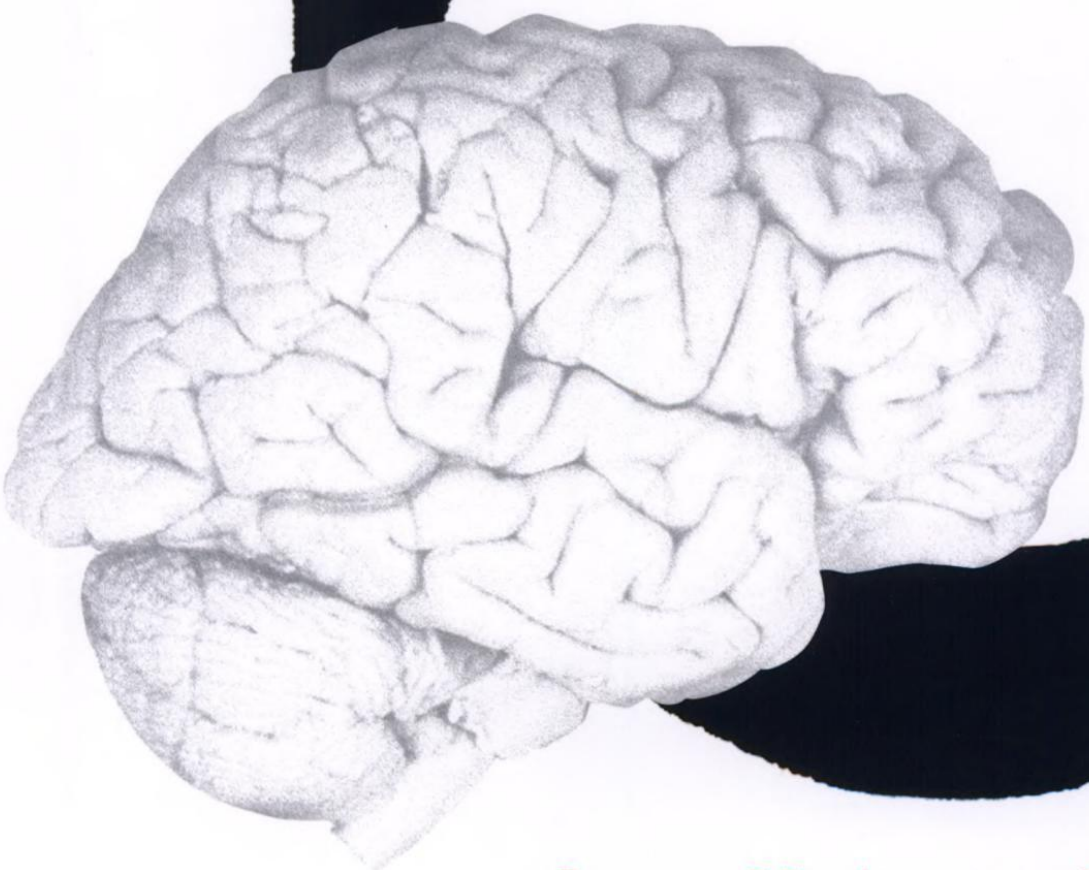
ZEN and the BRAIN



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Zen and the Brain

Toward an Understanding of Meditation and Consciousness

James H. Austin, M.D.

First MIT Press paperback edition, 1999

This book was set in Palatino by Graphic Composition, Inc. and was printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Austin, James H., 1925–
Zen and the brain : toward an understanding of meditation and consciousness / James H. Austin.
p. cm.
Includes bibliographical references and index.
ISBN 0-262-51109-6 (pb)
1. Meditation—Zen Buddhism—Physiological aspects. 2. Meditation—Zen Buddhism—Psychology. 3. Consciousness—Religious aspects—Zen Buddhism. 4. Zen Buddhism. I. Title.
BQ9288.A96 1998
294.3'422—DC21 97-24693
CIP

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Preface

> . . . I don't know what you mean when you say Big Mind and Little Mind. First of all there is the brain.
>
> J. Krishnamurti (1895–1986)[1]

During rare, spontaneous moments, experiences of very special quality and great import emerge from the depths of the human brain. To each person, these awakenings seem awesomely new. What they convey is not. It is the simplest, oldest wisdom in the world. The message is that ultimate meaning is to be found in this present moment, infusing our everyday lives, here and now. But one can't predict such major peaks of enlightenment. Their insight-wisdom is next to impossible to describe. Even so, these fragile events inspired our major religions in ways that still shape our cultural development.

Aldous Huxley called mankind's basic trend toward spiritual growth the "perennial philosophy." Herein, I take a different perspective. To me, the trend implies a dynamic, intimate perennial *psychophysiology*. It is a series of processes, slowly evolving, that culminate in defining moments of an extraordinary character. What are such "peak" experiences? How could they both profoundly enhance, yet simplify, the workings of the brain? This book summarizes the latest evidence.

This is also a story of one neurologist's personal quest and professional search. These two paths converge in ways that lead to one straightforward thesis: awakening, enlightenment, occurs only because the human brain undergoes substantial changes. Does prior meditation help the brain to change in this direction? If so, how? This subject is explored throughout the book.

Is it taboo to discuss religion in a neurological context? It wasn't to William James, almost a century ago. We forget that back in 1901–02, he had already joined these two topics, using the title "Religion and Neurology" for the first of his twenty Edinburgh lectures.[2] Since then, knowledge has exploded within the neurosciences.

Neuroscientists have received most of the Nobel prizes in the fields of medicine and physiology during the past quarter-century. Even the United States Congress, in an inspired moment, voted to call the last ten years of this century "The Decade of the Brain."[3] I hope the reader feels at least equally inspired, and ready to take up the challenge of learning how your own brain functions.

I know this will not be easy, and I ask your forbearance. Our educational "system" has not yet really prepared us for such a task. And the blizzard of new research data, piling up each day, also makes it a formidable job for any writer to condense the information and to make sense of it. I take on two final sets of responsibilities. The first is to summarize the often-murky topic of Zen in order to make clear how vital are its interrelationships with the brain. The second is to express my personal views as one recent witness to Zen experience, while still preserving all those basic truths long held sacred no less to religion than to science. In so doing, it became clear that some chapters required the form of a personal narrative. Most other chapters could be expressed in the form of essays.

Don't be surprised when you encounter topics, some personal, others scientific, set next to each other in unconventional ways.

It may seem small comfort to hear this in advance, but the chapters' uneven textures also serve an illustrative function. Indeed, it has long been recognized that Zen itself displays a most uneven juxtaposition of forms.[4] These jostle our biases, keep us intellectually off balance, and postpone any premature, comfortable equipoise. Gradually our understanding ripens. Only slowly do our attitudes shift. Meanwhile, if we ever think we have Zen in our grasp, we are surely in error.

In part I, we consider what the elusive subject matter of Zen is, and what it is not. Part II examines meditation from the standpoint of its basic physiological mechanisms, not its epiphenomena. Respiration, yes. But perspiration, blood pressure, and superficial brain waves, no. These are *not* where this book is coming from. The next section, part III, summarizes the latest relevant developments in brain research. In part IV, we move on to define both the usual states of consciousness and their alternative expressions. This groundwork serves as the prelude to parts V through VII. Here we present specific examples of several alternate states of consciousness. Moreover, we then break new ground to consider how, where, and when they arise in the depths of the human brain. Finally, part VIII goes beyond transitory "experiences." Here, we clarify both the nature of the advanced *stage* of ongoing enlightenment and its social consequences. Chapters that contain testable hypotheses are listed on p. xvi.

All along, the approach is secular. No reader need fear being brainwashed. Zen enters not through words but through experience. Nor, I hope, will any expect an easy prescription for instant enlightenment. No pat answers are to be found here, no shortcuts. Shortcuts and one-dimensional approaches have already given us too many wishful, incoherent pictures of meditation, consciousness, and of enlightened states. But this situation has not relieved me from the responsibility of oversimplifying the subject. To this end, you are invited to use the glossary, figures, and tables, plus three question-and-answer summaries. Still, I invite the reader's caution: nothing about the brain, or Zen, is ever as simple as this book might suggest. What seems plausible today may be incorrect for reasons other than my errors of commission, omission, and interpretation. Important facts aren't yet known.

Acknowledgments

Much of this book evolved over three separate sabbatical years. Thanks to the arrangements most kindly made by Professor Shuji Takaori, I was fortunate to spend eight months of the first formative period, 1974–75, in the Department of Pharmacology at Kyoto University School of Medicine. In Kyoto, my crucial contacts with Nanrei Kobori-roshi at Ryoko-in stimulated much of the form and the content of this book. The other half of this sabbatical was spent in the Department of Histology at the Karolinska Institute in Stockholm, again thanks to the efforts of Professor Kjell Fuxe.

The second sabbatical period, 1981–82, was spent at the National Hospital, Queen Square, London, and was kindly arranged by Professor Roger Gilliatt. My frequent contacts with Myokyo-ni (Irmgard Schloegl) at the Zen Center in London, both then and subsequently, proved invaluable.

The third year, 1988–89, was also divided. The first portion was spent at the Research Institute for Brain and Blood Vessels in Akita, Japan. Here, the facilities were kindly placed at my disposal by Dr. Ken Nagata and Dean Takeshi Kutsuzawa. The second half was spent at the National Institute of Neurology and Psychiatry in Kodaira, Japan, thanks to the kind efforts of Dr. Eijiro Satoyoshi. My participation in several of Joshu Sasaki-roshi's long retreats at Bodhi Mandala in Jemez Springs, New Mexico, were most helpful, both before and after this year in Japan.

Many others helped bring this book into being. I am grateful both to Judith Austin for her support and helpful editorial comments on the manuscript, and to Frank Urbanowski for his vision of a completed book. Dr. Kionobu Katou and Mrs. Ikuyo Suzuki graciously offered to help with the translation of Kobori-roshi's calligraphy.

Special thanks also go to those secretaries who both deciphered and typed the manuscript through its several draft forms. Most of all to Marcia Conner, whose heroic efforts were invaluable. Also to Jeannine Coppage, Bella Dwyer, Mary Halliwell, Velma Parker, Fran Randolph, Kim Smith, and Melinda Washam. The simplified illustrations reflect the skill of Sara Gustafson. I am indebted to my teacher, Terayama Katsujo, for his gift of Zen-inspired brushwork: the ideogram for emptiness (*mu*), and the *enso* evoking the moon of enlightenment.

I should also like to express my appreciation in general to all those who organized the annual Winter Conference on Brain Research. They enabled me to learn about the brain in a unique multidisciplinary way.

By Way of Introduction

> I should not talk so much about myself if there were anybody else whom I knew so well.
>
> Henry Thoreau (1817–62)[1]

This book began as a personal quest for information. I had come on sabbatical leave to Kyoto, Japan. As soon as I engaged in Zen meditation, I became puzzled. Nothing in my previous medical or other training had prepared me for this encounter. My ignorance was abysmal in three major areas: (1) Zen—What *is* it? (2) The human brain—How does it *actually* function? (3) Meditation and enlightened states—What *really* goes on during these? Stimulated by these questions, I have gone on to try to answer some of them in this book, to make the conceptual framework a little easier for the next person on the path.

We expect scientists to be impersonal about their data. But suppose we wish to move toward that scientific goal which William James had predicted. To reach a "critical science of religions," he said, the basic material must come from "facts of personal experience."[2] In my case this could only mean extracting entries made in my journal. You will be reading material that describes an unusual interior world from the *inside*.

Neuroscientists in a university setting, myself included, tend to feel uncomfortable if invited to disclose their own varieties of religious experiences. Publicly to acknowledge that one follows an Eastern mystical tradition is awkward at best. It is viewed as "too far out," a frank abandonment of one's critical academic faculties. Is this true? It is no longer for me alone to say.

We expect serious scientists rigorously to challenge their biases and to reject any belief system that does not fit their data. In fact, Zen students face a not dissimilar task. They, too, must be keen enough to diagnose, and strong enough to pull out by the roots, the dysfunctional aspects of their own egocentric self. Moreover, at the same time, Zen encourages them to keep their critical distance and to challenge whichever of its aspects do not fit. If, in the process, students happen to introduce some of their own observer biases, this is not a problem unique to the study of "altered" states.[3] Even the subatomic physicist introduces uncertainty into each process of observation.

No neurologist overtaken by a major alternate state of consciousness is a "nerve doctor" at that very instant. No self-referent ego is there. No special discrimination scans the moment, biased by its years of training. Analysis isn't stunned. It simply *isn't there* for several seconds. Later, when the episode is over, a few persons might be able to drop such an experience. But what of others like myself, long immersed in the neurosciences, whose commitment to Zen is not so total as that of a monk? As the reader may have guessed by now, some of us might try to puzzle out such experiences. Indeed, one of my teachers recommended that I probe these intriguing experiences, using them as the focus for deeper questioning. Why was I surprised to hear this? After all, many Zen students incubate that other kind of riddle called a *koan*, and enter into a similar long-drawn-out process of concentrated inquiry.

So, in this book, the subject—neurologist—and investigator are one and the same person. It is rare today to find this kind of a clinical autobiography. Ideally, in the future, whoever writes such a book should be a fully enlightened Japanese master, fluent in English; a person who has both a doctorate degree in neurophysiology, hands-on experience in psychophysiological research, years of intercultural teaching experience; and also a physician whose training in both neurology and psychiatry has been doubly certified.

Herein, one student of the Way begins the daunting task of coordinating the facts in these same fields, bringing to the task his background in neuroscience research and a persistent curiosity. To flesh out the personal narrative, I add only those few autobiographical details that seem relevant.[4]

I owe both the stimulus for this work and much of my inspiration to Nanrei Kobori. Kobori-roshi was as open and as interested in learning about the brain as I was in trying to understand Zen. He afforded me a unique opportunity: to study Zen, in Kyoto, with an English-speaking Japanese master of exceptionally broad cultural interests. Unfortunately, such a special opportunity is now no longer readily available at most Zen temples in Japan. It is with his express permission that the substance of our Zen discussions is now open to a wider audience. The dialogue chapters, then, serve to preserve something of the flavor of an authentic Japanese Rinzai Zen master. He was the product of a swiftly vanishing past.

Such fully open dialogue is a trend of our time. It was not the style of previous generations. If the issue lingers of the proprieties of someone going public with private experience, then it, too, was already addressed in the last century by that pioneer American pragmatist, Charles Peirce, when he said: "What is utility, if it is confined to a single accidental person? Truth is public."[5]

Part I

Starting to Point toward Zen

None by his own knowledge, or by subtle consideration, will ever really understand these things. For all words and all that one can learn or understand in a creaturely way, are foreign to the truth that I mean and far below it.

John Van Ruysbroeck (1293–1381)

1

Is There Any Common Ground between Zen and the Brain?

> Ideologies, philosophies, religious doctrines, world-models, value systems, and the like will stand or fall depending on the kinds of answers that brain research eventually reveals. It all comes together in the brain.
>
> Roger Sperry (1913–94)[1]

The event is incredible: from grubby origins, a beautiful monarch butterfly emerges. Egg to caterpillar, yes. But how could a chrysalis transform itself into a fluttering butterfly? Unimaginable! It has to be seen twice to be believed.

There are plenty of reasons why we might also view with healthy skepticism the current crop of "born-again" humans. We have no clear idea *how* such an event might occur; why should we believe that it happens? Yet, long ago in a distant land, a man's brain abruptly changed. He too underwent a metamorphosis. His transformation was so complete, enduring, and influential that he is still remembered as the Enlightened One.

Most of us in the West already think we know what "enlightenment" is. To us, the Enlightenment was that long period of intellectual ferment in the sciences and arts during the eighteenth century. It received its impetus from Newton and other giants of thought who proved that, through reasoning, we could discover those "natural laws" which govern our physical universe. To us, thereafter, the word "enlightenment"—*Aufklärung* in German—would mean that truth became clear only when it had first passed through logical sequences and rational discourse. How could enlightenment have a second, *non*rational meaning? An insight-wisdom that preempts language and goes *beyond* reasoning? We have never quite accepted such a notion.

In fact, there never has been anything really convincing to be *said* about Zen. Only the same old soft evidence of the centuries. Only that it keeps conveying the same remarkable message: the human brain can be shaped, etched, and transformed by years of practice. To what end? To yield striking ongoing constellations of perception, insight, attitudes, and behavior. These flow spontaneously, blending conduct fully in harmony with whatever social setting prevails (see part VIII).

Even after he, too, was enlightened in this manner, the man they called the Buddha still viewed himself as a man. To himself, he remained only the most recent of many in the past who had become awakened. His now legendary accomplishment still serves as our prototype: Start by transforming only one person's brain, and whole societies may then undergo authentic change on a major scale. Indeed, the Japan of today still demonstrates how the Buddhist message has been woven into the cultural fabric of a nation for countless generations.[2]

Yet, Eastern religious themes leave us feeling uneasy. (Even the term *Buddhism* seems alien. Where else do we meet *ddh* in our own language?) We take for granted the Western icon of the bleeding, crucified Christ. Yet, curiously, we still

find it strange that an Eastern approach could also accent the kinds of suffering in the world. Our image of God tends to conform to Michelangelo's theistic vision. He is that majestic, white-bearded patriarch, reaching down to create man in His own image with the mere touch of His right index finger. Always a white male, and always a capital *H*. True, it was our own culture that spawned the phrase, "God is dead." But atheism still feels uncomfortable. Something must be wrong with any foreign import that leaves out "God," the Creator.

Disquieted by anything mystical, we still might concede that mysticism was implicit in the lives of Jesus of Nazareth, St. John of the Cross, Plotinus, and others in our own culture. But who can know, without trying it, what it really means to meditate as the Buddha has been portrayed, sitting in his strange, cross-legged lotus posture? We are latecomers to meditation. In contrast, many centuries before Siddhartha Gautama, the East had already discovered a curious fact: a person who sat quietly in this manner, in full awareness, might finally awaken extraordinary states of consciousness. In Asia, this knowledge passed through the yogic traditions, then evolved through the newly developing Buddhist traditions in India, China, and Japan.

How could such quiet meditative sitting cultivate the arrival of insightful mental states? In this and subsequent chapters of this book, we shall begin to answer this question. And as we learn more about Zen's subtler mechanisms, we shall discover another curious fact: Its messages are not really so alien to the West after all. Indeed, as many of the opening quotations will illustrate, our own arts and literature have been saying the same things for centuries. Could it be that at their source, human brains everywhere gravitate toward the same kinds of natural messages?

Extraordinary states of consciousness are invested with special experiential qualities. Many lesser events, "quickenings," are also distinctive. We will single out experiences of both types, examine each for its form and content. Soon we will discover properties that are of fundamental neurological significance. In fact, the various examples selected are useful models, ready to teach us how our own brain functions. Why is this one book so ambitious as to review both Zen *and* neuroscience? *Because the two fields are so intimately interrelated that each illuminates the other.*

So Zen is more than an agency of personal change. In this book, the topic of Zen will evolve to become an avenue for creating potential scientific change as well. For, starting in part III, we will be deriving *testable* hypotheses. Each of the twenty-two chapters containing these theories is identified on page xvi. Whether today's hypotheses are later proved or disproved is less important than the fact that when they are tested later, unexpected new basic mechanisms may be discovered.

But to explore illumination is a demanding task. In this respect, Zen can serve us as did Newton's prism, helping to split light into its spectrum of components. However, as Westerners studying Zen, we must soon open up to alternative ways and axes of thinking. Neither topic—Zen, or the human brain—is understandable in one dimension, at one time, at one level. So a word of caution: Having now chosen to probe the complex interface between these two big subjects, we

will be setting off to travel paths of incomprehension. The trip will take us along strange new planes that tilt away at improbable angles. Mental illumination resists being split.

We cannot monitor the discharge rate of every single nerve cell while it is in the act of helping to sponsor our intricate mental functions. Do the climatologists try to describe a major storm front by tracking each of its raindrops and every local current of air?[3] No, they do not predict the weather by plotting droplets. They study huge weather systems moving over large regions. So, too, do brain researchers reach out to use other descriptive techniques. This means that some of our levels of analysis will also employ units patterned on a much larger scale, systems which then depend on abstract psychological constructs. Let it be clear that each such step moves us farther away from Zen and from the simple direct experience of wet raindrops on the face.

It becomes necessary, then, to proceed in several ways. Pursuing a kind of bottom-up synthesis, we will draw on simpler examples to help understand higher functions. At other times, we will follow the top-down approach. This means observing complex brain functions, then working back toward those basic psychophysiological mechanisms from which they spring. No, we won't try to develop a complete neurochemistry of behavior. Behavior grows out of the interactions of the whole nervous system, whereas chemistry is best suited to the study of its smaller, simpler subparts, such as the single cell.[4]

The literature surveyed for the two major topics of this book is vast and very uneven. Half-blindfolded and with mittens on, researchers are working to assemble a giant, shifting, three-dimensional jigsaw puzzle. Many of the pieces out on the table don't yet fit. So we can hardly expect that the two general lines of evidence—Zen and the brain—will always join in an orthodox way that satisfies most religious tests for authenticity and most formal scientific tests for proof.

But others blazed this same trail, making the job easier. Among them was that pioneer explorer, William James. We shall meet James many times on our path. He warned us, decades ago, of our limitations. Were he living today, he would caution us to avoid what he might now call the "neurologists' fallacy." This is the naive notion that a brain perceives an apple the same way that a neurologist conceives of the whole process. He was already preparing us for the awesome, impossible simplicity of Zen insight: an apple is an apple—in *itself*—without our being in the picture.

Can the reductionist, who would rely solely on the fragile edge of intellect, even get near reason's antithesis in Zen? Not without venturing out on very thin ice. In fact, if we seem too openly to "neurologize" about internal events in part III it is only because we have already accepted the sobering Jamesian caveat: "In principle, intellectualism's edge is broken; it can only approximate to reality, and its logic is inapplicable to our inner life, which spurns its vetoes and mocks at its impossibilities."[5]

Anyone who would venture into that inner life, the interface between neuroscience and Zen, will also encounter the hostile crossfire of substantial misunderstandings from both sides. Two illustrations suffice, from major parties of international stature. Closing his last, fine work, Jacob Bronowski expressed sadness

at what he saw was a failure of nerve in the West. He believed that the West was in full retreat from knowledge whenever it took up such matters as extrasensory perception, mystery, and Zen. Sadly, he chose to lump them all together. He held that none of these could lead humankind to reaffirm its destiny. For, he concluded, it would be only through the ascent of self-knowledge that we could finally make "rational intelligence prove itself sounder than the reflex."[6] The reader will soon find that "self"-knowledge is what Zen is all about.

Christmas Humphreys came from the other direction. He regarded any approach to "the supremely spiritual school of Zen" that would involve "examining the brain in relation to Zen experience was rather like examining the car in the street to understand the mind of the driver indoors."[7] In fact, neurobiologists still go on openly studying reflexes and looking under the hood, not huddling passively in the trenches. Many of them still keep wondering: how does the inner life arise? Ever puzzled, they oscillate between two major fictions: (1) The brain can be understood; (2) We will never come close. Meanwhile, they keep pursuing brain mechanisms, partly from habit, partly out of faith. Their premise: The brain is the organ of the mind. Clearly, this three-pound lump of tissue is the source of our "insight information" about our very being. Somewhere in it there might be a few hidden guidelines for better ways to lead our lives.

Zen doesn't get preoccupied with such scientific flappings of the mind. Instead, what matters in Zen is the way our brain expresses—in simple awareness and in everyday behavior—those instinctual depths of self-knowledge that lie beyond the shallow fictions of the egocentric self.

To some, Zen is an exotic butterfly, now grown old and frayed along its wing edges. Fluttering beyond reach, it is a sublimely living thing. It was never intended to be examined close up with a lens, certainly not to be dissected. To others, their neural sciences should remain forever "hard" if not rigid. On principle, they reject the notion that there can be any reputable common ground between molecules, membranes, and mysticism. In their view, any attempt to localize mysticism in the brain is too close to last century's discredited phrenology. Still others may feel that Siddhartha's seemingly mild (but revolutionary) teachings have little bearing on today's harsh social realities.

These attitudes have lived in me in the past. I know them. Yet my hope is that the reader will discover, in the rest of part I and in part VIII, how increasingly relevant the Zen approach is to the serious social issues we confront today. For Zen has something practical to contribute to today's science, religion, philosophy, politics, and ecology. All these do come together, with Zen, in the brain.

Some readers will understandably be discomforted by the reports of animal experiments. Lay and scientific readers may be interested to know that Japanese Buddhists have set aside a memorial day, *Ireisai*. It is a requiem devoted to animals who gave their lives to benefit mankind. Both in the United States and elsewhere, substantial protections increasingly ensure that the kinds of research cited in these pages will have been conducted following humane principles.[8]

Authentic Zen has long sponsored the utmost freedom of personal inquiry. No person need fear the questions we must ask here, or the imponderables that

smiling beggar—a holy man. The sharp contrasts between their situations and his own lifestyle haunted him for years. So finally, when he was twenty-nine years old, he vowed to take up his own search for the meaning of existence. Following the prevailing custom of that era, this meant that he would live the austere life of a wanderer, and would leave his wife and young son behind.[4]

After six years of searching for the truth, depleted by the rigors of his ascetic life, Siddhartha finally rested near the city of Guaya in northeast India. Here he broke his fast, accepted some milk gruel, and resolved to meditate beneath a nearby pipal tree until he reached enlightenment. On the seventh day, as the morning star shone in the sky, he finally came to supreme enlightenment. He was thirty-five years old.

Thereafter, he traveled widely, teaching what he had learned, for another forty-five years. His disciples passed on the bulk of his teachings, emphasizing certain fundamental points in his dharma, or body of basic truths. For example, early in his career, at Sarnath near present-day Benares, he preached a key sermon. It stressed the Four Noble Truths: (1) Life is full of suffering and dissatisfaction. (2) Our passions and other worldly illusions cause these sorrows. (3) The way out of suffering is to extinguish self-centered desires and aversions. (4) There is a sensible, eightfold Path for doing this. It combines right understanding, thought, speech, conduct, vocation, effort, mindfulness, and meditation.[5]

The Buddha had learned the hard way that the ascetic life has limitations. Thereafter, he would advocate the middle way. It was an ethical, commonsense approach to living, a way of moderation. It was a way that avoided both fasting and indulgence, and steered clear of other physical or mental extremes. He believed that everyone had the potential to be awakened, saying: "Look within, thou art Buddha." He died in 483 B.C.E., at the age of eighty, at Kusinagara, India.

Some two centuries after he died, the Buddhist reformation had flourished to such a degree that it was officially recognized by Asoka, who became India's first Buddhist emperor. The movement then spread slowly north from India and east to China along the old Silk Road. Then, during the four centuries after 200 B.C.E., Buddhism split into two schools: Mahayana Buddhism, meaning the "greater vehicle," and Hinayana Buddhism, "the lesser vehicle." The latter, more ascetic southern school was also termed Theravada (the way of the elders). It went on to become the major religion of much of Southeast Asia.

