

Language, Thought, and Logical Paradoxes

by

Douglas M. Burns

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Preface

The relationship between language and thought is a problem as old as philosophy. The relationship between thought and the world about which one thinks has intrigued philosophers since the days of antiquity. Yet despite over two millennia of inquiry and debate, some fundamental issues remain unsettled and certain enigmas still perplex Western scholars. Do the traditions of Eastern thought fare any better? Would the problems which have puzzled Occidental thinkers be equally baffling to their Oriental counterparts? Or would the Eastern mind be able to provide fresh insights, new axioms, and alternate methodologies that eventually would help resolve Western dilemmas?

To answer such questions one must turn to specifics. There is no single entity which is the Eastern mind. Rather, in both the East and in the West one finds a host of varied, often antagonistic, philosophies. At best one can only pick specific questions which have puzzled the Occident and then ask if there is any tradition of thought in the East which might contribute to answering these questions. That is what I have attempted in this writing. The problems which I have selected are logical and mathematical paradoxes. The Eastern tradition is Theravada (Hinayana) Buddhism.

This book will not provide the reader with an introduction to Buddhist thought, nor will it serve as an introductory text on logic or linguistics. One must consult other writings to find such information. On the other hand, the following pages do not require any prior knowledge of either Buddhism, linguistics, or formal logic. The subject matter is complex and often abstract, and thus it may require some effort and concentration on the part of the reader. However, esoteric knowledge of any kind is not called for.

The inquiries expressed in the following pages were begun in 1971 and now, three years later, have progressed to their present form. Along the way correspondence and consultation with numerous scholars in varied disciplines was required. I will not list names, but I do wish to express my gratitude to all those who gave advice and assistance. These encounters have clearly demonstrated the inherent value of discourse and frank criticism. Consequently, I hope that some of the readers of this book will likewise contribute their comments and evaluations to the author.

Douglas M. Burns
Bangkok, 1974

Chapter 1

The Problem: Its Premises and an Approach

Paradoxes : Indicators of Error

The word “paradox” denotes situations of several different kinds. Perhaps most commonly it is used when things which are seemingly impossible are nonetheless true. For example, if a pot of water placed over a fire were to become cooler instead of hotter, we would call that a paradox—fact is contrary to expectation.

Paradoxes of a different sort are encountered when ostensibly valid deductions lead to conclusions which are either patently false or self-contradictory. Examples occur in mathematics and logic when one seemingly “proves” that $1 = 2$ or that a sentence is true only if it is not true.

Many paradoxes have arisen in the course of history, and most have been solved. Usually the solution to a logical or mathematical paradox has resulted from discovering a previously undetected fallacy which was employed in the reasoning process. Thus paradoxes of all sorts have an intrinsic importance. They indicate either an error in our beliefs or a fallacy in our reasoning. To the inquisitive mentality they present a challenge which stimulates a quest for new facts or a closer examination of accepted tenets.

Certain paradoxes baffled physicists of the 19th century. Enlightened by Newton’s laws, men of that time believed that they had the means to explain the course of the stars and the planets as well as the movements of the tiniest particles of matter. They envisaged an ordered universe in which solid matter existed in an absolute time and an absolute space. But certain obscure, seemingly trivial events deviated from the predicted patterns. The orbit of the planet Mercury, for example, never went quite the way that it should. The planet’s deviation was only a small fraction of a degree per century, but it deviated nevertheless, and no amount of Newtonian speculation could set things right. More significant still were the perplexing measurements of the velocity of light. Eventually the paradoxes could not be ignored. The Newtonian world view gave way, and a more complex cosmology of relativity and quantum mechanics came into focus.

These enigmas of the 19th century are no longer baffling. We have modified our views so that once again belief and experience are in harmony. However, paradoxes of other sorts remain. Two such paradoxes will be examined in this writing. One is a semantic paradox, the paradox of Epimenides, also known as the paradox of the Liar. The other is a mathematical paradox, namely, Russell’s paradox of classes.¹

The position I shall advocate is that our difficulty in finding a satisfactory solution to these paradoxes results from a deficiency in our understanding of certain fundamental concepts, and this in turn results from a deficiency in our understanding of the thinking process. The fallacies which have led to self-contradiction are not fallacies in mathematics or logic per se. Rather, they are fallacies in the way we understand truth, concepts, and classes. Here our attention must turn

¹ An illustration of the paradox of Epimenides is given at the start of Chapter 6. Russell’s paradox is stated in Chapter 8.

from mathematics to psychology. In certain ways psychology in the 20th century is comparable to the physics of the 19th century.

Psychology Without Consciousness

Let us examine some of the prominent features of contemporary psychology and related disciplines.

Early psychologists made extensive use of introspection—a direct means of observing thought processes. However, with the advent of behaviorism this has fallen into disrepute. Admittedly, certain virtues can be claimed for the behaviorist position. For example, when a trained rat presses a bar or when a conditioned pigeon pecks at a colored disk, we are apt to conclude that the animal *wants* food or *expects* a reward. But in fact all we really know is that the animal is behaving in a certain way. The conclusions of wanting and expectation are unfounded suppositions, projections of our own mental states rather than observed fact. Thus the good behaviorist does not venture beyond what is scientifically certain; he speaks only of environmental stimuli and responses to such stimuli.

As a methodological ideal, behaviorism is commendable, but somehow the tail now wags the dog. Not only does one refrain from speaking of wants and expectations in laboratory animals, one also shuns mention of human states of love, hate, fear, and pride. Behaviorism claims that thinking is not the manipulation of mental images, rather it is subvocal speech; one's thoughts are but subtle movements of the tongue and larynx. According to B.F. Skinner, mental images as such do not exist. Rather, Skinner asserts, whenever I believe that I am seeing an image, I am actually only repeating the ocular and skeletal movements which occurred when I was previously observing whatever my nonexistent image represents.² The facts that I can feel love and can feel hate, can think without moving my tongue and can clearly imagine things I have never seen—all this is of minor significance to the behaviorist. For Skinner and the like, evidence demands more than direct experience; it must be experience which can be shared by all.

The success of behaviorism has relegated mental imagery to the same status as the unicorn—a fiction. But behaviorism is not alone in this campaign. Computer technology has produced machines which appear to think and in some ways think better than men. Now (apart from electronic sensors) no one believes that computer calculation involves images or any forms of conscious experience. Certain computer engineers, inspired by the feats of their wondrous machines, are not satisfied with an analogy between computers and men. They go much further than that: If computers do not have consciousness, then neither do men. We are told "Consciousness is an illusion"!! (It would seem to this writer that illusion presupposes consciousness, but we will not pursue this argument here.)

Similar situations have developed in linguistics. The most fruitful linguistic investigations have been concerned either with the physical aspects of phonation or with grammatical structure. The ultimate marvel of language, the communication of ideas from one mind to another, is a phenomenon carefully shunned by most scholars of linguistic science.

² Blanshard and Skinner.

The same anti-ideational trends are found in logic. This is especially significant since logicians and mathematicians are the ones who have assumed charge of the paradoxes which we shall be considering. Willard Quine, whose name looms large in contemporary logic, would have us jump from inscribed sentence to the objective world. He completely bypasses the mind and any psycholinguistic processes by which we perceive and decode sentence meanings. His ideal is a compact, formal logic, tidy and self-contained and free of such ambiguous concerns as meanings and propositions. Moreover, sentences which speak of beliefs and thoughts create special problems and upset the desired simplicity of a neatly ordered logic. If reference to beliefs and thoughts are allowed into any of Quine's formal languages, they have been admitted begrudgingly.

This rejection of mental imagery and kindred phenomena occurs not only in the specialized disciplines of behaviorist psychology, computer engineering, linguistics, and logic. The same attitude finds adherents in other specialties and also in general philosophy. Hannay, who speaks in defense of mental imagery, summarizes the case as follows :

“Perhaps it would be too much to say there is a conspiracy against the mental image. But there is certainly a campaign. Demett I am sure speaks for many philosophers when he admits that to be able to get rid of mental images would be ‘a clear case of good riddance’.”³

To seriously deny the existence of mental images would seem to demand some sort of psychic blindness. After all, we do experience images. What further evidence is needed? Indeed, it is only the odd extremist who attempts to deny imagery. Most anti-ideationalists concede its existence. But at the same time they seem to be saying that they would be much happier if imagery did not occur.

Thus the case against images is not one of existence; rather it is one of convenience and amenability to investigation. The logician has no use for them. The linguist refers them to the psychologist, and if the psychologist is a behaviorist, he might tell us that our images do not exist. If he is not so committed to behaviorist dogma, then the psychologist will likely reply: “Yes, imagery is an interesting phenomenon, but it is a difficult thing to study. More can be gained by investigating other aspects of the psyche.”

This is why I say that the psychology of the 20th century is comparable to the physics of the 19th. We are inclined towards a simplistic, behaviouristic view of the mind. What does not fit with this view is either denied, ignored or referred to the other man's department. Had 19th-century physicists done the same with the precession of the orbit of Mercury and with the puzzling velocity of light, we would still believe in Newtonian laws, unaware of the true wonders and complexity of the universe.

Buddhist Tenets and Buddhist Methodology

Within the tradition of Western philosophy many a competent writer has voiced the same protests and cited the same evidence as stated above. I do not intend to simply repeat what others have already said. Rather, I wish to do two things which I believe are original. First, by developing a psychology which embraces mental imagery, we can resolve certain longstanding

³ Hannay, p. 182.

logical and mathematical paradoxes. This is possible because, as already stated, these self-contradictory enigmas arise not from fallacies in mathematics and logic per se. Rather they arise from deficiencies in our understanding of truth, concepts, and classes.

Second, I should like to approach these paradoxes by stepping outside the tradition of Western philosophy. Both the psychology and methodology of Theravada (Hinayana or Pali) Buddhism provide convenient starting points from which the paradoxes can be examined. It would be a gross overstatement to say that what follows are Buddhist solutions to the paradoxes. Instead these solutions proceed from Buddhist premises and employ Buddhist methodology.

The Buddhist relevance is of three sorts. First, Theravada Buddhism provides a firm basis of psychological and philosophical tenets from which we can proceed. Rather than introduce these piecemeal throughout the text, let me enumerate them now:

1. Truth is defined in terms of correspondence theory. That is, a true belief or true statement is one which corresponds to the facts.⁴

2. The pragmatic value of beliefs is recognized but clearly distinguished from its truth value. Some beliefs, for example, may be true and useless, and others may be false and useful.⁵

3. Consistency or coherence is a measure of truth, but correspondence is the final determinant.⁶ (By consistency it is meant that a system of belief should be free from contradictions.)

4. The emphasis on truth is on the truth of beliefs and thoughts. The truth of written and spoken sentences receives lesser concern.⁷

5. All modalities of experience contribute to concept formation. We must recognize that concepts arise from awareness of subjective experiences as well as from sensory encounters.⁸

6. Conditions of truth and falsity depend upon experience-derived perceptions and concepts.⁹

7. Direct experience alone is the criterion by which a belief is confirmed.¹⁰ Shared experience is not necessary. One proves to oneself the existence of redness, yellowness, moon, and stars; yet one cannot share such evidence with a blind companion.¹¹

8. The relationship between word and meaning is arbitrary; conditions may remain constant while their respective names may change.¹²

⁴ Jayatilleke, pp. 352–353. Majjhima Nikāya I 402–403. (Apaṇṇaka Sutta).

⁵ Jayatilleke, pp. 351–359. Majjhima Nikāya I 395. (Abhayarājakumāra Sutta).

⁶ Jayatilleke, p. 353. Suttanipāta, 883–884. Saṃyutta Nikāya IV, 299.

⁷ Documentation of this point is actually an inductive process. That is, the times that truth is mentioned in the Suttas apart from the communication of ideas, it is most often in the context of true thoughts rather than true sentences.

⁸ Majjhima Nikāya I 111–112. (Madhupiṇḍika Sutta). Saṃyutta Nikāya III 60–61.

⁹ Suttanipāta 886.

¹⁰ Aṅguttara Nikāya I 189. (Kālāma Sutta).

¹¹ *Further Dialogues of the Buddha*, Vol. II. Translation by Lord Chalmers, p. 115.

¹² Majjhima Nikāya III, 234–235. (Araṇavibhaṅga Sutta). Saṃyutta Nikāya II 190–192

9. The truth of certain statements cannot be judged by simple affirmation or negation but must be handled within a four-valued logic. Thus a sentence may be either true, false, both true and false, or neither true nor false.¹³

10. Thoughts are changing, dynamic entities. There is no such thing as an eternal or universal thought. Rather, there may be separate thought events each bearing the same appearance.¹⁴

11. The Platonic doctrine of eternal Archetypes or Forms must be rejected. We live in an ever-changing universe in which all entities are transient.¹⁵

A second advantage to employing a Buddhist approach to the paradoxes is the range of subject matter. Logicians, linguists, psychologists, and even many philosophers are often quite timid in crossing professional boundaries. Buddhism, as found in the Pali Canon, is not a religion in the usual sense of the word. It is more akin to psychology and philosophy, and it comfortably embraces all of the considerations necessary for our analyses of the paradoxes.

Third and perhaps most important is the Buddhist method of gaining psychological knowledge; that is direct observation of one's own thoughts, feelings, and perceptions.¹⁶ By insisting upon the exclusive use of shared or objectively demonstrable experience, psychologists have denied themselves the most direct access to the phenomenon they hope to understand.

Any man can find animal footprints in a forest, and anyone can see a tissue slide under a microscope. But only one who has spent many years at forest tracking will be able to read all of the forest signs. And only after many hours of practice and instruction does one read the full meaning of the colors and patterns on a microscope slide. The same is true with introspective investigation. All men, except perhaps orthodox behaviorists, observe their own thoughts and feelings. But one who has for some time directed special efforts to this end will have a degree of perspicacity and understanding which surpass that of the casual observer. This discipline of self-observation is the core of Buddhist mental training.¹⁷

Readers who have only a cursory knowledge of early Buddhism may infer that Theravada introspection is directed towards trance states, transcendental experiences, or psychic powers. Such is not usually the case. The central theme of Theravada Buddhist practice is called *vipassanā* or insight meditation. Its primary concern is close scrutiny and analysis of the mundane processes of thought, feeling, and perception. Thoughts and feelings arise and pass away by natural laws of cause and effect. With careful observation, we can discern and understand these laws.

The following material is unavoidably complex. Thus a repeated shift from Buddhist terminology to psycholinguistic terminology and repeated notations of Buddhist relevance would only add to the difficulties already awaiting the reader. Therefore, explicit mention of Buddhist significance will be made only infrequently. By the above paragraphs most readers will be able to recognize these Buddhist tenets regardless of the idiom in which they are stated.

¹³ Jayatilleke, pp. 333–350.

¹⁴ *Saṃyutta Nikāya* III 143. *Ibid.* II 94.

¹⁵ Wijesekera, pp. 1–25.

¹⁶ *Aṅguttara Nikāya* II 44.

¹⁷ *Majjhima Nikāya* I 55–63. (*Satipaṭṭhāna Sutta*).

Truth and Reality

For those readers not familiar with this aspect of philosophy, we must clarify the meaning of the word "truth." In popular usage "truth" is often taken as synonymous with "fact," but in this writing, as well as in philosophy in general, an important distinction must be made. Fact is what is. Truth refers to beliefs or statements about facts. Facts are reality; truth is either the accuracy with which our beliefs portray reality or it is the correctness of statements about reality. For example, it is a fact that there is a glacier on the west side of Mt. Everest. Thus the sentence "There is a glacier on the west side of Mt. Everest" is true.

