrectly inherent existence. As pointed out in the previous paragraph, despite the permanence and limited independence and universality of emptiness, Ultimate Truth is not substantive, inherently existing, or self-standing. Rather, emptiness is formulated within the doctrine of the two truths wherein there are two complementary views of phenomena, one ultimate, where all is empty, and the other conventional, where objects have an existence, functionality, and efficiency in the realm of everyday action. All phenomena or objects of knowledge are included within the two truths. Though the flagpole is totally void of independent existence, it conventionally or nominally exists and flags can be hoisted on it. Normal life and discourse is in the realm of conventional truth, but we unfortunately contaminate conventional truth (and, occasionally, even ultimate truth) by imputing inherent existence to it. The Ultimate Truth, emptiness, though a permanent phenomenon with a degree of independence and universality, is still empty—a nonaffirming negation of inherent existence. Any formulation of the Ultimate Truth must be a conventional phenomenon—nominally existent but thoroughly empty of independent existence.

As for physical relativity and its frame-invariant laws and attributes, the *Mādhyamika* philosophers would quickly point out that all physics is an elaborate conceptual imputation, an interaction between man and nature—neither of which independently exists. All the objects and laws of physics must lack inherent existence, whether frame-invariant or not—a view shared by a large body of philosophers and scientists. For example, Goodman holds

that the version of the world presented by physics is one of many possible worlds, a version inseparable from the world described, but in no way the only or preferred world. Mādhyamika would assert that the discerning physicist would not want to burden any objects or laws in physics with the contradictory attribute of inherent existence, thereby rendering them impotent and inert.

Physical relativity and Mādhyamika also understand causality differently. The view of causality in physical relativity has its roots in classical or pre-relativity physics. There causality, or more precisely determinism, means that a prior event is the efficient agent which transforms a preexistent entity into the caused event or effect. The law is inviolable: a given set of causes always yields the same result. Implicit in this view is the assumption of a self-subsistent or inherently existent entity undergoing some transformation. For example, a force generates or causes an acceleration of an independently existent particle of specified mass, as predicted by Newton's Second Law of motion.

In the transition from classical Newtonian physics to physical relativity, causality only undergoes modest changes. Except for the relativistically affected physical attributes mentioned above, objects are still considered inherently to exist. The main addition is that the cause cannot propagate its effect faster than the speed of light in a vacuum. Relativity theory shows that this constraint guarantees all observers a consistent view of determinism: causes always occur before effects, despite the relativity of space and time. Quantum mechanics drastically revises this notion of inherently existent objects along with causality and brings them more in line with Prāsaṅgika Mādhyamika, a subject I treated in a recent paper.²⁵

In contrast to causality in physical relativity, Mādhyamika causality is a more general dependence of phenomena on causes and conditions which establishes the dependently related nature of phenomena. Rather than deterministic causality with its inherently existent objects acting as material or efficient causes, the doctrine of emptiness has mutual dependence of relative phenomena or essential relatedness. For practical purposes in Mādhyamika, causality can still be conventionally or nominally understood in the usual fashion. For example, mental afflictions can be reliably transformed by appropriate mental exercises. In fact, the Mādhyamika spiritual practice relies on a precise understanding of the causal laws of psychology, but it never loses sight of the truth that if the subjective factors were inherently existent there could be no transformation. A correct view of emptiness is essential for practice.

V. SUMMARY AND CONCLUSIONS

The Mādhyamika critique shows the contradictory nature of inherent existence, thereby establishing the doctrine of emptiness. The quality of independence, believed to provide for the reality of objects, is the fatal weakness in

inherent existence. Yet the Mādhyamika claim that, despite any superficial intellectual commitments we have, all but the most advanced practitioners innately believe in and impute inherent existence. As Hopkins says: “This ‘inherent existence’ is not a concept superimposed by philosophical systems but refers to our ordinary sense of the way that things exist—as if they concretely exist in and of themselves, covering their parts.”²⁶ Analysis shows the absurdity of inherent existence, but it nonetheless has our deepest emotional commitment.

The Mādhyamikas emphasize that the revolution in attitude required for realizing *Nirvana* cannot be got from just an intellectual understanding of emptiness. Arduous intellectual effort must combine with powerful meditative techniques for removing mental afflictions and deepening the understanding of emptiness. Above all, the development of great compassion ignites and fuels the fire of wisdom which in turn makes compassion possible. In other words, a profound realization of emptiness requires the practice of compassion, and the wisdom of emptiness makes the practice of compassion possible by removing our belief in isolatedly existing individuals. The highest goal is not personal liberation, but attainment as a means for the relief of suffering of all sentient beings. The best exemplars, the Bodhisattvas, delay their final liberation from the wheel of suffering to work for the liberation of others.

Despite the modern controversy surrounding the interpretation of Mādhyamika,²⁷ it is clear that their highest goal is the liberation of all sentient beings from the suffering and ignorance of *samsāra*. Since the mistaken belief in inherent existence and our inveterate imputation of it on phenomena shackles us to *samsāra*, there is no quicker way to obtain release than to attack this fetter. For this reason the Mādhyamikas make a Herculean effort to rid us of this poison.

As I showed above, it is dangerous to get support from physical relativity in combating this poison. Since the ideas of physical relativity are increasingly being assimilated into our intellectual heritage—however imperfectly—it is impossible to translate the pivotal term *pratītyasamutpāda* as relativity without getting associations from science. There are points of genuine similarity between dependent arising and physical relativity, and an appreciation of physical relativity can help in understanding Mādhyamika. But the divergence of their views on causality and especially the status of their highest principles makes associations hazardous, and it is a psychological law that the part represents and invokes the whole association.