Around the year 520, the Indian monk Bodhidharma traveled to China where he introduced what would evolve into the Chan sect of Mahayana Buddhism.[3] Four striking statements describing Chan date from this early period. The quatrain illustrates how different this particular meditation school was from the many other religious movements that had come before, existed then, or would follow:

1. A special transmission outside the scriptures
2. Not depending on words and letters
3. Direct pointing to the human soul
4. Seeing into one's own nature, to reach Buddhahood

Table 1
The Two Major Zen Schools

	Soto	*Rinzai*
Chinese source	Ts'ao-tung school	Lin-chi school
Representative figures in China	Both Ts'ao-shan (840–901) and Tung-shan (807–869) The two, combined, are Ts'ao-tung (J: Soto)	Lin-chi (died 867) (J: Rinzai)
Emphasis	"Just sitting" in zazen Gradual enlightenment	Zazen, koan study, and personal interviews Sudden enlightenment
Temperaments	Less activist	More activist
Sitting	Facing wall; no koan	Facing out; concentrating on koan
General aura	Less austere, rigorous, and demanding	More austere, rigorous, and demanding
Representative figures in Japan	Dogen (1200–1253) Keizan (1268–1325)	Hakuin (1686–1769)
Present status in Japan	More adherents 6.7 million (1956)* 7.1 million (1984); 9% of total Buddhists†	Fewer adherents 2.9 million (1956)* 1.7 million (1984); 2% of total Buddhists†
Representative centers	Eihei-ji in Fukui Prefecture Soji-ji in Yokohama	Daitoku-ji in Kyoto Engaku-ji in Kamakura

*Survey dated 1956. D. Suzuki, *Zen and Japanese Buddhism*, Tokyo, Tuttle, 1958, 104–111.
†*Shykyo Nenkan* [*Religious Yearbook*]. Tokyo, Gyosei Press, 1985, 58, 59, 74–77.

From this distance, the early Zen we see in the Tang and Sung (960–1279) dynasties leaps forth as a vigorous, inspired human product. It had then, as it does now, its full share of cultural contributions, contradictions, confusing features, and firmly held doctrinal disputes.[3] What remains so special about it? Distinctive of Zen in any era is the way its leaders have (1) devised methods for cultivating enlightenment in their pupils, (2) validated its authenticity, (3) ensured that they and their students continually infused their awakened awareness into the art of living, and (4) carefully sanctioned each successive generation of teachers. The semilegendary Bodhidharma, for example, was already the twenty-eighth patriarch in a long succession of master teachers, a line which extended back to Buddha himself.[10]

When the Rinzai school was imported to Japan, it was adaptable enough to flourish both under the rule of the emperors in their capital of Kyoto and under the more militant shoguns in Kamakura. Zen's continued influence in medieval Japan was attributable to the way it appealed to more sophisticated leaders of samurai society, not to the rough, unlettered samurai themselves.[11] Moreover, the Zen approach was flexible enough to enter the arts of tea ceremony, calligraphy, and landscape gardening, as well as the martial arts. In Kyoto, the huge temple complex of Daitoku-ji (where I started to train) was founded in 1324. It exemplifies Zen's pivotal role in influencing Japanese cultural development. From such monasteries and temples, Zen spread its cultural aesthetic into the daily life of the community. There it coexisted with the indigenous Shinto religion and complemented it.

Stimulated by the many publications of Daisetz T. Suzuki (who lived to the ripe age of ninety-five years), Zen came increasingly to the West's attention after World War II. As other religions recognized its ecumenical message, and as meditation in general came to the fore, opinions have differed about what constitutes the basic core of Zen, and how best this core could be adapted to the religious pluralism of the twentieth century.[12–14]

Still, in every land, the familiar symbol of Buddhism remains. The icon is that of the Buddha in meditation. In each country, painters and sculptors adapted his facial features and garments to fit in with the conventions of their own regional culture at that time. As a result, the early Buddhas of the Ajanta caves in India look different from those in the Longmen caves near Lo-yang in northern China. The latter images also differ from the large Buddha at Kamakura, in Japan. In the Zen school of Buddhism especially, he is still regarded as a man, not a god. An inspiration to all other human beings, not a He.

Early Indian sculptors started to depict the Buddha with a rounded lump on the top of his head. This protrusion, the *ushnisha,* long anticipated the "bumps" of the Western phrenologists of the last century. It was designed to represent an upward extension of the contents of the cranial cavity. In this manner, successive artists symbolized the fact that enlightenment conferred an expansion of consciousness, an enlargement of insight-wisdom, and the enhancement of mental capacities in general. Only a superficial glance would confuse the outer ringlets of this cerebral protrusion with the bulge of a conventional topknot of hair. Another added symbol was the dot between the eyes, the *urna.* It stood for the levels of enhanced perception that were associated with insight.

Old iconographies, but pointing to something deeper. Herein, we are asking, What do these two symbols imply? How has the brain beneath them transformed its functions? For in our reading of the history of Zen, the message always comes down as follows: in the final analysis, Zen training means *brain* training.

3

But What Is Zen?

> Asked to explain Zen—
> my puppy with the same name
> looks, and thumps his tail.
>
> Jay Hackett[1]

So much, then, for the historical record. But in themselves, how can the words of the previous chapter explain a universal process, one that begins with the immediate perception of things as they really are, then flows seamlessly into inspired behavior? For Zen is *living* experience, not musty principles in the abstract. It is a special form of Buddhism in which precepts and practice fuse. What are some of its main teachings?

1. *Zen emphasizes meditation as a way to enlightenment.* This final *spiritual awakening* focuses on one thesis: we and the universe are coextensive. This central

theme is implied in the term *Maha-prajna-paramita*. *Maha* means great; *prajna* means insight-wisdom; *paramita* implies reaching that other shore, the place where there are neither attachments to living nor fears about dying. The term points to that profound insight which frees one from all suffering caused by selfish, egocentric concerns.

Atomic physicists can tell us in words that we are all derived from stardust. But Zen takes our interpenetration with the universe literally. Its insight strikes as a fact of *experience*. This deepest truth is not captured in words. Insight information, like a cool drink of water, has an impact at levels beyond reasoning.

To D. T. Suzuki, the kind of Zen enlightenment that took place back in the Sung and Tang dynasties of China was subtly different from other kinds of spiritual illumination. Zen masters then, he noted, aimed to bring their students so intimately in touch with the "Being of Life which animates all things" that they felt its own awareness vibrate within themselves.[2] An endpoint this advanced would seem to go beyond the usual spiritual goals that we ascribe to those who practice most religions today.

Zen enlightenment today is still somewhat different from the others. No, it does not descend from some greater power up above. Its aspirants view it as emanating from that within, which is all around. It means awakening to our fundamental unity with that eternal universe right under our noses. It does not imply adding some new and esoteric concepts from the outside. The potential for such insight-wisdom is latent in each of us, and will ripen under the proper set of circumstances. Fully ripened, it will greatly simplify, stabilize, and liberate the person. Opening up to anything and everything, the aspirant will drop off childish passions and rechannel his or her energies along more mature lines.

2. *The intellect is not at home in the province of Zen.* Zen withdraws before the intellect. Hides, if you will. In this, it resembles the elusive Japanese bush warbler, the uguisu. Never is this warbler perched on high, singing assertively for all to hear as do the Japanese grosbeak and the American cardinal. Instead, the uguisu blends naturally into the foliage of smaller trees and thickets. There, its lyrical notes begin with a low, soft uprising whistle, then end in a loud, incredibly beautiful liquid warble: "hot-kat-kyot!" One memorable day, I actually saw the bird while it was singing. Only then could I convince myself that a creature this small and unprepossessing could create such beautiful music.

Zen teachings emphasize the straightforward. They devalue the discursive intellect with its edifice of words and abstract theories. Lengthy, complicated philosophical discussions are scholastic mumbo jumbo. Less is more. As the Tao Te Ching puts it, "Those who know, do not speak; those who speak, do not know."

3. *Zen values the simple, concrete, living facts of everyday direct personal experience.* When our brain takes in a red rose, it doesn't need to think about the word "red," ponder its wavelength, or try to analyze what chemistry caused it to be this color. It perceives red *directly*. Zen training encourages this same instantaneous, uncluttered awareness throughout everything else in the here and now. The Zen point of view appreciates each moment's sacramental quality. Imbued with genuine ecological reverence toward nature in all its forms, Zen practitioners learn to look humbly, "livingly," at the way they use each day's food, clothing, shelter, and companionship.[3]

Zen, living in this present moment, concentrates upon *this* bird song, *this* falling cherry blossom. It brings together all these present moments of quiet clarity into the flow of its timeless, ongoing awareness. This Zen doesn't soar or proselytize. It will erect no cathedral spires high in the sky. It is utterly down-to-earth, matter-of-fact. In Zen, life's firsthand earthy experience is *the* living reality. The *un*reality is our usual hectic existence, the one full of swarming thoughts, clouded perceptions, and self-centered behavior.

Today's New Age spirituality, newly wedded to high technology, is already promoting a host of brain-tuning devices. Authentic Zen will not be drawn into such artificial "mind gyms." Zen requires no contrived "virtual reality." It is like an art appreciation course. Its message is to *look* at natural things; *see* into them. One day, you will finally see, beyond yourself, into their own sacred qualities. Then you will comprehend things as they really are, in keeping with the basic unity of all things. This illumination will remain, and thereafter you will act authentically in relation to all things.

4. *Zen is intensely pragmatic,* wary of moralistic judgments, of manmade distinctions between good and bad. Its security comes from knowing, as a result of long experience, how people act after they have become totally committed to its path of awakening. Go ahead, let them then encounter some ambiguous laissez-faire situation. Increasingly they will act in accord with the "natural, right way" of things. And meanwhile, why burden them with another superstructure of someone else's doctrines imposed from without? Their behavior is going to become increasingly selfless anyway, because it will be proceeding in harmony with this natural order of things.

A favorite Zen phrase is, "A finger pointing at the moon." Symbols are crucial in religion. In Zen the pale moon symbolizes enlightenment, at many metaphoric levels. The real moon up there will still go on existing, long after our fingers and words down on earth have ceased to point toward it. Similarly, anything *said* about Zen is, at best, no more than a finger vaguely pointing off in its general direction. Consider this book as another example. It has nothing to do *with* Zen. It is only *about* Zen. On its pages are words *about* what we think goes on inside the brain. A real book about Zen could just as well have a plain cover, empty pages, and no title, yet could still be worn out from use because you sat on it. Zen is like swimming; you don't learn swimming by reading *about* it in a book. You learn to swim by *doing* it, in the water.

5. *You learn about Zen in zazen,* Zen meditation. It is the essential, fundamental practice for ripening the brain's intuitive faculties. To the Zen master Dogen, the practice of zazen in itself constituted enlightenment. The Zen meditative approach has a simple, unstated premise: moods and attitudes shape—*determine*—what we think and perceive. If we feel happy, we tend to develop certain trains of thought. If we feel sad or angry, still others. But suppose, with training, we become nonattached to distractions and learn to dampen these wild, emotional swings on either side of equanimity. Then we can enter that serene awareness which is the natural soil for positive, spontaneous personal growth, often called spiritual growth.

Meditative practice does not set itself against all conscious thoughts or emotions. Rather it encourages those that are selfless and freed from unfruitful links

words and ground rules. These will help clarify what mysticism is, what it is not, and whether Zen is a form of it. Then, we'll need to define religion. In the process, we can decide whether Zen Buddhism is a kind of religion. Finally, we ask: Does neuroscience bear any constructive relationship with mysticism, religion, or Zen?

Nowhere is mysticism always received kindly. It has been suspect for millennia, for in ancient times the mystic (*mystes*, one initiated) was one who was initiated into secret, and thus troubling, esoteric rites. The word still troubles us. It conjures up dark associations, occult beliefs, mysterious doings. The skeptical man in the street sides with Samuel Johnson who held that, "Where secrecy or mystery begins, vice or roguery is not far off."[3] Here, we define mysticism in the most general sense as the ongoing practice of reestablishing, by the deepest insights, one's direct relationship with the ultimate, universal reality principle.

Other versions abound. William James held that a "consciousness of illumination" was the essential mark of a mystical state.[4] To Underhill, mysticism was "the science of ultimates, the science of unions with the Absolute, and nothing else."[5] To Dumoulin, true mysticism signified "an immediate relationship to absolute spiritual reality." It included all of our efforts to elevate ourselves to that "super cosmic, super sensory sphere" which is experienced immediately.[6] To Keller, mysticism was "the search, proper to each religion and carried out within each religion by some of its adepts, after full apprehension of what that religion defines as the highest and most intimate knowledge available to its adherents."[7] When we discuss mysticism here, its scope will not include spiritualism, supernaturalism, or any other activities believed to bend spoons or to otherwise suspend the known physical laws of the universe.

Worldwide, the mystical traditions tend to fall into at least two categories. One school holds that the deity principle or creative force lies *outside* themselves. They have the sense of moving through stages leading *up and out* toward its divine presence. The Christian approach follows this general orientation. From its perspective, when a person has been granted this intuitive apprehension of reality, it is a gift of grace bestowed from above.

The schools of Buddhist mysticism, including that of Zen, reflect the second orientation. They teach that the universal principle, or Buddha nature, already exists not only within each person but everywhere else.

Some observers contend that there is a third category, that of the prophetic religions. It is exemplified by some forms of Judaism, Islam, and evangelical Christianity, which practice intense, devotional worship. Vigorous prophetic approaches tend to become highly inspirational and arousing. They lend a distinctive, *numinous*, interpretation to the religious experience. Here, "numinous" implies the sense of having encountered the sacred presence of divinity. The person has the impression of being affected significantly by something both totally different from anything else and wholly other than his or her previous self. In the Buddhist meditative context, the flash of a major mystical experience is less violent than is the impact of a typical revelation in the prophetic context, and its tone is decidedly impersonal.[8]

Johnston observes that Christian mysticism engages in a special kind of concentration. It is one in which worship is pressured by suppositions of love which arise out of faith.[9] In contrast, the Zen Buddhist approach is to let go of all

arly tradition in the West doesn't feel at home in any setting it deems irrational. Moreover, it will contend that no brain can criticize mysticism with the requisite intellectual rigor once it has been compliant enough to bend to the mystical.

Some basic scientists also fear mysticism, and for good reasons. Feeling themselves truest to the quest for the scientific grail, they strive in the laboratory first to collect a body of valid data, then to interpret it logically, thoughtfully. So their goal is always to *resolve* paradox, certainly not deliberately to create it. No wonder these scientists instinctively shun mystics. Mystics do more than grow comfortable with paradox. Some talk about it. And when they do, they issue long strings of arcane metaphors from an occult world which no scientist can understand.

Past centuries viewed such mystics as wild-eyed recluses who wore their hair long and affected simple, sometimes shabby garb. We know today that mystical experiences occur commonly in otherwise sane "normal" persons. Moreover, increasing numbers of them follow one mystical tradition or another, meditate regularly, both by themselves and with others, and participate in occasional religious retreats.

So the issue is not whether the mystic goes to a formal church or professes any set doctrine. The critical point relates to what actually goes on—moment to moment—within that broad definition of religion developed above. In this we would fully agree with Andrew Greeley, a Catholic cleric whose Ph.D. degree is in sociology. Greeley concludes that the mystic becomes truly religious when he or she finally knows "the way things really are."[19] In Zen, this short phrase also describes the special knowing, that deepest *understanding*, which serves as a valid criterion for a person being "religious." "The way things really are" expresses the profound insight that Ultimate Reality, infused with the sacred, lives in the eternal here and now. (see chapter 132)

Albert Schweitzer was once struck by a similar insight. This deep "reverence for all life" went on to transform the way he lived and worked as a medical missionary in Africa. Schweitzer developed his own version of what a mystic was. The mystic, he suggested, was a person who did live among the temporal and earthly, yet who still belonged to the eternal and superearthly, having transcended any division between the two.[20] But semantic traps and assumptions lurk within such views. How do we *know* there is an "eternity?" What does "superearthly" really mean? Nor do the questions end there. Mysticism itself is wide-open to challenges on other grounds. Ontology will ask of it, What are the first principles of being, and how do they interrelate with the true nature of reality? Epistemology probes, How do we really come to know, and what limits do we place on that knowledge? Putting it another way, are mystical experiences "merely subjective?" Or are they accurate intuitions that reveal our deepest, basic existential nature? Only in the latter case would the experiences be valid windows into an "ultimate reality" in the absolute objective sense. No one settles such issues in print.

Meanwhile, the reader becomes aware of a vital omission: Whatever happened to God in such questions? Greeley suggests that the mystical experience does not necessarily imply any special divine intervention.[21] No God takes over,

so to speak, when the subject becomes a passive witness within the experience. Instead, Greeley concludes that what does take over are "deep powers in the human personality, normally latent." These are the powers which "produce in us experiences of knowledge and insight that are simply not available in daily life."

The Judeo-Christian form of monotheism sets its overarching deity up on high. Ruth Fuller Sasaki describes the Zen Buddhist approach to the universal highest principle as coming from another direction.

> Zen holds that there is no god outside the universe that created it and created man. God—if I may borrow that word for a moment—the universe and man are one indivisible existence, one total whole. Only THIS—is. Anything and everything that appears to us as an individual entity or phenomenon, whether it be a planet or an atom, a mouse or a man, is but a temporary manifestation of THIS in form; every activity that takes place, whether it be birth or death, loving or eating breakfast, it is but a temporary manifestation of THIS in activity. Each one of us is but a cell, as it were, in the body of the Great Self. [Having come into being, this cell] performs its functions, and passes away, transformed into another manifestation.[22]

Put simply, the insight of Zen beholds this "Great Self," not God.

If so, then where does the experience of this Great Self come from? The premise of this book is that it must come from the brain, because the brain is the organ of the mind. The same perspective holds whether mystical or peak experiences arise spontaneously, are cultivated, or are drug-induced. Our thesis is that prior meditative training and daily life practice help release basic, preexisting neurophysiological functions. This thesis will lead to the following proposition: mystical experiences arise when normal functions reassemble in novel conjunctions.

From such a vantage point the brain comes first, its mental phenomena come second. R. W. Sperry is one articulate proponent of this kind of "top-down" perspective.[23] His sound opinions developed in the context of his Nobel prize–winning research on animals and patients whose hemispheres were divided, leaving them with what came to be called a split brain. Sperry takes over the interface between science and religion at the points where James left off. He begins his own thesis on an optimistic note. He believes that the neurosciences have already rejected reductionism and mechanistic determinism on the one side, and dualisms on the other. As a result, he finds that the way is now clear "for a rational approach to the theory and prescription of values and to a natural fusion of science and religion."

To reach his conclusions, Sperry does more than avoid those dualisms that would regard the brain and the mind as two separate entities. He also rejects pure physicalism. Why? Because it holds to the unacceptable thesis that "all higher level interactions, including those of the brain, are presumed to be reducible and accountable, in principle, in terms of the ultimate fundamental forces of physics." Many others besides Sperry have already found fault with similar physical and materialist determinisms. How does it help us to know only about quarks, molecules, or the brain's high water content? Quantum theory alone doesn't allow us to predict the way they all come together to enable a brain to function as the organ of the mind.

Instead, Sperry holds that our brain functions in ways that go beyond the elemental forces of physics. In a very real sense, we have personal quirks which go beyond our quarks. Such a view implies that our whole brain develops new properties, *emergent properties*. They are properties generated only by *interactions* within the larger system as a whole, not by the acts of any small single constituent. Emergent properties are always much more than the sum of their parts. Take the novel emergent properties of H_2O, for example. We could never imagine that water is a liquid if we knew only the properties of its two constituent gases, hydrogen and oxygen.

Moreover, at its higher physiological levels of emergent processing, our brain also develops remarkable new *causal* properties. These are higher-level properties which can operate in top-down fashion. They *cause things to change* at lower physico-chemical and physiological levels. Whether such properties emerge consciously or subconsciously, they act to transform events downstream, shaping our value systems and the ways we behave.

Sperry's thesis then expands on this general principle of "downward causation." From this vantage point, he then presents his alternative view of the way things really are. It means simply "that higher properties in any entity, whether a society or a molecule, invariably impose [their causal control] over the lower properties of their infrastructure." He conceives these higher entities as being "causal realities in their own right." Therefore, they too will never be determined completely by the causal properties of their components, or by the laws which govern their interactions, or by the random events of quantum mechanics. So what modern neuroscience finally reveals to Sperry is a different kind of hierarchical universe centered on the brain. It is one "controlled by a rich profusion of qualitatively diverse emergent powers that become increasingly complex and competent."

In the last two parts of this book, we discuss how our brain functions come together to create our sense of time and to shape such emergent qualities as eternity, meaning, being, and knowing. Meanwhile, it is necessary to begin by asking much more naive questions. In part IV, for example, we ask, What is ordinary consciousness? Once we better understand what constitutes the ordinary, then we will find that the so-called mystical experiences become less of a bewildering hodgepodge.

5

Western Perspectives on Mystical Experiences

> The mystical experience is a *natural* form of knowledge in the sense that one need postulate no special intervention of the deity to explain it. Nevertheless, in the mystic experience, the person makes *contact* with the Way Things Are.
>
> Andrew Greeley[1]

Experiencing things as they really are? Yes, this is the central fact of enlightenment: "awakening" to the unity pervading all things. But such profound insights are only one of many alternative states of consciousness. Representative examples

of the varieties, and there are many, are found in the writings of James,[2] Underhill,[3] Johnson,[4] and Bucke,[5] among others. Taken as a whole, they are confusing. And, as if religious and philosophical speculations hadn't muddied the waters enough, our own language and traditions soon confuse us with ambiguities and misinformation. So, before we of the West try to come to grips with reports about the "Eastern" varieties of religious experiences, we had better take stock of our own confusions, get our own bearings.

Who in the West are those rare beings who "get" religious or mystical experiences? They number in the millions. They are men and women of all ages from all walks of life, educational levels, and religious backgrounds. In Gallup's 1977–78 survey, 31% of the adult population acknowledged having a sudden or dramatic religious or mystical experience at some time in their lives.[6] The largest single category was "an other-worldly kind of union with a Divine Being." It carried with it "the conviction of the forgiveness of sin and salvation." In Greeley's survey, between 33% and 43% of persons over the age of twenty reported having a mystical experience. It conformed to the definition of "being very close to a powerful spiritual force that seemed to lift you outside of yourself."[7]

Maslow, finding fewer people who did *not* have peak experiences, finally began to use the term "non-peakers."[8] He was not referring to persons *unable* to have peak experiences, but to those so afraid of mentioning the experiences that they suppressed, denied, or forgot them.

In Great Britain, of 1865 persons surveyed, 35% answered yes when asked the following delightfully open-ended question designed by Sir Alister Hardy: Had they ever been "aware of, or influenced by, a presence of power" different from their everyday *selves*, whether or not this was referred to as God? Moreover, the percentage was even higher among the more educated, of whom as many as 56% answered yes.[9] Clearly, we are considering experiences that are not only of great moment but ones that affect a sizeable (if sometimes silent) minority: perhaps a third of the general population.

Must the experiences occur in church, or in a formal meditative context? No. In Wilson's survey, the experiences occurred spontaneously in 31%, not prompted by any formal religious context.[10] In Greeley's survey, 45% were prompted by exposure to the beauties of nature.[7]

Demographic surveys depend heavily on language, and language is a slippery issue when assessing mystical experiences. Bourque and Back, in the course of 1553 interviews, noted that certain people used religious code words to describe their experiences, whereas others used an aesthetic language code.[11] What influenced the choice of code? It was the person's setting and social situation. Subjects who reported "religious" experiences (32%) tended to have them in relation to a church service, to prayer, religious conversion, or when their own life, or that of someone else, was threatened. These subjects tended to report having only a single experience. And if they did have more than one experience, the subsequent ones were considered to be "similar." Various fundamentalist Protestant denominations were heavily represented in this sample.

In contrast, other subjects had experiences which did not arise within a formal religious setting. They were triggered by a heightened appreciation of

4. *Retrospective interpretations.* These contain references to religious or other doctrinal-type interpretations not formulated until much later, after the experience ends.

We will return, in part VII, to a personal version of these four categories. But first, I need to declare my biases on another matter. The question is, Does everyone have the same kind(s) of mystical experience, per se? Do the reports differ only because people describe them differently? The literature supplies three types of answers.[14]

1. All mystical experiences are, indeed, the same. Moreover, they are all described the same way, irrespective of their cultural or religious setting. This is not so.
2. All mystical experiences are the same, but the reports about each experience are culture-bound. This is also not so; the early raw data of experiences do differ.
3. All mystical experience falls into a relatively small class of *subtypes.* These cut across all cultural boundaries. Whereas the several subtypes are not culture-bound, the language used to describe them *is* culture bound. I hold this interpretation.

Outside observers, each with different biases, certainly differ in the way they try to squeeze someone else's experience into each of the earlier four categories. Most would agree that after the initial raw data impacts, the rest of the experience can be shaped by that particular person's previous history, expectations, and religious background.

Alan Watts noted that devout orthodox believers have so automatically associated the imagery of a lifetime of icons with their emotions that these symbols then seem to lie at the core of their mystical experiences.[15] How might this occur? During religious worship, one draws repeatedly on such earlier images. Soon, these take the form of relatively state-specific associations which will be linked to subliminal memory traces. Loose threads of such linkages could then be woven into the fabric of a fresh major religious experience.

The world has an array of doctrines—ample proof that people in diverse cultures interpret their religions differently. Yet it is important to realize that different methods of meditation give rise to other variables. Zen emphasizes the training of attention and bare awareness, and it encourages its adherents to practice infusing them into everyday life. Certain types of Zen meditation encourage an "emptying of the mind," or a "no-mind" approach. Experientially, this appears to leave the brain *relatively* more "empty." The meditator feels relieved, free not only from the pollution of buzzing thoughts but also from the burden of their heavy emotional commitment. The cumulative effects of a major unburdening could begin to influence even the raw data of the later mystical experience.

For example, there is the critical matter of *self.* In the two subtypes of Zen states we will consider later, the self becomes increasingly absent from the scene all during the first raw data phase of the experience. The self begins to dissolve first during deep absorptions. Finally, it totally vanishes in kensho. This lack of self creates an extraordinary perspective, and it has far-reaching consequences.

from without, but that it happened either spontaneously, or arose out of *their* own efforts, or was referred to the cosmos, or to nature.

So it is not easy to characterize *the* mystical experience. Indeed, several Western authors have now compiled lists of criteria in their attempts to do so. Their lists are useful for general reference purposes, and for one other reason. For the "mystical" lists presented here will *not* be the same as those lists, to be cited subsequently, which were drawn up by authors who were citing the features of "alternate states of consciousness" (see part IV).

Let us begin with William James's original list of four characteristics.[2] First he listed *ineffability,* followed by *noetic quality, transiency,* and *passivity.* What is ineffability? Is it a valid criterion?

Ineffability means inexpressibility. It means that the experience resists being described in ordinary language. This difficulty stems from at least five factors: (1) Specific communication problems exist. These stand in the way of transferring the raw data and the quality of perception out from an extraordinary state back into the levels of language readily at hand in our other ordinary states. (2) Words have their own limitations. They prevent us from satisfactorily communicating deeply felt emotions not only to others but to ourselves as well. We learn this as an empirical fact. Remember how it was to be deeply, brim-overflowing in love, and to have tried to communicate this to the other person? (3) Suppose the person uses metaphors to try to bridge the gap. Metaphors have too many other meanings, which soon mislead and confuse the listener. (4) The elements that coexist are too paradoxical. It seems embarrassing to mention their bizarre nature to unsympathetic listeners. (5) The experience overcomes the subject with its abrupt onset, speed, and complexity. This makes it difficult accurately to describe to another person everything that did happen, and harder still to find a conceptual framework which will fit it.