Now these definitions of truth and fact easily lead to a number of ontological and epistemic considerations: What is reality? Does sense-experience truly portray reality, or is it only an illusion? Should we say that sense experience is but a relative reality, and beyond the reach of the senses exists Absolute Reality?

These are interesting and important questions, but they are not quite germane to the purposes of this writing. We need only assume that there is such a thing as fact. This may be fact in an absolute sense (e.g. that lamp really, physically, exists.). Or it can be fact in a purely experiential sense (e.g. I am having an experience which I perceive as a lamp). In either case it is possible to define true beliefs and true statements. If we allow that there is a relative and an absolute reality, then we can likewise allow that there is a relative and an absolute truth for one's beliefs about reality. I will not say more about these issues. The discussion of truth in the following chapters should demonstrate why questions of ultimate reality are not essential concerns to defining truth. Likewise, these discussions should also demonstrate why questions of ultimate reality need not be answered in order to resolve the famous paradox of falsity.

The Approach

The task which lies before us is as follows: Assuming the existence of mental imagery, we must define truth and understanding in terms of image thinking. Next we must examine abstract concepts which cannot be envisaged by simple imagery. (The concepts "virtue" and "efficiency" are examples.) How do truth and understanding on this level relate to truth and understanding on the level of imagery? Third, we must consider the relationship of concepts to language. Fourth, discussion must be made concerning mathematical thinking. Is mathematical truth qualitatively different from truth as previously defined? After these questions and considerations have been covered, we will have a sufficient basis for approaching the paradox of Epimenides and Russell's paradox of classes.

Chapter 2

The Varieties of Thought

Let us assume that independently of spoken and written sentences there exist such things as true and false thoughts or true and false beliefs. Now, we must ask: What is a thought? Experientially, a thought may arise as a mental picture. Or, either with or without such pictures, a thought may be experienced as subjectively heard words. Additionally, many thoughts are

complex and abstract in ways which cannot be expressed by simple images and also are more than mere subjective portrayals of vocal sounds. Thus it appears that either there is more than one species of thought, or a single thought has more than one aspect. We shall first examine imagery independently of subjective word sounds and apart from abstract meanings.

Images

Imagery is usually understood to be the mental portrayal of visual experience. However, this definition is not quite adequate for our purposes. Not only are we capable of imagining visual experience, we can also imagine auditory, tactile, and emotional experiences. The phrase “mental portrayals” seems a bit cumbersome, and “portrayal” alone is not sufficiently specific. Consequently, throughout this writing, I shall use the word “image” to denote the internal reproduction of all modalities of experience—visual, thermal, proprioceptive, olfactory, and so forth.

In terms of imagery, understanding is easily defined. It is the ability to form an image or an associated group of images of a specific event or condition. It is important to see that this is a totally nonlinguistic phenomenon. A man who is congenitally blind may easily use the word “red” with both grammatical and semantic fluency. But still he has no understanding of its meaning. He cannot picture redness in his mind. Similarly, one who has never known grief may readily speak of grief, but once grief is experienced, the word takes on a new and fuller meaning. Such a one now has a memory of grief; grief becomes understood.

As with understanding, truth, also, is definable when we confine our attention to imagery. Psychologically, truth is a condition of matching or congruity between one’s mental pictures and the events or conditions which those images attempt to portray. If I believe that in my desk drawer there is a green pen when in fact such is not the case, then that image thought is false. The picture in my mind does not match the thing to which it is referred.

Here the words “true” and “false” are used in the same way as when we say that a portrait gives a true representation of its intended subject or that a sound recording is a false reproduction of the original sound. Thus in the broadest sense truth is not an exclusively psychological condition. Matching can occur between two images, between an image and a physical event, or between two physical events.

From this we see that there are two prerequisites for conditions of truth and falsity. First, there must be an image, a model, or an appearance of some sort. Second that image must be referred to a designated event. Should I merely imagine a green pen and not perceive that image as representing any actual condition, then such a thought is neither true nor false. It is only a picture, a thing unto itself.¹⁸

There is, however, a serious objection to defining the truth of thoughts in terms of simple imagery. Suppose I think that in the next room is a person. Human beings are of varied shapes, sizes, and complexions. They assume numerous different postures and don a seemingly infinite variety of dress. Only by the remotest chance will a single image of a human being be true of some one person picked at random.

¹⁸ A more extensive discussion of reference and thought representation is given in Chapter 7 (“Reference and Orientation”).

Generic Concepts

Here we must progress from simple imagery to generic concepts.¹⁹ Consider the concept “automobile” or “car.” The front view of a car presents a visual pattern quite unlike the side views, rear view, and bottom view. Moreover, none of these varied visual patterns have any similarity to the numerous auditory and tactile encounters which may arise from that same automobile. However, by noting proximities in space, time, and sequence, the human infant soon learns that all of these dissimilar sensory patterns are associated with each other in relatively consistent ways. They belong together. Furthermore, the child discovers consistent similarities between his family’s car and the cars which pass on the street.

An inherent feature of the human mind is that it extracts and isolates concepts from the complexities of experience. As a child’s range of encounters widens, as his exposure to automobiles becomes more varied and extensive, so his concept “car” enlarges and develops. We see then that generic concepts are built out of a vast array of sensory encounters.²⁰ If images are analogous to photographs, then such concepts as “car,” “person,” and “dog” are comparable to a vast file of varied but associated photographs.

Thus it appears that generic concepts are built out of imagery. But so concluding we must now modify our definitions of understanding and truth. To an American the concept “America” is so extensive as to defy simple illustrations other than those which are purely geographic. The diversity of scenery, lifestyles, attitudes, and values is copious. We could thus say that one understands one’s respective concept “America” by a rapid scanning of this varied accumulation of images.

However, it is likely that most generic concepts are structured in a more orderly and simplified manner. To understand the concept “human being” or “person,” for example, it is not necessary to remember assorted specific encounters with people. Rather, it appears that the mind isolates those particular patterns and forms which distinguish human beings from other objects of sensory experience. By way of comparison, consider how a cartoonist sketches the human form. A few simple strokes of a pen is all that is needed to convey the impression of a person. It is not at all necessary to portray the full range of color and detail which actually are present in the human body. Often just a simple stick figure will suffice. The same number of simple lines sketched in different patterns will readily be perceived as a dog, an automobile, a tree, etc.

In a similar manner it appears that generic concepts are composed of a limited number of primary image patterns. But while cartoon sketches are simple visual patterns, most generic concepts will also include images which portray tactile and/or emotional qualities, etc. as

¹⁹ Most of the following statements regarding generic concepts (such as “person,” “mountain,” and “house”) are likewise applicable to concepts of individual entities (such as “Charles de Gaulle,” “Mt. Kilimanjaro” and “my house”). For convenience of discussion, I shall only infrequently refer to concepts of individual entities and speak mainly of generic concepts.

²⁰ There is some evidence which suggests that certain concepts (such as the concept of one’s own species) may be genetically inborn in a simplified form. This would not invalidate any of the present discussion. Rather, it would mean that a few associated image patterns exist prior to or apart from experience and can then integrate with images of experiential origin.

determined by the object of which one is thinking. Conceptual understanding requires only that these primary image patterns be brought to mind. Secondary features (such as color and the finer details and variations of shape and form) would not necessarily come to awareness unless a more extensive consideration were desired.

Such is the manner in which we can define understanding within the context of generic concepts. In what way shall we define truth and falsity? Built out of a vast array of images, generic concepts have ranges of meaning. If I have three pets, a spaniel, a terrier, and a boxer, all are included within the meaning of the concept "dog." "Dog" matches and hence is true of each of the three. Thus a concept is true of an event if the event is included within the range of that concept. Therefore, to delineate truth and falsity it is necessary to clearly delineate such ranges. For example, at what point in evolutionary development should we drop the concept "ape" and apply the concept "human." Or again how much of a human body is required to match the concept "person"? A body without a leg would probably be acknowledged as a person; a leg alone would not. Our definitions and delineations may be somewhat arbitrary, but once established we can come to a clear determination of truth for each instance in which a generic concept is referred to an event or condition.

To illustrate what is meant by the range of a concept, let us again consider cartoon sketching. With only a few strokes of his pen, a cartoonist can easily create the impression of a cat: a rounded head, pointed ears, small nose, reduced or absent muzzle, perhaps some whiskers. But if one gradually rounds the ears, flattens the head, and/or elongates the muzzle, eventually the feline impression is lost. The sketch will more closely resemble a dog, a bear, or some ambiguous intermediate form.

The same principle applies with the primary features of generic concepts. The range of the concept "cat" is the range of image patterns which portray feline characteristics. A concept is true for a thing or true for an event if that thing is sufficiently portrayed within the range of the concept. However, unlike simple cartoon sketches, a concept such as "cat" must also include images of tactile impressions and other features which illustrate substance and three-dimensional existence.

In the natural process of concept formation precise delineations do not occur. The mind simply notes similarities and relationships among the varied patterns of experience. Definitions and exact delineations arise with linguistic convention and are further refined to meet the specialized needs of science, philosophy, and other disciplines. We shall examine the relationship of concepts to language later. However, in order to define truth in a way which eliminates ambiguities, it is necessary to mention this linguistic aspect of concept formation at this time.

In summary: From the above paragraphs we have developed definitions of understanding and truth which are founded on imagery and yet extend beyond simple imagery to include generic concepts. To understand a generic concept is to bring to mind the images which are its primary patterns. Many concepts are complex and thus composed of a large number of images. Consequently, one's understanding of a concept may be only relative or incomplete depending on the number of associated images one has acquired. Since concepts portray things, one's understanding of a given thing increases in direct proportion to one's understanding of the concept of that thing (assuming that the concept is true for the thing).

As with simple images, truth is a condition of matching. A concept is true for a thing if a sufficient number of the primary image patterns of that concept match the primary features of the respective thing.

Also from the above discussion, it is easily seen that adjectival concepts such as “red,” “fat,” and “circular” are understood in the same manner as generic concepts. That is, to understand the concept “red” one must be able to envisage redness. Additionally, since imagery extends through time, we can see changes in image patterns. This in turn enables us to understand action verbs such as “walk,” “build,” and “catch.”

Abstract Concepts

Our case, however, is still far from complete. We have said that concepts are built out of experience; yet certain concepts such as “atom” and “neutrino” denote events admittedly beyond all forms of direct sensory encounter. Additionally, concepts such as “virtue” and “reward” appear to defy imagery.

How do we envisage atoms and neutrinos? The nuclear physicist will likely understand such particles in terms of complex mathematical descriptions, and considerations of mathematical understanding are presented later in this writing. Most of us, however, understand atoms, etc. by imagining tiny particles which adhere together and make up bigger things. Such particles may be composed of still smaller particles; some revolve around others; some have electromagnetic attraction and repulsion, and some travel in wavelike motions. While all of these features occur beyond the range of vision, we attempt to imagine them by borrowing from features of sensory experience. The images by which we try to understand atoms are images acquired through sensory encounters.

On a different order of abstraction consider the sentence “Effort brings reward.” It would seem that the meaning defies imagery and hence would not fit the definitions of truth and understanding as presented above. However, we must recall that imagery as defined in this writing includes the portrayal of all modalities of experience—auditory, tactile, emotional, etc. The concept “effort” has an obvious experiential basis; it is akin to a feeling of tension which accompanies earnest voluntary activity. Having experienced such a feeling, we can remember it, and upon this our understanding is founded. In similar manner the concept “reward” covers a range of pleasurable experiences including gustatory enjoyment, aesthetic arousal, personal esteem, and companionship.

“Virtue” is occasionally cited as a concept which defies both illustration and definition. The problem, however, is not that virtue is abstract; rather, it is complex and in some ways non-visual. Virtue is sometimes judged by solely behavioral standards (i.e., physical actions) and thus falls exclusively within the range of sensory encounters. But virtue may also be measured by motivational qualities (such as love and compassion), and in these instances the concept is built out of emotional images. Furthermore, confusion arises from the numerous and conflicting personal and cultural standards of virtue. However, if one clearly delineates the essential behavioral and/or motivational components of the concept “virtue,” one finds this concept, too, can be understood by way of imagery as herein defined.

Consequently, it appears that even the abstract concepts of science, aesthetics, and ethics are accountable in terms of imagery.

Again it is important to note the difference between verbal fluency and understanding. As with the blind man who talks of redness, one who has never been in love may speak of love as clearly and convincingly as one who has. Such fluency may even create the illusion of understanding. Speaking of love (or speaking of neutrinos) both speaker and listener may fail to realize that the speaker has no understanding of the respective subject.

Relational and Quantitative Concepts

There is an entirely different class of concepts which we have not yet examined. Consider “all,” “no,” “different,” “because,” “or,” and “during.” By what sort of images can these be understood? Unlike generic concepts, these do not portray things; rather they express either quantities of things or relationships between things. Apart from things, there is no way that they can appear in imagery. Consequently as a group by themselves, they can be neither true nor false, nor can they denote a class. (What sort of truth value or meaning can be derived from the phrase “If whenever the much or without any between”?) Apparently quantitative and relational concepts are qualitatively different from the concepts built on imagery. Thus the single word “concept” is equivocal, and when speaking of concepts it is sometimes necessary to designate the type to which one is referring.²¹

At this point special attention should be given to the concept of negation. In English this is expressed by such words and prefixes as “no,” “not,” “without,” “un,” “non,” etc. Many generic concepts are defined in negative terms: Bachelors are men without wives; reptiles are air-breathing vertebrates which do not have hair and do not have feathers. Is there such a thing as a negative image of a wife or a negative image of feathers?

It appears that the so-called negative images are actually ordinary (positive) images modified by the concept of negation. Introspectively, one can demonstrate this by endeavoring to think “no caterpillars.” The concept “no caterpillars” demands “caterpillars” as a prerequisite. As long as one works at “no caterpillars,” caterpillars will be in the mind. The only way to not think of caterpillars is to turn one’s attention to football, logical paradoxes, or some other unrelated topic.

One can surmise that negative concepts have an experiential origin: I look in my drawer for a handkerchief and find that there are none. Simultaneously, two appearances are in awareness. In my mind is the concept “handkerchief.” But the visual, sensory encounter fails to reveal anything which matches that concept. What is in the mind does not appear to the eyes. Now the reader will note that as I describe this hypothetical event, the entire negative relationship is imagined. That is, we have imagined the scene of imagining handkerchiefs concurrent with not seeing them. This level of abstraction, I believe, enables us to see how negative concepts are understood: One envisages the respective image and also envisages its absence.

Negation can be considered as one among the relational and quantitative concepts. And the above example can serve to illustrate the general nature of concepts of this sort: Such concepts

²¹ The significance of such words as “this,” “that” and “the” is treated as a separate category and discussed in Chapter 7 (“Reference and Orientation”).

do not stand by themselves but rather find expression in concepts built from imagery.

Chapter 3

Concepts and Language

The reader will note that except for our discussion of concept delineation (Chapter 2 “Generic Concepts”) no mention has yet been made of language. Indeed, by the above considerations, it appears that the mind can understand generic, abstract, quantitative, and relational concepts without recourse to words and sentences.

At first this may seem puzzling. After all, whenever we think, we hear our thoughts in the form of spoken sentences. The process is not only involuntary; it also seems unalterable: The instant one begins to think, words come to mind. One readily concludes that thought and language are inseparable. However, a closer examination of the facts does not support this conclusion.

Words and thoughts are two closely associated but distinct phenomena. Failure to appreciate this has been a recurrent source of linguistic and philosophical confusion.