After destroying our belief in intrinsic or frame-independent mass, length, time, and other physical properties, the great glory of physical relativity is the development of a fully invariant or frame-independent formulation of the laws of physics. From the smoldering ashes of our belief in independent physical attributes a fully invariant physics rises up like a great Phoenix. Independence returns at a higher level! In contrast, when Mādhyamika destroys our

belief in the intrinsic existence of phenomena we are left with a nonaffirming negation—emptiness. Rather than restore the vanquished principle of independent existence in some higher or more secure form, we are left with sheer dependency and interconnectedness. The Ultimate Truth is the voidness of independent existence in all phenomena—including emptiness. The mind must be left with no inherently existent thing or principle. Something which never could nor will exist shall never arise from the Mādhyamika pyre. Unfortunately, the association of emptiness with physical relativity offers perilous opportunities for imputing inherent existence upon the Ultimate Truth itself.

The present Dalai Lama cites²⁸ Nāgārjuna's famous *Mūlamadhyamakākārikā* (XIII, 8) as:

The Conquerors said that emptiness
Is the remover of all [bad] views;
Those who view emptiness [as inherently existent]
Were said to be incurable.

None of those mentioned above who translate *pratīyasamutpāda* as relativity ascribe inherent existence to emptiness. Nevertheless, associating emptiness and physical relativity with the latter's pervasive invariants and absolutes unnecessarily exposes us to this incurable disease.

There are many profound sympathies between Mādhyamika and modern science, especially in quantum mechanics. However, in our culture, dominated by the scientific-materialistic world view, it is hazardous to make imprecise associations with science. For this reason I agree with Inada when he says: "This technical term undoubtedly does have 'strains' of the relativistic notion but not in the normal or in the scientific sense."

NOTES

1. Tsong Khapa, "The Short Essence of True Eloquence Eulogy of Buddha Shakyamuni for This Teaching of Relativity," in Robert Thurman, *Tsong Khapa's Speech of Gold in the Essence of True Eloquence* (Princeton, New Jersey: Princeton University Press, 1984), p. 177.

2. T. Stcherbatsky, *The Conception of Buddhist Nirvana* (Delhi: Motilal Banarsidass, 1978 rep.).

3. T. R. Murti, *Central Philosophy of Buddhism* (London, Allen & Unwin, 1968).

4. Thurman, *Tsong Khapa's Speech*.

5. Kenneth K. Inada, *Nāgārjuna: A Translation of His Mūlamadhyamakākārikā* (Tokyo, Hokuseido Press, 1970), p. 17.

6. Jeffrey Hopkins, *Meditation on Emptiness* (London: Wisdom Publications, 1983), pp. 36–37. Hopkins provides a less technical, but equally careful, treatment of the topics in this book in the more recent *Emptiness Yoga* (Ithaca, New York: Snow Lion, 1987). My citations are to the more technical book.

7. Thurman, *Tsong Khapa's Speech*, pp. 137–149, and Hopkins, *Meditation*, pp. 127–196.

8. Thurman, *Tsong Khapa's Speech*, p. 137; Hopkins, *Meditation*, pp. 625–638.

9. Richard H. Robinson, "Did Nāgārjuna Really Refute All Philosophical Views?" *Philosophy East and West* 22, no. 3 (July 1972): 325–330.

10. Thurman, *Tsong Khapa's Speech*, pp. 157–158.
11. Hopkins, *Meditation*, p. 10.
12. *Ibid.*, p. 38.
13. *Ibid.*, p. 168.
14. *Ibid.*, p. 167; Thurman, *Tsong Khapa's Speech*, pp. 146–147.
15. Nelson Goodman, *Ways of Worldmaking* (Indianapolis, Indiana: Hackett Publishing Company, 1978), p. 6.
16. Nelson Goodman, *Of Mind and Other Matters* (Cambridge, Massachusetts: Harvard University Press, 1984), p. 42.
17. Thurman, *Tsong Khapa's Speech*, pp. 90–111.
18. Hopkins, *Meditation*, pp. 367–368; Thurman, *Tsong Khapa's Speech*, p. 316.
19. Hopkins, *Meditation*, pp. 721–727; Thurman, *Tsong Khapa's Speech*, pp. 166–167.
20. Limiting the discussion to special relativity restricts the analysis to nonaccelerating reference frames and phenomena not depending upon gravity. General relativity removes these restrictions and universalizes the arguments to all possible reference frames.
21. Hopkins, *Meditation*, pp. 215–217.
22. *Ibid.*, p. 216.
23. *Ibid.*, pp. 408–409.
24. *Ibid.*, p. 432.
25. V. Mansfield, “Mādhyamika Buddhism and Quantum Mechanics: Beginning a Dialogue,” to be published in *International Philosophical Quarterly*.
26. Hopkins, *Meditation*, p. 9.
27. E. Naper, “Dependent-Arising and Emptiness” (Ph.D. dissertation, University of Virginia, Charlottesville, 1985; available from University Microfilms), chaps. 4–6, which offer a good analysis of the controversy.
28. Tenzin Gyatso, *The Buddhism of Tibet*, trans. J. Hopkins and L. Rimpoché (London: George Allen and Unwin, 1975), p. 76.