Kaufmann was wary of James's three other criteria. He argued that noetic quality, transiency, and passivity are not specific for a mystical experience. He observed that they are also attributes of ordinary, purely sensory experiences. These too yield knowledge, do not last, and can overcome a passive recipient with their flood of sensory data.[18]

This objection is only partly true. The definition we will be using for *insight-wisdom* is wordless comprehension of the most profound significance. It strikes in a way completely different from our ordinary sensate-based knowledge. Indeed James's word *noetic* already implies the presence of this special, extraordinary kind of cognition. Where does ordinary cognition stop? To understand, let us begin with the usual dictionary definitions of the term. Cognition traces its origins to the Latin *cognoscere,* to know. Cognition then becomes definable in terms of those thoughtful mental operations which lead us to "know" all about an apple, for example, and to be able to employ logic to explain why it differs from a pear. When we use reasoning to try to *explain* such distinctions, we begin to appreciate not only what such a thoughtful process "feels" like but also how very slowly it seems to move.

James knew this. He wished to emphasize something different. When he placed together the two words "noetic quality," he wanted to make clear three

striking experiential facts: (1) *Profound insight strikes directly.* (2) *On contact, vast quantities of complex information are communicated.* (3) *But no intervening thoughts complete the transfer.* So his words "noetic quality" imply the impact of a novel kind of thoughtless comprehension. It happens automatically. It is much faster than our usual reasoning, and more complex than our usual intuitive skills.

Deikman compiled another list[19] containing the following major characteristics of mystical experiences:

1. Realness
2. Unusual percepts
3. Experience of unity
4. Ineffability
5. Cosmic insight

Deikman added another important distinction when he noted that the experiences could be shallower or deeper.[20] Often, a shallow experience was linked with the more familiar forms of sensate experience. It presented ideational material which the person could organize later into more conventional concepts. Shallower experiences drew on recognizable emotions. In contrast, deeper experiences had less of a sensate quality. Their insights struck in the form of a compelling wisdom. Having penetrated further into the depths of the affective realm, they also resonated in ways that seemed more extraordinary in retrospect.

Laski, in 1968, reported the results of an early survey of over fifty friends and acquaintances.[16] Their experiences fell into two different categories. In one category, her subjects lost their normal perceptions. These she called "*withdrawal* experiences." "Withdrawal" implied that a sensate *subtraction* was involved, not an accumulation. Withdrawal experiences took place more slowly. As they evolved, they might also carry the impression of an *outflowing* into something larger, or indeed infinitely large, in association with darkness. This category of experiences will be referred to, using the term "absorptions." (see part IV; table 10, columns VI-A and VI-B).

Her second category was called "*intensity* experiences." They were brief, and were frequently prompted by triggers which involved objects, events, or ideas. They might be associated with words suggesting feelings of upward thrust or of positive movement upward. Afterward, during an extended "afterglow," the experience was interpreted and appreciated. "Normal" faculties and perceptions then gradually returned.

Her intensity experiences included three separate subtypes:

1. *Adamic experiences.* These involved feelings of joyful purification, of renewal of life, and of loving kindness to all. While the world might seem transformed, the self was still not lost. She chose the term "adamic," because it reflected Adam's total happiness and innocence before the Fall.
2. *Knowledge-contact experiences.* Knowledge entered through some new "contact." The contact came either from sources within, from an undefinable source,

or from without. Laski believed that only her most creative or intellectual subjects had adamic or knowledge-contact experiences.

3. *Union experiences.* These were the most highly valued. They were characterized by feelings of union with something else, or with someone else. They conveyed the feeling, which came afterward, that this contact had been total.

Laski's subjects placed an extra, subjective gloss of interpretation on their intensity experiences. William James had earlier used the term "overbelief" to describe this same phenomenon. It implied that the person believed more than the evidence warranted. Laski's subjects frequently capitalized their words. It was an index of the degree of their extrarational ontological overbeliefs. So, earlier, had Aldous Huxley when he used terms like "Absolute Enlightenment."

Laski chose to lump together all these several varieties of experience. She used the general term, "ecstasy."[16] But the word ecstasy usually implies an exalted state, one charged with intense *emotion* and beyond the person's usual abilities to control. So when she started her questions with, "Do you know a sensation of transcendent ecstasy?," it may have introduced certain of her own observer biases into her subjects' reports. Words aside, she clearly separated experiences of sensate withdrawal from those others which might lead to higher forms of insight-knowledge. She also remained aware that the latter forms might sometimes begin with a degree of withdrawal experience.

In Laski's survey, which general features were distinctive of both types of experiences? Her final summary included the following:

1. Triggering events occurred.
2. Some things were lost. They included such things as distinctions, desires, self, time, place, etc.
3. Some things were gained. These included the sense of unity, release, new knowledge etc.
4. Quasi-physical feelings occurred: a penetrating warmth; an almost painful joy.
5. Other feelings occurred consistent with intensity or withdrawal. Intensity was like the building up to a climax; withdrawal was a kind of merging into the experience.

Greeley later drew on a more representative national sample.[7] He presented his survey population of 1467 Americans with several descriptive phrases. He then asked his subjects to decide, from memory, how closely each of his "descriptors" actually fit their own much earlier experiences. The phrases illustrate the premises of his study. It suffices to begin by listing the five leading phrases that were most often responded to, followed by the percentage of the 513 responding subjects who recalled that they had undergone one or more of such experiences.

1. A feeling of deep and profound peace (55 percent)
2. A certainty that all things would work out for the good (48 percent)

3. A sense of my own need to contribute to others (43 percent)
4. A conviction that love is at the center of everything (43 percent)
5. A sense of joy and laughter (43 percent)

Many readers may wonder at this point: don't these five phrases seem too tame to describe *major* complex experiences? Indeed, could they have been drawn from the "shallower" end of the spectrum, say from Laski's subtype of adamic experiences?

Parenthetically, Maslow had already commented elsewhere on somewhat similar experiences. He preferred to designate them as "plateau" experiences. To Maslow, plateau experiences were moments when a person underwent serene, contemplative cognitions of intrinsic values. These were still near the cognitive end of the spectrum, for they remained more voluntary and were also less intense than a major peak experience. They were epitomized by a mother sitting quietly and marveling at the way her baby is playing.[21] Feelings of *deep peace and joy* are indeed prominent in such experiences. However, there is no major sensate loss, nor is there a true loss of self. For these reasons, and because many of these episodes do seem to form a separate cluster, we will be referring to them later under a separate descriptive heading. They will be designated as the *state of heightened emotionalized awareness without sensate loss* (see part IV; table 10, column V).

Now, did some of Greeley's subjects report deeper experiences? Depth certainly seems to increase as we now examine items which occurred less frequently in his list.[7] Soon, phrases appear which take on the flavor of insight-wisdom. Eight of these major descriptors are as follows: an experience of great emotional intensity (38 percent); a great increase in my understanding and knowledge (32 percent); a sense of the unity of everything and my own part in it (29 percent); a sense of a new life or of living in a new world (27 percent); a confidence in my own personal survival (27 percent); a feeling that I could not possibly describe what was happening to me (26 percent); the sense that all the universe is alive (25 percent); the sensation that my personality has been taken over by something much more powerful than I (24 percent).

But wait. What about the phrase "confidence in my own personal survival"? If the subject's self *were* being preserved, this would seem to be an unlikely description of a major peak experience, because—as Zen makes clear—the experience of awakening wipes out the egocentric self. So why did this phrase draw so many responses? Perhaps because Greeley's subjects found that it described the *after*effects of their experience. That is, a major awakening does leave the person feeling more competent in the world. It is a world which now seems much better and less threatening. In support of this interpretation, Greeley's analysis suggested that those who expressed "confidence in their personal survival" tended to have a higher level of "psychological well-being." They also tended to be the subjects who had deeper experiences, states marked by such earlier "classical," Jamesian-type elements as passivity, ineffability, a sense of new life, and of being "bathed in light."

4. The person does find some objective correlative or source for the experience, either within nature as a whole, or beyond nature.

While a few subjects may reject their experiences following Kaufmann's criteria, most people *overvalue* their extraordinary experiences. The Zen master counters this tendency. He supports the student, but invests the experience with as few words as possible, and moves on. Following his example, the Zen aspirant learns to regard mystical experiences not as places of arrival but as points of departure.

The lists above are not complete. It is useful to enumerate several other characteristics, because we will find later that each of them have physiological implications:

1. Occasionally, a subtle sense of anticipation may occur, a vague prelude usually lasting minutes rather than hours.
2. Experiences do not repeat themselves in exactly the same way. Over a period of years, the same person may have several experiences, even within the same general subtype. These are not stereotyped. They vary qualitatively, unlike most seizures.
3. In general, experiences, even within the same subtype, tend to evolve toward deeper insights, especially during prolonged training in a monastic tradition.
4. Subtypes occasionally become juxtaposed and slide into one another. These create unusual mixtures, difficult to classify. Psychedelic drugs enhance this tendency, as do overzealous, pressured meditative techniques.
5. Some extraordinary experiences cause an immediate behavioral change in the person. A trained observer, such as a Zen master, readily appreciates the transformation. However, these immediate physiological changes tend to wear off over the next several hours or days.
6. Few of the so-called peak experiences reported by subjects polled at random yield major transformations that will last long enough to change their lives. As few as 1 to 4 percent of such subjects undergo major changes.[24]
7. However, when experiences are repeated, they are more likely to bring about an enduring change.[7,11]
8. Details of a major experience are not lost. They can be clearly recalled. But *the person does lose certain other things:* the older, dysfunctional attributes of the personality. This particular pattern—a new psychological profile which contains *both* preservation and loss—is quite unusual. It excludes the operation of the more familiar kinds of memory disturbances. Indeed, these preferentially wipe out our most recent memory functions, not our oldest ones.

Gradually, the Western world has come to appreciate that mystical experiences serve several practical functions: (1) They tend to resolve anxieties at various levels and to promote a physiological sense of well-being. (2) They help to actualize potential abilities. (3) To the degree that others have similar experiences, they contribute to the social bond within a group. (4) They prompt people to

Table 2
Comparisons between the Mystical Path and Schizophrenic Reactions

	Mystical Path	*Schizophrenic Psychosis*
General nature and duration	An ongoing, more orderly development	May be compressed, disorderly, and disorganized
Hallucinatory phenomena	In general, more visual; not threatening	In general, more auditory; can be threatening
Ideas of self-reference	Enlightenment cuts off the personal connotations of stimuli	Stimuli generate ideas of self reference, especially in paranoid schizophrenia
A gap is experienced which splits outer social reality from inner personal reality	1	3
Inhabiting only the inner world and being fearful of it	0–1	3
Degree of tolerance for inner experiences	Trained for and well-tolerated	May be overwhelmed by them
Simplification of lifestyle and renunciation of worldliness	More under conscious control	More under unconscious control
Dissolution of social attachments	1	3
Reentry into society, improved by the experience	The usual goal	Less common
Subsequent ongoing, fruitful, well-integrated contacts with society	2	1 or 0
Sense of unity with the environment	2 (partially cultivated)	Less commonly perceived
Driving by cravings and aversions	Reduced	May be enhanced
Continued conscious control	Usual	Less effective

0 = none; 5 = maximal

Nearing such an interface, we must sift with care. For William James noted that ostensibly normal people also generate similar phenomena during their religious conversions.[3] He emphasized that revelation is accompanied by a deep harmonious sense of assurance, and by perceptions which assign the appearance of newness to the external world. But such insights do not always lead to an adaptive outcome. Nor are persons truly "born-again" until they integrate their higher plateau of values into their previous personality structures. Only then does the final result become an ongoing one, realistic and capable of being projected into the future. In these respects, as in the others cited in table 2, the maladaptive psychotic patient will again differ strikingly from the healthy mystic. The psychotic patient tends to have "positive symptoms" such as hallucinations and delusions. Other, "negative symptoms" include a withdrawal, in which motivation is dissolved to the point of apathy (table 2).

Nonsense frequently occurs in the ancient form of Zen dialogue called *mondo* (see chapter 26). And at first glance, you might think that some of these historical dialogues in Zen resemble the way schizophrenic patients talk nowadays.[4] Why? Because in schizophrenia, many sentences are also ungoverned by convention. To clarify the differences, it helps to ask, Why is schizophrenic

language so inappropriate and irrelevant? Among the theories are the following: (1) Perhaps their language is in the form of a code. In this case the verbal nonsense conforms to the underlying code, and does not mean absolute nonsense. (2) Perhaps the meaning of schizophrenic language lies in its incomprehensibility. The speaker may be trying to discourage the listener. (3) Certain words within language are especially vulnerable. In fact, particular words become pun-prone because they have multiple meanings which open up paths for many free associations. It may be relevant to note that the Chinese and Japanese languages do have many words with multiple meanings. This might have made it easier for Oriental speech to branch out into free-floating realms of polysymbolism.

So for perhaps multiple reasons, the speech of schizophrenic patients is full of loose abstractions. It is also obstructed by roadblocks, called "blocking." In contrast, classic Zen speech uses the simple, direct words of immediate experience. These express its sense of freedom and spontaneity (see chapter 48).

Recent research suggests that schizophrenia is an organic disease. It may reflect either a kind of fetal arrest of brain development, a delayed maturation, or a premature degeneration. Abnormalities of structure are common in the temporal lobe, limbic system, and frontal lobe.[5] In the early stages of schizophrenia, when the disease is less severe, some patients already show smaller temporal lobes. Other patients, more severely affected, may show enlarged fluid-filled cerebral ventricles.[6] Among identical twins, the twin who develops schizophrenia tends to have smaller hippocampi and a larger third ventricle centered in the hypothalamus.[7] One possible result of such structural lesions is that they could subtly disconnect, and derange, those circuits which carry messages back and forth between the limbic system, the hypothalamus, and the prefrontal cortex.

Although the brain waves may be asymmetrical, it is not clear how this electroencephalographic (EEG) finding relates to the schizophrenic disorder[8] (see chapter 20). It is more likely that schizophrenic symptoms represent an imbalance among various neurotransmitters than that they are caused by a simple "dopamine overactivity" (see chapter 44). True, many antipsychotic drugs acutely block the second type of dopamine receptors. Yet, when given chronically, these same drugs *enhance* dopamine metabolism in the frontal cortex.[9] Moreover, many of the current generation of antipsychotic drugs also have the ability to antagonize the effects of serotonin at its third type of receptors. Normally, these ST_3 receptors inhibit the firing of the next nerve cells. And among these cells which could be inhibited by their ST_3 receptors are those intrinsic to the medial prefrontal cortex.[10]

Enhanced perceptions are an early symptom in schizophrenia, a symptom consistent with the mental hyperactivity of someone in a state of hyperarousal. To Fischer, the similarities suggested the hypothesis of an arousal continuum. It was one in which he would place our conventional everyday "I" near the *midpoint* of an arc which represented an arousal scale.[11] Off at the lowest end of the scale, the person would be in the *hypo*arousal state exemplified by yogic samadhi, and would proceed next toward the relaxed meditative tranquility of zazen. Theoretically, as arousal then kept increasing, and passed beyond its normal midpoint at "I," the subject would then become increasingly activated both cognitively and

behaviorally. Fisher proposed that such sequences proceeded first through periods of sensitivity, creativity, and then anxiety. Next on the ascending scale came the successive extensions of hyperarousal that were said to represent acute schizophrenia and catatonia. Finally, at the most extreme, *hyper*aroused end of this activity scale came the ecstasy which occurred in mystical rapture.

Fischer also ventured to explain why we usually perceive our outside world as being separate from ourselves. His hypothesis began with the arguable premise that usually our cortical interpretive states went on functioning more or less independently of those derived from our subcortical activities. Suppose, on the other hand, a person moved off in *either* direction, to the right or left, along the arousal spectrum cited above. Then, he speculated, the two activities—cortical *and* subcortical—would tend to come closer together and become more integrated. As the person proceeded farther out, toward *either* end of the arousal spectrum, the two processes would tend to merge. Thus, in Fischer's view, if one were to move off either beyond mystical rapture at the high end, or beyond yogic samadhi at the low end, one would finally come into contact with one and the same larger, universal reality.

It is open to question whether such maps and hypotheses are valid. Is it legitimate to position schizophrenia and catatonia on any scale, and to fit them somewhere between anxiety and the ecstasy of mystical rapture? And there are sound practical reasons why clinicians must have firmer criteria than this. For they must decide, *yes* or *no,* Am I dealing with the early religiosity of the truly schizophrenic patient? Or are these only the religious impulses of a normal person who is wandering a bit more than usual along the mystical path? Table 2 goes on to emphasize some of these important empirical distinctions. For example, when normal people are on the mystical path they develop more conscious control and learn how to tolerate their inner experience. They also become increasingly free from both cravings and aversions, and integrate their mystical experiences more successfully than do schizophrenics.[12]

The "arousal scale" hypothesis tends to sow confusion for several reasons. It could seem to imply that all zazen is the same, and that zazen and yogic samadhi belong near each other, paired off toward one *hypo*aroused end of some spectrum opposite from ecstasy. It glosses over the fact that heightened periods of awareness also occur within zazen. It also tends to invite another misconception. It suggests that a subject might proceed, in stepwise increments, to develop each of the several categories of states above, simply by turning up the amplitude on a continuum of arousal per se. In humans, arousal is but one of many relevant ongoing brain functions, not the sole driving mechanism.

Still, the hypothesis offers a useful point of departure for the different theses to be developed herein. For we are going to propose that (a) alternate states differ qualitatively, and very substantially, in the ways in which each of their many physiological aggregates falls into place; (b) when these do come together, it will be in a novel fashion, one in which many other functions also drop out; (c) a blanket distinction between cortical and subcortical events does not allow one to separate either ordinary states or extraordinary states into neat categories; (d) no arousal curve remains smooth and unbroken. It has open segments, transition periods.

These are pivotal moments of change; and (e) the particular states in which deep *insights* occur are key transforming aspects of the mystical path. These insightful states are relatively far removed—both semantically, physiologically, and temporally—from those other categories of states which we usually think of when we use such words as rapture, samadhi, schizophrenia, and ecstasy.

Will it come as a surprise to find that the first step proposed in our thesis is to take a serious look at the issue of self?

7

The Semantics of Self

> The central problem of understanding states of consciousness is understanding who or what experiences the state. Our theories evolve with the center missing; mainly the "I," the Witnesser.
>
> Arthur Deikman[1]

For centuries, Zen training has been transforming the maladaptive self. Some changes occur in rare dramatic moments. Others, equally impressive, evolve slowly, incrementally. But what could cause a growing brain to develop a dysfunctional self in the first place? And by what means could it later become constructively transformed? In several following sections we will be asking, Which words stand in the way of our understanding? How does one go about constructing a self? What are its unfruitful aspects? Finally, in part II we consider how the meditative dynamic fruitfully restructures the self.

Obviously, a self must exist. What else could make us consciously aware of events arising outside or within us, of factual knowledge, and of the way we act within the external world? Turn to the dictionary definitions of consciousness, and they will all refer back to that core of *self* in the center. Never do the definitions acknowledge a striking fact: some extraordinary forms of consciousness retain no subjective *I* inside them. Still they are witnessed. Dictionaries use the term *experient* to stand for the person who undergoes an experience. Herein, we will employ a variant spelling, whose sole purpose is to alert the reader to a key distinction. Let *experiant*—now spelled with an *a*—serve to convey whatever still goes on experiencing when this usual personal self is *absent*.

Yet, the very notion of an experiant invites disbelief. How could any brain modify its awareness so remarkably that it leaves no subjective *I* inside which does the attending? We struggle to comprehend. Meanwhile, common sense dictates both our premise and our biased conclusion: if someone who aspires is to be called an aspirant, then behind any experience must be some kind of egocentric experiant; something still in there having it, attending to it, and being the source responsible for it. Accordingly, we in the West adhere to Jung's interpretation: "If there is no ego, there is nobody to be conscious of anything. The ego is therefore indispensable to the conscious process . . . I cannot imagine a conscious mental state that does not relate to a subject, that is, to an ego."[2] Many familiar words like *ego* and *id* have now become a part of our doctrinaire Western psychological

selves, but in ways that will simultaneously encourage the flow of their basic ethical, compassionate impulses.

Long before Freud put forth his theories about the id, Taoists and early Buddhists had developed an original "big picture." It was a perspective that, to the reader, may now begin to sound vaguely familiar. All around and interpenetrating us, said their teachings, was a natural open domain. Surprisingly, it unfolded into full view only when the person's natural self awakened. It, too, was governed by no laws of logic except its own. It, too, encompassed every possible sharp contradiction. Indeed, it knew neither good nor evil. It was even outside time. It had no function. It existed in its suchness or thusness. It was. It was so universal that it went far beyond the ken of earthlings. We could only guess about it within the limitations set by our newly acquired systems of human values and factual knowledge. Moreover, even when someone did "awaken" to the presence of this Ultimate Reality, it was not a very special event. It meant merely that he or she had reestablished the original connectedness with what had always been present anyway.

No, said Freud. This was not reality. It was *un*reality. Still, he acknowledged that mysticism had anticipated some of his own formulations. He admitted that "certain practices of mystics" could enable the "perceptual system . . . to grasp relations in the deeper layers in the ego and in the id which would otherwise be inaccessible to it." But, no person could grasp these deep relationships, he stated, unless their mystical practices (which he downgraded) had first upset "the normal relations between the different regions of the mind." Freud doubted that such abnormal procedures could ever put that person "in possession of ultimate truths, from which all good will flow." Yet, he continued, "All the same, we must admit that the therapeutic efforts of psychoanalysis have chosen much the same method of approach. For their object is to strengthen the ego, to make it more independent of the superego, to widen its field of vision, and so to extend its organization that it can take over new portions of the id. Where id was, there shall ego be. It is like reclamation work, like the draining of the Zuider Zee."[3]

Freud's psychoanalytical goals, if not his methods, came closer to Zen than is sometimes appreciated. Indeed, long before Freud, Zen training methods also encouraged the practical self to mature, to shed its excess psychic baggage and widen its field of vision. The training also helped to reclaim the passions from inappropriate conditioning, and to do so in a way that would rechannel their energies along other lines. To understand how such complex processes might unfold, we need to find a fresh conceptual framework. If it is to be a useful model, it should begin by returning us to our simpler origins, to the way our infant brains first built up our notion of self.

Is our society ready, today, to become familiar with some basic landmarks and vital functions of the young and growing human brain? Can we appreciate its functional anatomy as eagerly as we look forward to seeing the faces and hearing about the dysfunctions of the latest media personalities?

aggression.[3] Now that we are adults, could we learn to modify our rigid responses, become even more flexible?

Sometime between fifteen and twenty-four months of age we act self-consciously. Place the viewing child in front of a mirror and she or he will recognize that a dab of rouge on the nose is an imperfection of self.[4] The blemish obviously mars the expected image. *Whose* image? Revealed in such behavior is a person who by now has developed some kind of a larger "me" to be looked *at*. Moreover, an inner "I" has recognized that some dreadful "bad" spot is spoiling "my" nose.

Comparable pronouns then find their way into that complex behavior we call language. The words enter in a cluster around the start of the "terrible two's." The order in which they enter is informative. First comes "mine," "me," "you." Then "I."[3] Also around age two, we start projecting our own mental states *outward*, imputing them to other persons. Suppose mother pretends to be distressed. We will reach out to console her with budding empathy.[4] Yet we still won't have gone on to establish a firm sense of our own identity—of ourself as a presence which continues—until somewhere between six and nine years.[5] By the end of that first decade, most of the brain will have finally insulated over its bare wiring. It is now well insulated with myelin, fore and aft. Moreover, its messages are passing readily from one side to the other. They leap across the white bridge of the corpus callosum at their peak physiological efficiency in ways that unify the verbal and nonverbal capacities of our two hemispheres.[6]

What constitutes this personal imperative dwelling deep inside us, this insistent self whom we slowly become aware of as children? William James noted that this private self began with a physical nucleus. It arose from sensations referred from our head and throat. Surrounding them was a vague layer of the thoughts that originated in our central person and were referable back to it. Superimposed next were "self-feelings." These ranged from the heights of self-esteem to the most personal depths of despair. Linked with such emotions were our instinctive behaviors: self-seeking and self-preservation.[7] Did some outer boundary enclose our "inside" physical, mental, and psychic self? If so, it seemed to be our skin. "Other" began outside our skin. "Other" was everything external to us. As children, we had set up the barrier: self/other. It would prove to be a very thick barrier. Conceptually much thicker than our skin.

The barrier is still present. Even now, as adults, when you look at me and I look at you and we see the other person as "other," it is because we each perpetuate that ancient boundary on the surface of our own skin.[8] Meanwhile, a third person on the scene sees us both as "other." Clearly then, this distinction between self and other has some *relative* aspects to it. It is not something absolute, but rather an artificial, self-imposed mental construct.

Now then, suppose some fourth human observer arrives, one who happens to be graced with rare total, enlightened, universal awareness. This observer, *while still seeing different creatures*, goes beyond our fictional distinctions and now views all four of us as part of *one*, larger whole. No more thick skin barriers. After perspectives change, can experience itself change? Can starting with a different mental set really change experience?

You can demonstrate this to yourself at a far simpler level. Gently close your eyes. Then use one index finger to explore the skin of its counterpart. Start by moving the right finger, while letting the padded surface of the opposite index finger remain stationary. A sensation of shape arises. It is always referred to your *left* finger, the object. Your brain even projects this "fingerish" shape out to a nearby location in space. All the while, the skin of your right index finger seems to have become less sensitive when cast in its temporary role of being the active explorer. It develops merely the vague feeling of the formless rubbing process itself.[9]

Reverse, now, only the *role* of each finger. Let the skin areas rubbed together remain the same. This time, the left finger pad explores. Now, only the right finger takes shape. The whole perceptual experience "topples over" in the opposite direction. These two experiences cannot coexist. Perception switches from one set to the other as an either/or phenomenon. The brain came to a decision: one stationary finger is to be the *object*. It must therefore attend to it as an object, and will perceive it as a depersonalized "object," even though it was your very own, warm, attached finger.

Starting in childhood, other decisions made it obvious that our body contained some kind of a sensorimotor self. That is, we could feel our arm and see it in action when it stretched far off to grasp an apple out in this different world beyond our skin. But many other selves were not obvious; they were indeed invisible. Because, into each such extension, we were also thrusting and grasping with parts of our hidden conceptual and affective selves. Collectively, one may think of these as our various *psychic selves*. It is true that they go on acting covertly, but it would not be correct to regard their attachments as occult by any means. They are merely *incorporating* many notions sponsored by the rest of our corpus, our body.

What was the result? An elaborate possessive psychophysiology; a possessive self that went on to *incorporate* far more than we could ever imagine of the objects and people we've clutched, and of the emotional bonds and opinions we've attached to each of them. To some of these corporate selves, it will make a difference whether you are forced into handing over "your" apple to someone else, or offer it spontaneously as a gift expressing true compassion.

Another example, close to home, may help you to appreciate the psychic self. Suppose you and another teenager are now standing out on the sidewalk. You are both facing the same house. Imagine that, in your case, you have just returned here after a gap of five years. You are now looking at *your* home—at the very home where you grew up. On the other hand, you've just met the second teenager, and she had never lived in the house or seen it before. While standing there for several minutes, intimate reminiscences of your home start to fill your thoughts. But to this other teenager, it's just another house. She has no subjective ties to it. She sees it unsentimentally, objectively.

No child fortunate to grow up in one home can do so. We can't be impersonal, not when it's *our own* home. It grows on us, permeates us. Its elements become so near and dear they can make us homesick. Growing sentimental is an interactive physiological process. It is one in which we extend our personal

self—building on countless memories and associations—not only into the rooms and people in our house, but out into every geographic detail of the yard and the neighborhood where we played with the other kids. All these become the stuff of our incorporating, possessive, reminiscencing selves. They become *my* house, *my* neighborhood! As William James noted, we extend this possessing "self" to include not only family and friends, but clothes, bank accounts, and other possessions.[7] So the infantile "mine" of eighteen months had now really grown up, though the true extent of its covert emotional bonds would remain largely invisible.