Consider the case of uneducated congenitally deaf children. Not only are these children ignorant of all spoken sounds, they also have no comprehension of printed words, sign language, and lip reading. It is safe to assume that their thoughts are free of the subjective word sounds familiar to the rest of us. Yet upon investigation it has been found that:

“... deaf children without language can acquire concepts, compare magnitudes, remember sequences and associations, and solve simple problems involving forms, colors, and the like.²²

Not only have these children performed above the level of nonhuman primates, some have revealed ability superior to the average child of the same age.

More mundane observations also support the word-concept distinction. For example, I am told of a certain happening and understand the report perfectly. However, I cannot recall the sentences by which this information was conveyed. If I relay this story, my words will be paraphrases of the original rather than direct quotations. Now a linguist might claim that I have merely employed transformational rules of English grammar. But such an explanation does not account for this same phenomenon occurring in bilingual and multilingual situations. Here one may recall all the factual information and yet not recall in which language this information was given. Such occurrences have been noted even between highly dissimilar languages, such as Thai and English. One may know what was said but not recall whether it was said in English or in Thai. At such times one has retained the concepts, i.e., the mental pictures, but one has not retained the words which give rise to those concepts.

Here, however, we must consider an assertion occasionally found in Theravada Buddhist literature: It is sometimes stated that thoughts (*vitakka* and *vicāra*) are activities of speech (*vācā*) rather than activities of mind. This contention is based on a passage in the Cūlavedalla Sutta which reads:

²² Carroli, p. 73.

“Having first had initial thought and discursive thought, one subsequently utters a speech; therefore initial and discursive thought is activity of speech.”²³

It requires no great depth of insight to see that most of one’s thoughts never reach vocal expression. Consequently, if we allow that this passage is authentic, how is it to be understood in the light of our present discussion?

The problem is one of delineating the meaning of *vācā*. Does it denote only speech as the simple process of vocalization? Or does it denote language as a broader phenomenon which includes speech as one aspect? This same distinction occurs in modern linguistics. Many linguists divide language into two levels—surface structure and deep (or underlying) structure. The former includes audible sounds—phonemes, articulation, and aspects of grammar. Deep structure is variously understood as relating to the meaning of these sounds; it is a precursor of phonation. Deep structure is admittedly a poorly understood phenomenon, and when explained as being akin to the meaning of sentences, one easily gains the impression that it must in some way relate to imagery. However, not many linguists would commit themselves this far. It would seem that “*vācā*” in the above passage should express a meaning closer to language than to speech, and *vitakka* and *vicāra* would thus correspond to the deep structure of language.

There is, however, an even stronger argument. The passage in the Cūlavedalla Sutta is but one small section in a voluminous set of scriptures. It must be considered in the light of far more prominent and more frequently occurring tenets of the Pali Canon. In the Eightfold Path, for example, right thought and right speech are not only distinguished, they are also qualitatively defined and illustrated in ways which show that the former is more than a simple precursor of the latter.

We have defined understanding in terms of imagery and concepts built from imagery. However, with our examination of language, we must now consider another way in which the word “understand” is used. When we say that one understands Spanish or understands Chinese, we mean that the perception of Spanish or Chinese sentences arouses thoughts in the mind of the perceiver. Moreover, (assuming that variations in context do not alter the meaning) one’s thoughts will consistently be the same or similar for each respective word pattern, and they will also be the same as or similar to the thoughts aroused in other persons who comprehend that same language.

To avoid confusion, in this writing the word “understand” will be used exclusively for the nonlinguistic ability to form an image, to picture something in one’s mind. For linguistic understanding (i.e., the ability to decode speech) we shall employ the word “comprehend.”

Additional support for the distinction between words and thoughts comes from neurological findings. The human capacity for spoken language is primarily dependent on two centers usually located in the left side of the brain. If the more posterior speech center is destroyed without damage occurring to other parts of the cerebrum, one will still be able to

²³ Majjhima Nikāya I, 301.

speak and may also retain normal hearing ability. However, such a person is unable to comprehend speech sounds. The brain has lost its ability to decode spoken sentences.²⁴

If only the more anterior speech center is destroyed, one may have perfect speech comprehension but not be able to utter sentences of more than one or two words. This is not an impairment of the speech muscles; rather, the brain has lost its ability to translate thoughts into language.

Geschwind reports a patient who suffered a rare condition. There was extensive damage to the cortical brain, but none of this damage involved either of the speech centers nor did it involve their interconnecting fibers. The patient could repeat sentences spoken to her, and she could even learn new songs singing them with perfect reproduction of both words and melody. However, she revealed no evidence of either comprehension or understanding. She could not obey simple commands and was incapable of both verbal and nonverbal communication. Essentially, she appeared to be a living, thoughtless tape recorder. Her survival depended on receiving continuous and complete nursing care.²⁵

Thus words and thoughts are closely associated but nonetheless distinct. Their relationship is established through learning. This involves not only learning the meaning of individual words; one must also learn the rules of syntax by which we comprehend the full meaning of sentences. Upon hearing the word "giraffe" the concept "giraffe" comes to mind. Words like "net," "light," and "fair" will produce one or more alternate concepts as determined by context and by one's individual thought associations.

I do not feel that concepts should be called symbols. If we use "symbol" to denote a property of concepts, then by the same reasoning we should say that models and photographs are symbols of their respective subjects. A symbol is better defined as a stimulus which consistently makes a given concept come to mind, and in most cases that concept will portray an event or condition quite different from the original stimulus. Thus defined, words are symbols; concepts are not.

Here we should take a closer look at our concept of concepts. We have shown that generic and abstract concepts are often built out of a number of associated images. Additionally, let us now note that these images have a consistent and recurrent quality. Every time I hear the words "palm tree," "battleship," and "octopus" approximately the same respective ranges of images come to mind. Moreover, it must be assumed that these words arouse similar ranges and types of images in the minds of other persons who speak English. Thus generic concepts can be more fully defined as recurrent image associations which are "shared" by the members of a given community. The word "shared" is not to be taken in the literal sense. Rather, it means that the pictures which come to the mind of one member of a community will be similar to those of the other members.

A single thought is a momentary psychological event, an image which appears briefly in the mind. A concept is the pattern which such a thought may take. The relationship between

²⁴ In such cases it usually happens that the ability to comprehend written sentences is also lost or impaired. This is due to the fact that the area of the brain responsible for the comprehension of spoken language usually is immediately adjacent to the area which decodes written language. The close proximity of these two areas is believed to result from the manner in which reading normally is learned.

²⁵ Geschwind, pp. 76–83.

concepts and thoughts is the same as that between species and individual members of a species. There is only one pattern which is a square, but this pattern may occur an infinite number of times. Similarly, there is a single thought pattern which is the concept “square” (as distinct from the word “square”), and this concept occurs whenever an individual thought “square” (i.e., “□”) arises.

Patterns, whether mental or physical, exist only as they find embodiment in individual instances. Without such instances, we can only speak of potential but nonexistent patterns. Defined as thought patterns, there is no need to consider concepts as abstract members of a third realm, a realm neither of physical things nor of thoughts of things. As patterns, concepts are no more abstract than geometric forms. Their ontology is no more mysterious than that of an animal species considered apart from the individual members of the species.

Chapter 4

Truth in Relation to Language

We have defined truth and falsity respectively as conditions of matching and non-matching (Chapter 2, “The Varieties of Thought” section). In the psychological domain this matching is between thoughts and the events or conditions to which those thoughts are referred. Moreover, we have shown that sentences have the function of producing thoughts when perceived by one who comprehends the respective language.

Unlike thoughts, sentences have virtually no similarity to the things which they designate. Sentences do not match their respective things, or do so only rarely.²⁶ Thus the matching definition of truth cannot apply to sentences divorced from thoughts. If sentences are true without subjective models or without models of any sort, then truth in the case of sentences and truth in the case of thoughts and portraits are two completely different things. The word “true” would require two unrelated definitions.

But thoughts and sentences are too closely associated to make this an attractive consideration. It would seem more likely that truth is primarily an attribute of thoughts and only secondarily an attribute of sentences. A true sentence is one which produces a true thought. If item x has a square shape, then the sentence “x is square” is true because “square” (which itself is not at all square) makes “□” come to awareness, and “□” matches the shape of x. This, no doubt, is why Theravada Buddhism gives primary emphasis to the truth of thoughts rather than sentences.

Several trends and traditions in Western philosophy are contrary to such a position. R.M. Martin is one who would take exception to the above, and to illustrate his point he quotes J.M. Bochenski:

“It is true that some philosophers (especially since Descartes) have talked about the study of concepts “in themselves”; however, logicians have always dealt with concepts as expressed by words, that is, with discourse. The tradition started with Plato and is still

²⁶ By the word “sentence” I am referring only to spoken and written word patterns. Thus I do not intend for “sentence” to imply any aspects of language below surface structure,

absolutely general. There seem to be two principal reasons for adopting this method. (1) Concepts do not subsist in themselves ... but are meanings of terms; therefore they should be studied through the terms, that is, through discourse. (2) Written (or spoken) terms are material things (or events)—and it is a basic methodological principle that, whenever it is possible, we should start with such things (or events), because they are much easier to study than mental entities.²⁷

By our foregoing discussion, we see that Bochenski's first point (i.e., concepts do not subsist independently of words) is clearly in error. Not only have concepts been demonstrated in uneducated congenitally deaf children; they are also demonstrable in apes.²⁸

His second point is that it is much easier to study material things than mental things. This may be true, but if one wishes a philosophy with broadened horizons, difficulty is no excuse for avoidance.

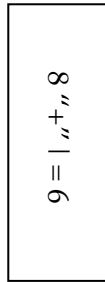
The truth of a sentence depends upon its associated thoughts. If "8 + 1 = 9" is the only inscription on an otherwise blank sheet of paper, one is inclined to read this as a true mathematical statement. But rotating the paper 180°, one reads "6 = 1 + 8," which is false. Again, suppose that after an athletic contest I am told "Joe jumped higher than his younger brother." The sentence can be either true or false: Joe jumped higher than his brother jumped, but he did not jump higher than his brother's standing height. The truth of such sentences thus depends upon their meanings rather than their written or vocal patterns, and the meaning is determined by what the speaker and listener have in mind, i.e., their thoughts. Further, consider the sentence "No mulid ever arloned a bulap." To the English reader the sentence is neither true nor false because the key words do not arouse any specific concepts.

Thus the psycholinguistic facts lead to a conclusion contrary to the preferred position of classical logic. A given sentence can be either true, or false, or both true and false, or neither true nor false depending on the thoughts or lack of thoughts aroused. This, however, does not necessarily jettison the law of the excluded middle (i.e., the law that every proposition is either true or false, and no proposition can be both). Rather, it means that we must define the law in terms of thoughts rather than sentences. Such sentences as "They are eating apples," "Joe jumped higher than his younger brother," and "Higgins followed Marx" (Did Higgins follow Marx to London, or believe in the teachings of Marx, or postdate Marx?) may all be ambiguous in that they can arouse qualitatively different thoughts. However, the alternative thoughts aroused will not have this equivocality. Any given thought which is composed of well-delineated concepts and is referred to a specific event or condition will have a definitive truth value which can be expressed in a two-valued logic. This is so for the same reason that a given picture is either true or not true of a given object. Perhaps we could define a true sentence as one which has the *potential* of arousing true thoughts. In this way sentences could be true without

²⁷ Martin, R.M., pp. 26–27.

²⁸ The problem-solving abilities of apes demonstrates that they can imagine situations which they have not yet experienced. Additionally, at least two chimpanzees have been taught simplified languages which employ both generic and relational concepts. The chimpanzee's mastery of language thus demonstrates its possession concepts. It would seem most unlikely that concepts come to such chimpanzees only as they are exposed to the novel experience of language instruction. See Premack, pp. 92–99.

having to be perceived by any observer. But this still would not remove ambiguities. The sentences



and “Joe jumped higher than his younger brother” have potentials which are equally true and false. Also, it is theoretically possible for each word pattern to form a true sentence in one language and a false sentence in another. Therefore, unless we specify a given language, every word pattern is potentially true and false.

Alternatively, one might propose that we speak of propositions instead of sentences. However, propositions apart from sentences are nothing more than concept combinations, and we have already shown concepts to be recurrent, well-delineated thought patterns. To maintain that truth is an attribute of propositions is only a variation of what we have already said; that is, truth is an attribute of thoughts.

Our conclusions regarding written and spoken sentences must also apply to the subjective word sounds that normally accompany thinking. If such word thoughts are not accompanied by any other images, then they are merely subjective portrayals of vocal patterns and beyond this are neither true nor false. Normally such subjective sounds are coexistent with their respective concepts. However, in special situations, this is not the case. For example, one may memorize sentences of an exotic language and have no idea of their meanings. This same phenomenon can also occur in one’s own native language. When reading aloud for oral recitation one may concentrate so fully upon correct pronunciation that one misses the meaning of what is said. Similarly, when proofreading for printing errors, when listening inattentively, or when reading technical material while mentally fatigued, one may grasp the words but not “get the picture.” At such times one’s word images have no truth value other than the fact that they may be true representations of the spoken or printed word patterns from which they arose.

An objection may be raised to defining truth in terms of the image patterns aroused by sentences. For example, suppose that person A says to person B, “Napoleon lost the Battle of Waterloo.” Conceivably, the pictures which arise in A’s mind may be totally dissimilar to those in B’s mind, and the images of both persons may be completely different from the actual scenes of the battle. Must we thus conclude that the sentence spoken by A is false? No, the sentence is true for both A and B, and it is true for two different reasons.

First is what we can call “true by virtue of name.” No living person remembers the battle of Waterloo, and there are no photographs which capture any of its moments. Therefore, any pictures by which we imagine the event must be regarded as purely speculative. But we can dispense with visual images completely and still have a condition of truth. “Napoleon lost the battle of Waterloo” means: There once was a battle *named* the Battle of Waterloo, and the loser of that battle was *named* Napoleon. This minimum amount of information contained within the sentence is sufficient to produce a condition of truth. And it will be true even if the listener had

never before heard of the Battle of Waterloo and has no knowledge of its time, place, and the nations involved.

Second, we must distinguish between superfluous imagery and the primary image patterns of each concept. Suppose that I am told "Jim is waiting in his room." The picture which comes to mind may be Jim sitting in a chair and wearing a white shirt. But in fact Jim may be standing and wearing a blue shirt. I do not say that the sentence is false nor that I misunderstood. However, it would be true to say "That is not the way I imagined it" or "The picture which came to mind is false." The distinction is as follows: As already discussed, concepts (such as the concept of a personal acquaintance, Jim) contain a limited number of primary images. These images portray a variety of different sensory and emotional patterns, and in most cases no single image can represent the entire concept. My concept of Jim is founded on those images which portray Jim's distinctive characteristics: his low forehead, his easygoing manner, his wide mouth, etc. Additionally, my concept of waiting is not one of a certain posture or certain action; rather, it is one of a certain state of mind. Thus the picture of Jim sitting is a superfluous (and false) elaboration built from the primary image patterns of the concepts "Jim" and "waiting."

Thus in determining the truth of a sentence (i.e., the truth of the thoughts which a sentence arouses) it is necessary to carefully identify the primary patterns of each respective concept. Battles, for example, can be waged between ants as well as between men; they may be fought only with words or fought only with cannons. Consequently, there is no set of visual patterns which can apply to all battles. An essential feature in the concept "battle" is a portrayal of subjective states rather than physical patterns. "Battle" means a willful struggle against whatever opposes one's desires. The Battle of Waterloo could denote a Belgian farmer's struggle against crop failure as well as denoting Napoleon's defeat.

Here we must consider still another matter which can lead to semantic misunderstandings and seeming contradictions. Consider the Buddha's famous parable of the blind men and the elephant.²⁹ Feeling only the end of the tail, one blind man envisages an elephant as being like a brush. Another blind man encounters only the elephant's leg and imagines that elephants are like pillars; and similarly for the tusk, the ear, etc. Subsequently, upon hearing and speaking of elephants each blind man will have a different and mutually exclusive mental picture. The man who touched only the tusk upon again finding a tusk will announce that he has found an elephant. How should truth and falsity be delineated in such circumstances?

The significant point here is to distinguish between one's personal or idiosyncratic comprehension of a word meaning and the meaning of that word as determined either by popular consensus or formal definition. In natural languages word meanings are often fluid, and their ranges of denotation and connotation may be altered with the passage of time. The true definition of a word is a matter of consensus as determined by the norm of speakers in a given linguistic community and at a given time. A blind man who understands elephants only as tusks may find a tusk and announce that he has found an elephant. He has a true image (tactile image at least) of what he has found. However, he has a false belief about the meaning of the word "elephant" as determined by linguistic convention. This in turn means that his words will produce false images in the minds of most listeners.

²⁹ Udāna 68,

There are numerous other examples of problems of truth and meaning which frequently lead to confusion and/or philosophical bickering. It is not necessary to pursue these here. With such problems one must do three things: 1) Distinguish between words and concepts. 2) Delineate the relevant primary features of each respective concept. 3) Distinguish idiosyncratic meanings from meanings based on consensus and formal definitions. If these rules are followed, most problems of truth and meaning can be resolved.

Chapter 5

Logical and Mathematical Truths

One last issue must be confronted before turning our attention to the paradoxes: What are logical and mathematical truths? Are these in any way different from truth as already defined?

Logical Truth

As one kind of logical truth, consider the well-known analytic statement: All bachelors are unmarried men.

Another such example is:

Every green thing has color.

The truth of such statements is determined simply by examining the sentences themselves. It is not necessary to consult any external facts to find confirmation.

“Bachelors” and “unmarried men” are two different word patterns which bring to mind the same concept. That is, the primary images aroused by one are identical to those aroused by the other. These two image appearances are the same and hence match. Similarly, the concept “green” is composed of a certain range of color images, and these same images are contained in the more inclusive concept “color.” “Green” matches one component of “color.” Thus we find that the matching interpretation of truth applies to analytic statements as well as to synthetic (i.e., factually true) statements. In the analytic situation the matching is internal; i.e., between the respective components of a given thought. Synthetic statements result in external matchings; that is, the thought matches some event apart from itself.³⁰

Another version of a logical truth is

$g = g$.

The symbol “=” expresses a relational concept, and hence by itself can be neither true nor false. Along with its concept of identity, “=” has the effect of directing attention from one image or appearance to another image or appearance. Now the symbol pattern

$g =$

is meaningless or incomplete, for the relational nature of “=” demands something to which “g” is referred. Furthermore, the sentence

$g = m$

³⁰ An important qualitative distinction must be made between the matching of identical or similar thought appearances and the matching of thoughts with physical events. This is discussed in Chapter 7.

is neither true nor false so long as we do not designate any meanings or values to both “g” and “m.”

However,

$$g = g,$$

is necessarily true. The mind sees that the symbol to the left of “=” is identical to the symbol on the right. That is, “=” refers attention from “g” to “g,” and there is a matching, hence truth.

Similarly, consider the more complex logically true sentence:

$$\text{If } g=m \text{ and if } m=y, \text{ then } g=y.$$

The sentence is necessarily true 1) because of the relational concept of identity expressed by “=,” and 2) because the first “m” in the sentence is taken to be identical to the second “m.” To assert “g = y” is to assert “m = m.”

Thus it appears that matching is the *sine qua non* of logical truths.

Mathematical Truth

With mathematical truths the matter is more complex. The following discussion of mathematical thinking is confined largely to traditional arithmetic. Later we shall consider such thinking in the realm of set theory.

It seems quite unlikely that mathematical thinking is a unique mental process bestowed upon civilized man in recent millenniums. Rather, considered psychologically, it would appear more likely that mathematical thought is a specialized development of the processes that we have examined in the preceding chapters. Such is the position I shall advocate.

Consider the patently true mathematical sentence, “ $2 + 3 = 5$.” How can one understand the truth of this sentence without recourse to symbols? That is, in what way can one know that $2 + 3 = 5$ without thinking the word sounds “two,” “three,” and “five” and without bringing to mind the numerals “2,” “3,” and “5” or “II,” “III,” and “V” or any symbols of equivalent meaning? The method is quite simple. One need only visualize a pair of dots, (:), and adjacent to this visualize another group of three dots, (: .). Combining the two groups one beholds a total of five, (: : .). The non-symbolic demonstration that $2 + 3 = 5$ is $(:) + (: .) = (: : .)$. The procedure is direct and irrefragable and is consistent with the matching interpretation of truth as given above.

One does not argue against the validity of this procedure; rather, one protests its expediency. To demonstrate that $7 \times 13 = 91$ requires more dots than the average person can envisage with precision and certainty. The limitations of human imagery preclude us from a direct and accurate understanding of quantities of great magnitude. Even if we resort to tangible dots, such as buttons spread before us, we soon reach numerical quantities where this procedure, too, becomes unduly cumbersome, and the probability of error is increased.

Confronted with these inherent psychological and practical limitations, civilized man has devised an ingenious way to circumvent the problem. This is the employment of numeral systems. Each numeral designates a distinct quantitative value. At a given instant one may not be able to envisage 386 separate units, but one can easily bring to mind either the numeral pattern “386” or its auditory counterpart “three hundred eighty-six.” In fact the various numeral systems are so efficient that we often make mental use of them even when quantitative imagery could easily do the job. For example, when thinking that $2 + 3 = 5$, one’s thoughts may portray only the respective numerals with no consideration of the quantitative values which those

numerals designate. Quite often both kinds of thoughts occur simultaneously. That is, one may envisage both absolute quantities and their numeral designators at the same instant³¹. However, with increasing numerical values, quantitative imagery becomes proportionally imprecise, and by the time one reaches numbers of three or more digits the mind is apt to abandon all attempts at direct quantitative representation and think solely in the form of numerals.

In the domain of quantitative imagery we can define both understanding and truth in a manner consistent with our foregoing discussions. With the sentence " $6 \times 7 = 42$," for example, one may imagine six rows each with seven dots and see that this is the same number of dots as having four rows of ten dots plus two dots extra.

But what sort of truth value can be ascribed to mathematical thoughts which are devoid of quantitative imagery? Note that while such thoughts are devoid of quantitative images, they still contain images of another sort. These are images of numeral patterns, either sounds such as "forty-two" or inscriptions such as "42." Children memorizing multiplication tables are not really engaged in understanding *per se*. Rather, they are learning that " $6 \times 7 = 42$ " is an acceptable combination of symbols; " $6 \times 7 = 44$ " is not.

Mathematical sentences divorced from quantitative translation cannot fit the definition of truth given in this writing. Apart from quantitative imagery or quantitative patterns of any sort, " $6 \square 7 = 42$ " is neither true nor false.³² Instead we must say that it is an acceptable combination of patterns within the arithmetic of Arabic numerals. The so-called "truth" of this sentence thus becomes a matter of metamathematical rules. That is, if " 6×7 " is the only pattern to the left of "=" and if to the right of "=" there is to be only one numeral and no other patterns, then the only acceptable pattern is "42."

Such mathematical sentences, like sentences in general, are neither true nor false.³² Rather, they are potential precursors of truth or falsity, and their truth value depends on how they are translated into quantitative patterns. For example, " $11 + 10 = 101$ " yields a falsity when translated in decimal terms, but it yields a truth when given binary translation. It is not imperative that a mathematical sentence (or any sentence) be translated only into mental imagery in order to produce a state of matching, hence truth. Imagery is only one way of forming patterns. Matching can also occur between physical things. Thus a computer which takes " $2 + 3$ " and turns out " $x + x_{xx} = x_{xxx}$ " has (without consciousness) produced a quantitative condition of truth in regards to the number of x's on the right-hand and left-hand sides of "=" However, if the computer takes " $2 + 3$ " and goes no further than " $2 + 3 = 5$," it has presented only a potential precursor of truth, and the final truth condition (i.e., the matching of appearances) will be supplied in the mind of the reader.

Suppose, however, one perceives a sentence which designates a quantity greatly exceeding the limitations of imagery. For example, I am told that a certain barrel contains 820,673 grains of corn, and such is in fact the case. Is the thought "That barrel contains 820,673 grains" true? It is

³¹ Thinking simultaneously with numeral images and quantitative images is psychologically the same as thinking the words "red chair" at the same time one forms an image of a red chair.

³² There is one important exception to these statements: Mathematical sentences can be translated in terms of number theory, such as Peano's axioms and the rules of sets and ordered pairs. In such instances mathematical sentences are turned into logical statements, and they thus result in logical truths of the sort illustrated in Chapter 5 ("Logical Truth").

true, but the truth is based on numeral imagery instead of quantitative imagery. While I cannot envisage so many grains, I can envisage the fact that if I were to count those grains the final numeral would be 820,673.

Similarly, the thought “ $5,342 \times 9,703 = 51,833,426$ ” is true; for it means that if one multiplies the numeral 5,342 by the numeral 9,703 in accordance with the accepted arithmetic rules, then one will obtain the numeral pattern 51,833,426. No considerations of quantity are necessary.

Chapter 6

The Paradox of Epimenides

Let us recapitulate the main points of the foregoing discussion: Truth is defined as a matching relationship, and within the psychological domain this matching is between an image (or group of images) and the event or condition to which that image is referred. Reference is a prerequisite for matching, and the reference may be either image to image or image to external event. Both generic and abstract concepts are aggregates of associated (but not necessarily visual) images. Such concepts have ranges of meaning as determined by the number and kinds of images they contain, and these ranges can be delineated by linguistic conventions and definitions. Concepts are recurrent; that is, image associations of similar composition repeatedly arise in the minds of the members of a given community, and we further assume that these similar image associations (i.e., concepts) are consistently aroused by the same word stimuli. Consequently, language is primarily a vehicle of communication. It is the means by which I attempt to arouse in the mind of a listener thoughts similar to those which I myself have in mind. Thus sentences are precursors of thoughts. Sentences divorced from thoughts usually do not match the things which they designate and hence do not result in conditions of truth.

Of the numerous versions of the paradox of Epimenides (also known as the paradox of the Liar) perhaps the most concise is the sentence:

This sentence is false.

“This sentence” designates that self-same sentence, and we must then decide whether the sentence is false, as it claims to be, or whether it is in fact true. Whichever way we choose we immediately fall into contradiction. If the sentence is false, then what it says is true. But by being true it contradicts the claim to be false. It can be true only by being false. It can be false only by being true.

One may attempt to resolve this dilemma by claiming that the sentence is neither true nor false but is instead meaningless and without truth value. However, we can still maintain the paradox by rewording the sentence: This sentence is not true.

Since “not true” designates both false and neither-true-nor-false, we are still confronted with contradiction.

Readers with a linguistic orientation may query whether the paradox arises from some inherent fallacy in Indo-European languages and their associated thought processes. However, the dilemma is by no means exclusively Indo-European. Translating the sentence into such languages as Chinese, Japanese, Thai, and Lahu (a Burmese hill tribe) the same quandary

emerges. I know of no languages which are exceptions. Also, it might seem as if something is inherently wrong with allowing a sentence to speak of itself, but in most instances this does not create a problem; for example, "This sentence has five words." Paradox arises only when self-reference is employed with locutions of truth and falsity.

Proposed Solutions

One cannot say that there are no known solutions to the paradox of Epimenides. There are several, but none seem very satisfactory, and none are universally accepted. Of these solutions probably the best known and most popular is that of A. Tarski.

Tarski resolves the problem by establishing a rule which forbids us to say "This sentence is false" and which also precludes us from formulating any other versions of the same paradox. To accomplish this end Tarski prohibits the use of "true," "false," and the like with regards to any sentences which belong to the same language level in which we are speaking. Thus his solution proceeds by 1) establishing a hierarchy of language levels and 2) by establishing a rule of grammar. That rule is: In a given language level, L_0 , it is forbidden to speak of the truth or falsity of any sentences occurring within that same level. If we wish to speak of the truth of a sentence in L_0 , we must do so from the position of a metalanguage, L_1 . Likewise, within L_1 we are not allowed to speak of the truth of any sentences of L_1 . To speak of truth inside of L_1 , we must ascend to a still higher level, L_2 ; and so on to higher and higher levels of language.

Tarski is concerned with the formal languages of logic rather than natural languages such as English and German. One criticism of his and similar approaches is that the paradox of Epimenides is paradoxical in natural languages as well as in formal logical languages, and establishing artificial levels and rules is only a means of avoidance which gives no insights into the origins of self-contradiction. Indeed, natural languages to the side, avoidance is the foundation of Tarski's solution. We are forbidden by grammar to state the paradox, hence the problem is resolved.

To the uninitiated Tarski's "solution" seems almost ludicrous. It is like the proverbial ostrich which escapes danger by burying its head. However, one must try to view the problem from a logician's perspective. Logic is not primarily concerned with truth in an empirical sense. Far more attention is given to formal linguistic systems which are thoroughly consistent in all their ramifications. The paradox of Epimenides defies such consistency. To the logician it says:

x is true if and only if x is not true. Or more concisely:
y if and only if not y.

By introducing the above mentioned rules, Tarski reestablishes consistency. Hence there are no disruptions in the internal harmony of his logic. But consistency alone is an inadequate criterion for truth. If we ask what truth is, we are apt to be told that it can only be defined from a language beyond itself, and hence a final definition is unattainable.

Many logicians are dissatisfied with Tarski's approach to this paradox. And partly for this reason a symposium-workshop was held in 1969 dedicated exclusively to the paradox of Epimenides. Over half a dozen solutions were presented, and one of the main contributors, R.L. Martin, introduced his own contribution with the words:

“Besides disagreement as to the best way to solve the Liar, there is apparently also a more fundamental disagreement as to what constitutes a solution.”³³

Recurrently throughout the symposium participants voiced dissatisfaction with the correspondence theory of truth, but no alternatives or modifications of the theory were proposed. Again it was repeatedly suggested that some hidden fallacy must lie within the reasoning which leads to the paradox, but there was little agreement as to what that fallacy might be. Throughout all this discussion was the explicit assumption that truth is a property of sentences. That is, a declarative sentence is either true or not true much like a given object is either red or not red, round or not round.

A Psycholinguistic Approach

This writing has proposed that truth is a matching relationship, and sentences are true only by virtue of the thoughts which they may arouse. If it can be shown that such an interpretation of truth provides a satisfactory resolution of the paradox of Epimenides, then we have further reason to give sympathetic consideration to the foregoing conclusions.

If truth is primarily an attribute of thoughts and only secondarily an attribute of sentences, then let us first examine the paradox expressed only in the form of thoughts:

A. This thought is false.

By the definitions already established, A must be taken to mean

B. This thought does not match the thing or event to which it is referred.

The matching or truth of this thought thus depends upon the thing or event to which it is referred, and most commonly that event is perceived as being the selfsame thought. Thought B is referred to thought B.