Let us now take stock of the Jamesian self to see what now makes up its core and layers. To do so is to be impressed. Already, this basic center of self contains (1) self-preservation behaviors; (2) sensations from the body, especially those from the head and throat; (3) thoughts and other possessions or recognitions; (4) self-feelings; and (5) instinctual self-seeking behaviors. Before the self can vanish, all this must drop out! Even so short a list defines a major psychophysiological agenda. *If, in a flash, an enlightened state of consciousness is to dissolve all such ties, it must extensively revise the way impulses usually flow in many circuits in the brain.* Where do these circuits lie? All over.

Toward a Psychophysiology of Self

Consider three simple examples of the issues that underlie our being "self-centered." Begin with a creature's first instinct, to preserve itself. Our survival imperatives arise from circuits hardwired into the stalk at the base of the brain, called the brain stem, (see figure 3), and from their extensions into the hypothalamus. Their survival functions are irresistible. If you're deeply submerged in water, running out of oxygen, these circuits will thrust you up to the surface, gasping for a lungful of air. Many of their instinctual drives and cravings seem almost as powerful as our basic need for oxygen.

Next comes defensive behavior. One major premise underlies it: a vulnerable creature must be protected. Is it really necessary to build a moat, battlements, or castle keep? Not unless there exists the threat that someone inside could be harmed, or their possessions stolen. To meet the threat, primates mobilize their defensive behaviors along an irregular perimeter that includes the central gray matter in the midbrain, the hypothalamus, and the amygdala (see figure 3; see also chapters 41, 43, and 52). These sites are like strongholds disposed along some archaic Maginot Line. None of our primal fears subside until their deep bunkers are vacated, neutralized, or bypassed.

Beyond self-preservation and defensive behaviors, the constructs of self become multilayered, emergent. Therefore, being self-centered is nothing to feel guilty about. It is everyone's lot, built in at many sentient levels that feed into the visceral core. Some of our self-centeredness began with that early strong neural bias toward the experience of seeing. When we spun around as a child, the world *did* move. Obviously, *we were the axis of a turning world.* Seeing it meant believing it.

And we have every reason to believe it still. Whenever our head and eyes move, the result is not a blur. Instead, the accessory optic system of the brain

registers and adjusts instantly for the way each new visual image of the outside world keeps stimulating the retina.[10] Such hidden, automatic visual mechanisms reinforce our prevailing belief: we are definitely a physical self. Our vestibular apparatus complements this visual system. It sends us messages from the inner ear, telling us both about how we move and about the way gravity pulls on us. Normally, the above cues do more than stabilize the position of our head and eyes in space. We take them as proof that we exist.

So much of this early, unconscious, physical self-centering is first built up within our brain stem. The accessory optic system feeds into its highest level, the midbrain. The vestibular system directly informs the pons next below, while proprioceptive impulses from the head and neck muscles enter the brain stem at multiple levels. Finally, these hidden, axial elements of our sensate physical self begin to filter into consciousness, passing up through the midbrain,[11] thalamus, and cortex.

Here, higher up in the brain, other sensate messages code for increasingly subtle constructs of our physical self. To illustrate: certain nerve cells in the monkey's superior temporal region lie in wait to discharge their impulses. They are patterned to fire *only* when this monkey sees one particular external object, such as the head of another monkey. Moreover, these cells are also so highly selective that they will discharge *only* when this other head is being seen from a special perspective. It is that particular perspective which must refer back, for its line of sight, to the head of the *observing* monkey. So, these temporal nerve cells seem to have set up their own observing monkey's head as *the* "observation site" which serves as their standard point of reference for the construct of "other."[12]

At such higher levels, the brain will finally link many networks, synthesizing our notions of self into an "omniconnected anatomical structure." Within such resulting large distributed networks we finally integrate the facets of our sensorimotor self with those of our thinking, knowing, emotional, *psychic* self. Some have speculated that the brain represents these "selves" in a manner likened to that of a hologram, wherein separate bits of data distribute themselves throughout the whole image, and something of the whole image is contained in each bit as well.[13]

Who, as a child, escapes the limbic connections of their sensorimotor self? For shortly after that thorn prick is felt, and one's motoric self is seen to jerk the arm away, there occurs the wounded recollection that one has been stuck before. Now thorns become extra bad. And yet, this same "remembering self" was also capable of a stream of "good" memories. It could tap into pleasant autobiographical associations: the scent of roses or other memorable Proustian images, snapshots leaping out of the growing album of our personal history.[14]

Before long, we would have our well-developed—and often overused—capacity to label many things "good," or "bad." And some of these "bad" categories could hurt, almost like thorns.

As it matures, the front part of our brain brings a special executive focus into this self-oriented mixture.[15] Up in the frontal lobes, we begin to plan, to project, or to *restrain*, many of our body movements (see chapter 57; figure 2). Yet, among the many higher origins of one's omni-self, those coming from the crossroads of the temporal lobes are most intriguing (see chapter 56). Here, evolution

interactive. So not until one approaches it in a comprehensive, interdisciplinary manner is it possible to advance even tentative explanations. The second reason stems from the fact that the investigators from our different tribal disciplines do not yet have a vocabulary which enables them to talk with one another using a common sign language. Misleading jargon stands in our way. Descriptive words are inadequate. It is time to return to simpler, basic words, those from cradle and playground.

9

Some ABCs of the I-Me-Mine

> To study the way of the Buddha is to study your own self. To study your own self is to forget yourself. To forget yourself is to have the objective world prevail in you.
>
> Master Dogen (1200–1253)[1]

> We have met the enemy, and it is us.
>
> Pogo[2]

Long before Pogo, Buddhism had also become very specific: our major problems and discontents arise from *within*. We start as fundamentally sound, and basically good. But in one sense, we become our own worst enemy. As soon as this notion gets personal, it becomes hard to accept. Notice how quickly people shift to the defensive whenever it is even hinted that their cherished personal self has caused some difficulty.

Reading this chapter may leave you, too, feeling uncomfortable. For our goal is to develop a seemingly naive system that describes some subtler aspects of this personal self.[3] Please do not think the system is too simple and childlike to apply to you. For this is not a new topic. Indeed, for many centuries the question Who am I? has been *the* central issue in Zen Buddhism. Obviously, we each have an explicit (but transient) physical self. To probe our sources of selfhood is not to ignore this basic fact. It is rather to define our sensitive *implicit* self in a way that comes to terms with its three different operational components. These three components themselves are not new. They are at least as old as each of us now is. We were just reintroduced to them at the start of the previous chapter. All we had to do was listen.

What we heard were older children who had been vocalizing them even before they started their terrible two's. Their operative words were *I*, *Me*, and *Mine*. In these three words lie clues as to how we constructed our invisible self. From here on, they are italicized with initial capitals. This is to emphasize how vital is their presence, and how telling is their absence. Following Pogo's lead, it serves our present purposes first to comment on their uncomfortable and unfruitful aspects. This could be misleading. For the point of Zen is not to crush or banish their powerful and "friendly" energies. It is to liberate, transform, and redirect them into their many other positive, constructive functions. The triad consists of the following:

now form the mosaic of our personal identity, our self-image. We shift our behavior from that of one role model to another depending on the situation.

For we also adopted the attitudes originating in each persona. These attitudes then shaped how each of our role model *I*'s *should* behave. The "good," most positive role models in the *I* are forever contending with their opposites, the "bad" personas, the shadow traits.[4] As a result, implicit in every *I* will be sharp contradictions, internal conflicts, and anxieties.

Next, the pronoun *Me*. It stands for our self as an object. What kinds of things can happen to the *Me?* Among the words in the B's, the dictionary includes *battered, besieged, blamed,* and *blushing*. So the *Me* suffers. It is *bothered* by all the "bad" events that must lurk in the jungle outside, things that go bump in the night. They threaten to harm, expose, or embarrass the *Me*. Mark Twain aptly exposed the *Me's* tender underbelly when he observed: "Man is the only animal that blushes, or needs to." Moreover, the *Me* is also constantly on the receiving end of every self-inflicted, psychic wound that has been generated by the inappropriate activities of its two other partners, the *I* and the *Mine*. Hence, the more we hypertrophy these two partners the more they develop ways of coming back to embarrass or otherwise threaten the vulnerable *Me*. Beset by all its uncertainties, the *Me* likes to be praised, because flattery is comforting and feels "good" to it.

Finally, the adjective *Mine* stands for our grasping, greedy, possessive self. Even within the *C*'s one can find many words that exemplify its negative attributes. The *Mine clutches*. But in every act of *clinging*, it winds up its own *captive*. It is self-indentured, because whatever is possessed also possesses. The more it grabs, the less satisfied it is, so it *covets* even more. Possessing more, it has more to lose. It will *cherish* the beauty of the outer physical self both in its mirror image and in the flesh. Inwardly, it *clasps* tightly to its pleasurable sensations, its thoughts and emotions.

Our *Mine* starts out in relatively simple fashion. It begins with the deceptive premise that there is a self/other split in perception. The simplicity is temporary. Because next, the *Mine* proceeds to enormously complicate its boundaries. As noted, it extends its invisible tentacles of self out through and beyond our skin. To the *Mine*, our skin surface is merely a porous envelope, never a barrier. Once in the outside world, the *Mine* attaches itself onto any other elements it desires. The large arrows in figure 1 illustrate, schematically, how the *Mine* thrusts in *two* directions; both in and out (figure 1).

The result is inevitable. Because the *Mine* becomes so tightly attached to things, anything it values must be defended. The cherished internal valuables include *my* biased thoughts and *my* strong opinions. Later on, they might also include *my over*valued spiritual insights. A *Mine* so easily threatened, fearing loss, leaves apprehension in its wake, and this psychic load shifts back and forth among the three partners.

Why do we remain so ignorant about the *Mine?* Because we never actually *see* its long insinuating arms. But they have the suction cups of an octopus, and the strength of their hold is beyond belief. Will the arms ever let go? Not until the flash of enlightenment cuts them off. Only then can the experiant appreciate

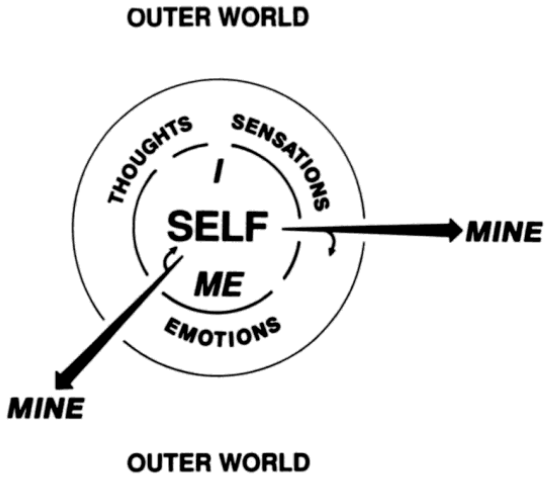

Figure 1 The ordinary self/other world of the *I-Me-Mine*
A visual model for the way we construct the illusion of a self/other world. Our *I-Me-Mine* is a tightly knit triad. It consists of a complex of attributes which relate our sensate physical self to our thoughts and emotions. It includes a sovereign *I*, a vulnerable *Me*, and a possessive *Mine*. Note that the small, curved arrows of the *Mine* not only thrust out toward what we possess in the outer world. They also curve back to attach themselves to our several inner notions of selfhood.

how extensive were these arms and how intrusive was their grasp. Finally, at this moment, all the cut tentacles of the *Mine* lie exposed on either side, struck off by that cold, bloodless stroke of insight-wisdom.

Master Dogen was making a fundamental point in the quotation at the beginning of this chapter. Training in Zen boils down to studying the *self*. As a prelude to having it drop off. So the training begins with becoming intellectually aware that there is an *I-Me-Mine* complex, identifying its responses in one's everyday life, probing it and pruning it. But soon the real work must begin, that of redirecting its potential energies. And this means nothing less than abdicating the sovereign *I*, abandoning all the ramparts defending the *Me*, and abolishing each enslavement by the *Mine*.

No single flash of insight-wisdom accomplishes this. The *I-Me-Mine* had already set up its covert fantasy world and had gained its long head start when we were children. It is a triad expert at sabotage, camouflage, and denial. We underestimate both the vast circuitries dedicated to support it and the widespread problems they cause. As the *Hsin hsin ming* wryly understates it: "The Great Way is not difficult; just avoid picking and choosing."[5] Not difficult? Just try to eliminate one long-established habit! Try to surrender one firmly fortified opinion!

Beginners come to Zen no less innocent than do other novice monks and nuns come to their other monastic traditions. No one is aware how much their invisible *I-Me-Mine* fantasy world has monogrammed everything, and fitted it neatly into an airtight, subjective frame of reference. For the result seems like a plausible edifice. Yet it is as fictitious as was the old Ptolemaic concept of the astronomy of the universe. Back in the second century, such a concept had also

seemed self-evident: we, on Earth, stood literally at the pivotal center of the whole world. Hence, as was taken for granted, every other planet, moon, and sun could only orbit around us.

Not until Copernicus (1473–1543) did we appreciate the true way our solar system exists. Finally, with the Sun placed at its center, the earth, moon, and planets fell into their correct relationships, rearranged *as they really were* and had been all along. Modern astronomy began when earthlings shifted into the Copernican way of looking at a heliocentric world. It wasn't easy. But it was the true, enlightened view. It finally enabled us to get beyond our egocentric-geocentric dogma, a doctrine which had once insisted that our two feet stood on private property, and were therefore always at the absolute center of everything. Now we could understand orbital realities from a valid universal perspective.

The paragraph above is a reasonably accurate analogy for the "awakening" spoken of in the meditative traditions. It arrives after a very long probing into the depths of space: the *inner* space of the subjective personal self. There, finally, when the shift occurs into full objectivity, it opens up into a new, enlightened paradigm, equally Copernican in scope.

After such awakenings, the italicized, initial uppercase personal pronouns of the old triad will never again be the same. Not gone entirely. Just reduced to a *lower profile* of manageable proportions, shrinking toward a smaller i-me-mine. Thereafter, these lowercase letters stand increasingly for someone whose basic energies are still being rechanneled through the same triad. Now, however, they emerge transformed, and function in salutary directions. These A-B-C attributes enable the person to become more *actualized, buoyant,* and *compassionate.*

As we move to the next chapter, our goal will be to address other misunderstandings and fears that arise about Zen practice. They center around the terms *narcissism, depersonalization,* and *derealization.*

10

The Zen Mirror: Beyond Narcissism and Depersonalization

> Human understanding is like an irregular mirror, which distorts and discolors the nature of things by mingling its own nature with it.
>
> Francis Bacon (1561–1626)[1]

> The wild geese do not intend to cast their reflection. The water has no mind to receive their message.
>
> Zenrin Kushu[2]

A mirror reflects. Water reflects the geese flying overhead. Instantly, unsentimentally. Reflection does not change the mirror, the water surface, or the geese. It is an optical process, a fact of life.

When waves no longer ripple the water's surface, it finally reflects the moon. Some day, some year, when the Zen aspirant finally drops into that same calm,

unruffled state, the awesome lunar perspective will emerge (see chapter 138). As the brain instantly images reality, directly and clearly, it seems to act like the surface of a mirror. Zen frequently uses this analogy of the mirror to imply that one's perceptions register in the same way that still water accurately images the moon overhead. Nothing else enters in: no self-centered notions, no intellectual interpretations, no old emotionally loaded associations. So the reflecting mirror of Zen symbolizes the natural, immediate way the brain works preconsciously.

Thus, when Master Huai-hai (720–814) was asked, "What does right perception mean?," he would answer, "It means perceiving that there is nothing to perceive." But fortunately for all, the junior monk persisted, asking, "And what does that mean?," At this point, his Tang master finally became more explicit: "It means beholding all sorts of forms, but without being stained by them, because no thoughts of love or aversion arise in the mind."[3]

In contrast, we in the West find that our roots of the word *reflection* take a different turn. They mean a bending back. Francis Bacon understood that humans do bend and distort the true nature of things, discoloring them with our personal interpretations. Let us again specify precisely where these maladaptive distortions come from: it is from the *ignorant side* of our *I-Me-Mine* complex, not from its natural actualizing, buoyant, and compassionate functions.

Greek mythology gave us Narcissus. We still pay homage to him with every sidelong glance at our face in the mirror. And it would be another reflected face, also within our Western traditions, which would pose the rhetorical question, "Mirror, mirror on the wall, who is the fairest one of all?" The question seems to be the essence of *narcissism,* that value-laden word which suggests that the viewer is both neurotically absorbed in self and turned away from society. Some would say that when a meditator retreats into the posture of zazen it implies a similar inward turning, a mere preoccupation with what lies below one's own navel. So they ask: Don't meditative disciplines simply foster that other form of self-worship, the one already well-known under the term *narcissism?*

People who seem self-absorbed don't necessarily have a narcissistic personality disorder. A decisive question is, How do they see *other* persons? Healthy people see others existing as *separate* persons. In contrast, narcissistic people view others as only grandiose or devalued extensions of themselves.[4] By such criteria, narcissism represents one more example of that old inturned, Ptolemaic mode with which our *I-Me-Mine* bent the mirror and routinely distorted the image of other persons. True, Zen meditation does require plenty of self-discipline to escape from distractions and to make time for sitting. But does the whole process of Zen aim to magnify or adore the self? No; to dissolve its fictions.

So any notion that Zen might be narcissistic arises out of a profound misreading of both Zen and narcissism.[5] Zen meditative practice leads the person out of narcissism, not into it. For whatever reasons students begin Zen, their path thereafter is progressively humbling. Stunned by the way kensho's swift stroke has cut off all self-references, the residual diminutive i is doubly awestruck (a) by the enormity of what was lost, (b) by how much of it soon returns. Thereafter, the long meditative path leads increasingly outward, in the direction of selfless, compassionate service to others.

technical term for this is *annatta,* the state of non-*I*. But the event is not perceived as *loss*. It is perceived as being totally emancipated from every previous bond implicit in the *I-Me-Mine*. Moreover, this flash of insight brings the experiant into wordless contact with the sense of eternal Reality itself, in all its immanent perfection. So this event conveys the *finding* of true Realization, not its loss.

These other positive attributes bring to absorption and kensho a sense of awe and grace. They convey no uncomfortable sense of personal loss, no troubling sense of unreality. So the other two old psychological terms don't fit. Perhaps *im*personalization and *neo*realization might be closer to the mark. However worded, the two large categories of states we will encounter in Zen are certainly not "disorders" in any psychiatric sense. Very seldom does the experiant find these are unpleasant, either at the moment or in retrospect.

Japanese Zen imported its orthodox traditions of Chan from the mainland many centuries ago. Rigidities are built into its systems of ritual and custom. Such conservatism is not quick to respond with enthusiasm to the gamut of today's New-Age religions. But Zen's critics still go on accusing Zen of the same, age-old faults of narcissism, and worse. Ferguson rises eloquently to defend those in today's Aquarian cultures who have been similarly indicted. Yes, she replies, "Critics call them narcissistic, not knowing the thoughtful nature of their inward search; self-annihilating, not knowing the spaciousness of the Self they join; elitist, not knowing how desperately they want to share what they have seen; irrational, not realizing how much further their new world view goes toward resolving problems, how much more coherent it is with everyday experience."[9]

But Zen's critics seem undaunted. To them, Zen remains just one more obscure mystic way which leads into a series of fanciful delusions. Still, it is only fair to point out that Zen also cuts off other, major selfish illusions and delusions. These dysfunctions have consistently sabotaged those other salutary A-B-C attributes of our *I-Me-Mine* complex which can go on to create our better selves. Critics also claim Zen is radical nonsense, an attack on our hard-earned citadel of rationality. True, its assault is uncompromising. But its targets are again the old arrogant-vulnerable-indentured aspects of the *I-Me-Mine* complex. There, the method of Zen is to infiltrate ignorance and unreason, not to defeat rationality per se. Moreover, its usual assault does not need to be a frontal one, nor one which is ushered in with fanfare. Rather is its standard approach the silent one, acting through intuition and attrition.

Zen is patient. Indeed, as we bring out further in part II, it will be only very slowly that sitting meditation and mindful daily life practice disarticulate the *I-Me-Mine*. Only gradually does Zen training seem to infiltrate and whittle away at every nerve network which had trapped us inside our usual, ignorant fantasy world. One might visualize it as operating on each ignorant and deluded network using a long series of present participles, words which end in *-ing*. First, the training encourages a "loosening up," a process of easing. This dampens the brain's previous overdriven activities. Then, by slow erosive action, in brief quickenings, and in rare larger events, the approach becomes a process of "giving-up," of "letting go," of "opening up." In such ways does the training translate finally into processes that emerge as receptive, insightful, and transformative. These three

Nervous systems arrived late on planet Earth. Only recently did the human brain evolve its many striking conscious properties. None of its convoluted sensibilities, and no part of any of the rest of the whole universe is extrinsic to the scope of Zen. So, in its larger universal context, Zen embraces all of life's natural dimensions. One of them is the sentient, experiential dimension.

Every brain still goes on informing its bearer about what it encounters in the everyday worlds of its personal experience.[3] There are at least four of these worlds, and they overlap. Start with the first, *perceptual* world. You might suppose that it would be the most familiar one. Yet, how rarely do we savor the miracle whereby impulses from our sense organs are transformed into the scent of plum blossoms, or into taste, sight, and touch! We feel the thrust of our second, *emotional,* realm. Its pulsing, visceral energies invade us with fear, love, desire, or anger. Next, using thoughts, ordinary mentation fumbles its way along in the third, *rational,* world. It uses the vehicle of language to help reason out what seems to be true. Less often do we catch—let alone hold on to—the glint of the fourth, complementary, world. It is our ordinary *intuitive* world. Its insights dart in, extracting and integrating knowledge otherwise hidden among countless networks within our brain.

Is there another dimension beyond all these—a fifth, *trans*personal world? The early masters thought so. Indeed, Huang-po believed that enlightenment was our open access into this "Universal Mind." Those less sure today may still find Siu's concept interesting.[3] He views this dimension as the universe of "sage" knowledge. No boundaries constrain this world. It extends infinitely beyond what a single brain can either imagine about itself or can project into nature. Instead, sage knowledge is intrinsic to *all* nature. It is nature's essence shared intimately by one and all. Some readers may be more comfortable thinking about this fifth dimension as a "Great Self," a kind of earthly Mother Nature projected on a cosmic scale. Still others use different words to describe it, such as Buddha Nature, or they conceive of it as the highest, universal principle.

Rational knowledge can bring us intellectually in tune with the facts of scientific mankind. And ordinary intuitive knowledge can then go a step further, so that we include in our scope the totality of mankind. But sage knowledge is the profound comprehension that all our atoms resonate in their oneness with all other forms of stardust everywhere in the universe.[3] Sage knowledge, then, is a kind of "self-articulation of the Ultimate Reality itself."[4] This is where Zen appears to be coming from. Within this fifth dimension, our levels of human awareness and those of the ontological unfolding of reality will correspond so intimately with each other, stage by stage, that they may be thought of as ultimately constituting one and the same process.

Zen training does in fact orient itself in this general direction. But Zen itself remains unadorned. Yes, it still encompasses all of the four earlier levels. But it will steer just as clear of all such abstract notions of "levels" as it does of every other entangling conceptualization. Negating itself, it withdraws before each step of the advancing intellect. Zen is more at home with "soft" things closest to poetry, with elusive scents of plum blossoms, with other experiential things that don't reduce well to numbers. Therefore, at first, it will seem far removed from

our rigorous fields of science which are packed with coldly objective data and hair-splitting discriminations. On the other hand, when the Zen aspirant finally awakens in kensho, it will be to the coldest, clearest basic truths stripped of every soft personal sentimentality.

Yet, it is especially in such matters that Zen masters and orthodox neuroscientists tend to part company. Each group would prefer to hold fast to its own hard-won citizenship. In fact, each is trying to objectify experience. In practice, the two camps operate using the biases imposed by their own training. Each is hampered by the limitations imposed by their complex methods. Perhaps the most one might hope for is that neither group will go out of its way to avoid, to deny, or to suppress the other's field.

From its vantage point, Zen continues to invite us to look critically, objectively, into our sovereign, self-referent *I*. Slowly, we then discover the fictions that made it seem vulnerable. We find a self that had been indoctrinated by others, one currently assaulted by the senses, driven by emotions, beset by thought-forms, bound by long-fixed habit patterns of behavior. This discovery is more humbling than scary. Finally comes the major flash of insight. Only then, from the fresh new perspective of No-self, No-I, can sage wisdom spring.

Where is Zen going? Look for no well-intentioned but overemotional intrusions; no busybody mentality. Its province is the simple, deft, preventive measure. Its moves are the more effective low-profile actions. These anticipate future problems, and head them off. Forget about crusading impulses which must remake the world in one's own self-image. They are covert distortions of the creative process. Mature adults no longer need to carve their names into the bark of a living tree. First, let our self-indulgent, self-referent *I* drop out of the scene. *Then, in the long view of things, salutary behavior will flow freely along novel constructive lines.*

Meanwhile, newcomers approach Zen as if they were sitting down to sample an elegant, exotic, five-course meal. What could spoil such an otherwise splendid occasion? Only the attitudes that they bring with them. First, they try to translate each word on the menu into English, bringing a dictionary to the table. Then they strive to analyze each morsel of food solely in terms of the source of its unusual ingredients. Soon they wonder when the dessert will come, imagining how delicious it must be. And all along they worry about the size of the bill and the tip at the end.

Zen is the awareness of the whole setting, the simple tasting of each mouthful, and the enjoying of the company.

So far, we have begun by presenting some orthodox Zennist views about where Zen thinks it is coming from. But suppose we now ask, Where is Zen really coming from? Then we must do two things. First, get into the brain and repair our own ignorance. Second, strip off the heavy baggage of centuries of mystical, philosophical, and doctrinal speculations. So it will be to find out how the brain itself functions, both in meditation and in various specified states of consciousness, that we now turn in the next three parts.

Part II

Meditating

Yet, grace, if thou repent, thou
canst not lack, but who shall
give thee that grace to begin?

John Donne (1572–1631), *Holy Sonnets*

12

What Is Meditation?

> It is like the pacification of turbulent waters by pouring oil over them: no waves are roaring, no foams are boiling, no splashes are spattering, but a smooth, glossy mirror of immense dimension, and it is in this perfect mirror of consciousness that myriads of reflections, as it were, come and go without ever disturbing its serenity.
>
> Soyen Shaku[1]

> A monk asked master Chi-Ch'en: "What is the way upward?" The master replied, "You will hit it by descending lower."
>
> J. Wu[2]

When we were children, playing alongside railroad tracks, long freight trains of coal cars came thundering by a few feet away. It was too much. Every sense was assaulted. We were overcome by the earth trembling underfoot, by the noise and smoke, the flashing by of car after car. We learned to turn away, retreat, and cover our ears.

Meditation helps us retreat from all the wheels going around. It relieves us from self-inflicted trains of thought, trains driven by and loaded with the fossil fuel of ancient emotions. It returns us to the way we were, before the thundering trains came, back at play in the world, in that open, trackless landscape where life's distractions are less intrusive.