One might question the validity of such self-reference. Can a thought (or any appearance) be referred to itself in the same way that it can be referred to some totally distinct event? If thought B referred to itself over again is not a valid condition of reference, then this version of the paradox is easily resolved: As already noted (Chapter 2: “Images”), reference is a prerequisite for the conditions of both truth and falsity. If we do not allow the thought to be referred to itself and do not refer it to anything apart from itself, then there is no reference, and the thought is neither true nor false.

But what is the result if we do allow the thought to be self-referred? Since all things are the same as themselves, any appearance referred to itself is necessarily in a condition of matching, hence truth.³⁴

Consequently,

B. This thought does not match the event to which it is referred, matches itself and is true.

However, by concluding that the event to which B is referred is B itself, we then consider the thought in a slightly different way:

B. This thought (B) does not match the event (B) to which it is referred.

³³ Martin, R. L., p. 91.

³⁴ There is a well-known objection to saying that a thought can be true of itself and also true of things apart from itself. This point is discussed in the following chapter. Also, a more complete discussion of reference is given in Chapter 7 (“Reference and Orientation”).

This in turn leads to:

C. This thought does not match this thought.

Or

D. B does not match B.

It appears that our necessary truth has led to a patent contradiction. However, such is not the case. The fallacy which results in seeming paradox arises from taking B, C, and D to be the same thought. On the contrary, C and D are distinct thought events which have arisen as a result of our contemplation of B. In D we see representations of B twice occurring, but these are not the same as B itself. This point is easily overlooked by one accustomed to thinking of truth only in terms of sentences. But one who is inclined to the Buddhist way of noting the rise and fall of thought events and who also is accustomed to examining mental states independently of their verbal accompaniments will more easily discern what happens.

The matter is perhaps less confusing if we omit the demonstrative "This" and examine the thought in the form:

E. thought does not match the event to which it is referred.

Such a thought standing alone and not referred to any event including itself, is neither true nor false. If, however, it is referred to some random object such as a rose bush, then there is a non-matching, thus falsity. This is so because a rose bush in itself is not a condition of non-matching between a thought and an event. On the other hand, if thought E is referred to a belief that snow is green, there is a condition of matching. The component "thought" matches the belief, for beliefs are thoughts. "Event" matches actual snow, for snow is one kind of event. And "does not match" is a relational concept which expresses the relationship between the thought and the event.

In B the demonstrative "This" influences the way in which thought E is referred. As soon as the thought arises one ponders "What thought?," "Which event?." Subsequently, thought B or E fades and thoughts in the form of C and D arise.

It is not possible to have a picture which contains all of itself within a single component of itself, but this is exactly what we attempt to do when we assert

B. This thought (B) does not match the event (B) to which it is referred.

This, I believe, is the correct solution to the paradox of Epimenides. However, one fundamental objection is anticipated: We have begun with thought A,

A. This thought is false

and then on the basis of our preceding discussion translated this to a new form,

B. This thought does not match the event to which it is referred. The objection is as follows: Thought B contains a very special and uncommon definition of truth. Thus the man who thinks thought A may not at all be thinking in the way of B, and hence the translation is unfounded. There are three counter-objections to this assertion.

First, it is not quite true that the matching interpretation of truth is uncommon or esoteric. On the contrary, it is simply a restatement of correspondence theory (i.e., a true belief is one which corresponds with fact), and correspondence theory is no doubt the most popular interpretation of truth among both philosophers and laymen. The difficulties which have arisen in employing correspondence theory in the paradox of Epimenides have arisen not from deficiencies in the theory *per se*. Rather, the difficulties have occurred because the theory was not

carried far enough. This is why it is first necessary to show how the matching relationship holds true even for generic concepts, abstract concepts, and mathematical truths.

Second, philosophers such as Tarski, Frege,³⁵ and others have failed to give us a definition of truth. Rather, they say that truth is an indefinable quality which the mind intuitively grasps. Since it cannot be defined, it can only be shown by way of example, and one of the most popular examples is:

P. The sentence "Snow is white₁" is true if and only if *snow is white₂*.

One immediately sees that sentence P is necessarily true, and such an "intuitive" example is considered sufficient to forgo any definition. But if one watches the thinking process behind this so-called "intuition," a definition can be found: In sentence P the two clauses "'Snow is white₁'" and "*snow is white₂*" produce identical thoughts and hence match. The "intuition" is nothing more than a recognition of this matching. The same principle holds even with sentences containing free variables:

"If $x = b$ and $b = c$, then $x = c$ "

is true 1) because the first "b" in the sentence matches the second "b" regardless of the possible values assigned. And 2) the symbol " $=$ " allows us to substitute both x and c for b .

Thus the assumed objection to translating A, "This thought is false," to B, "This thought does not match the event to which it is referred," actually gives further support to the correctness of this translation. That is, a failure to analyze the so-called self-evident nature of truth renders one incapable of providing a definition, and this in turn precludes one from analyzing and ultimately resolving the paradox of truth. Moreover, if one does not have a clear definition or concept of truth, then the thought "This thought is false" may occur in the mind only as a pattern of words with no other images associated. If such a word pattern is the only existing thought and if this thought is not referred to anything, then there is neither truth nor falsity.

Finally, even if one does have a definition and concept of truth which is different from the concept of matching, any thought containing that concept will still match itself whenever it is self-referred. Thus it does not matter how one translates or understands "This thought is false." In whatever way it is translated, when self-referred it is necessarily true.

Besides this above objection, there are several variations and alternate interpretations of the paradox which must be examined.

Consider thought B:

B. This thought does not match the event to which it is referred. It may appear that the event to which B is referred is not just B itself but rather B referred to B. If this is the case, then the reference is false. B portrays a condition of non-matching. Of necessity it matches itself and consequently does not match the condition of itself matched to itself.

As another variation, consider thought F:

F. Thought G is false.

And thought G:

G. Thought F is true.

By our previous discussion this means:

³⁵ Frege, pp. 290–291.

F₁. Thought G₁ does not match the event to which it is referred.

G¹. Thought F₁ does match the event to which it is referred.

This in turn would mean that G does not match F referred to G. Here the solution will depend upon the way in which the mind perceives the problem and generates subsequent thoughts. Quite often one falls into an infinite regress with F referred to G referred to F referred to G... without end. Since such a process is interminable, there is no truth value.

This absence of truth value can be demonstrated by considering another version. Suppose that thought 1 is "Thought 2 is false," and thought 2 is "Thought 3 is false," and each subsequent thought refers in the same way to another beyond itself. Now if we come to a definitive end, say thought 30, which is "All monkeys have wings," then thought 29 (i.e., "Thought 30 is false") is true; and thought 28 (i.e., "Thought 29 is false") is false, and so on until we return to thought 1 which is true. However, if the process goes on into infinity or if thought 30 is "Thought 1 is false," then we never come to a final matching of appearances. Each of these sequential thoughts is neither true nor false. Earlier we saw that if a thought is not referred, then it is neither true nor false. Here, however, we see a way in which there can be reference and still no truth value. That is, the thought is a segment in a interminable process of reference.

There are several other variations of the paradox which we need not take the trouble to pursue at this time. The relevant point is that by adhering to the principles illustrated above each can be assigned a truth value or lack of truth value without generating self-contradiction.

Since the usual version of the paradox of Epimenides is H. This sentence is false, let us now consider the problem in this form. Since sentences are true by virtue of the thoughts which they arouse, H must be understood to mean:

J. This sentence produces a thought which does not match the event to which that thought is referred.

J may be considered both as a sentence and as the thought produced by that sentence. Viewed as a thought, we see that the component "This sentence produces a thought" does in fact match both sentence J and the fact that it produces thought J. Consequently, when referred accordingly, there is no falsity concerning this component alone. Next consider the thought segment "a thought which does not match the event to which that thought is referred." Thought J referred to itself necessarily matches itself and hence is true. But if we refer the thought to itself and produce a matching, then this matching condition does not match the thought "a thought which does not match the event to which it is referred." The thought matches itself and consequently does not match the condition of itself matched to itself.

This is admittedly confusing, but it is not paradoxical. We have conditions of both truth and falsity depending on which thoughts (or thought segments) and which referents we consider.

Additionally, by imagining the thought as referred to itself, we have produced still another thought, namely the thought of the thought referred to itself. And in this manner we can develop an infinite regress of thought referred to thought referred to thought... ad infinitum. If one takes the trouble to analyze this process, it is seen that the successive steps in the expansion of reference alternate between being true and being false.

Furthermore, "This sentence is false" may be so ambiguous or confusing to the reader that the resultant thought takes no form other than the subjective word sounds of the sentence itself. That is, both the printed and the spoken words may not arouse any images other than images of

the vocal sounds "This sentence is false." In such instances (as seen in Chapter 4) the sentence would be neither true nor false apart from being a true portrayal of word patterns.

Consequently, "This sentence is false" can be either true, or false, or both true and false, or neither true nor false depending on how it is perceived and the resultant thoughts. This is so because a single sentence can generate either one or more than one concept combination, and such thoughts can be referred to either one or more than one situation. Or, alternately, a sentence may produce no thoughts at all or produce thoughts which are not referred to any event or condition.

I can imagine the sort of reaction that many logicians will have to the above. It must seem a hopeless expression of subjectivity and complexity. Why should one adopt such a system in preference to the neat and orderly object languages of contemporary logic?

The psycholinguistic facts may be complex and elusive, but they are facts nonetheless. True, they are not easily expressed in simple formulae and are foreign to the highly specialized thinking of logicians. This, I think, is why such facts have been ignored for so long a time despite their obvious presence. Why indeed should one meddle with the psychological when logic is so compact and orderly? Well for one thing logical thinking is a psychological process. For another, complex as the above considerations may be, they appear to resolve the paradox of Epimenides in a much less artificial way than any approach yet presented.

One readily admits that the Newtonian formula $d = rt$ (distance equals rate times time) is neat, easily comprehended and has great utility. One also agrees that Einstein's substitution of the Lorentz equation,

$$d = \frac{d' - rt'}{\sqrt{1 - r^2/c^2}}$$

is complex, confusing, and esoteric. But the former gives only a superficial description of events and if pushed to its limits leads to seeming paradox. The latter comes closer to the core of things and avoids the contradictions arising from the former.

There remains one additional aspect of the paradox of Epimenides which we have not yet considered. This will be more easily examined if we first turn attention to another paradox.

Chapter 7

Self-Matching Thoughts

The thought "concept" is itself a concept and hence matches itself. Similarly, a thought "occurring on a Tuesday" when arising on a Tuesday is likewise self-matching. The same is also true for such thoughts as "associated with English words," "occurring to persons over 10 years old," and "mental event." All are self-matching. Conversely, a thought "chair" is a thought rather than a chair and hence does not match itself. Similarly, "occurring on a Tuesday" when arising on a Friday is likewise non-self-matching.

From this we see that thoughts can be divided into two classes, self-matching and non-self-matching. But a problem arises when we consider the thought "a non-self-matching thought." Does this thought match itself or not? It would appear that it can match itself if and only if it

does not match itself. We are confronted with a seemingly insoluble self-contradiction, hence paradox.

Note, however, that this conclusion is founded on a fallacious premise. We have allowed that certain thoughts may not match themselves. By our previous discussion we have seen that all things are necessarily self-matching. Consequently, "a non-self-matching thought" matches itself, and the paradox should be resolved.

This would all be quite well but for one fact: A thought "chair" would match itself, would match any other thought the same as itself and also would match an actual chair. The thought "x is a chair" would be equally true for chairs and thoughts of chairs. There would be no distinction between thoughts and physical events.

The solution to this problem is as follows: In normal states of consciousness nonverbal thoughts are perceived in dual perspective. They are seen to portray events and at the same time seen as distinct from those events. Three independent sources of evidence support this conclusion.

The first consideration is psychobiological. The function of thoughts should be obvious. They enable an organism to both understand and anticipate events beyond immediate sensory awareness. Thus in their simplest forms nonverbal thoughts are psychic models which portray the assumed sensory features of the environment.

An organism must perceive these mental paradigms as representing actual events. If they are not so perceived, then they are the equivalent of fantasies and are functionally useless. However, it is equally important that these images be perceived as images and distinct from the things which they represent. Failure to make this distinction would be biologically disastrous. Thus we see a very real biological necessity for our above conclusion. Thoughts must be perceived in two ways. They must be seen to represent actual events and at the same time seen as distinct from those events.

Moreover, it appears that with abnormal states of consciousness this dual perspective may be lost. With hypnosis, psychosis, and drug intoxication, mental images of all sensory modalities may occur simultaneously with actual sensory encounters and yet be indistinguishable from them. Thus hallucinations are mental images seen only in single perspective; awareness of their subjective origins is absent. The seeming reality of dreams provides yet another example. While hallucinations are concrete in appearance, delusions are abstract. A *sine qua non* of a delusion is that the victim is unable to see his belief as a belief; it is seen only as fact.

A second demonstration that thoughts are simultaneously perceived in two qualitatively distinct ways occurs by simple introspection. When planning an extended hiking trip, one will be concerned with the needed items of equipment; flour, matches, boots, etc. Engrossed in these concerns one has the respective thoughts "flour," "matches," "boots." But at such times one is not inclined to consciously reflect "Now I am thinking 'flour'" or "Now I am thinking 'matches'". However, either in retrospect or by altering one's line of attention the psychic as well as the sensory nature of these images is readily apparent. The primary appearances of the respective thoughts are images of flour, matches, etc., but each also has a secondary appearance which is that of being a thought.

We shall use the terms "primary appearance" and "secondary appearance" to designate these two qualitatively different aspects of thoughts. Primary appearance is the direct thought

portrayal. Secondary appearance is the quality by which one perceives that a thought is a thought rather than a sensory experience.

The third support of this conclusion is logical consistency. If we allow a distinction between primary and secondary appearances, then the paradox of “a non-self-matching thought” and related problems can be resolved.

When a thought matches an event, usually it is the primary appearance alone which so matches. Moreover, this primary appearance matches itself and also matches the primary appearance of any thought the same as itself. Photographs provide an excellent comparison. A photograph of a chair is immediately perceived as representing a chair, and this recognition of chair in the photograph results from its primary appearance. The photographic image matches the actual chair and also can match any other photograph which is the same as itself. However, one also recognizes that the photograph is a photograph and not an actual chair. This perception results from its secondary appearance.

As with photographs, so it is with thoughts. In primary appearance a thought “chair” matches itself, matches an actual chair and matches any other primary appearance the same as itself. This, however, is not the case with the secondary appearance. The secondary appearance includes 1) the quality of being a thought and 2) the relationship of that thought to its larger environment—such as, occurring at a certain time and/or place, being aroused by a certain act of word perception, etc.

From this we see that the so-called self-matching thoughts are those in which the primary appearance matches the secondary appearance. “Thought” is a thought; “occurring today” has occurred today; “produced by the perception of English words” has been produced by the perception of English words. Conversely, what we originally called non-self-matching thoughts are now seen to be thoughts in which primary and secondary appearances do not match. The primary appearance of a thought “chair” does not match its secondary appearance; i.e., being a thought.

Therefore, when asking the paradoxical question:

Is the thought “a non-self-matching thought” non-self-matching? the question must be taken to mean:

Does the thought “a thought with primary appearance which does not match its secondary appearance” have a primary appearance which does not match its secondary appearance?

The question can now be given a definitive answer without self-contradiction. The primary and secondary appearances do not match. The primary appearance portrays a condition of non-matching. It is like a picture of two other pictures. The secondary appearance is only one of being a thought and/or occurring at a given time and place. These two appearances are totally dissimilar, and thus we conclude that the thought “a non-self-matching thought” is non-self-matching.

The seeming paradox arises when we fail to distinguish the secondary appearance *per se* from the non-matching which exists between the primary and secondary appearances. While the

primary appearance does not match the secondary, nevertheless it does match the condition of non-matching which exists between itself and the secondary.³⁶

Reference and Orientation

In our discussion of the paradox of Epimenides the astute reader may have queried the validity of asserting thoughts to be true of themselves and also true of things apart from themselves. The above discussion, I believe, should answer any criticisms of this sort. Additionally, we now see that there are several ways in which "This thought is false" can be self-referred. For example, its primary appearance can be referred only to itself alone or it can be referred to itself referred to itself. These two possibilities are among the ones examined in Chapter 6. One could also refer primary appearance either to secondary appearance alone or to primary appearance referred to secondary appearance plus other such variations. There is no need to explore such possibilities in this writing.

But at this point we should take a closer look at our concept of reference. The verb "refer" has implications of volition and choice. Thus when speaking of thoughts as referred to events, one is apt to gain the impression that an image comes to mind following which some decision is made regarding the thing for which that image will stand. But this is not usually the case. The process is more often one of spontaneous perception rather than willful reference. Aside from certain fantasies and "unreferred" mental pictures, most thoughts are immediately perceived as belonging in a certain context.

The matter can be restated in the following way: One's world view or total belief system is the whole of all the concepts which one has acquired. Each concept is perceived as relating to other concepts in the contexts of space, time, sequence, and/or similarity. Thus most thoughts are perceived as portraying a certain thing which has a definite relationship to other things in the universe. Normally one does not experience an image and then consciously decide what event that image portrays. Rather, the image is immediately seen as representing a certain event or condition in one's world view. In discourse a speaker accomplishes this end by orienting his listeners to time, place, person, etc. Thus we use phrases such as "The other day when I was in Oakland," or "The Dean (of our university)," or "Winston Churchill." In this way a setting is established, and (like the pieces of a jigsaw puzzle) each succeeding thought assumes its respective position in the predetermined context.

However, in this writing I have spoken of thoughts as referred to events almost as if one were to select a picture and then go about finding objects which match that picture. This has been done only for convenience of discussion. With the paradox of Epimenides, it seems important to demonstrate the various logical possibilities of thoughts about things and thoughts about themselves. The idea of reference is an easy and less complicated way to illustrate such combinations. But the idea must not be taken as implying premeditated choice. For example, when one thinks "This thought is false," it is quite unlikely that such a thought will be (or even

³⁶ As is often the case with such paradoxes, one may attempt to reestablish self-contradiction by calling attention to such concepts as "a concept which does not match the non-matching which exists between its primary and secondary appearances." However, by adhering to the above procedures, it appears that all such variations likewise fail to yield genuine antinomies.

can be) perceived as its own primary appearance referred to its secondary appearance. Rather, such a hypothetical condition of reference will arise as the primary appearance of a new and different thought which is a thought about the first thought.

Finally, this discussion gives us a position from which we can examine such words as “this,” “that,” and “the.” Their function is one of orientation, and we can designate them as a subgroup among the relational concepts, or we can even define them as a group by themselves called “orienters” or “deictics,” something apart from concepts. Their effect is the same as that of a pointing finger. They direct attention either to a certain location in one’s immediate world of sensory contact or to a point among the interrelated concepts of one’s world view. They tell us in what context their associated thoughts should be placed relative to the concepts already in awareness. Thus they determine reference, i.e., they determine what thoughts represent. Therefore, when one thinks “This thought is false,” the thought word “This” does not modify the basic concept or image pattern of “thought is false.” Rather, its effect is to direct attention in a certain way.

Admittedly, the word “This” in “This sentence is false” may be ambiguous in that one may not know to what “This” should refer. But in one way or another we can reach a definitive point of reference in one’s universe of events, and from there we can proceed to the paradox. For example: The last sentence of Chapter 7 of the book *Language, Thought, and Logical Paradoxes* is false.

Chapter 8

Russell’s Paradox

In 1901 Bertrand Russell discovered a paradox which has had far-reaching consequences in mathematics and in set theory in particular. Russell began by dividing all classes (or sets) into two subclasses—classes which are members of themselves and classes which are not members of themselves. An example of a non-self-member class is the class of all the citizens of London. A member of this class is any person and only that person who is a London citizen. Now this class itself is not a London citizen; rather it is a class and hence is not one of its own members. This in turn means that the class of London citizens is a member of the class of non-self-member classes.

An example of a self-member class is the class of all classes mentioned in this writing. Since this class itself is one of the classes mentioned in this writing, it is a member of itself. Consequently, it is also a member of the class of all self-member classes.

Paradox arises when we inquire about the class of all non-self-member classes. Is this class a member of itself or not? We find that the class is a self-member if and only if it is not a self-member.

Many mathematicians have sought from set theory a structure into which all mathematical knowledge can be incorporated. Consequently, the discovery of contradiction at the presumed heart of mathematical foundations has been disconcerting. Following Russell’s discovery, several varied solutions to the paradox have been proposed. These approaches often have a feature reminiscent of Tarski’s approach to the paradox of Epimenides. That is, it is usually

assumed that the fundamental notions of classes and members are either sufficiently understood or undefinable; primary concern is on methods of avoiding the paradox. If the class of all non-self-member classes leads to self-contradiction, then this class (and certain others) must not be allowed into any set theory on which mathematics is founded. Or if classes of this sort are allowed, restrictions must be placed on their usage.

To this date no one has discovered a set theory which is free from paradox and still able to embrace the whole of mathematical knowledge. Nevertheless, most mathematicians no longer consider Russell's paradox to be a serious theoretical challenge. One may adopt whichever theory suits one's needs and proceed without further concern. However, we also hear recurrent notes of dissatisfaction:

"Each of these approaches is able to preserve substantial parts of traditional set theory, yet none preserves all the laws of sets that might seem desirable. There is an arbitrary, makeshift air about each of these four approaches; yet nothing better is in sight. This situation is very much at odds with what the philosophy of realism would have led us to expect. If sets are abstract entities which really exist independently of the mind, awaiting discovery by it, then one would expect to be able to produce some single, clearly best theory of sets. It no longer seems plausible to suppose that this can be done."³⁷

In the following paragraphs I shall not be concerned with set theory as a basis for mathematics. Rather, I wish to examine the ideas on which set theory is founded. It is sometimes said that Russell's paradox is a purely mathematical concern, but this is not quite so. The paradox can be stated and understood without any knowledge of arithmetic, algebra, or the like. It is paradoxical to laymen speaking in ordinary language as well as to mathematicians speaking in technical and formal language. The problem is not mathematical *per se*; it is logical. It first arose from an attempt to reduce all of mathematics to logical axioms. With the paradox of Epimenides, the problem (and hence the solution) lay in our understanding of truth. With Russell's paradox, I believe, the problem originates from an inadequate understanding of classes or sets.

Classes as Objects of a Third Realm

The view of classes taken by Russell and many other philosophers is as follows: Classes are said to be abstract entities which exist independently of their members. In fact a class may have no members at all, such as the class of unicorns or the class of French kings alive in 1970. It is claimed that such classes are quite different from concepts, for they are said to exist apart from the mind but are discovered by the mind through the eye of Reason. Thus they are reminiscent of Platonic Forms or Archetypes. There is asserted to be one class which is the class of equilateral triangles and another which is the class of dogs. Philosophers who adhere to this view further claim that all rational beings are capable of discovering such classes through Reason alone. Two philosophers who discover the same class are like two explorers who discover the same mountain peak. Both philosophers behold the very same entity, an entity which exists independently of their own consciousnesses. The position I shall advocate is that classes readily can be defined as concepts. I find no justification for assuming such a third realm of existence, a

³⁷ Barker, p. 91.

realm that includes neither events nor the concepts which portray events. Concepts arise primarily, if not entirely from experience. If classes really are independent of both events and the concepts of events, then Plato should have discovered the class of kangaroos and the class of steam engines as easily as he “discovered” the class of triangles. This assertion may sound absurd, but by the above ontology and epistemology it is not apparent why it should be absurd.

Classes as Concepts

Thoughts are momentary subjective appearances, but certain of these appearances are the same or similar. Thus one notes that there are recurring thought appearances (such as the thought “square,” i.e., “□”), and one assumes that similar such appearances arise in the minds of other persons as well as in oneself. Why indeed should one believe that the thought “□” which one has at this moment is the very same entity as the thought “□” which one had yesterday or the thought “□” which arises in the mind of a companion? Well, certainly they all look alike. But in the same manner the letter “e” which I type on the first line of a manuscript may be indistinguishable from an “e” typed on the second line, and, moreover, it looks very much like most of the “e’s” which I can find in any English-language book picked at random. Never do I assume that I am seeing the same “e” over and over again. This, I believe, shows the fundamental error on which the doctrine of the third realm is founded.

Since each person seems to imagine squares in the same way, we acquire an illusion of shared experience. In the mind’s eye we all appear to see the same entity. But is it not more reasonable to assume that similar but separate images of squares, dogs, and whatever arise in the minds of each of us? We all have the same general brain structures and the same kinds of sensory organs. Additionally, we usually share a common language, common culture and usually have similar educations. These facts should be more than adequate to explain why the words “triangle,” “dog,” etc. arouse similar images in different persons. Additionally this should also explain why our sequences of thought associations are often similar.

While these conclusions may seem almost commonplace to psychologists, some philosophers and logicians will disagree. D.W. Hamlyn disputes the above as follows:

“The point turns on what is involved in saying that X and Y have the same thought. To say that is surely not to say that they have the same private experience or even ones that are similar... It is to say that there is common intersubjective description applicable to what they are thinking of and what they think about it.”³⁸

The point to Prof. Hamlyn’s comment turns on the phrase “common intersubjective description.” It appears that he is saying that when X and Y have the same thought, one can use the same words to describe their respective thoughts and this is why the thoughts are the same. Now admittedly there is the case of the blind men and the elephant as already discussed (Chapter 4). That is, two people may think about the same thing with very different pictures in mind. However, thoughts containing concepts with completely dissimilar image patterns are not the same regardless of the fact that the same verbal label may be put on those thoughts.

³⁸ Personal correspondence.

Additionally, if two totally different thoughts are thoughts about the same external thing, then at least one of those thoughts has either a false set of images of that thing or else it has a range of images which is so limited as to be inadequate. What we could say is that the two persons have referred their thoughts to a common point in space and time or to a common situation, but what they think about that event or situation will be different. Hamlyn's criticism contains a valid point, but it fails completely as a refutation. It says only this: Thoughts may be different in appearance and yet described by the same words and directed to the same event. Such an assertion is only a restatement of what has already been said in this writing. It in no way invalidates any of the foregoing discussions.

What are Numbers?

If classes can be defined as concepts and if concepts are explainable in terms of imagery, why then is there any need to assume a third realm, a realm of classes which are distinct from both events and thoughts of events? Why do many modern mathematicians adhere to a philosophy which seems both archaic and psychologically naive? I believe that the answer to these questions lies in the rather confusing ontology of numbers. Numbers are certainly more than specific instances of quantity. The number 17, for example, exists independently of any collections of 17 pebbles, 17 stars, or 17 days. Thus, divorced from instances of quantity, 17 would appear to be only an idea, a concept. However, certain objections have been raised against considering numbers as concepts.

First, number theory holds that there is only one of each of the natural numbers. That is, there is only one natural number 4, only one natural number 7, only one natural number 17. Thus some philosophers of mathematics have objected that if numbers are concepts, then there would be as many 17s as there are times when people think "17." This objection overlooks the distinction between individual events and recurrent patterns among events, i.e., the distinction between thoughts and concepts (see Chapter 3). In alphabetical sequence there is only one letter between C and E. This is D, but also there are trillions of D's which have been printed. D can be either a single recurrent pattern or an individual example of that pattern. There is no more reason to assume a Celestial Archetype for 17 than for D. In units of whole numbers there is only one quantity between 16 and 18, but this does not demand a Universal 17 by which all others are to be judged. This alphabetical comparison can be taken even further: D, D, and d are distinct patterns, but they all have the same systemic value. Similarly, the sound "seven" and the figures "7," "VII," "·:·" (Mayan), and "111" (binary) are distinct patterns which all designate the same quantity, (: : :).

This takes us back to our earlier discussion of the twofold way in which the mind understands arithmetic through imagery (Chapter 5, "Mathematical Truth"). A numerical concept can be a quantitative image, such as (: : :), or a numeral image, such as "7" or "VII," or it can include both. The confusion which concerns the ontology of numbers often arises from 1) a failure to distinguish quantities from the numeral patterns which designate quantities and 2) a failure to realize that such numeral patterns exist both as concepts (i.e., recurrent image patterns) and as physical inscriptions. Additionally, 3) concepts based on numeral imagery may or may not accompany quantitative imagery.

Numbers can be defined as numeral patterns which designate specific quantities.³⁹ While there are billions of 17s in print, there is only one pattern "17." We allow this pattern a certain range of minor variations, such as "17," and also acknowledge that it has an auditory equivalent, "seventeen," as well as equivalents in other languages and in other numeral systems (e.g. XVII). Thus we can restate our definition as follows: A number is all of the numeral patterns which designate the same quantity⁴⁰ Such patterns may recur in word, on paper, and in the mind.

One objection to such a definition is frequently raised: There are certainly numbers designating very large magnitudes (perhaps in the trillions or more) which have never occurred either in thought or in print. Is one to say that such numbers do not exist? The answer is yes. But such an assertion means only that there are novel numeral patterns yet to be created. In no way does this deny the existence of the quantities (or sequential positions) which such numerals would designate; nor does this deny the possibility of ever creating such patterns. A similar argument applies to sets. That is, undiscovered sets are simply potential patterns which have not yet come to awareness.

It is important that we be aware of when we are dealing only with numeral patterns and when we are actually concerned with the quantities which those numerals designate. While 7 exists independently of any instances of seven days or seven persons, still seven means (: : : .). Divorced from this meaning we talk only of patterns and have ascended from mathematics to metamathematics. If we ascribe to Seven some quality apart from (: : : .) and apart from "7" or "VII," then we have ascended to metaphysics and are no longer talking about the 7 of arithmetic.

From this above discussion it appears that there is no need to assign numbers to a special realm apart from events and concepts of events. Divorced from actual quantities (including concepts containing quantitative imagery), numbers are numeral patterns, and concepts composed of numeral imagery are one form of such patterns.

It is sometimes objected that if mathematical entities exist in the mind, then the mind creates them, and thus it can create any such entities that it desires. For example, one could imagine a whole number solution to the equation " $x^2 + y^2 - 3 = 0$," but no such solution is to be found. The problem here arises from confusing words and other symbols with the things which those symbols designate. Words can be combined so as to speak of things which are either impossible or unimaginable. One can easily speak and/or imagine the words "a five-sided circle," but there

³⁹ See next footnote.

⁴⁰ Alternately, a number can be defined as all the numeral patterns which designate a certain point in the process of numerical sequence. This sequence can be either linear (e.g., 1, 2, 3, . . .) or temporal (as when counting vocally). Sequential relationships express one form of quantity, such as a quantity of days or a quantity of heart beats. Quantities of this sort are not static quantities like (: : .), and to understand them directly the mind must employ memory and envisage changes occurring through time. As this sort of imagery has a very limited range, one readily abandons it in favor of counting. That is, each unit in the sequence of days or sequence of heart beats is correlated with a given whole number in the sequence of numerals.