Zen meditation is a relaxed attentive state, a passive activity. Both aspects are important. So when Zen talks about "no mind," it does not mean complete mental blankness, as though one were asleep. It implies freedom from thought pollution. When the incessant chatter drops out, what remains are those few mental processes essential to the present moment. Nor does Zen meditation mean a voluntarily override of thoughts. Thoughts are as natural to the world as are clouds and trees. Rather does meditation pacify those pressures from the *I-Me-Mine* which drove the excesses of thought in the first place. Thoughts then drop off by themselves. As Shunryu Suzuki expressed it, "You yourself make the waves in your mind. If you leave your mind as it is, it will become calm."[3]

Sitting quietly for twenty minutes once or twice a day helps most people relax inside a kind of buffer zone. Within it, you begin to introspect and to get back in touch with the connections between your body and brain. But the recommended approach goes further than simple physical resting per se.[4] It means taking on a passive attitude and using a simple concentration device. This usually implies focusing on the breathing, or on repeating some simple word which is in keeping with the person's belief system.

Meditation then becomes several things other than a way to relax, physically and mentally. It becomes a way of not thinking, clearly, *and then of carrying this clear awareness into everyday living*. There, with senses enlivened, it sponsors an active, behavioral alternative to the statement, "Stop the world, I want to get off." Deeper levels of meditation also become the prelude that helps access still other

states of extraordinary brain activity. If meditation has already clarified the brain and made it more receptive, personal growth is then more likely to occur after these states enter.

However, if meditation remains isolated from some larger religious context, it does not tend to provide the foundation for sustained spiritual growth. The Zen master provides the first, essential, supportive instruction in meditation. Both then and thereafter, he demonstrates by example his deep spiritual respect for the whole process. This respect is reinforced when the meditator practices in a group that shares the same authentic spirit.

Zen meditation is called *zazen,* from the Chinese, *tso-ch'an.* One enters into it with a seriousness of purpose befitting the posture which the Buddha himself used. Nor is it viewed casually as something in itself, as merely a means to an end. Instead, it is one vital part of a total training method. This training will gradually reshape brain and body, behavior and attitudes, consciousness itself.

The great Soto master Dogen said this about meditation centuries ago:

> A quiet room is recommended for the practice of zazen, and food and drink are taken only in moderation. Free yourself from all attachments . . . think neither of good nor evil, and judge not right or wrong. Stop the operation of mind, of will, and of consciousness; bring to an end all desires, all concepts and judgements.
>
> To sit in zazen, put down a thick pillow and on top of it add a second one. Thereafter, one may chose either a full– or half–cross-legged position. In the full (lotus) position, one places the right foot on the left thigh and the left foot on the right thigh. In the half (lotus) position, only the left foot is placed upon the right thigh. A robe and belt should be worn loosely, but in order. Next, the right hand rests on the left foot, while the back of the left hand rests in the palm of the right.
>
> The two thumbs are placed end to end. The body must be maintained upright without inclining to either side or forward and backward. Ears and shoulders, nose and navel must be aligned. The tongue is kept against the palate, lips and teeth are firmly closed while the eyes are to be always opened. After the bodily position is in order, also regulate your breathing. If a thought arises, take note of it and then dismiss it. When you forget all attachments consistently, you will become zazen itself naturally. This is the art of zazen[5]

Before settling in, the meditator can loosen up by bending the trunk a few times to the right and left, moving the shoulders and trunk around. One initiates the tonic firmness of the trunk first by bending forward and thrusting the buttocks out in back, then slowly returning to the erect posture. Thereafter, the posture remains stable. The ears are back on a plane with the shoulders, and the nose is on a plane with the navel. Shoulders and arms hang naturally, the lower abdomen is released and everything above it is relaxed. This becomes possible because the lower trunk now provides most of the support for holding the body erect.[6]

So the zazen position is nothing mysterious. It sensibly distributes the body's weight evenly, using as its tripod the two knees and the base of the spine. The knees rest on a mat and the buttocks on a cushion. The head is held erect and the chin tucked in. Because muscles all along the spine keep it straight, the

head then stays in line with the center of gravity. The mechanics of this erect posture are simplified, and one needs only the minimal amount of muscle tone to maintain it. The same erect posture tends to perpetuate itself after the sitting ends, contributing to the ongoing physical sensation that one is "centered." The relief of being "on-center" is well-known to every potter who starts with an eccentric lump of clay, every clothes washer who spins an off-balanced load.

The adept may come to view zazen as the universe expressing its own enlightened true nature. But the lay meditator struggles, for early practice is rigorous work, and hard on the legs. Formal Zen meditation periods vary in length, but they usually last between thirty and fourty-five minutes, longer than the transcendental meditation (TM) sittings of twenty minutes. Attention lapses, the back and shoulders slump, the head droops, and one soon loses the appropriate physical and mental attitude. Meditation becomes boring.

Ken Wilber points out that the various approaches to spiritual practice each differ in their special conditions.[7] Zen's special condition involves sitting in zazen, becoming frustrated by it, discovering the sources of one's own resistances to it, and overcoming them. No pain, no gain. Indeed, it is in the very process of being frustrated that *one diagnoses oneself most clearly as the source of the resistances.* And also discovers ways to draw on one's inner resources against being distracted. Zazen's special conditions teach the body-brain in the most practical way, by the seat of one's pants. A nice, big, puffed-out cushion might seem ideal, but it cuts off the circulation to the legs; too thin a cushion offers little support. As in learning to follow the breath, and to place the hands comfortably, it takes many sittings before each person finds the golden mean. We are all built differently.

Last, but not least in these pages, we will discover that meditation is a vital probe for understanding how the brain works. But much sifting is required: one review of meditation cites close to one thousand articles[8]; the latest has a 124-page bibliography.[9] Indeed, my journey into zazen would turn out to be both an odyssey of professional enlightenment as well as one of self-discovery. It all began unexpectedly, in Kyoto, and in the following way . . .

13

Ryoko-in, Kyoto, 1974

One thing is everything
all things are One.
If you know only this, then
don't worry about attaining perfect knowledge.

Master Seng-ts'an[1]

This summer, I have come to Kyoto on sabbatical leave. My project is to study the brain with my friend and colleague Professor Shuji Takaori. Shuji acquired his fluent English when he trained at the University of Michigan for his doctorate in neuropharmacology. His major research interest is the locus ceruleus. This fascinating group of nerve cells releases norepinephrine throughout the brain (see

figure 9). The question we are asking seems straightforward: How does the cerebral cortex change when messages reach it from the locus ceruleus?[2]

My introduction to Zen begins as a happy accident, the way good things often do. My old friend and classmate in medical school Jock Cobb and his wife Holly, knowing we are leaving for Japan, have given me Herrigel's book, *Zen and the Art of Archery.* Now, living in Kyoto, it is easy to become immersed in its rich history and age-old expressions of Zen culture.

Kyoto is a place of beginnings. Lofty Mount Hiei looks down from afar at the front door of this small house where my wife and I now slip off our shoes and sleep inside on straw mats, Japanese style. High on Hiei's slopes, among the tall cedars, stands its ancient temple of Enryaku-ji. Here, the Tendai school of Buddhism had taken root after being transplanted from China. Three centuries later, near the end of the twelfth century, it would be the Tendai monk Eisai who came back to Kyoto to teach the more rigorous form of Chan Buddhism he had learned to practice in mainland China. And it was also on Mount Hiei that young Dogen was later ordained. After making his own pilgrimage to China, Dogen would return in 1227 to import the traditions of the Soto school of Chan into Japan. The Rinzai school of Buddhism went on to consolidate its influence in Kyoto in 1324. In that year, the monk Daito became the first abbot of its large new temple complex, called Daitoku-ji.

During these early centuries, Japan had no written language appropriate to greet the influx of Chinese culture. So the Japanese were obliged to write the word *Zen* (as they then pronounced *Chan*) in two of the imported Chinese characters (*kanji*).[3] The idiograph on the left conveyed meanings. Among them were some distant religious associations with the radiant well-being of spiritual power. The other character, on the right side, implied one only, and it suggested the way the word was to be pronounced.

Inspired by the cultural fabric of Kyoto, I have become even more curious to find out about this religious oneness. Why is it still so influential in Japan? A colleague, Dr. Yoshi Osumi, also a physician-investigator, has known other Americans who had received Zen training. They went to a small subtemple at this same Daitoku-ji, named Ryoko-in. He volunteers to telephone the temple and arranges for me to go there to meet its Zen master, Nanrei Kobori-roshi.

I had been stationed in Japan in 1950 and 1951 during the Korean episode. I had been impressed then by some of its larger Buddhist temples, in Kyoto, Nara, and Kamakura. Still, at Ryoko-in, I find myself unprepared for the tranquility that flows from the exquisite simplicity of its gardens and buildings. Nor am I prepared for the simple dignity, sophisticated interests, and conversational agility of the luminous, friendly man of steel who is its roshi. This is not the last time Zen will take me by surprise.

We meet on a typical sweltering hot July day. The roshi, head shaven, looking lean and fit, is enveloped by a thin white flowing garment. He smiles and is perfectly composed throughout the interview. He is not perspiring and does not otherwise appear to be affected by the heat. After bowings and greetings, we seat ourselves into low, comfortable wooden chairs. Our spacious antechamber looks out through open screens at a beautiful, simple Japanese garden. The distant buzz

for someone else. Words will be especially troublesome. When we part, it is in a most friendly fashion, but he leaves no hint of an invitation to any subsequent meeting. From this, I am left to conclude that if there is ever to be any follow-up it will be entirely at my initiative.

I telephone the temple myself a week later, stumbling along in my newly acquired, halting Japanese. The roshi gives me a courteous, but formal reception. I feel like a foreigner, and it takes a concerted uphill conversational effort in English to make the next appointment a firm one.

This time, I arrive at Ryoko-in early. I pause inside to admire some simple pottery vases and teacups. I am fascinated to hear from the attendant that the roshi himself had made them, and that his brush had also turned out the striking, bold calligraphy hanging on the wall.

Our second interview takes place in another room of the subtemple. The roshi enters dressed in a light-brown, flowing garment. This time we are seated on cushions at a low table. Again, he is poised and comfortable; I must adjust my leg position frequently for comfort. (I thank him, silently, for having thoughtfully provided a chair the first time.) I begin by commenting on how effectively the design of the wall around the outside of Ryoko-in incorporates a series of very old roof tiles. He seems pleased that I have noticed. He mentions, in a self-effacing way, that he had designed it, preserving the aged tiles from former roofs in token of the way this temple's history had stretched back many centuries.

Buddhism itself goes back over two thousand years, he continues, and it expresses many cultures. Buddhism became associated with Taoism and Confucianism when it moved north from India into China. There it took on a distinctive Chinese character. During its early centuries in China, no separate Buddhist schools represented either the gradual awakening, which would be emphasized later in Soto Zen, or the immediate awakening stressed by Rinzai Zen. "Our way in this temple," he adds, "is to value both the gradual and the sudden types of enlightenment."

The Chinese preferred down-to-earth, tangible things. They never felt at home with the many abstractions of Indian theological thinking. "Take the question, What is truth? The Chinese answer is direct, concrete: 'That pine tree over there.' Zen respects what exists here and now. We don't chase abstract ideas or floating words."

Our conversation then comes to a long silent pause. I realize something basic. Much of my entire life consists in chasing abstractions. Each idea is linked to a whole set of other associations. How radically Zen departs from what I have known before!

Finally, in the silence, the roshi acts. He leans forward, and with one swift graceful movement sweeps up the small teacup from which he has been drinking. "This cup is 'round,'" he says. "Roundness is right here, in the cup in front of us. This roundness is not related to any distant concept of 'roundness,' nor is it to any other words we may have built up in our mind. Likewise, we may think that a Greek column is beautiful. But it, too, exists in the same way, in itself. It does so quite apart from us and from any architectural formulas that were used to design it."

unconscious. Instead he uses it to refer to the larger sense of the "universal unconscious."

We then take up the subject of the Japanese tea ceremony. He observes that it is pervaded by feeling tones of harmony, reverence, purity, and tranquility. He emphasizes that the participants enter into it in a spirit of equality. There, relationships each to the other are not conditioned by ideas of social rank, privilege, or gender. One's perceptions awaken in the tea ceremony, and everyone shares in this liberating experience. Each goes on to revere the others. "In the same way," he concludes, "wisdom, *prajna*, does not exist for itself. What it leads to ultimately is to sharing, to compassion, to love."

Another long, silent pause. Again, I gather that the initiative for entering Zen training will be up to me. When I ask Kobori-roshi if it might be possible to do so, he pauses. "The temple has firm rules," he says. "We think it is worthwhile to start only if the person can then continue for a minimum of six months."

Waves of uncertainty sweep over me. The first laboratory experiments were off to a slow start. There were already minor tremors from the culture shocks and aftershocks of living in Kyoto. Is this the time to enter Zen training, to commit oneself to even stranger ways of thinking and doing? On the other hand, didn't I seek out Japan to find new problems to solve? So, sensing an affinity with the man, his ideas, and his temple, I ask, "May I see you again?"

He agrees!

14

Zazen at Ryoko-in

Colored blossoms scatter and fall.
In this world of ours, who lasts forever?
Today let us cross the last mountain range of life's illusions,
No longer to dream shallow dreams nor succumb to stupor.

Iroha poem[1]

Our first two long interviews are highly stimulating. But the roshi has given no hint of an invitation to join the Zen group. Our third interview is blessed by the weather. It is such a beautiful, clear summer day that we dwell first on the seasons. Kobori-roshi explains that Japan has many seasons. Even if one starts with the four usual seasons, there will be four other transition periods in between them. So even in winter, the first green shoots of spring come thrusting up through the blanket of snow. Next, the spring plum and cherry blossoms unfold and fall off. Then, in late summer, the leaves of a few trees are already turning the colors that signal the arrival of fall.

Many Japanese poems, *haiku*, focus on just these interfaces between the seasons, he points out. I remark that the Japanese as a people seem extra sensitive to the seasons. He adds that they turn this same sensitivity toward internal events as well. Japanese children frequently ask, "How is your inner weather?"

With no further discussion, the roshi begins to show me the proper approach to meditation! I am enormously relieved. This is my first tangible evidence that I

am being accepted as a lay student at the temple. Only later do I find that, in earlier centuries, it was routine to turn down all Zen aspirants at the temple gate. If they persisted—in spite of the closed temple gate—they were usually invited inside after nightfall.

"First," the roshi says, "our way follows some general principles. Life involves being open-eyed. There are many different ways to meditate. We prefer to sit in zazen open-eyed. Using this approach, a person more naturally carries Zen practice into the rest of everyday life. Other ways of sitting with eyes closed started in India. They involve separating oneself from ordinary life. Indian philosophy emphasized life as suffering. To close one's eyes may perhaps seem to be the easiest way to retreat from it temporarily. But the Chinese already had their own view of life. It was different. Life was affirmed; life was worthwhile. Therefore, our way is to practice zazen with open eyes. This means *active* sitting, not passive sitting. It is more difficult, but there are fewer transition problems."

He then demonstrates the correct sitting posture. In actual fact, it differs only slightly from the poised, erect way he has been sitting all during each interview. "First, you cross your legs, both legs if you can, one if you cannot. Place your left foot comfortably on your right thigh. Then you sit erect: backbone straight, chin down, head back. Think of a long, steel rod. [He gestures.] This rod goes straight down your spine into the center of the earth and then straight up again high into the sky." I get the picture.

"Rest your forearms on your upper thighs, not on your hips. Loosen the stiffness around your shoulders, place your left hand in your right palm and bring your thumbs up together, nail to nail." Looking down now at his fingers, I am astonished to discover what I had overlooked before: his fifth fingernails are long, Chinese style.

"Next, you let all the weight of your trunk settle down to your abdomen, still keeping your back straight. You keep the back end of your bottom elevated with two rolled cushions. This leaves both knees pressing gently on the floor. Now, your base is solid like a triangle. Your posture is like that when you sit on a horse. You sway a few times to either side, then you settle in. No moving. When you breathe, emphasize breathing out. Say the word, 'one,' to yourself at the same time you exhale. Breathe all the universe in; let it all slide back out. [At this point he utters a long steady, sustained exhalation: "O . . . n . . . e."] Then let your eyes become powerful so that they penetrate deeply into one spot. Keep your eyes on this one spot. Do you see that leaf out there in the garden? Look powerfully into that leaf, so that your vision goes directly into it. You must first learn to see into things and then through them.

"Your next step is to concentrate on some simple phrase that helps you relax, yet still keeps you focused. Many such phrases come down to us from the Han dynasty. For example: 'White clouds embrace mystical stone.' If you use any phrase like this, concentrate only on the general *feeling* of it. Forget the words, and do not try to visualize the scenery. When you finally reach that stage of practice when no thoughts are in your mind, you may take on a koan.

"You should do zazen as frequently as you can. Morning or evening sitting generally works best. We say that morning sitting is golden; evening is copper.

Sitting will be in the zendo here from nine to eleven every morning and on Sundays from ten to twelve. Wear comfortable, loose dark clothing. All other instructions will come from Robert, the American who leads the sitting.

"Always remember," he concludes, "to carry your sitting into the rest of your living. Doing this, zazen gradually works its way into your life. For regular Zen monks, the life in practice then becomes an endless book, composed of only three chapters. The first is this staying in the very core of our sitting, even when we move out of the sitting posture. The second is communicating this same core both to others and on into all things. The third is helping other people to develop their own core."

Leaving the temple that day, feeling enormously privileged, I bow more deeply than I could ever have imagined, in gratitude to the roshi.

The next day I start formal zazen at Ryoko-in. Shoes off at the main entrance to the temple; an admiring glance at the old well inside and at the interior gardens; walking on age-polished wooden floors; slipping on a tight pair of narrow sandals outside, shuffling over the smooth, flat rocks. Past the sliding door into the zendo. Very dim inside . . .

When my eyes accommodate, I make out the outlines of a large rectangular room. On a low platform, around its two nearest sides, sit several figures. They rest on cushions, cross-legged, looking down at the old tile floor out toward the center of the room. Finally extricating my large, Western-sized feet from the small sandals, I try to place the sandals neatly together, like the others, at the base of the platform. Up now on the squeaking wood platform onto a large, flat square mat. Under my buttocks goes another rolled cushion. Down finally, into the half-lotus posture. Other human outlines filter in, until nine cushions are occupied.

Shortly before 9:00 A.M. comes a sound. "Dock, dock, dock." The group leader, the *jikijitsu*, is tapping on wood. Next comes a solid *CRACK!* I *jump!* I find later that two hard wooden blocks have been struck together. Then a small bell tolls, in measured, beautiful notes. Its final ring carries on and on throughout the zendo, penetrating into my brain. Silence. Sitting has begun.

This first sitting in the *zendo* is very difficult. My practice yesterday, at home, lasted only a few minutes. It was no preparation for this thirty minutes at one stretch. The first ten minutes in the zendo are bearable, the next interval is unbearable; the final minutes are torture. Pains in the knees and thighs are the chief problem. (When I later tell Dr. Osumi about this, he smiles and says, "Zazen is good for the central nervous system, but bad for the peripheral nervous system.")

At long last, the bell rings again. Relief! At this signal, the other figures on the mats begin to stir. Detaching themselves from the platform, they stand up, put on their sandals, and file toward the second door leading outside.

But I have a big, practical problem: my left leg is numb from the knee on down. The leg is rendered powerless, as though I had sustained a stroke.

As the last sitter exits from the door, I stay on the platform massaging the feeling back into my leg. After a minute or so, function returns and I limp over to the door. Looking out, blinking, into the sunlight, I see a small courtyard. Around the inside of this enclosure, the other lay adherents are walking, clockwise, very deliberately, in single file. Their hands are held loosely in front of their

chest, and they are looking down at the ground in front of them. This, I gather, is *kinhin,* walking zazen.

No sooner do I catch up with the tail end of the line than the group leader at its head reenters the zendo door, and we all go back inside to sit another round of zazen. At the close of this second period, the numbness affects only my left foot. When I join the group walking outside, I am faintly reassured to see that several others are now limping also. During the final thirty minutes, I don't try so hard. I avoid pushing my left foot far over on my right thigh. Without my forcing it, the sitting goes easier. After another bell, and some rhythmic chanting in Japanese, the morning sitting is over. After repeated bowing with the two hands placed together, we file silently out through the main zendo entrance.

I start talking, and the response is a finger over the lips. No loud talking, I find, is the general rule throughout Ryoko-in. Once outside, I introduce myself to the others. They are an interesting, diverse group: a world-class professional potter from Australia, a Japanese-American girl from Hawaii, and two Japanese male university students. The Americans include a widow traveling slowly around the world, a woman sociology teacher from a Midwestern university, a married couple from New York, each teaching English at a nearby Japanese university, and Robert, the leader. He has studied Zen in Japan for several years, and is semipermanently established at the temple.

Over the succeeding months, I settle into the temple's routine. *Its* strict Rinzai routine is not going to change. *Mine* has to. First, I learn to be on time. Once, misjudging travel times, I arrive late and disturb the others in the zendo. Afterward, I am soundly chewed out by the *jikijitsu.* Chastened, I learn to leave home early, allowing plenty of time to take the series of three trolley cars. This means I now have extra minutes to enjoy a leisurely walk through the rest of the large old temple complex at Daitoku-ji. When I arrive at the subtemple, I bow and walk slowly through its outer garden, feeling the soft crunch of freshly swept gravel underfoot around the flat rocks. I look deeply into its leaves and into the exquisite moss covering its carefully tended grounds. I inhale the beauty of its old, gnarled tree trunks, the mountains-in-miniature of its old rocks. It is a fine prelude to zazen . . .

I learn much from my fellow students in the Zen group, or *sangha.* The widow had also been a student at a different, Soto Zen temple. I ask her what was the most important thing she had learned from her previous roshi. "Let go," she says. "Let go of all your conditioned worries, the thoughts and ideas you hold onto." I find these two simple words very helpful.

On one other occasion I inquire naively: "What is the connection between going back to one's original self and becoming enlightened?" She replies that she, too, had been puzzled about this. When she had asked her previous roshi to clarify it, he replied as follows: "It isn't as some special earlier original self that you become enlightened. Enlightenment isn't something you add. It exists throughout the universe *all* the time. All you have to do is simply allow it to express itself. Then, when you plug into it, you cease to be a separate self and simply blend in with the rest of the enlightened universe." I find this is vaguely reassuring, but not yet comprehensible.

in the mountains, I could perceive that this one person is a part of the larger whole in an ongoing now. Now, in the busy streets of Kyoto, I start to enlarge upon this perspective. In parallel, the former sense of being a private isolated self tends to diminish. But all this comes and goes, still mostly at the intellectual level.

Observing these changes, an old paradox starts to resolve itself. Back when I first started to read about Zen, the literature placed emphasis on *abrupt* forms of awakening. It was difficult to conceive what a "gradual" awakening meant. But now I observe definite changes taking place in my own mental topography. Attitudes seem to be undergoing a kind of deep, slow continental drift. "Policy" shifts seem to be evolving at depths which go on to affect the strategies and tactics of behavior. If this is a kind of very gradual awakening, then it appears to be taking place.

In years past, sudden insights sometimes flashed in to help solve problems in my laboratory research. I speculate: could *prajna's* intuitions be of a similar kind? Could such brief insights, by analogy, resemble a quick "spiritual earthquake?" Little do I know.

15

Attention

> The faculty of voluntarily bringing back a wandering attention, over and over again, is the very root of judgement, character, and will.
>
> William James[1]

James was correct. And training both attention and awareness is also absolutely central to Zen. Everyone knows what it *feels* like to "pay attention." What goes on, technically, is that we enhance the way we process information from a preselected location in space.[2] Attention seems like a simple matter, but within it is a whole series of interrelated phenomena. They include *awareness*, a word derived from being wary, watchful. Awareness implies perception, a purely sensate phase of receptivity. *Attention* reaches. It is awareness stretched *toward* something. It has executive, motoric implications. We attend *to* things.

We can be more or less attentive. The term *attentiveness* conveys how much intensity we devote to the act of paying attention. This intensive aspect of attention resembles in a sense the separate "volume" control function found on an older radio or TV set. But in those days you first had to turn on the separate off/on knob. Then, before anything else could happen, you had to wait for the set to warm up. The brain responds in a similar fashion. It reacts sluggishly when we first awaken. This fact reminds us that *arousal* is basic. First, we must be sufficiently aroused. *Then* we become generally aware enough so that we can attend. Arousal, awareness, attention.

Attention shifts. The process of shifting happens either voluntarily, or involuntarily. Recall what happens at a cocktail party. We can look in one direction, while still deploying attention elsewhere to eavesdrop on the nearby conversation. Moreover, we can also shift attention inward. Our thoughts can then range

tune *up* their sensitivities to detect fainter stimuli at low intensity.[5] One wonders: are some meditators "oversensitive" to begin with? Do they tend to use meditation to withdraw from their environment in ways that could lessen the excessive intensity of their experience? (see chapter 29).

On the other hand, during rare moments, the same meditators may also make a major shift into an extraordinarily different mode. It is a shift that carries the properties of clarity, persistence, and concentration far beyond their ordinary limits. Now, as attention transforms itself, *involuntarily,* it reaches that state called *absorption.* Absorptions tend to occur after emotional or devotional aspects have come in to pressure and color an already heightened mode of ongoing attention. Absorptions convey the sense of being held, transfixed, and riveted. It is a process during which extra, concentrated energy involuntarily infuses the act of attention.

Sometimes, as children, after we had been keenly attentive to a movie, we found that a foot had gone to sleep. Later, we discovered that the usual sense of our body image might even fade out when we were drowsy or preoccupied. From such ordinary experiences we learned that, when our attention was diverted elsewhere, we might not notice things, ourselves included. More extensive degrees of this kind of "dropping out of self" also occur during absorptions.

How can we now, as adults, voluntarily bring back and refocus our wandering attention, that faculty which James believed was so critical? To sustain attention takes a steady, dynamic flow of impulses. Much of this tonic flow starts down in the brain stem in our ascending reticular formation[7] (see chapters 36 and 37). Suppose, for example, you start with a hungry monkey, and then observe how he responds when you place an apple on the shelf off to his left side. If a small lesion has previously cut off the *right* half of his reticular activating system, the hungry monkey ignores the apple when it is in his *left* field of vision. This monkey is not blind, but neither does he "see" the apple over on his left side for all practical purposes. Why? Because his lesion blocked the right side of his cerebrum from being activated by the right side of his reticular system. But now move the apple over to the shelf on his *right* side. Here he can process it because his left hemisphere still remains connected to an intact left reticular formation. Now, he quickly sees, grabs, and munches on the apple.[8]

The monkey's impaired attention is loosely called "neglect." It is accompanied by abnormally slow brain waves over the right hemisphere. These slow brain waves point to a sluggish, less aroused right hemisphere, the side wherein the reticular formation no longer reaches up normally to activate his higher mechanisms of attention.

We might be curious at this point: is there some process which is the reverse of neglect? Could it be a form of *hyper*attending? If so, which of the several aspects of attention just considered would become prominent when a person becomes hyperattentive? And what parts of that person's brain would be responsible?

16

The Attentive Art of Meditation

> The whole point of Buddhism may be summed up as *living in the present.*
>
> Dhiravamsa[1]

"Living in the present moment." This is a short working definition of *meditation.* A longer one is also useful: "a family of techniques which have in common a conscious attempt to focus attention in a non-analytical way, and an attempt not to dwell on discursive, ruminating thought."[2] Why does "conscious" belong in the definition? For two reasons. First, because it reminds us that, at its beginnings, meditation is self-initiated. Before meditators finally relinquish intention, they consciously use it to guide awareness in very subtle ways. Second, the word "conscious" paves the way for understanding some distinctions that later on will become increasingly important. For when we come to states of absorption and insight-wisdom we will discover how certain functions become directed *un*consciously—that is, automatically and *un*intentionally.