A sequential definition of numbers has the advantage of including negative as well as positive integers. That is, both -7 and +7 would be distinct numbers by sequential definition, while by static quantitative definition -7 would be excluded. However, imaginary numbers (e.g. would not be numbers by either the sequential or the quantitative definitions. Imaginary numbers would be defined only as certain combinations of mathematical symbols.

is no way to envisage such a figure. Symbols can be grammatically combined in many peculiar ways, but imagery follows the same rules of shape and form as are seen in the world of sensory experience. It is true that the mind is inventive and can create novel patterns, but there are limits to the types of patterns possible. For example, one may contemplate a space with six dimensions, but at such times one does not experience images having a six-dimensional appearance. Rather, one thinks with two- or three-dimensional symbols which represent such a hypothetical space.

A Solution to the Paradox when Classes are Concepts

It appears that classes as employed in set theory can be defined as concepts.

Returning to Russell's paradox we find further evidence for this conclusion. Each example of a non-self-member class is noted to contain a non-self-matching concept; that is, a concept in which the primary appearance does not match the secondary appearance (see Chapter 7). The class of all pencils is a class and not a pencil and hence is not a member of itself. In the same way the concept "pencil" is a concept rather than a pencil and thus is non-self-matching.

Conversely, we find that self-member classes are but class versions of self-matching concepts; that is, concepts in which primary and secondary appearances do match. Here it must be recalled that secondary appearance includes both that of being a thought and the relationship of that thought-event to the larger environment in which it occurs (such as, arising at a certain time, place, and person; expressed in English words; etc.). As the class of all classes is a member of itself, similarly the concept "concept" is self-matching. The class of all classes brought to one's attention by reading this page is a self-member, for it has itself been brought to attention by reading this page. In the same manner the concept "brought to attention by reading this page" is self-matching. Likewise, the class of all things which are not horses is not a horse and hence is a self-member. The concept "not a horse" itself is not a horse and thus is self-matching. The class of all classes with more than five members is a self-member, for it has more than five other classes as members. Expressed as a concept this becomes "a concept matching more than five things," and such a concept itself matches more than five concept-event matchings and hence matches itself. Thus, stated as concepts, self-member classes are seen to be self-matching concepts; i.e., concepts with primary appearances which match their secondary appearances.

Take any generic concept, such as "antelope." This can be pluralized and combined with the quantifier "all." The result is the concept "all antelopes," and this we can call a *class concept* or alternately the *class version of a concept*. A member of this class is any event which matches the concept apart from its quantification and pluralization. That is, any thing which is an antelope is a member of that class.

Thus the classes of set theory can be understood as class concepts. From this it further appears that non-self-member classes are class concepts with primary appearances which do not match their secondary appearances. Defined in this way how should we view Russell's paradox? Stated in its usual form the paradox reads:

Q. The class of all non-self-member classes is (or is not) a member of itself.

When we define non-self-member classes in the manner shown above, sentence Q becomes:

R. The class concept “all class concepts with primary appearances which do not match their secondary appearances” has a primary appearance which does not match its secondary appearance.

Thus, when translated into concepts, Russell’s paradox is the class version of the paradox of “a non-self-matching thought” (see Chapter 7). The primary appearance of this concept is one which portrays a certain condition of non-matching. The secondary appearance is only one of being a concept and occurring at certain places and times. Consequently, sentence R is true and non-paradoxical. The primary appearance does not match the secondary.

Here we must be quite precise in our definition of membership. If we say that a non-self-member class is one in which the primary appearance does not match the secondary appearance, then the class of non-self-member classes is a non-self-member. For in fact the primary appearance does not match the secondary. However, this in turn means that the primary appearance does match the condition of non-matching which exists between itself and the secondary appearance. There are two distinct matching relationships: primary-to-secondary and primary-to-primary-to-secondary. In the former case we have a non-matching and hence non-membership. In the latter case we have matching, thus membership. The class of non-self-member classes thus can be either a self-member or non-self-member depending on which matching relationship we consider. A failure to distinguish between these two leads to seeming contradiction and hence paradox.

Conclusion

We have come a seemingly long way from our original Buddhist premises, but if the reader reviews the points listed in Chapter 1 (“Buddhist Tenets and Methodology”), the Buddhist relevance should be apparent. I felt it best to list these points at the beginning and then proceed directly to the psycholinguistic facts without further mention of which have specific Buddhist recognition and which do not. The above material presented in any form is unavoidably complex and sometimes confusing. To interject notes of Buddhist relevance and to repeatedly shift from Buddhist terminology to psycholinguistic terminology would only add to this complexity.

I think this writing shows the importance of an interdisciplinary approach to certain fundamental problems. Specialized knowledge, however sophisticated, is often insufficient. Viewing our journey in reverse order: To analyze the contradiction of Russell’s paradox we needed to examine the nature of classes, and classes took us to concepts, linguistics, and concept formation. Ultimately we had to deal with the problems of mental imagery and understanding. Only by coming to grips with these often ignored considerations were we able to lay a foundation on which to approach something so distant as to initially seem unrelated.

We say it is self-evident that the class (or set) of pencils is not a pencil, but what is this “intuitive” realization? When we looked more closely we saw that it was an example of an important psychobiological function, the ability to distinguish thoughts from sensory experience. Contrary to the traditions of many disciplines, it is sometimes necessary to solve problems by examining the very mind which seeks the solutions.

Appendix

Linguistic Relativity

Having concluded our discussion of the paradoxes, let us now turn attention to another matter which also relates to problems of language and thought. This is the linguistic-relativity hypothesis, the best known advocates of which are Edward Sapir and Benjamin L. Whorf.

Whorf worked primarily with American Indian languages and was particularly impressed by Hopi. In contrasting these languages with English and other Indo-European tongues he found striking differences in grammar and lexicon. So fundamental were these differences that Whorf concluded that such languages reflect not only radically different cultures; they also reflect different perceptions of time, space, and physical reality. He writes:

“This fact is very significant for modern science, for it means that no individual is free to describe nature with absolute impartiality but is constrained to certain modes of interpretation even while he thinks himself most free ... We are thus introduced to a new principle of relativity, which holds that all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated.”

“When Semitic, Chinese, Tibetan, or African languages are contrasted with our own, the divergence in analysis of the world becomes more apparent; and, when we bring in the native languages of the Americas, where speech communities for many millenniums have gone their ways independently of each other and of the Old World, the fact that languages dissect nature in many different ways becomes patent. The relativity of all conceptual systems, ours included, and their dependence upon language stand revealed.”⁴¹

It is not surprising that Whorf’s ideas have spread far beyond the confines of linguistics. His hypothesis is frequently and favorably mentioned by both philosophers and interested lay persons. Indeed the idea has a powerful appeal: Whole new worlds of thought and understanding, new insights into reality await one who frees himself from the narrow confines of English or Indo-European thought patterns.

However, it would also appear that such an idea is in opposition to certain of the tenets by which we have approached the paradoxes. We made a clear distinction between thought and language and showed thought to be in many ways independent of vocal patterns.⁴² The problem

⁴¹ Whorf, pp. 214–215.

⁴² We might also note that the Sapir-Whorf hypothesis is at variance with certain Buddhist teachings. First, the Buddha was aware of different languages and advised his followers to teach the Doctrine in the indigenous dialects of the respective communities (Majjhima Nikāya III, 230–235). The Doctrine was always considered to be universal and not confined to any one linguistic medium. Second, in the practice of insight meditation (*vipassanā*) one often strives to develop direct observation of phenomena without reference to verbal thoughts. Thus a true insight into nature is not acquired by adopting some alternative language. Rather, it is acquired by observation and understanding which are unprejudiced by language.

does not appear to require a simple decision as to whether the linguistic-relativity hypothesis is right or wrong. Rather, there are varying degrees and facets of the hypothesis, and the matter ultimately reduces to asking to what extent and in what ways does linguistic relativity occur.

In its most extreme forms linguistic relativity reaches the following conclusions: If one had perfect comprehension of the Hopi language (or perhaps Shawnee or Nootka) and could thereby think like a Hopi, then one could perceive the error in Newtonian physics; the truth of Einstein's theories would be apparent; perhaps even the baffling occurrences of psychic phenomena would be more easily understood. This is stating the case a bit stronger than even Whorf stated it. Yet one not infrequently finds inferences of this sort.

The anthropologist Dorothy Lee describes the language of the Trobriand Islands (off Southeast New Guinea), and Robert E. Ornstein further elaborates upon her data and conclusions. The conclusions are as follows: The Trobrianders do not perceive a world of linear or sequential time. Rather, we are told that, like the Zen monk and the Sufi mystic, the Trobrianders see every action as existing only in an undifferentiated present. "What we consider a causal relationship in a sequence of connected events is to the Trobriander an ingredient in a patterned whole." Ornstein says that where we would see a single yam progressing from ripeness to overripeness as a sequential process, neither the Islander nor the Zen monk would see it this way. The Trobriand word for a ripe yam is "*taytu*," and for an overripe yam one uses a completely different word "*yowana*." To a Trobriander the overripe yam is an entirely different entity which is neither causally nor sequentially connected with the ripe yam.

As the primary evidence for these conclusions, Lee notes that there are no verb tenses in Trobriand, no verbal distinctions between past and present; the language does not even have a connective word "and." A literal translation of a Trobriand description of coconut planting would proceed as follows:

"Thou-approach-there coconut thou-bring-here-we-plant-coconut thou-go thou-plant our coconut. This-here-it-emerge sprout."⁴³

I find such an analysis of Trobriand thought highly inferential and dubious. Three distinct arguments come to mind.

First, we live in a world of linear, sequential time, a world of cause and effect. This is a physical reality, and an understanding of this reality is essential to human survival. If the Trobriander does not see any causal relationship between seed and yam or between unripe yam and ripe yam, then why does he plant yams in the first place? If he wants a ripe yam and does not see any connection between the ripe and the unripe, then for what reason would he first seek a ripe yam in a place where he previously saw one which was unripe? If past and present are truly alike, then why cannot the Trobriander act in the past as easily as in the present and hence change the past, hence never commit errors? If it be argued that "the patterned whole" is fixed and cannot be changed, this still would not prevent the Trobriander from knowing the present in the past and hence having precognitive powers. Also, if events are thus fixed and known to the Trobriander to be so, then he must never be confronted with matters of choice. If it be conceded that the Trobriander cannot see the future but does know the present from immediate

⁴³ Ornstein, pp. 41-42 and pp. 91-92.

awareness and knows the past from memory, then how does this differ from our own way of knowing?

Mystics may enter into worlds which transcend time and where cause and effect have no apparent meaning. But persons who must manipulate physical reality in order to sustain themselves must have minds which grasp causative processes. Possessing minds of this sort, they will also need languages which communicate concepts of causation.⁴⁴ The same is true for time as understood in Einstein's relativity. The facts of Einsteinian time are relevant only if one is travelling close to the speed of light (186,000 miles per second), and not even astronauts do this. In the interests of efficiency (hence survival) it is much easier to describe events in Newtonian terms. My second argument is that, unlike English, many languages rely heavily on context and thereby often omit the prepositions, conjunctions, and verb tenses which seem mandatory in European thought. Thai is one example. In English one says "He eats rice" and "He eats with chopsticks." If we omit the "with," we have "He eats chopsticks," and one thinks of eating chopsticks like eating pretzels. But Thais will say "eats chopsticks" just like "eats rice," and there is no sense of confusion or ambiguity. Why so?

To the Thai it is just common sense: No body chews up chopsticks unless they are mad or trying to attract attention. We all know what chopsticks are for. Why bother with unnecessary words? Englishmen say "It is raining." Thais say "Rain fall." (Where is the it that rains?) Americans say "The weather is hot." Thai has no articles and has no need for the verb in this instance. In Thai one simply says "Weather hot." In all of these Thai examples there are no markers of verb tense and no mention of past, present, or future. But it would be quite wrong to say that Thais have no concept of sequential time. The context of each sentence makes explicit time reference unnecessary. It is not only misleading, it is quite erroneous to assume that one can understand Thai thought by a word-for-word literal translation of Thai sentences. One must first subdue the habits of word-thought associations that are ingrained in Western languages. When this is done, one finds that despite discrepancies in grammar, there is only slight difference between the thoughts expressed in English and those expressed in Thai.

I know nothing about either the Hopi or Trobriand languages other than what Whorf and Ornstein have written, but experience with Thai has shown that one cannot make inferences about the thoughts behind a language unless one has learned to comfortably communicate within that linguistic medium. One must be able to easily think with the word sounds of that language and not have to first translate from the words of one's native tongue. Whorf's writings imply that he did not do this with Hopi. Instead he made word-by-word translations and depended on a bilingual Hopi informant for both vocabulary and grammatical correction.

One can easily imagine the sort of errors that would arise if one were to attempt a literal, word-by-word analysis of English: Breakfast would be breaking a fast. Religious atonement puts the sinner at one with God, i.e., at-one-ment. Desire is seen as suffering; for to intend to do something is to be in a state of tension—intension. True innocence is found only beyond the sensate world: Innocence is in-no-sense. (Recall that Hopi had no written tradition). Not to know is to shut out the all-knowing consciousness within oneself; thus ignorance is actually an active

⁴⁴ Causation is one of the most fundamental principles in the world view of Theravada Buddhism. It is not listed in Chapter 1 ("Buddhist Tenets and Methodology"), as it has not been mentioned in the solution to the paradoxes.

process, the process of ignoring—ignorance. How mystical and otherworldly the Anglo-Saxons must be! Even their adjectives for God begin with the sacred and universal sound OM —“omniscient,” “omnipotent,” “omnipresent,” and “omnific.” Finally (our third point), what is the significance of having two distinctly different words, one denoting ripe yams and one denoting overripe yams? Probably it reveals only that yams are highly important to the Trobrianders. Bedouins may have no words for yams, but they are said to have about 5,000 words which in one way or another refer to camels, camel anatomy, camel behavior, etc. Where English has the single word “snow,” Eskimos have several words each denoting different kinds and conditions of snow. On the other hand, the Aztecs had but one root word for snow, ice, and cold.⁴⁵ A language having one word for ripe yams and another word for overripe yams is no evidence at all for a failure to perceive causal relationships. We do not speak of eggs as baby hens. And we know quite well that kittens and puppies grow up to be cats and dogs.

The above discussion is a criticism of the more extreme versions of the Sapir-Whorf hypothesis. Other levels and aspects of Whorf’s ideas appear to be more valid and insightful.

For one thing, Whorf has done an excellent job of calling attention to the arbitrary nature of our classification of nouns, verbs, and adjectives. In English we say “It flashed” or “A light flashed” as if the flash and the light were in some way distinct. Our grammar demands sentences with both subjects and verbs, and thus our descriptions of nature comply. But in Hopi one simply states the single verb “Flash.”⁴⁶ Examining the Nootka language (Vancouver Island, British Columbia) one gains the impression that all words are verbs. Instead of “a house,” Nootka seems to say “It houses.” However, it is probably more appropriate to conclude that here the noun-verb dichotomy is non-existent, and one has instead a single class of words for all kinds of events.⁴⁷ It is by convention rather than any fact of nature that English has a noun “cold” but no verb “colding.” “To dwell” is a verb; why can there not be a noun “a dwell”? We say “He is fat” but not “He fats.” If “possess” and “adhere” are verbs, then why cannot we have verb forms for “equilibrium,” “current,” and “peace”? As in English, the Hopi word for house is a noun, but its words for lightning and meteor are verbs.⁴⁸ Hopi words for summer and morning have semblances of being a kind of adverb.⁴⁹

Perhaps the most valuable insight presented by Sapir and Whorf was noting how the vocabularies and grammars of different languages reveal the delineation of quite different concepts extracted from the complexities of experience. Whorf provides numerous examples.