Candor insists that any working definition of meditation employ the word "attempt." It bears reemphasis: meditation is hard to understand, hard to arrive at, hard to maintain. An artful process, it takes much patience, practice, and skill.

With calm relaxation as its prelude, sustaining bare attention then becomes the keynote of meditation.[3] If we use bare attention both as its basic premise and its defining characteristic, meditation currently divides into two generic categories.

1. *Concentrative meditation* is sustained attention which focuses persistently on a single item until one tends to become more or less absorbed in it. The item could be a flower, a mantra, the movements of breathing, or a koan.

2. *Receptive meditation* is sustained attention, *un*focused. It opens up to whatever experience is available, neither overreacting to it, nor associating to it, nor interpreting it.[4] This kind of openly receptive meditation encompasses the several meditative approaches which are translated as "mindfulness," "insight meditation," and "just sitting."

At this point, the process looks simple: calmness → bare attention → concentrative or receptive meditation.

Meditation in general is not this straightforward. Nor is it in Zen. It is difficult to classify the attentive art of meditation into only these two types. Why? Consider how many different ways we use a camera. We can begin with film of extra sensitivity, or with finer-grained or color film. We can expose many, or few, frames per minute. Our hands can aim the camera straight ahead, or they can turn it around, away from the outside world, and direct the camera so that it looks back at the handler. We can switch lenses, varying the field from regular to wide-angle, to telephoto, or to zoom. The shutter can be opened wide or narrowed to a slit to gain an extra depth of field in focus. Older cameras require much deliberate, conscious thought; newer versions handle most functions automatically. Similarly, each brain, sifting through its "family of meditative techniques," settles on what part of its repertoire happens to work best at the time.

In practice, Zen meditators will find themselves trying out different styles at different times, both while sitting on the mat and while attending to the events of the present moment in everyday life.[5] But disclaimers are in order, for none of the basic meditation techniques are unique to Zen. Figures on seals excavated from the Indus Valley culture depict classic seated yoga postures dating back to around 2000 B.C.E.[6] So many of the Zen approaches stem from methods long used in yogic traditions which were later taken over by the early Indian Buddhists.

Evolutionary neurobiologists might trace some of the basic receptive processes much further back. It was their hunting skills that enabled protohumans to survive. "The hunter is the alert man," says Ortega y Gassét.[7] The alert hunter knows that "the solution might spring from the least foreseeable spot on the great rotundity of the horizon." So the hunter deploys his "universal attention." It makes no presumptions, "does not inscribe itself on any one point and tries to be on all points." Receptive meditation resembles this kind of "universal attention."

Of course, meditation in our era has been refined. Now we conceive of it as a mode of attending to the wide range of aspects of living in general, not simply to hunting. And from out of its equanimity arises the potential for rectitude of action to flow, not mere spontaneity.[1] Along with this equanimity arises that same sense of genuine well-being which one recalls having experienced after a good long vacation. Remember? After a week or so away, the feeling arrived of being *with it*, mentally attuned and physiologically competent.

Once the meditator establishes this same firm foundation, in a retreat setting, the concentration approach can evolve into lesser absorptions, and the deeper levels of mindful awareness can begin to yield brief intuitions of various sizes. But meditators will usually have to wait until they have honed various skills over a period of many days or weeks in such a retreat. Only then, finally, will their increasing one-pointedness and serenity open up to access more advanced levels of alternate states.

17

Restraint and Renunciation

> Poverty is not the absence of goods, but rather the overabundance of desire.
>
> Plato (c. 427–347 B.C.E.)

> Most of the luxuries, and many of the so-called comforts, of life are not only not indispensable, but positive hindrances to the elevation of mankind.
>
> Henry David Thoreau[1] (1817–62)

It is time to emphasize what Plato and Thoreau had learned: meditation has a necessary prelude. It goes nowhere unless the requisite foundations are laid. The serious aspirant on the meditative path makes an *ongoing commitment* to follow a more restrained, simplified life. The essential practices involve nothing more, but nothing less, than cultivating ordinary common sense, morality, and ethics in everyday living. They imply a "letting go" of self-indulgence, without that nagging feeling of having sacrificed something vital. It is what every backpacker learned

the hard way: the hike depends as much on what you leave behind as on what you carry.

The Buddhist meditative Way begins with right living. The aspirant voluntarily adopts sensible restraints, and renounces situations which could lead to unfruitful behavior. Given this background, zazen can then be conducted as an integral part of the daily practice of a wholesome life, not as a kind of head-in-the-sand isolation.

This restrained, moral, disciplined living is termed *shila* (in Sanscrit). It spills back into meditation and strengthens it correspondingly. The reasons are straightforward. The simpler life has fewer clinging attachments, cravings, and materialistic goals. Fewer distractions means fewer intrusions from discursive thoughts. The meditator finds it becoming easier to cultivate the "meditative mood,"[2] to enter meditation and to remain centered in it longer. This turns out to make it easier to exercise restraints and practice renunciations. Self-control is not as difficult when there is less self to control. It takes years to really learn this fact, decades to put it into practice.

The "beat Zen" of the "dharma bums," the pop psychologies, and amateur drug-induced psychedelic states are caricatures. Chief among the reasons why they fail is the fact that there are no substitutes for *shila*. It remains that bedrock foundation of daily life practice, the ethical guidelines that are so central to Buddhist and other religious disciplines.

Buddhist monks or nuns, like their Christian counterparts, renounce far more than we realize.[3] One obvious example: the cosmetic vanities that focus on long hair. These vanities are literally cut off, not once but every five to seven days, each time the head is shaven. The austere monastic life tends to discourage notions of rank among the younger monks at the entry levels. All become poor, and each performs the most menial of tasks. The monastic life is a planned withdrawal toward simplicity, away from our usual hassling "civilized" complexities. Because this detachment is voluntary, it has the quality of an opt-out, not of a cop-out. With time, many material and other unessential "needs" become less pressing. As St. John would observe: "Now that I least desire them, I have them all without desire."[4]

And over time, and with repeated cautioning by the roshi, the aspirant realizes the deeper level of wisdom in Dogen's old statement: "Cut off the mind that seeks, and do not cherish a desire to gain the fruits of Buddhahood."[5] The hot pursuit of enlightenment is seen to be but another form of grasping, spiritual materialism. From then on, the ongoing quest will become truer, steadier.

Buddhism, too, has its precepts and Ten Commandments.[6] The commandment against intoxicating liquor becomes less difficult to follow than one might think. I would find, over time, that my taste for liquor had simply dropped away. This was a natural development, and it was no sacrifice.

element of striving? If each factor has some role to play, then when and how much of each? The debate has gone on for centuries. Within Zen, the Soto school still emphasizes the goalless and effortless approach. Its form of zazen, *shikantaza*, implies "just sitting" quietly, in awareness, not working on any koan, or counting the breath. It is an alert condition, performed erect, with no trace of sluggishness or drowsiness.[2] During retreats in particular, shikantaza can be shifted, or shifts itself, into long moments of *extra*attentiveness. This means a kind of listening as though one were blind, of looking as though one were deaf, of feeling as though all one's pores were open and receptive. The senses seem to stretch out to close the gap between stimulus and perception, that interval which had once been occupied by the old judgmental barriers of interpretation. At such times, the meditator enters a state of high perceptual expectancy. It is the way one listens, knowing that a tiger lurks in the jungle nearby.

In the rigorous school of Rinzai Zen, one blow from a flat stick would quickly straighten out Rodin, and the second swat would straighten up his languid model. Moreover, this Rinzai school also takes on an extra degree of striving, because its adherents work toward resolving their koan. Not infrequently, progress ensues just after the moment when they can no longer sustain such pressures. Ideally, a student's breaking point is carefully calibrated.

There is a kind of attentiveness that develops late during the practice of the deeper, effortless mode of Zen meditation. To me, the phrase "opening-up" is the most descriptive, least confusing, term for this later development. It implies that the meditator has gone beyond thoughts, and has already passed through (a) the phase of preliminary, passive concentration, and (b) the more passive "emptying out" and "letting go" phases. So that finally, instead of the meditative focus narrowing down, the large attentive field then gently opens up to a reflective surface, like that of an immense mirror. Now, any and all stimuli enter softly. But they drop out from awareness as quickly as they enter, attracting no emotional response in the process.

A second style of deeper Zen meditation does narrow down the meditative focus. It gently drifts attention over to engage a single meditative object or theme to the exclusion of all others. Such an approach also implies that the meditator is now not only detached from the outside environment but is focusing on some mental item generated internally.

Living Zen

Let us now review the four major phases discussed in these last two chapters. They are (1) preliminary concentration, (2) letting go, (3) opening up, or (4) focusing down. It is during zazen that the meditator will learn these as *skills*, not merely as techniques. Practicing zazen twice a day makes it much easier to develop and maintain these skills. Having first defined their nuances on the cushion, one then slowly learns to adapt these same skills to the simplest acts of one's daily life. Zen training places a major emphasis on transferring sitting zazen into "living Zen."

Living Zen implies being attentive in each present moment. This, too, gets off to a shaky start. First the meditator tries to extend the same meditative mode

19

Physiological Changes during Meditation

> All that is clearly established by the data on autonomic-metabolic measurements during meditation is the hardly surprising conclusion that meditators are in a state of relaxation.
>
> J. Davidson[1]

Many reviews have now clarified what kinds of changes meditation produces in the body.[1–8] The consensus: meditation causes *secondary* physiological and biochemical changes that are appropriate to how much relaxation is involved.[8,9]

Readers interested in the secondary changes can find a four-page list of them in Shapiro's summary.[4] Shapiro goes on to cite some eighteen hypotheses invoked to explain how meditation might cause such changes. He concludes that a multidimensional model will be necessary because no single explanation is satisfactory.[10] Woolfolk adds that the "findings reflect the influences of very complex sets of social, cognitive, perceptual and physiological variables."[2]

Herbert Benson began to simplify this situation. He emphasized that those who meditate in a quiet setting develop a *relaxation response* whenever they combine a mental device, a passive attitude, and a decrease in muscle tone.[5] His subjects practiced a "simple, non-cultic technique" of meditation. Sitting quietly and comfortably, they deeply relaxed all muscles, saying the word "one" silently during each expiration, maintaining an attitude of peace, and letting relaxation unfold at its own pace. The resemblance to "just sitting" in Zen meditation is clear.

After relaxing daily for weeks and months, his patients reduced their systolic and diastolic blood pressures, and had fewer premature ventricular heartbeats, both during sleep and while awake. When they then encountered stress-producing circumstances, his subjects *increased* their blood norepinephrine levels.[11] Despite the increase, they did not increase their heart rate or blood pressure. This led to the suggestion that the subjects had also developed measures to counter the stimulant action of norepinephrine. These mechanisms remain to be clarified.

In two other recent critical reviews, the heart rate, skin resistance, breathing rate, and blood pressure responses to meditation were contrasted with those obtained during simple resting.[6,7] In his critique of twenty-three studies of meditation, Holmes concluded that, *as opposed to simple resting*, meditators do not show *consistently* lower heart rates, skin resistance activity, respiratory rates, blood pressures, or biochemical changes.[7] It should not be surprising that Joe, Mary, Bob, and Betty have individually different responses. The fact is, we are much more mixed-up genetically than are laboratory rats.

Reviewing seven studies, Holmes further concluded that meditation did not help control the body's arousal response to threatening situations. In fact, meditators, if anything, appeared *more* physiologically arousable in response to stress than did controls. In contrast, advocates of the transcendental meditation technique believe that it is more effective than is simple rest with the eyes closed

in reducing such indices of stress as the rate of breathing and plasma lactate levels. They point out that it may be of greater adaptive significance for a person to be able rapidly to recover from stress than to reduce arousal in the face of threatening circumstances.[12]

Meditators who practice intensively do feel that their senses become more acute. Those who practice mindfulness meditation intensively (sixteen hours a day for three months) show a measurable, slight increase in their visual sensitivity.[13] When tested with a tachistoscope they detect single brief flashes of light more readily than before. They also distinguish successive light flashes, each separated by a shorter interval. Advanced meditators appear more sensitive to their own mental and perceptual processes. Some report that each light flash has three components: its beginning, its lasting, and disappearing.[14]

Let us make the tentative assumption that meditative practices do, to varying degrees, help many people feel more relaxed.[15] And concede that the practices do so, whether they are from the East, or are the Western secular techniques such as progressive relaxation, autogenic training, and self-hypnosis. Let us further assume that many of the techniques are reasonably effective, but not consistently so, in improving such indices of relaxation as the slower rate of breathing, the increase of skin resistance, and the increase of alpha waves in the electroencephalogram. If so, why go further? Is there any advantage to choosing one method over another, at least as a *technique* for obtaining the initial relaxation response?

Boals would object to the very concept implied in this question. It implied that meditation was solely a relaxation technique. He believed that this was a limited view, one that had "outlived its usefulness." He concluded that meditation was instead a complex process of *learning how to deploy attention*.[16] Zen traditions over the centuries support this larger view.

In fact, both Zen and the other age-old meditative traditions also provide a supportive social and cultural framework. This appeals to many meditators, helps them meditate longer, more often, and more intensively. Once they begin, many of the more persistent Zen meditators, moreover, will develop inclinations to follow the Way, going well beyond their initial "relaxation response" in the quest for different values.

Meditation is difficult to evaluate physiologically, much more so than you might suppose. For example, early research suggested that Zen masters and monks who had practiced for ten to twenty years would show, during their zazen, a large drop in basal metabolic rate.[17] More recent research yields a different interpretation. When TM meditators were studied, it was found that they were relatively tense to begin with during the control period. This initial "tension response" was prompted by the mental stress of their entering the artificial experimental situation itself. Thereafter, although their metabolic rate did fall during meditation, most of this drop could be attributed to their subsequently becoming more at ease and reducing their muscle tension. This, in turn, could be explained by the relaxation and improved body posture associated with the period of meditation.[18] Even among experienced meditators, who self-rated themselves as generally "tense," meditation coincided with a 13.5 percent drop in oxygen consumption.

Several artifacts are implicit in studying meditation in a laboratory setting. Indeed, anyone who consents to be a subject for an experiment changes even before the electrodes, tubes, or other connections are attached. Some pituitary hormones may show a brief phasic increase fifteen minutes *before* meditation starts, a rise which has been attributed to learned behavioral conditioning.[19] Meditators also respond to other so-called, demand characteristics of the experiment. This phrase refers to all the clues that let them know what the experimenters want and what their hypothesis is. Now, a goal, an expectation, is set. The meditators may think to themselves: "I will try to be a 'good' subject. I will try hard so that my recordings will be valid and will help advance scientific knowledge." Or, "I can't relate to this experimenter. Why should I cooperate so much?" Similar expectations, nuances shared by subject and investigator alike, are diametrically opposed to the goalless, passive, open state conducive to deeper levels of meditation. The more vigorously this desired state is sought, the more it eludes the grasp. Werner Heisenberg's general principle is true no less in meditation research than it is in physics: attempts to measure meditative states introduce new inaccuracies and uncertainties.

Existing research on meditation has other limitations. One is crucial: *no physiological or biochemical measurements can define the precise subjective quality of the meditator's private state of awareness at any one moment, let alone sequentially.* Many reports are pilot studies containing brief "one-shot" samples. Most experiments are not repeated using sufficient numbers of reliable subjects, studied over many years. This means that we still lack the requisite longitudinal view. And meditation is but a prelude to certain brief extraordinary alternate states. Their nature cannot be communicated exactly at that very moment without some kind of interruption of the internal flow of events.

"Meditation" is not monolithic. We have emphasized that several different meditative styles coexist today. This is another reason why research on "meditation" does not lend itself to simple generalizations. TM and yogic traditions prefer closed-eye techniques. Zen traditions emphasize the half–open-eyed approach. Even within Zen itself there are several meditative practices and styles of living, quite apart from the issue of whether the meditator also "works" on a koan. Not surprisingly, when Pekala recently reviewed the phenomenology of meditation he found that none of the twenty-eight studies was adequate methodologically. None fulfilled the key criteria of reliability, validity, and comprehensiveness. None was adequately controlled either for the demand characteristics of the experiment, or for a meditator's tendency to develop symptoms during introspection.[20]

Meditation and Sleep Cycles

The relationships between meditation and sleep cycles are very important. For one thing, *meditators take naps,* as do people in general. In fact, as many as 61 percent of normal people nap more than once a week and for over an hour.[21] People tend to take naps at either of two times: when the body temperatures are higher, or between 2 and 4 P.M.[22] Naps are physiologically restorative. For ex-

ample, healthy male college students were studied who habitually took naps lasting from half an hour up to two hours. They increased their efficiency, their alertness, their EEG frequencies, heart rates, and body temperatures. They also shortened their reaction times and increased the frequency of their spontaneous skin resistance responses.[23]

Naps have implications for meditation research that tend to be overlooked. Morning naps may contain elements of REM (rapid eye movement) sleep. These morning REM episodes can slip into each nap earlier than usual.[21] Moreover, any studies purporting to show that meditators (who may also take catnaps) will improve in physiological categories such as those cited above must also have appropriate controls. These should include subjects whose nap habits are also observed longitudinally. Otherwise, one cannot exclude the possibility that whatever benefit may have occurred is attributable simply to repeated naps alone.

Firm evidence shows that meditators fall asleep. One study was performed on five TM meditators, four of whom were teachers. They spent 19 percent of their time in stage 1 drowsiness, 23 percent in stage 2 sleep, and 17 percent in stage 3 or 4 sleep. Even during their first twenty minutes, over 40 percent of their time was spent in stages 2 to 4 of sleep.[24,25] The fact that no REM sleep episodes were observed may be explained by the fact that the studies were performed in the afternoon when the pressures to enter REM are lower.

Some have suggested that meditation of various kinds is nothing more than a prolonged drowsiness, a kind of partial sleep. This view overlooks three facts. One is that meditation is also associated with very long-range, positive changes in attitude. Another is that meditation increases the frequency of absorptions and deep insights. Third, everyone sleeps at night, and some will nap during the day, but these do not create new attitudes, or lead to absorptions or kensho. So something about meditative training is different. Wherein lies the difference?

1. Meditation encourages a finely held awareness and attentiveness for relatively long intervals, even though the person sometimes lapses into other periods of drowsiness.
2. When practiced as zazen, it holds the person in one erect posture. This cuts down not only on movements but on sensations feeding back from them. Zazen becomes long intervals of sensorimotor deprivation. These intervals are so timed that they intrude into what had formerly been the day's usual waking cycle, not its sleep cycle.
3. Meditation permits the panorama of thoughts to be observed repeatedly as they enter and drop off. There is no more convincing demonstration of the fact that our thoughts and their attachments are transitory.
4. It sets up a quiet period, a retreat during which larger issues can be mulled over dispassionately.
5. Ideally, it takes place in the context of a meditative mood. This usually implies that the person has already made some kind of spiritual commitment and renunciation.

Critics can rightly find flaws in the experimental design. The flaws illustrate the kinds of problems plaguing meditation research. For example, the control group had not rested in the evenings; the meditators might have felt the subtle demand characteristics of the situation to do better; and more subjects are required than a mere twenty in each group.

Schuman emphasizes what researchers should be focusing on. It is on those primary processes in the *central* nervous system which underlie alternate states themselves.[3] Otherwise, investigators will keep on being sidetracked by all the secondary physiological changes in the body and the brain which accompany the "low arousal" meditative states. It is true that the skeletal muscles of the spine do hold the central nervous system erect during meditation. And it is also true that the brain, as part of the body, has important interactions with the cardiovascular,[30] pulmonary, digestive, and endocrine[31] systems. Yet here we will not be preoccupied by such bodily changes. Our plan is to go well beyond the phase of relaxation. Our goal is to discover which salient changes—primary in the *brain*—underlie alternate states of consciousness. This means penetrating the phenomenology, the semantics, the claims and counterclaims. Our focus will remain on the brain, for therein lies the psychophysiological basis of extraordinary states.

The early investigators were hoping that "brain waves" might clarify what went on in the "higher centers" during meditation. Do brain waves tell us something useful about a person's state of consciousness?

20

Brain Waves and Their Limitations

> Concluding anything about alpha is perilous.
>
> Barbara Brown[1]

During our experiments in Kyoto, we monitored "brain waves" arising from the cat brain. It is an old technique. [In 1929, Hans Berger coined the term electroencephalogram to describe the recording of the human brain's spontaneous electrical potentials.] Since then, electrodes attached to the scalp or to the coverings of the brain have been used to follow, mostly at a distance, the electrical activity of the brain beneath.

The brain is no power plant. Even when researchers amplify its faint potentials up to 50 microvolts (μV), its output amounts to only 50 millionths of a volt. For comparison, a flashlight battery puts out 1.5 volts. Moreover, estimates are that the whole brain generates only enough total current to light a 25-watt light bulb.

Nor is the brain's electrical activity constant. It pulses up and down from one fraction of a second to the next. Its rapid pulses take the form of rhythmic waves. If you are out at a shoreline, you might see waves of water arriving perhaps once every several seconds or so. EEG waveforms cycle much faster. They rise and fall from one to fifty times *each second*. Waves of excitation create the crests; waves of inhibition, the troughs.

The several major categories of EEG waves cycle at different frequencies. For purposes of this discussion, we will concentrate on the four faster frequencies

bled mode. For all these reasons, investigators who would wish fully to evaluate alpha waves during meditation must monitor and carefully specify what *kind* of attention is going on, and on a moment-to-moment basis.[4] This is rarely done. As a result, many inferences about meditation based on whether alpha is present or absent have not been substantiated.

Alpha shows regional differences. Up to one third of subjects increase their alpha rhythms in the occipital region during mental tasks. Another third show decreases.[8] If the eyes stay open during various *motor* tasks, alpha can increase over the temporo-occipital region, but it decreases over the frontal and central regions whether the eyes are opened or closed.[9]

Given the above complexities, we can appreciate Brown's caveat that it is perilous to conclude anything about alpha.[1] Still, the standard biofeedback techniques have long been used to train people to relax. And these methods have usually been directed toward enhancing their alpha rhythms and reducing their beta rhythms. When patients who are severely and chronically anxious do learn to facilitate their alpha rhythms, they gain a global feeling of increased well-being. Their alpha increases even before their inner feelings show marked improvement. However, the symptoms stay relatively unchanged in that other group of patients who cannot learn to increase their alpha.[10]

Pertinent to our understanding of zazen are three simple biofeedback techniques which help subjects develop more alpha: (1) The subject's eyes remain *open*. This technique engages relaxation skills which can be more easily transferred to the stressful situations in ordinary daily life. (2) A light is used as a feedback target. This stabilizes visual fixation, and dampens random eye movements. (3) The subject is encouraged to maintain a passive attitude.[10]

It helps to keep the eyes open for another reason while learning to control alpha activity.[1] At first, when the eyes stay open, and the subject is relaxed, alpha rhythms normally occupy only 2 to 25 percent of the recording. Suppose, theoretically, one could then train alpha to increase well beyond these figures, say up to 100 percent of the time. Then the implication would be that normal subjects could still have another 75 to 98 percent "more room in which to learn." In contrast, if the eyes stay *closed*, then three quarters of the subjects easily develop alpha rhythms, and they soon occupy some 85 percent of the recording. But this would leave only another 15 percent of the time in which to learn to produce more alpha rhythms. At least for biofeedback purposes, this 15 percent is not enough "room" in which to learn to train one's abilities to relax.

Theta Rhythms

Theta rhythms of 4 to 7 cps are not conspicuous in the alert EEG of normal subjects. Theta rhythms edge in as we become drowsy, when our alpha rhythms fade, when the external world recedes even more, and when daydreams and fantasies take over.[1] Then theta activity is most easily identified from the parietotemporal region. Because theta varies, its mental correlates are also difficult to pin down. During mental tasks, a distinctive theta rhythm can be detected from the scalp over the midline of the frontal region. It appears more often in extroverts who

begin with a low anxiety level, and in other subjects after their anxieties and arousal levels have been reduced by drugs such as diazepam (Valium).[11]

Persons highly experienced in self-hypnosis tend to show more theta activity both during hypnosis and while awake.[12] Astronauts also show increased theta when they become weightless during orbital flights. This finding is attributed to the fact that fewer vestibular stimuli reach the brain stem in a weightless environment.[13] Some patients fall asleep excessively during the daytime. They show synchronized theta bursts during their repeated "microsleep" episodes.[14]

Beta and Gamma Rhythms

Beta activity is also difficult to link with one specific, discrete subjective state.[1] During beta activity, nine of twenty-six subjects reported feeling tense and anxious. Another five reported some degree of excitement, concentration, and alertness. One felt hungry, and eight others identified no particular feeling state. Still, three reported that they felt loving, warm, and content during beta rhythms. This finding, that a positive affect can occur during beta activity, could be germane to the phenomena of bliss experienced in internal absorption.

Beta rhythms increase temporarily during states of vigilant attention. But beta then drops off when attempts are made to maintain vigilance for as long as two hours on a radar monitoring task. At this time detection performance also drops, and alpha and theta frequencies increase.[15]

Recently, interest has focused on gamma activity, a term applied to rhythms faster than 30 cps. Waves that oscillate forty times a second are ubiquitous. They can be detected both in single nerve cells and from larger constellations of neurons. This fact hinders current efforts to be sure where they arise, and what they imply in relation to states of consciousness. In normal humans, modern research techniques have now uncovered a set of different changes in 40 cps EEG activity which can be correlated with attentive responses to auditory clicks.[16] Moreover, such changes distinguish one group of "fast-reactors" from another group of "slow-reactors." The findings are noteworthy, because similar methods could be applied to clarify why Zen adepts act quickly (see chapter 154).

* * *

Four key terms imply important physiological distinctions. We will use these words frequently. *Synchronized* waveforms are those which recur regularly and smoothly. They include the regular, very rhythmic alpha and theta waves which rise to higher amplitudes. The contrasting term is *desynchronized*. (Historically, the word has referred to the *irregular* fast and low-voltage frequencies in the beta and gamma range. More recently, it has been acknowledged that some of these fast frequencies do have regular wave forms.) When any of these four basic EEG or other physiological rhythms persist over time, it can be called a *tonic* rhythm. However, if the rhythms go through phases, shifting on and off quickly, they are then called *phasic*.[17]

How does a brain generate the rhythms picked up by an EEG? What the EEG electrodes do, up on the scalp, is pick up and pool huge numbers of the faint potentials produced by each nerve cell's luxuriant tree of dendrites (see figure 4). To these, the EEG also adds other potentials picked up from countless cell bod-

ies. When pooled, the potentials then take the usual form of much larger and slower waves.[18]

The alpha rhythm is a basic rhythm. Even a small cylinder of cortex, isolated far from the rest of the brain, can still generate its own independent ten-per-second alpha rhythm. Each single wave within this train of ten waves reflects two phenomena. The crest is the moment when most of the dendritic excitation comes in phase all at the same time. The trough that follows is the interval when dendritic activity is more inhibited and relatively quiet. In this sense, the electrical peaks and valleys are like the penetrating rhythms of the temple drums. Silence on either side augments the impact of each beat.

Still, only about 20 to 50 percent of the EEG reflects those brain activities generated directly under a large electrode recording from the surface. The rest seeps in from sites more distant. Recent sophisticated techniques increase the spatial resolution of the EEG, deploying arrays of 120 electrodes over the scalp. Some still conclude that "EEGs represent neither signal nor noise but [are] chaotic carriers of brain information."[19]

Deeper structures like the thalamus (see figure 3) generate their own rhythmic activities. They also export trains of impulses up to reach the dendrites of cortical nerve cells. Now, the crests of alpha waves recorded in the human thalamus peak just before those in the cortex. Moreover, electrical stimuli delivered slowly to thalamic nuclei also *evoke* a series of prominent waves up in the cortical EEG. These findings suggest that the thalamus acts as a pacemaker which sets some of the rhythms for the cortex.[20] After successive thalamic stimulations, the amplitude of the cortical waves keeps getting higher and higher. Finally, as the thalamus recruits a critical number of cortical cells, the cortex becomes overexcited. At this point, it fires back down to the thalamus and other subcortical regions. Out of such studies has grown the concept that the brain has "reverberating circuits." This means that rhythmic firings in one part of the brain go on to influence the excitability of other nerve cells some distance away, and are then influenced in return.

Certain leaves are sensitive to the faintest breeze. For instance, bamboo leaves (like those of the aspen) are the first to rustle, long before their larger limbs bend. As I was about to leave Kyoto, Kobori-roshi presented me with one of his own ink paintings. It was a bamboo stalk, with leaves, skillfully rendered. The inscription read: "Only the bamboo knows the pure breeze." In the brain, ripples of excitation sweep back and forth over dendrites. Many rustling excitations stop here, destined never to pass farther down over the nerve cell body itself. And few indeed will ever help set off the actual nerve impulse which fires down through the body of the cell, then out through the long trunk which is its axon. (see Figure 4) In fact, only a small part of our EEG is made up of those few spike discharges which finally do issue out from the long axons of cortical nerve cells.

It is just as well that this is so. Suppose that every time a dendrite got excited it *did* trigger off its entire nerve cell. Then our brain might be involved in continuous convulsive seizures.

And when similar considerations are applied to other levels, they may help explain why vast gaps remain between what our EEG displays at a given moment, what we sense is going on within our current state of consciousness, and what

our overt acts of behavior are at the same time. With this caveat, we now turn to consider how the EEG evolves during meditation.

21

The EEG in Meditation

> One might conclude either the process of meditation is unique to the meditator or that the essential information is not carried by the frequency component of the EEG.
>
> C. Brown and colleagues[1]

We know that people's EEGs differ, that an individual's EEGs vary, and that meditation is not one state but a series of dynamic physiological changes. So it comes as no surprise to find that many different EEG changes have been recorded during meditation, and that most studies are open to criticism.[2,3] Griffith concluded, from data on yogic meditation, that it was all "rather confusing, taken as a whole."[4]

One can make a few soft generalizations. At least from the standpoint of brain waves, the zazen that is performed in full concentration while sitting in a chair yields probably about the same EEG as that performed when the subject is sitting on a cushion in the usual half–cross-legged lotus position.[5] Early during meditation, the EEG tends to show increased amounts, or amplitudes, of alpha activity. Next, theta activity increases, even though some of these theta waves may be consistent with drowsiness. Other theta patterns occur in short bursts, and still others occur for longer periods at higher amplitudes. Interestingly, Buddhist meditative chants are themselves associated with enhanced, rhythmic, synchronous theta activity.[6] Finally, in meditation, low-voltage fast beta ripples may sometimes be superimposed on still slower waves.

First we will expand upon these alpha, theta, and beta wave generalizations. Then we can address the controversies that have grown up around the issues of drowsiness, sleep, and "right brain vs. left brain" functions.

Alpha Activity

When more alpha activity occurs during the early phases of meditation, it does not mean that the subjects are merely "idling" mentally. Nor are they otherwise deferring their attention. In fact the reverse is true, for attention does facilitate alpha rhythms. Subjects can increase their alpha rhythms by concentrating on the sounds of a metronome or on a visual stimulus.[7]

We noted that alpha persists during tasks that can be performed easily or automatically. Accordingly, alpha waves occupy some 50 percent of the record when experienced Soto Zen monks are engaged in their walking meditation, kinhin. In contrast, alpha waves occur only about 20 percent of the time in inexperienced practitioners. Moreover, the control group of graduate students generates no alpha waves during the act of walking.[8]

Devout Protestants who pray regularly for thirty minutes a day increase their alpha frequency from 9 to 11 cps. One person who frequently shed tears

Beta Activity

In their pioneering study in 1955, Das and Gastaut reported an EEG pattern that contained still faster frequencies. It appeared when their Indian yogic meditators were under the impression they were entering what they called "samadhi."[14] However, Anand and his colleagues could not confirm this finding that faster frequencies were linked to the samadhi of other subjects.[15,16] What explained the faster frequencies in the first report? The possibility was raised that they were only an artifact caused by excess tension in scalp muscles, picked up by the surface EEG electrodes.[3]

Banquet's meditators showed definite evidence of faster EEG activity in the beta range. It developed at a certain time: after they had passed beyond their "second," rhythmic theta stage of meditation.[12] At this point, his meditators pushed the button to signal that they were in the presence of their "third" stage. It was one said to be of "deep meditation or even transcendence." During this stage, their EEGs then showed beta activity at 20 cps. At first, their fast activity took the form of intermittent spindle-like bursts of beta activity interspersed between alpha or theta rhythms. Then, beta activities continuously rippled over the surface of the larger slower waves which took over and became the slow ongoing background activity.

The amplitude of this beta activity fluctuated, reaching the relatively high levels of 30 to 60 μV. It tended to appear first over the left hemisphere. Predominating anteriorally, it extended back to include all leads. A special method of computerized analysis, called compressed spectral array, showed that even faster activities were also present. These reached gamma frequencies of 40 cps. In contrast, if control subjects developed faster frequencies, they occurred at several different rates and were not as rhythmic or regular.

During this third, deeper meditative level, muscle activity recorded from the subjects' chins tended to disappear. Relaxation of the chin muscles is one important characteristic of desynchronized REM sleep. However, these subjects showed none of the typical rapid eye movements found in dreaming sleep. And it was of interest that the meditating subjects could still readily, and correctly, respond to questions by pushing their button. None of these actions changed their EEG activity during this stage.

Now, it is a noteworthy fact that these meditating subjects could send messages out of their third, deep state. This capacity resembles the way that one other group of subjects can also communicate signals to the investigator. These particular subjects are the so-called lucid dreamers. (In chapter 73 we shall find that these lucid dreamers also remain alert enough to signal their responses to the world outside even while dreaming.) Banquet's subjects showed one other important finding while in their third, deeper meditative stage. Stimuli from the outside were not "getting all the way in." An external light flash or click stimulus did not "penetrate" far enough to change their ongoing EEG. The EEG continued, as before, to show a mixture of slow and fast frequencies.

To summarize, when Banquet's subjects were in their third meditative stage they showed a distinctive pattern: (a) a particular subjective state; (b) prominent,

speculation that regular meditation was a kind of practice in developing a special skill. The skill lay in repeatedly "freezing the hypnagogic process at later and later stages (first in the predominantly alpha wave stage, later in the predominantly theta wave ranges)."[22]

But how to interpret the frequent sleep episodes? To some researchers they suggest only that meditation is simply a "low arousal state." Others would dismiss meditation as being no more effective than taking an extra nap during the day. This book will propose several alternative explanations for the fruits of meditation. Some of these proposals will cast the cyclic events of sleep in a much more creative role. Meanwhile, we can make the following plausible case for meditative training: *it is teaching the person how to reach—and hold onto—one of several abilities to attend.* Even so, the most highly trained meditators will still slip up occasionally and drift off into sleep.

The EEG and Other Tests for Lateralization of Function

Some suggest that meditation is a "right hemisphere experience." Others find no evidence, either from the EEG or from tests of performance, which would confirm such a theory.[3,23] One study reported that TM meditators activated their left hemisphere more during analytic tasks and their right hemisphere more on spatial tasks. However, simple relaxation with the eyes closed gave similar findings.[24] Moreover, long-term meditators showed no evidence that meditation had improved either their performance on tasks of a kind usually assigned to the right hemisphere, or that it had interfered with their performance on "left hemisphere tasks."[25] Reviewing the evidence available, Pagano and Warrenburg concluded that meditation does *not* shift the way the brain processes information from a mode that is primarily "linear" and left-hemispheric into an approach that is more "holistic" and right-hemispheric.[23]

Other EEG findings are also of interest. Within a period of extended meditation, the surface EEG findings can become dissociated from behavior. When such moments of noncorrespondence occur, they are significant for several reasons. Chiefly they suggest that behavior has other correlates of its own, and that these mechanisms lie much deeper in the brain than the surface EEG can reach. Noncorrespondence also provides hints about how the surface EEG might miss moments when meditation opens up quickly into brief, alternate states of consciousness. For example, one subject who fell sound asleep during meditation then showed the usual, extraslow delta EEG waves of deep sleep. But next he lost this delta activity, awakened, looked at his watch, and once again closed his eyes. Following this, his delta waves promptly reappeared. True, he had gone directly from sleep, to waking, to sleep again. On the other hand, he had not shown the usual *stepwise surface* EEG findings one expects the average subject to show when passing through the several lighter intervening stages of sleep.[18] (These successive sleep stages are pictured in figure 14.)

Similar episodes of "microawakening" and microsleep are not uncommon during meditation. In a person's topography of awareness, such micro events set up sharp cliffs or plunge into deep valleys. Their steep sides inform us that the meditator tends to rise up abruptly, or drop down, through many physiological

layers. Ordinarily, the cliff edges are rounded off, and such transitions evolve relatively slowly during intervals that last for many seconds or minutes. But suppose the brain passes suddenly through its transition periods. This could open up more opportunities for the shearing off, as it were, of adjacent aggregates of functions. During meditation, some unstable fragments of physiological mechanisms seem to be briefly "loosened," and are then available to recombine in new, unexpected ways.

22

Breathing In; Breathing Out

> One of the basic tenets of meditation is the notion that passive awareness is a natural, elementary, and direct form of experience that is ordinarily overwhelmed and obscured by the activity of the mind. The purpose of meditation, therefore, is to allow the mind to become quiet and thereby uncover the capacity for this experience.
>
> M. Schuman[1]

Can breathing help uncover our capacity for direct experience? You might not think so. After all, breathing is automatic. We constantly inhale and exhale. Yet this whole chapter will be devoted to breathing. Why? Because breathing is an excellent example of the intimate relationships between psyche and soma, brain and body. The way we breathe not only becomes a central focus in zazen, it also gives us a sensitive, reliable index of how our emotional life influences the rhythmic workings of our brain stem.[2,3]

The brain stem is that stalk at the base of the brain made up of medulla, pons, and midbrain (see figures 2 and 3). The medulla is its lowest segment. Here we keep track of those chemical signals in the bloodstream—low oxygen and high carbon dioxide—that drive us to breathe more. From the medulla, impulses flow down the spinal cord and out through peripheral nerves to contract the muscles of the rib cage and diaphragm. The chest expands, the diaphragm descends. All this translates into breathing *in*.

Then, as the lungs expand, their stretch receptors become increasingly taut. This sends signals up the vagus nerves to inform the brain stem. There they generate a flurry of inhibition, which turns inhalation off. Finally, as we start to breathe out, much of our exhalation proceeds passively, driven by the elastic recoil from the chest and abdomen.

One other factor dampens inspiration: the proprioceptive messages that return from our lower abdominal muscles. We are not consciously aware of most of these impulses, yet they too ascend to inhibit the medulla and to turn off inspiration.[4] Note what happens in zazen. The meditator trains bare conscious attention to focus on these faint up-and-down breathing movements in the lower abdomen, the *tanden*.

The boatman times his "yo ho heave ho!" cry. Its end coincides with his strongest pull. Martial arts trainees also exhale and shout during their most vigorous movements. But singing tends to be overlooked. We forget how *chanting*—that great prolonged communal exhalation—also brings exhalation into the

formal practice of group meditation. Chanting and other breathing techniques prolong expiration, and they create slightly higher pressures within the lungs and abdomen. In this manner such practices may further increase the inhibitory tone of the vagus nerves, and do so in subtle ways that further reduce respiratory drive within the brain stem.

Using respiration as our model, we will examine changes in respiration that illustrate three basic ways in which local physiological functions can be changed in the brain. In simple terms, these involve (1) excitation or stimulation; (2) inhibition, cooling, or damage; and (3) release of excitation from prior inhibition.

It turns out that very small regions in the medulla serve specific respiratory functions. In animals, one can cause shallow inspirations by cooling the upper ventral medulla. The inhibition from this cooling reduces its local functions.[5] In contrast, expiration is prolonged by cooling only one side of the *lower* ventral medulla. Inhibiting this lower region does not change the depth of inspiration, nor does it suspend breathing. However, it is not unusual for neurologists to find that strokes which damage the mid to lower part of the pons also stop their patients' breathing for many seconds at a time. Indeed, a small stroke sometimes markedly reduces respiration, even though it may seem to involve only one side of the lower brain stem.[6]

Once when I was in the laboratory in Kyoto, and not at all mindful of such facts about breathing, I observed a curious phenomenon. At the time, I was performing pharmacology experiments on cats and was monitoring the field potentials of several larger groups of nerve cells throughout the brain. As I looked at all these discharges, I became puzzled. Every few seconds, the firing waxed, then waned. The resulting wave forms were a series of peaks and troughs. Why did they follow a regular rhythm? Why were the rhythmical firings at sites higher in the limbic system synchronous with those of other cell groups down in the brain stem? Further observation provided a simple explanation. Every time the cat breathed *in*, its nerve cells fired much more. Every time the cat breathed *out*, these discharges slacked off. *Breathing out was quieting the brain.* Lesser degrees of this same phenomenon have since been observed in the human amygdala and hippocampus.[7]

The human pupil is another index of similar rhythmic changes. Again, *inspiration is the activating mode.* Breathe in and your pupil dilates slightly; breathe out and it constricts. If you inhale deeper and exhale further, you will create extra wide swings in the dilatation and constriction of your pupils.[8] Still other rhythms are superimposed on the intrinsic beat of respiration itself. We tend to breathe faster every ninety minutes or so, and some lesser rhythms recur every thirty to sixty minutes or so.[9]

Well-trained meditators dampen their breathing in several ways. Some will slow their respirations to as low as four or six per minute. They also reduce the overall volume of air they breathe, lengthen their exhalations, and increase the extent of their abdominal breathing. Akishige found this out when he studied six Rinzai Zen monks who had meditated an average of eleven years. During ordinary quiet sitting they averaged only six breaths a minute. At rest, most of us breathe two to three times faster. During zazen, his monks did breathe slightly

faster: eight per minute. Four Soto Zen monks, who averaged twenty-one years of practice, started with an average resting respiratory rate of nineteen. Their rate fell to sixteen during zazen.[10]

Normally, we spend slightly less time breathing in (43 percent) than breathing out. When the monks merely sat quietly, they spent less time than this in their inspiratory phase. But during zazen, their time in inspiration fell even further. Now it consumed a mere one-quarter of the whole breathing cycle.

So, the major change during formal zazen was that the monks now spent much more time breathing *out*—about three-quarters of their respiratory cycle. Indeed, the distinctive finding was that these monks were always prolonging their expiratory phase, both during the simple act of sitting quietly and during their formal periods of sitting in meditation.

Why did the two groups of monks breathe at different *rates?* It was speculated that they had used different techniques to train their breathing. These particular Rinzai monks had been trained to breathe softly—so softly that they did not ruffle a single hair in a tuft of rabbit fur attached to their nose(!). Monks of the Soto sect had it easier. They had allowed respiration to take its own course. However, neither group of monks appeared to have prolonged their expiratory phase solely on the basis of conscious training efforts. Rather, their introspective reports suggested that these longer expirations had evolved naturally during zazen.[11]

The expiratory pause is the final phase at the end of one cycle of breathing in and out. In this pause, no expiratory movements take place. Which of our basic human emotions shows an increase during this pause? Only tenderness. In contrast, fear lengthens the phase of inspiration and increases the amplitude of breathing.[2] In general, states of tension increase chest breathing; relaxation favors abdominal breathing. Akishige's subjects found that abdominal breathing was easier to perform in the half-lotus position. Abdominal breathing was less successful if the meditator, say, sat cross-legged with the buttocks resting on the floor, or sat upright on folded knees with the buttocks resting on the heels.[12]

When both brain and body quiet down, less oxygen is needed. When monks slow their breathing rates to only four breaths a minute, each of these breaths contains an increased tidal volume of air, for a total volume of 3.2 to 4.4 liters per minute. Even so, this total volume is still substantially less than the volume of air that normal controls breathe at rest: around 6 liters a minute.

Parenthetically, not only monks, but cats too can be trained to prolong their expiration. In the cat, each prolonged expiration inhibits not only many of the single inspiratory nerve cells in the medulla which are influenced by respiration but other nerve cells there as well.[13] The flow of air along the nasal passages also influences the brain, because air flow stimulates nasal nerve endings. These stimuli go on to induce a rhythmical 40 CPS activity up in the olfactory bulb, which is the higher extension of the central nervous system overlying the nasal passages.[14] When slow meditative breathing reduces the volume of air flow, it also reduces the discharges of nerve cells in the bulb. In summary, then, *whenever we breathe more quietly and prolong the phase of expiration, we are probably quieting the firing activity of many nerve cells, both in the medulla and above.*

onds. Moreover, in this group, the most reliable correlates were a decrease in heart rate and an increase in skin conductance responses. In contrast, the EEG changes in these subjects were less consistent and were evident chiefly as alpha activity presenting throughout the frontal-central-parietal leads.

Note: such brief, clear, and quietly aware moments are not merely the typical normal drowsy prelude to sleep. Instead, when we are drowsy, the signs are shallow abdominal breathing, slow mentation and reaction times, and flatter alpha waves in our EEG.[17] Nor can anyone produce such moments of mental clarity *voluntarily* by choosing to hold the breath.[18]

These studies of TM subjects link clear, thought-free consciousness with two quite different sets of physiological evidence. The most impressive of these events suspends respiratory drive and causes a relative hypoventilation. The second cluster of associated findings are more subtle and variable. They include peripheral autonomic changes and tendencies toward increased EEG coherence. It is of interest that coherence can extend over a broad area and might involve a range of alpha-theta (and later beta) frequencies. These observations hint that no single tiny, sharply localized spot is generating the thought-free episodes.

Instead, the moments of clarity appear to stem from a series of linked physiological changes. To help explain both their quality and the widespread EEG correlates, we will begin by dropping a suggestion here, the evidence for which will be developed further in part III. Simply stated, this no-thought clarity is what might be expected to occur when a person shifts certain functions within the deep and *centrally located* recesses of the brain.

Most studies of meditation have approached the less fruitful edges of the larger central problem. Not so these TM studies of breath suppression and no-thought clarity. These pioneering studies, while not yet completed, focus our attention on a core issue: meditation opens up surprising gaps in thought, intervals that might last a quarter of a minute or so. Obviously, they invite hypotheses and stimulate further research.

For example: suppose that further training could enable such moments to become longer and deeper. Would they then help create the kind of larger gap through which major absorptions—even insights—could surge? And this is not to overlook the remarkable paradox: how could a person's brain *do* these two things at the same time? How could it (1) suspend so vital a function as breathing? Yet (2) leave the subject still able to perceive—in clear awareness—a mental landscape free of thoughts? It suffices here to introduce four mechanisms and to cite other potential contributions as well.

The first mechanism centers around the fact that respiration *stops*. This implies that the sensitivities are greatly reduced in those basic circuits, first mentioned above, that normally drive our respirations. It suggests that the brain stem may itself have become relatively unresponsive to its usual sources of stimulation (either neural or chemical). In fact, other studies have found that TM meditators were *less* stimulated than were average subjects by the very strenuous respiratory stimulus of breathing extra carbon dioxide. This result helps explain why the subjects whose breathing stopped did not then engage in compensatory overbreathing. And incidentally, it provides further confirmation that meditation does reduce central respiratory drive.[19]

mechanisms of arousal and awareness. So, as meditation increasingly inhibits the respiratory drive, and as other brief local inhibitory pulses are superimposed on its own localized calming effects, this combination could overcome the usual restraints imposed from lower levels, releasing awareness circuitries at successively higher levels. Perhaps such an abrupt release from prior inhibition might help explain why some of the autonomic correlates of breath suppression[16] resemble those seen when the brain orients to significant stimuli. (See chapter 36.)

Stimulating the midbrain reticular formation itself causes alerting. However, it also produces other changes of the kind that occur in anxiety. The stimulated animal breathes faster and shortens its expiratory phase.[29] So it does not seem likely that activating the *whole* midbrain reticular formation would prompt a human meditator to go into episodes of *no* breathing plus a quiet, thought-free hyperawareness. Even if only certain of its parts were stimulated selectively, the rest of the midbrain would still need to be uncoupled from these usual excitatory influences which normally tend to drive the breathing cycle.

This discussion emphasizes that quiet meditation sometimes releases remarkable levels of clear awareness, coupled with breath suspension. But several paradoxes remain. For instance, if we are to regard some brief moments of breath and thought suspension as shallow preludes to absorptions, then we must also clarify how still deeper absorptions could shift past this awareness into a major *hyper*awareness.

So, it is not too soon to begin to ask: could one further source of such heightened levels of awareness begin up somewhere near the "ergotropic triangle"? (This energizing region, to be discussed in chapter 43, lies just above the midbrain.) The triangle becomes of more than general interest to us now, because next to it lie several other noteworthy sites. And these are well-known to *suppress* breathing when they are stimulated. For example, Hess could slow the rate of breathing and produce shallow breathing when he stimulated the local region where the hypothalamus receives the fornix.[30] Brief stimuli delivered to the anterior thalamic nucleus in humans also markedly reduces the amplitude of their breathing for a minute or more.[31] Moreover, patients who receive deep electrical stimulation at other intriguing sites also stop breathing, and for long periods. These other higher regions include the orbital prefrontal cortex, the limbic system sites it interconnects with, and the ventral lateral thalamus (see figure 3). In these stimulated patients, breathing stops during the inspiratory phase and is held there.[32] One may hope that future research might be directed toward meditating subjects who, fortuitously, have had depth electrodes already in place for some unrelated medical indication. Depth recordings could help clarify which levels interact to cause these intriguing links between no-thoughts, clear consciousness, and breath suppression.

Meanwhile, we go on breathing. How casually we assume that one breath follows another! But this present chapter on how we breathe will have alerted us. Likewise, many other basic aspects of Zen experience will soon begin to interrelate in intriguing ways with psychophysiological events, again in regions deep along the central axis of the brain.

23

The Effects of Sensorimotor Deprivation

> When the senses and thought are annihilated, all the passages to Mind are blocked, and no entrance then becomes possible. The original mind is to be recognized along with the working of the senses and thoughts, only it does not belong to them, nor is it independent of them. Do not build up your views on your senses and thoughts . . . but at the same time do not seek the Mind away from your senses and thoughts.
>
> Master Huang-po (d. 850 A.D.)[1]

These early words of caution from Huang-po are not doubletalk. Back in the Tang dynasty, he was already stressing the critical point as clearly as translation allows: you don't become enlightened by closing off your senses and by blotting out all thinking processes. Still, we have just noted that meditative training does seem to "quiet" at least some of the brain. So couldn't meditation "simply" be a kind of sensory deprivation?

Yes and no. For one thing, "sensory" deprivation is not simple. Nor is it all sensory. But Zen meditative training does point toward a major simplification: you let go of your busy cognitive landscape, and limit your attention to the breathing movements of the lower abdomen. The result? Now you're minimizing the future-oriented cerebrations of the frontal lobes. Disappearing along with them are the corollary impulses from your sensory association and limbic motivational systems. Visual input falls when your eyelids are half-closed and the eyes are positioned slightly downward. A silent environment reduces auditory input as well. When these factors combine, your meditative awareness becomes free to shift toward simpler perceptions, into those contributed more directly by your brainstem, thalamic, and parietal lobe circuitry.

Then, too, you don't move in zazen. And the added muscle relaxation itself goes on to have secondary effects. The drug gallamine triethiodide (Flaxedil) stops muscles from contracting. As a result, the EEG becomes more synchronized, and the level of vigilance falls.[2] In other animal experiments, curare has been used to paralyze the calf muscles. Even so, some stretch receptors still function within this lax muscle. These receptors continue to send signals if the paralyzed leg is stretched. And these muscle stretch signals are then strong enough to cause cortical EEG arousal. This set of studies suggests that the brain's arousal level depends to some degree on how much stimulation it keeps receiving from the tonic proprioceptive (self-informing) messages which flow back up into it when the muscles, joints, and tendons move. So whenever you stop moving, and stretching, it contributes further to the total sensate deficit. As a result of this mechanism, both sensory deprivation and meditation cause a noteworthy drop in the feedback of proprioceptive signals that can enter the brain. This implies that less stimulation enters from the eyes, face, tongue, jaw, neck, trunk, and all four limbs.

So there is more to zazen meditation than sensory deprivation. Sitting without moving means *both sensory and motor deprivation.* Restless energies build up,

urges previously discharged in various movements. To clarify the mechanisms of meditation, it helps to review how much has been learned from studying the other, experimental forms of what we will here call sensorimotor deprivation, or SMD. The analogies prove useful even though SMD differs from zazen.

To cite one example of the differences: during Zen meditative retreats, one interrupts the relatively short periods of zazen and inserts periods of motor *activity*. These interruptions differ from the way researchers conduct their typical long, so-called sensory deprivation experiments.[3] However, zazen and SMD are similar in the way each provides a "depatterning" environment. This means a setting that cuts down both the amount of incoming stimuli and the patterns by which the brain lends significance to them.[4]

In SMD experiments, the subjects lie quietly. Their vision and hearing are blocked. Padded cuffs about the hands and feet reduce their joint movements and the tactile stimuli to the skin. Clearly, it is "unphysiological" to be so confined, let alone to have to sit or lie down for many hours. Not surprisingly, many persons find SMD painfully boring. Their thoughts skip around, and they can't stick to any one topic. They can vividly recall the visual aspects of their memories, but their intellectual performance drops.[5] When they finally get up to move around, they are sluggish, speak slowly, can't actively manipulate ideas or readily invent short stories.

But suppose these SMD subjects are allowed intermittent exercise and are provided with meaningful information. Now they suffer fewer cognitive defects from being physically immobilized. Again, *perceptual* deprivation (in which the sensate input is limited to diffused light and to white noise) reduces their test performance more so than does simple sensory deprivation (silence and darkness). The major drop in task performance occurs during the first twenty-four hours if the experiments last for several days. Thereafter, the subjects learn to adapt. Over the course of repeated sessions, their performance improves slightly.

Certain other functions improve during SMD, not decline. In one study, for example, SMD subjects were perceptually deprived for only fifty minutes, an interval comparable with some extra long zazen periods. In this instance, as words flashed by, they recognized more words than did control subjects, even though they had been exposed to the words for a shorter time.[6] After seventy-two hours of SMD, hearing becomes more sensitive. The subjects react faster to signals on vigilance tasks and miss fewer of them. Long hours of sensory deprivation also enhance touch, pain, and taste sensitivities. Even visual deprivation *alone* improves touch and pain sensitivities. It also increases auditory discrimination and heightens the sensitivities to smell and taste. These improvements continue for as long as a day *after* the deprivation ends. There is no truth in claims implying that meditation itself confers unique benefits in this regard.