In English we might describe a scene as “He is leaning against it to hold it up.” But the Shawnee description of the same scene would break down to something like “λ-shape imparted with bodily motion.”⁵⁰ Thus the same visual pattern is analyzed in strikingly different ways. Again, if we see a scene which in English would be described by the sentence “The boat is grounded on the beach” the Nootka description seems to contain word units implying a perception of vector forces. There are no words denoting boat; instead the sentence seems to say

⁴⁵ Whorf, p. 216.

⁴⁶ Ibid., p. 243.

⁴⁷ Ibid., pp. 215–216.

⁴⁸ Whorf, p. 215.

⁴⁹ Ibid., pp. 142–143.

⁵⁰ Ibid., p. 169.

“on the beach pointwise as an event of pointwise motion.”⁵¹ In still another example, in English one might say “It is a dripping spring.” The Apache description would be “As water, whiteness moves downward.”⁵²

These above examples illustrate how different linguistic communities have isolated different patterns from similar visual encounters, and consequently, when describing identical scenes, quite different concepts are called forth. This happens even with our awareness of psychological processes. In English we say “I see that the cloth is red” and “I see that the cloth is new.” But the Hopi recognize that these are two quite different kinds of seeing. One is the seeing of pure color sensation. The other involves perception and inference. Thus in Hopi there are two different grammatical forms for these two different kinds of seeing.⁵³ Similarly, in Chapter 8 (“What are Numbers?”) we have shown how numbers can designate either static quantities, such as five apples, or temporal, sequential quantities, such as five days. Hopi makes a clear distinction between these two different types of quantities, and different grammatical rules are required in the respective instances. In English one says “Ten days is greater than nine days.” Hopi grammar would not permit such an expression; rather, one must say “The tenth day is later than the ninth”⁵⁴ Instead of a static quantity, the Hopi speaks of sequential relationships.

As a result of such observations, Whorf concludes:

“We dissect nature along lines laid down by our native languages. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds—and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way—an agreement that holds throughout our speech community and is codified in the patterns of our language. The agreement is, of course, an implicit and unstated one, BUT ITS TERMS ARE ABSOLUTELY OBLIGATORY; we cannot talk at all except by subscribing to the organization and classification of data which the agreement decrees.”⁵⁵

Here, I think, Whorf oversteps the bounds of his observations and makes an unfounded conclusion. It is true that nature presents us with a kaleidoscopic flux of impressions which has to be organized by our minds. But the same is true for uneducated congenitally deaf people and for higher mammals, and they organize these impressions without language. Even in English we may employ quite different words to describe the same sensory encounter, but this does not mean that our basic perceptions are limited to just one or the other of such alternate descriptions; for example: “He leans against it to hold it up” vs. “It is resting on his shoulders” vs. “His body supports the weight.” Also, if one is not a native speaker of a language, one is apt

⁵¹ Ibid., pp. 235–236

⁵² Ibid., p. 241.

⁵³ Ibid., p. 85 and p. 121.

⁵⁴ Whorf, pp. 139–140.

⁵⁵ Ibid., pp. 213–214.

to make the error of giving literal translations to idioms, metaphors, and the like. As shown above, breakfast would be breaking a fast; intension would mean in tension, etc.

Note that in the above examples of American Indian sentences each of these sentences makes sense to us. They are quite novel word combinations when contrasted with their usual English counterparts, but they are not incomprehensible; they are not untranslatable, and they do not create meaningless mixtures of images and ideas. We seem to grasp each of the concepts as translated and presented be it “λ-shape,” “pointwise,” or seeing newness versus seeing redness. The wording seems strange, but the ideas are quite meaningful to the English reader. If the thoughts behind these aboriginal American sentences are really foreign to the Western mentality, then how could they be translated and comprehended in the first place?

Now admittedly these translations may not be perfect, or perhaps they were chosen in preference to other examples less easily translated. But this would not negate the point. There are two common Thai expressions which seem to defy precise English translation, These are “*pai thèao*” and “*chery*.” The former means something close to going for fun, and the latter expresses a casual attitude of indifference. But such English definitions do not truly capture the feelings to which these two expressions refer. However, because “*pai thèao*” and “*chery*” are commonly used in everyday spoken Thai, many foreigners in Thailand learn these words rather quickly. Hearing them in a variety of situations, one soon learns the ranges of feelings denoted. Consequently, many non-Thais appear to have full understanding of *pai thèao* and *chery* even when their ability to speak and comprehend Thai is very limited. The understanding of these uniquely delineated concepts does not appear to demand either bilingual ability or insight into an exotic manner of thought.

In Chapter 3 we mentioned instances in which bilingual speakers have recalled the content of a message but not the language in which the message was conveyed. This has been observed to happen with the two very dissimilar languages Thai and English. If it also occurs among bilingual speakers of English and Hopi, Shawnee, or Nootka, then the case I am presenting would be further strengthened. If the world of Hopi thought presents a reality incommensurable with that of English thought, one should prefer to hear this as the firsthand observation of a truly bilingual speaker of the two languages. To the best of my knowledge, this has not been the case. Rather, it appears that the conclusions of linguistic relativity have come only from persons examining the surface structures of the respective languages. That is, Whorf and others have only examined the word patterns of languages which they admittedly spoke poorly or did not speak at all.

Despite more than three decades of interest in the Sapir-Whorf hypothesis, there have been relatively few attempts to test it for empirical verification.

The findings which we do have suggest a rather limited and modified way in which language can affect thought. For example, persons who have a vocabulary that distinguishes many fine hues of color (and/or nuances of taste) are no better than persons with more limited vocabularies in discriminating physically different shades of color (or taste). Language does not appear to enhance the ability to detect fine differences in sensation. However, as would be expected, those with the larger vocabularies can more easily communicate these differences. Additionally, they are better able to recognize and identify these hues when again exposed to them. Those subjects who did best at this color recognition reported that they would name the

color when first presented with it and then use this name when later attempting to find this same color among many others on a color chart.⁵⁶ Similarly, the Zuni language of New Mexico is quite different from English in the way it delineates and names different ranges and hues of color. It has been found that persons who speak Zuni readily recognize and remember color ranges which are easily named in Zuni. And they do this better than persons who speak only English. Conversely, in recognizing and remembering colors more easily named in English, persons who speak English perform better than persons who speak Zuni.⁵⁷

Another study was performed on Navaho children. Navaho grammar classifies objects into 11 different types—round thin objects, long flexible objects, etc. Thus the language gives special attention to shape and form. It was found that Navaho children who spoke Navaho were inclined to sort and arrange objects on the basis of shape and form. English-speaking Navaho children of the same age did not do this. However, middle-class English-speaking children in metropolitan Boston performed the sorting task in about the same manner as the Navaho-speaking children; consequently, factors besides language appear to be involved.⁵⁸

Thus we do find evidence for some linguistic influence in our perceptions of sensory experience. But these are rather limited findings and are far from demonstrating alternate perceptions of time, space, and causation. After reviewing the matter Carroll concludes:

“To sum things up, the linguistic-relativity hypothesis has thus far received very little convincing support. Our best guess at present is that the effects of language structure will be found to be limited and localized.”⁵⁹

In at least one writing Whorf comments on logic and attempts to show that radically different languages would require distinctive logics. The rules of Aristotelian logic would not apply to Aztec. But, as best I can determine, Whorf does not show that the basic principles of logical thought are relative to each given language. Rather, he shows that formal logical systems which arise from a given culture will carry the lexemes (i.e., vocabulary) of that culture. For example, instead of a logical sentence which would translate as “I drop the stick in the water and it bobs to the surface,” a Shawnee logic would give us “Condition of force and reaction at water surface occurs to the wood.”

Of the several such examples that Whorf supplies, one striking feature is that many of these American Indian sentences do not contain a subject. In fact some contain only a single verb, e.g., “Flash” (meaning “I see a flash” or “A flash occurred”). Certainly most of our logical systems demand more than this. But failure to state a subject may only mean that the speaker has omitted reference to what is already presumed by context. Where in English one would say “He has left already” or “He is not here now,” in Thai one is more apt to say “Go already” or “Not present.” The word pattern alone does not reveal the whole range of thought; for the thought is conveyed partly by word and partly by context.

Furthermore, the examples cited by Whorf do not touch such fundamental logical rules as negation, conjunction, and disjunction. In fact, on the contrary, Whorf gives two examples of Hopi grammar which are clearly in accord with the logic of Western thought: 1) In Hopi the

⁵⁶ Carroll, pp. 94–95.

⁵⁷ *Ibid.*, p. 108.

⁵⁸ *Ibid.*, pp. 108–109.

⁵⁹ Carroll, p. 110.

negation of a negation is an affirmation. That is, a double negative yields a positive.⁶⁰ 2) Verb modes which express ability are stated in the form of the negation of inhibition. That is, one can do something if there is nothing that prevents one from doing it.⁶¹ It would be far more interesting if Whorf had given us examples of a language with no concept of negation or where the negation of a negation yields a negation.⁶² But apparently such examples are not to be found. And this in turn further implies that there is a common thought process shared by all men if not by all intelligent beings with sensory organs like our own. With regards to our discussion of concepts in Chapter 2, the present point can be summarized as follows: Generic concepts readily vary from culture to culture, but relational concepts appear to be more nearly universal.

We do, of course, have languages which speak about things unimaginable. I am thinking in particular of the mathematical descriptions of hypothetical spaces of five or more dimensions. One can even describe a space with 1,000 dimensions! But we never envisage such spaces, for our imagery always has Euclidean appearances; it is confined to the appearance of either two or three dimensions. The mathematician who describes a space of seven dimensions employs two-dimensional symbols to represent that space. One may either envisage a cube or alternately describe a cube as having dimensions *a*, *b*, and *c*. Seven-dimensional space has dimensions *a*, *b*, *c*, *d*, *e*, *f*, and *g*. We can write out numerous types of relationships among these seven, but our thoughts of these will be composed of images which never exceed the appearance of three dimensions (or perhaps four dimensions, if one considers time, change, and/or motion as revealing fourth dimension).

From the above discussion, one concludes that language has only limited influence on one's perceptions of time, space, and physical reality. Yet despite this there is quite another way in which language reveals whole new worlds of thought and experience. These are not worlds of physical dimensions, but worlds of mood, emotion, myth, and magic. It is not by the power of language per se that such revelations come about; rather each natural language reflects a given culture, and different cultures emphasize different values, different world views, different life styles, and different modes of interpersonal relationships.

It is true that one may acquire fluency in an alien tongue and yet never capture the feelings and attitudes of the respective culture. Likewise, one may acquire considerable empathy for a culture and yet possess minimal linguistic ability. It is a matter of human sensitivity as much as linguistic fluency. Yet language is an important element. If one observes bilingual persons who have had prolonged exposure to the cultures of both languages, often one will note a change in facial expression and mannerism that occurs with the respective changes in language. It is almost as if a given language puts one in a given frame of mind. Such changes may reveal the typical mannerisms of the culture, or they may be indications of one's personal experiences with that culture. Occasionally it has been noted in bilingual psychiatric settings that a patient may appear relatively normal when conversing in one language and yet seem schizophrenic when interviewed in the other.

⁶⁰ Ibid., p. 121.

⁶¹ Ibid., p. 119.

⁶² A double negative need not necessarily denote the negation of a negation. It could, instead, emphasize the negation and hence still be negative. But such instances reveal alternate rules of grammar, not alternate rules of logic.

Imagine an animistic tribe where stones and clouds are living things, where kindly thought has the power to make crops grow, and the sun rises only because of the chants and prayers of the tribal community. Beyond the horizon is a land of ghosts and dragons, and the stars are the cherished souls of one's departed ancestors. There is no Monday or Tuesday, no grade school or high school, no 1971 or 1972. It has always been this way and always will. One knows not and cares not whether one is 20 years old or 60 years old. Each night stories are told of the gods and ghosts and of the magical spells which influence them. It may take half a lifetime before one has learned it all. The North Wind brings danger, and when he blows there is great apprehension, and certain herbs must be burned. If your totem is the eagle, then the South Wind is your friend, and she will bring you luck; it is pleasant to sit alone on the hilltop and listen to her kindly whispers. One does not eat when the South Wind moves, for it is rude to chew food when a friend is speaking.

This is truly a different world, neither the world of Newton nor of Einstein, neither Christ nor the Buddha. The language of such a world, to be sure, reflects the spirit and the beliefs of the culture. But it is not the difference in language which is ultimately significant. Linguistic relativity is only a shadow of something more fundamental—cultural relativity.

It is not difficult to imagine why verb tenses and expressions of time would be different or even lacking in a Hopi world. Events have relevance only as they come to one's awareness, and thus Hopi grammar seems to handle time more from an experiential position than an absolute, Newtonian position. Hopi statements about the future seem to indicate expectation or subjective existence more than chronological fact. It is difficult to ask in Hopi "What is happening at this moment in yonder distant village?" Questions of this sort are relevant only if rapid communication is available. What happens in yonder village becomes significant only when one travels from here to there, and this requires some duration. Duration in turn is not a matter of hours; it is a matter of intervals. It is the number of things that happen between events, like walking over a range of hills, stopping for food, and meeting a friend. Or it is the amount accomplished, like gathering so many bags of corn. It seems gratuitous to conclude that a traditional Hopi could not understand such concepts as "at this moment in a distant village." More likely, it is not the sort of problem that was apt to concern him very often, and consequently he did not create linguistic devices which readily expressed the idea.

The Hopi has no word which is the equivalent of the English word "time." He appears to be concerned with particular events; i.e., with experience. This alone is not a more sophisticated approach than our own. However, it could save the Hopi from a metaphysical pitfall that is inclined to deceive the speaker of English. Since we have a word "time," we are apt to talk about time in the abstract, as if time existed independently of events. But without change there is no time. There must be either a change in position (i.e., motion), or change in thought, or a change in quality (e.g., what was blue a moment ago is now red). Without change there is no before and after; hence no time. It is doubtful that the Hopi could easily understand Einstein. But he may have the advantage of not carrying preconceived notions which must be discarded in the acquisition of such understanding.

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Dr Douglas Burns had been a practicing Buddhist since he was a teenager. Besides being a Doctor of Psychiatry, he was also a herpetologist, an intrepid explorer, and an expert on exotic animals (see his essays in the *Buddhism and the Population Crisis*, Bodhi Leaf 76, BPS, Kandy, 1977). Reportedly he was also a CIA agent. Besides Thai, he spoke quite a few Southeast Asian tribal dialects.

Dr. Burns first arrived in Thailand in 1965. At that time he had a research grant from the American Council of Learned Societies, and his project was to study the effects of Buddhist meditation. While his academic knowledge of Buddhism was already sufficient, the purpose in coming to Thailand was, in his words, "to see what happens when the principles are put into practice." Consequently, he has traveled throughout Thailand and other parts of Asia interviewing monks and meditation teachers, and also administered repeated psychological tests to those who undergo Buddhist training for extended periods.

Believing that a true understanding of Dhamma requires personal experience as well as factual data, in 1970 Dr. Burns spent nine months in meditation practice. For over seven months of this period he was a monk and a disciple of the Venerable Ajahn Chah, one of Thailand's most well respected meditation teachers.

This same spirit of logical analysis combined with introspective awareness is reflected in this present writing. His other main Buddhist works are *Buddhism and Depth Psychology* and *Nirvana, Nihilism and Satori*.

In 1977 Dr Burns mysteriously disappeared while exploring a national park in the south of Thailand. He was in his mid thirties at that time.