During certain types of SMD experiments, the subjects can request bits of information. The longer they had been deprived of stimuli, the more fresh information they request. What do they seek out? *Meaningful* sequences of stimuli. They don't want simple words or mere noises. The nature of this search helps understand something crucial about the changes that evolve during long

meditative retreats. For retreats and SMD share one other phenomenon. *Both extend the same general search for meaning in ways which probe topics at deeper existential levels.*

The universal search for existential meaning asserts itself gradually. The way the search phenomenon evolves is well illustrated in a recent study of SMD subjects. They had volunteered to be immersed in the quiet warmth of water tanks.[7] Tank isolation isolates subjects comfortably from most external stimuli. After repeated sessions the subjects finally drop off notions about their physical self-image and its relationships. Their thinking then evolves. They start to think about new ways they can relate to other persons. They develop new orientations toward larger issues of context, not content. They discover how inherently ambiguous it is to define "self" in terms of the usual, fixed, physical boundaries of self/other, inside/outside. Continuing to focus on this ambiguity, they then recognize how artificial was the manner in which they had earlier defined their self-identity. At this point they start seeing things afresh—"not new landscapes, but with new eyes . . ."

After having undergone many prolonged courses of profound isolation in the tank, a few persons will then go on to "gradual learning, slow conceptual drift, durable long-term change, and an occasional surprising revelation."[7] Along the way, they also experience many sensate phenomena and affective responses. To these, no special religious significance can be attached.[6] Likewise, Zen deemphasizes the hallucinations and other side effects that occur in association with zazen.

In general, several kinds of visual phenomena arise during SMD. Sometimes they intrude when the subject is alert, at other times during drowsiness. After SMD experiments that last only eight hours, vision becomes distorted more when the subjects are deprived of *patterned* stimuli than when all sensory stimuli are cut off per se. Some positive visual images pop in which represent "luminous dust," "idioretinal sensations," or "phosphenes." These indicate that nerve cells in our large visual brain still go on actively generating spontaneous lights, patterns, shapes, and forms, even in complete darkness.

"Luminous dust" can account for a few vague visual phenomena that enter during SMD or during drowsiness. But it will not explain the highly organized, formed, visual hallucinations that suddenly appear in SMD already full-blown. Some researchers soften this word. They refer to their subjects' hallucinations under the generic phrase "reported visual sensations." (This catchall term is reminiscent of another noncomittal phrase, "unidentified flying objects" or UFOs.)

Most hallucinations are brief, impersonal, and have no psychodynamic significance.[6] Others start with simple, unstructured, meaningless sensations that then evolve in a more complex, structured, meaningful way. After five to eight hours of SMD, many images show vivid colors and striking details. These seem compatible with the kinds of "quickenings" described as typical hypnagogic or hypnopompic hallucinations (see part V). SMD will release, for the first time, otherwise typical hypnagogic images in subjects who never have seen them before.[8] It will also provoke more of them in subjects who had experienced them before.[9] In keeping with the way hallucinations tend to enter during transition periods, the SMD subjects frequently cannot decide whether they are awake or asleep at the time.

who had already used LSD previously will report that they respond to it more during SMD. Given the population sampled, it is not clear how much their comments might reflect primary personality and other physiological variables or some acquired sense of freedom in reporting unusual experiences.[14]

Some persons withdraw prematurely from SMD because they find the conditions too stressful. These subjects, during their baseline studies, tend to be the ones who excrete abnormally low levels of epinephrine in their urine. Therefore, persons who can't stick it out for the duration of SMD may begin by differing biochemically—and perhaps in other constitutional ways—from those who do.

When animals are placed in solitary confinement, isolated for weeks and months, their situation bears a remote resemblance to that of hermits. There are secondary consequences to this less active, less stimulating social life. The brain changes biochemically. Young rats isolated from one another for thirteen weeks remain behaviorally active. However, biogenic amine levels fall in the limbic system. Norepinephrine levels and norepinephrine turnover drop both in the hippocampus and in the central amygdaloid nucleus. Dopamine also falls in the central amygdala.[15]

In conclusion, sensorimotor deprivation changes the brain experientially, physiologically, and biochemically. It does so in ways germane to meditation and meditative states, but it does not provide an exact model for meditation.

24

Monks and Clicks: Habituation

> Although the many psychophysiological studies have drawn a fairly consistent portrait of the physiology during some meditative states, in our opinion they have contributed relatively little to a meaningful understanding of states of consciousness during meditation.
>
> David Becker and David Shapiro[1]

The statement above is an accurate interpretation of the literature. Why do we still know so little about meditative states? To understand, it helps to begin with a specific issue in research: the way normal subjects respond when they listen to the recurring sound stimulus of a click. At first, each click causes them to drop out their alpha waves. This is a temporary phenomenon known as "alpha blocking." But suppose you keep repeating the same clicks monotonously. Soon, each repeated stimulus no longer causes alpha blocking. The brain has finally "gotten used to" the stimulus. This phenomenon is called *habituation*. It implies that an organism will tune out any habitual stimulus found not to have important consequences.

It might seem that the meditative approach called mindfulness or "opening up" meditation would be just the reverse of habituation. For it implies staying so sensitized, so receptive, that each stimulus seems new, fresh, and important. Theoretically, meditators who practiced mindfulness meditation would keep reacting to each click. Theoretically, each stimulus would keep blocking alpha, and they would not habituate.

how it was presented would critically alter the results when humans and animals were tested for habituation.[8]

One noteworthy finding was that, while sleeping, subjects reduced habituation to the sound of a tone. Hence, hypotheses derived from studies of normal waking subjects could not be transferred to the way they might respond to stimuli when they had entered slow-wave sleep or were dreaming.[9] Of particular note was the evidence that subjects who had entered REM sleep made no clear EEG response to the stimuli used, nor did stimuli presented during REM sleep cause habituation of either their heart rate response or their finger pulse response. Moreover, habituation studies in general gave inconsistent results, even when the stimulus parameters were well defined.

Later, Becker and Shapiro performed a carefully controlled study of how meditators responded physiologically to clicks during meditation.[1] It turned out that the way control subjects habituated was about the same as that of *eyes-closed* Zen meditators (who averaged seven and a half years of practice), of yoga meditators (averaging five years), and of TM meditators (averaging seven years). Instead of showing differences from controls, each group of meditating subjects habituated their alpha EEG rhythms and skin conductance responses at about the same rate. The Soto Zen meditators were engaged in "just sitting" while they meditated for 30 minutes. The subjects in one control group were asked to attend to the click stimuli; those in the other were asked to ignore them.

Such a major failure to replicate previous studies is important. It poses a problem for those who would otherwise prefer to think that something very special goes on when an advanced trainee meditates, something which enables repeated stimuli not to cause habituation of the alpha blocking response. On the other hand, when some meditators are surrounded by technically sophisticated equipment in a laboratory, they may find it difficult to reach the depths of meditation. So even this 1981, eyes-closed, report[1] does not fully address the hypothesis to be developed further in this book: when meditation *does* shift into the rarer moments of *internal absorption*, clicks should not then interrupt the EEG. The explanation to be proposed is that the brain will have blocked these and other external stimuli from having entered at the subcortical level.

One can only look forward to some future study of monks in Japan who (a) have clearly passed all criteria for an advanced degree of ongoing enlightenment; (b) have maintained their zazen practice, with eyes partially open, at a very high level for more than a decade; (c) are thoroughly adapted to the highly artificial conditions of the experiment; and (d) can be studied while they reliably and reproducibly enter states of deep absorption.

One might think that studies of evoked potentials would help clarify meditation (see chapter 64). Indeed they would, if the potentials happened to drop out during a period of internal absorption while recordings were being continuously monitored. However, varying levels of attention and distraction themselves change the height of evoked potentials. So, too, does sleep. This creates problems in interpreting evoked potentials. In one study of TM practitioners who had two to four years of experience, the evoked potentials varied only slightly. However, they did vary substantially from one meditative session to another and were inde-

pendent of whatever stage the EEG was in at the time. Meanwhile, one is left nodding in full agreement with Paty and colleagues who concluded that "The relationships between changes of consciousness and electrocortical activities must, therefore, be interpreted with much prudence."[10,11]

25

The Koan and Sanzen: Kyoto, 1974

> Unwilling to disregard greed and anger,
> You trouble yourself in vain to read the
> Buddhist Teachings.
> You see the prescription, but don't take the medicine—
> How then can you do away with your illness!
>
> Layman P'ang (740–808)[1]

> My only fear is that a little gain will suffice you.
>
> Master Hakuin (1685–1768)[2]

It is now a few weeks after I began formal sitting in the meditation hall at Ryoko-in. The roshi is starting to conduct his brief private interviews, called *sanzen* in the Rinzai tradition. These take place during the second of the three morning meditation periods. They are devoted mostly to problems the trainee is having in practice. Just before entering his chamber, you kneel and pick up a small wooden mallet. Your next task is not easy. It is to announce your presence by striking two authentic notes on a small bronze bell. The roshi, having listened to the bell and observed your subsequent bowings, prostrations, and behavior, knows only too well exactly where you are in your practice. He conducts the interview with all seriousness, and with gradually increasing formality and firmness, especially during the meditative retreats called *sesshin*.

At my first sanzen, he focuses on breathing correctly. "Are you breathing down in your lower abdomen? Are you breathing *out* on 'one'? Are you really *concentrating* on 'one'? Not on the idea of 'one,' but on the *total* reality of it?" I have not consistently done any of these. Heal thyself, physician, I mutter to myself on the way out.

By the second sanzen things are better. Thoughts are much less of a problem, and so it is with misplaced optimism that I now ask for a koan to work on. I have no idea what to expect. He says, "When every phenomenon is reduced to one, then where is that one reduced to?"

My brain reels! My gaze shifts away. What on *earth* did this mean? He waits until my gaze returns, and then looks at me directly, saying, "Not what, not why or how. Not when, but *where* is that one?" I am utterly baffled.

Seeing my bewilderment, he rephrases it slightly: "When all things return to the one, *where* is the one returned to?" This sounds vaguely better, but it still means absolutely nothing. "Because you are a scholar," he continues, "you will try to concentrate on this koan using your mind and your knowledge. It won't

work. You must take the koan inside yourself and penetrate it. This is no small thing; it is a major undertaking. You must concentrate on your koan everywhere, but take care not to do so near automobiles. Once when I was a young monk concentrating on my koan—which, by the way, took years—a passing automobile almost struck me down. This story tells you how deep your concentration must be."

At the next sanzen he begins by asking gently, "Where is 'one'?" I shake my head, saying "I really can't get anywhere *near* this koan." He replies, "Your problem is that you've encapsulated your 'one' inside layers of ideas and ten thousand other conditioned things. You must strike through these layers, break away from any philosophical approach. Finally you will get down to the deeply religious insight. Then it will be no separate matter. It will be something that you will find totally and consciously acceptable."

"But," I reply, "I am still having trouble even defining what 'one' means." He says, "If you find that unity is a better word, use unity." This helps not at all. "Be clear about one thing: the answer to 'where' will not be 'everywhere,' and it will not be 'nowhere.' Such answers are things out of the conscious, conditioned mind. When you finally reach your answer, it must be *clear, definite.* Your answer cannot be shaken by *anyone.*"

Another sanzen. He begins with a firm question: "If all ideas are melted into one, *where* does that one come from?" No answer from me. I am learning. I am sitting more and talking less. He continues, saying, "The koan is contradictory; you cannot find the answer by logic. Head and body working *together.* That's what you need to penetrate the koan. You will finally find this union of mind and body inside Zen."

In the following months, head and body do not come together. I cannot crack this koan. Reading about Zen is not supposed to be helpful. I read, anyway. In one place, I find that this "Where is one?" koan was attributed to Master Chao-chou (778–897) back in the early Tang dynasty. Reading elsewhere, I come across a vague but potential word answer to the koan. It dates back to the time of Seng-t'san, the third Zen patriarch, who lived even earlier. There, in the *Hsin hsin ming,* I find the statement: "When all things are viewed in their oneness, we return to our original nature." I'm confused. Could this be the answer? If so, how could an answer precede a question? For if Seng-t'san's statement were to be regarded as an answer at all, then it had arisen almost two centuries *before* Chao-chou had posed his question. So I keep wondering: Does "one" mean "oneness"? Does "oneness" mean "unity"? And, by the way, what *is* my original nature?

All my word problems are self-inflicted, and they multiply. At another sanzen, still perplexed, I bring up yet another puzzling paradox. "How is it," I ask, "that emptiness—this central Buddhist concept—can exist if supposedly, at the same time, everything in the universe is all linked together? Doesn't the latter imply that there is a very high degree of fullness?" "You are getting diverted," he answers. "You have to *know* emptiness," he replies. "You must stop splashing along the surface with all your words and concepts. You cannot understand emptiness with words or with ideas. You must dive down deep into zazen. There, forget about emptiness. Forget about fullness. Get back to working on your koan,

on 'one'. Keep on thinking; 'where' does that 'one' come from? This is your problem; keep to it." Trying to help, he then closes by saying, "If you continue your zazen, 'one' will finally become itself, and others, and everything else in the universe." I continue sitting, but nothing like this happens.

Next we begin a short, three-day retreat. It involves sitting several times in the morning and evening of each day. Maybe I can't pierce this koan, but I have been developing an almost palpable perception of being "in touch" with everything going on. By the third day, perception is becoming clear, immediate. The word "now" seems to symbolize this immediacy.

Sanzen again. No preliminaries. As soon as I enter, the roshi demands, "Where is 'one'!" "Now!," I blurt out. He raises his eyes, looks at me sharply. I meet his gaze. He nods slightly. "A little better," he says. "But much too logical. You must get inside the koan, immerse yourself in it like it was a tub of warm water."

December arrives all too soon. I have come to see him for my last, long farewell interview before leaving Kyoto. "I'm disappointed", I say, "that I didn't make more progress with the koan." He reassures me, replying, "I worked over a six-year period on my first koan, with four years taken up during the war." I mention, lamely, that the term, "original nature" might seem to be a kind of "word answer" to the koan. He dismisses this casually, saying, "Of course, no word answer is relevant. Stay with the koan itself. Break down through the where of the koan, and then it will open up."

He illustrates. He points down and in, extending both arms into a long V. But at the bottom, he leaves a gap of three inches or so between the tips of his outstretched fingers on both sides. "A deep valley of the mind will open up like this," he explains. "Once you've gone through one of the experiences, a valley is cut in the mind, and it will stay open. Go into that opening.

"When you get back to Denver," he continues, "keep up the same discipline there, even though you sit by yourself, that you did here in Kyoto where you sat formally in the zendo with the other people. Keep on going like a train in a tunnel, and you will finally reach the daylight at the other end. Don't stop in the tunnel." I resolve to follow his advice.

* * *

The years pass quickly. It is always refreshing to come back to Ryoko-in to see Kobori-roshi. Two years later, on one of many such visits, I mention that my koan is still "Where is 'one'?" and that I am still asking questions of it. He replies, "Where, what, when—they are all adverbs. Finally you will stop asking your questions. Remember, you weren't asking questions at the moment when you were born. And at the moment of your death you will not be asking questions. Get back there. This koan, 'Where is one?' is a big block of conceptual ice. It has sharp edges. First you must melt all the edges, finally the block itself."

My problem is that I lack the intense mental heat and the large segments of time required to melt this big block of ice. In order to keep up my research and other professional activities in the world of full-time academic medicine it has become necessary to compromise. Mine becomes a persistent, but partial commitment, far less than that of a monk. Yet this first impenetrable koan may have

about the real meaning of Buddhism. And promptly hears this non sequitur: "The cyprus tree in the courtyard." What is one to make of these old, incomprehensible replies? Such questions, and answers, are termed *mondo*. If we permit them to, they can help us interpret where the masters of old and the roshi of today are coming from. One begins by realizing the limitations of logical concepts. Overall *form* is key, not content. So, it is no use trying to read literal meaning into the words of the Zen mondo. If you insist, you will be baffled and disappointed, if not intellectually offended.

Does every mondo handed down from the Tang dynasty describe a totally spontaneous exchange? No one in our own century knows this for a fact. Nor do we know what the whole context was, or whether the translation is still accurate. It is unfortunate today that we still find mondo quoted, without explanation, in ways which almost flaunt their incomprehensibility. What they exemplify, instead, is how much freedom the master's enlightenment experiences had opened up to him, and how this freedom then flowed into the conduct of his everyday teaching activities.

Suppose you are a busy roshi. Your monk asks a question. The question discloses an attitude, a mental posture, which will block his progress in Zen. Why bother to parry such a question, let alone to answer it in kind? In such instances, many old mondo provide good examples of how an enlightened Zen master used to operate. How did he deflect a concept-laden question? By responding simply and with free-floating spontaneity. No, the old masters were not usually trying to put anything over on their monks,—nothing intellectual, that is. Nor were they behaving irresponsibly by their own cultural frames of reference. Instead, one finds preserved in the old mondo the flavor of the ways in which the roshi once felt free to respond with perfect liberty in all actions—including speech.

So it will be useful to recall this interpretation of the old dialogues when we begin, in the next chapter, to describe a roshi operationally. For, in any era, he will be a person whose responses actualize "that perfect freedom which is a potentiality for all human beings. He exists freely in the fullness of his whole being. The flow of his consciousness is not the fixed repetitive patterns of our usual self-centered consciousness, but rather arises spontaneously and naturally from the actual circumstances of the present."[5] Can we maintain such a point of view?

The Koan

Matters of life, death, and the universe are awesome in scope. Some aspirants find it helpful systematically to narrow the focus of all their questioning down to one issue, their *koan*. A koan is the distillate of a verbal exchange long ago in a distant land and in a much different culture. The word *koan* started as an old Chinese legal term. It referred to a public document of a case so significant that it set a legal precedent. In like manner, the old classical Zen koan still endure. Many of them, having begun as mondo, would set precedents that would be handed down for centuries.

In any century, students who truly concentrated on their koan could shut off the flow of other distracting ideas and channel themselves toward one central

analogies, symbols, or anything said about symbols. These, too, add cognitive and affective layers which can only deflect the immediate thrust of insight.[9]

Accordingly, it is hard to find a toehold on the sheer wall of a koan, let alone to hang on and keep working on it. One measure of a Zen master is how well he can keep convincing his students that their koan is vital to their existence, charged with the deepest significance. The better the master and the student work as a team, the more the student feels that resolving the koan is itself a matter of life and death. Later, we will see that life and death issues sometimes evolve into alternate states of consciousness (see chapter 104).

Beginners are frequently assigned the koan *Mu*. It stems from a monk's question, again to venerable master Chao-chou: "Does a dog have Buddha nature?" Old Chao-chou's answer: "Mu." The "Mu" is interpretable at many levels. A basic implication is emptiness. For present purposes, let us regard the old master's response as an exclamation, one which briskly negates the monk's question. On what grounds? On the grounds that it is as empty of meaning as all things are empty of distinctions. Notwithstanding, one first addresses a koan such as "Mu" as though it were not "empty." Indeed, it may convey the vague feeling of having some distant, covert meaning, if one could only fathom it. Starting as a mere preoccupation, the koan then grows into a kind of obsession. In the persistent student, what finally evolves is a process of *becoming one* with the koan. The student assimilates it, and becomes absorbed in it to a degree that excludes other thoughts and activities.[9]

Daisetz Suzuki held that "To solve a koan one must be standing at an extremity, with no possibility of choice confronting one."[10] Many stories from the old days illustrate how focusing on a koan could *drive* the student to such an extremity. When Hakuin was twenty-four, he was concentrating so intensely on his koan, "Mu," that he could not sleep. Having also forgotten to eat and to rest, he commented later that "it was as though I were frozen solid in the midst of an ice sheet extending tens of thousands of miles . . . To all intents and purposes I was out of my mind and the *Mu* alone remained."[11] *That* is concentration!

Nowadays, a prudent roshi is unlikely to let things go quite this far. Having sensed such obsessive preoccupation, he would also have warned the student to look both ways when venturing out in traffic. Nevertheless, while still applying lesser degrees of pressure, the roshi will never accept a rational answer. The student is on the spot: an answer is expected; no *conceivable* answer is ever accepted! It is a Catch-22 situation.

Still the roshi keeps prodding and encouraging. He watches and waits. Sometimes for years. He accepts nothing until he senses that the aspirant has gone deeply enough in meditation so as to have become fully immersed in the koan. Having finally spotted this level of behavior, he may then choose to deliver a well-timed shock. Sometimes even a light touch will do. It acts like the peck of a mother hen on the outside of an egg, a stimulus which arrives at the precise moment that the maturing chick is also hard at work, pecking away on the inside.[12] Maybe this particular shock will trigger awakening; maybe not.

In a very real sense, no person then "resolves" the koan. At least, no egocentric *I-Me-Mine* self remains around at that moment. Where, then, do the issues

linked to the koan resolve themselves? In those deeper brain circuitries which have suddenly become *un*conditioned. The more intense the previous quest for answers, the more widespread had it been embedded in the psychophysiological operations of the brain, the greater will be the relief when kensho arrives. Great doubt; great *release.*

But only a special kind of insight—a major alternate state of consciousness—will illuminate so meaningful a resolution. Prior to this event, no word answer would ever suffice. Thereafter, no roshi would conclude that such a state was valid until he sees his pupil's behavior confirm it. Again, how does he know? At the instant of insight, the resolution is both so transforming and so energizing that the student can demonstrate its validity in *spontaneous, fluid action.* This implies two things. First, that the scope and depth of the insight have released the student into a major degree of freedom. Second, that the freedom has entered deeply enough so as to be held onto thereafter in a form that is recoverable.

The more profound and complete the resolution, the longer it infuses the student's spontaneity, no matter how vigorously the roshi presses his challenges during their next critical interview. Subsequently, the remaining traces of this same liberated behavior may enable some students to recall parts of it almost at will.[9] Another approach is to offer students a much less convincing, secondhand way of demonstrating their progress. They may be asked to select certain metaphoric "capping phrases," called *jakugo.* These are parts of old oriental poems and literary passages which seem best suited to suggest that the student's insight has grasped something of the implications of the koan.[13]

It suffices merely to note that some people have collected other "answers" to a koan, responses that are unlikely to prove convincing. Before 1916, in Japan, such contrived answers were kept private. Whether they should ever later have been made available to the public is still vigorously debated. Misleading, so-called answers to various koan have since been printed in English.[14] Could any such crib sheets be further from the point? Indeed, the fact that these versions do exist illustrates how profoundly the koan has been misunderstood over the centuries.

Take, for example, the demand of Hakuin's memorable koan: "Show me the sound of one hand!" The ersatz "answer books" would suggest that the student display action—thrust forth one hand. Or the challenging question, "What does Mu look like from the back?" To this, the pupil who might wish to seem to be identifying with the koan would turn around and present her back to the master. And to the challenging question, "What is a stone called?," the pupil could give his own name, thereupon seeming to demonstrate that all distinctions had been lost between subject and object.[14] No hard-nosed roshi who knows his students will be fooled by any such rehearsed, pretend answers. Nor is the serious insightful student likely to try.

What special qualities, then, enter the kinds of responses that are acceptable? They resemble a pun expressed in the playful pantomime of a charade. They escape from ordinary abstractions. They are responses that condense swift *action* into the question's key words. Their spontaneity briskly engages all those fresh, fluid elements of mime and demeanor that can't be faked. Here, the roshi

is in his element. An expert diagnostician, he is already familiar with each student's body English.

An old story from the Tang dynasty reveals how master Pai-chang (J:Hyakujo) once challenged his monks.[15] He set a water bottle on the floor. Then he asked, "If this isn't a water bottle, what do you call it?" One monk spoke up, saying "It cannot be called a piece of wood!" Far too intellectual. Whose response did the master accept? That of Wei Shan, the monk who stepped up and simply overturned the bottle with his foot.

This kind of novel behavior is fully in keeping with the way the insight-wisdom of kensho overturns each old bottled-up preconception, and at every level. Now, let the roshi exercise his quality-control function. What happens when he challenges the student? Only authentic, spur-of-the-moment, responses emerge. To each of the roshi's fresh challenges, the student's reactions prove highly inventive, so creative that they overturn both conventional explanations and magical explanations as well[16] (see chapter 154). Some responses do take highly "unorthodox" forms. Still others fall into patterns that illustrate more orderly themes. For instance:

1. The student's response bypasses the question as it stands. It sidesteps all of the question's tacit assumptions. The response pays no attention to any of its absurdities, nor to any of its potential metaphysical aspects.
2. The student's behavior centers on a concrete element in the question. On the water bottle, for example.
3. The student's response emphasizes action. It speaks louder than words.
4. The action shifts the student's identity away from the usual self and toward something else that is not the usual self.
5. When the response is not a "real" action, it displays a kind of lighthearted, playful pretending. After all, what *is* a water bottle? Something to be overturned.
6. The student's response quickly bypasses so many cultural layers that it might seem to suggest some disrespect. Thus, in one act, the action may dethrone both the pretensions of the intellect and the master's elevated social position. To whatever degree this act reduces the master to the position of having ordinary feet of clay, the student then directly engages these feet. Because now the teacher and pupil stand on the same level playing field, sharing the same common ground: earthy, everyday reality.

An apocryphal story exemplifies some of the points above. The master says, "If it's that easy for *you* to hear the sound of one hand, let *me* hear it too!" Whereupon the pupil slaps the master's face. Previously, no such action was thinkable, certainly not in the East. But this is Zen. A domain of no-thought. What makes the slap uniquely Zen? The way it condenses several complex possibilities into one simplified act, and does so in a new context. For it answers the roshi, devalues any excessive social height he had before, and temporarily puts the pupil on a par with him.[16]

Besides Mu, the novice is frequently assigned simpler "breakthrough" koans such as Hakuin's "Sound of One Hand," or "Original Face." Then, after the first episode of *kensho*, a different koan can be assigned to encourage some five successively deeper layers of insights beyond those at the entry level. The following two examples suffice to suggest the elusive quality of these remaining levels. For instance, a koan for the next level is: "Empty-handed, yet holding a hoe; walking, yet riding a water buffalo." Reasoning won't help. There's nothing of substance to work with. Only the shift into insight will clarify this statement. At which point the sudden comprehension is just as convincing as when you "meet a close relative face to face at a busy crossroads and recognize him beyond question of a doubt."[17]

After that, the next level of koan is said to help the student understand the so-called realm of differentiation. Again, there is the example of the monk who wants to know what is the essence of Buddhism. So he asks his master, "What is the meaning of Bodhidharma's coming from the West?" At which point, old Chao-chou comes up with that classically oblique answer: "The cyprus tree in the courtyard."[18]

No firm evidence indicates that koan-like questions were a formal part of the process of Zen training before the advent of the sixth patriarch in China, Hui-neng (638–713). But on one occasion during his tenure he was said to have asked Nan-yueh the following question: "Who comes toward me?"[18,19] Nan-yueh could not answer his master's question and withdrew. And the issue was not resolved until this monk had wrestled with his "great mass of doubt" for another eight long years.[20] By the time of the late Sung dynasty (960–1279), the view came to be held that it would be especially from the soil of such great doubt, tilled vigorously with the aid of a koan, that great enlightenment would spring.

Meanwhile, Chan masters Chao-chou and Ta-hui (1089–1163) were among many who kept emphasizing that meditators should subject their koan to concentrated introspection only at depths far beyond the reach of the intellect.[21] Today, because we lack a more accurate term, we talk about such a long quest proceeding at levels we call "the subconscious." As yet, we have not clarified the psychophysiology of the subconscious. But we are familiar with another version of the long subconscious phase. It corresponds closely with that sustained period, termed "incubation," which is one of the several stages of the creative process.[22] Nowadays, we use the familiar words "intuition" or "insight" to describe the generic process which, by piercing a large mental logjam, finally yields the simple solution to a major puzzle.

In Zen, the brain resolves an *existential* impasse. In this context, one calls it "enlightenment" or "awakening," *kensho* or *satori*. It is also termed "insight-wisdom" or "seeing into one's true nature." The two intuitive processes are similar in form if not in content and degree.

Because many years usually elapse before awakening, the koan serves several useful interim purposes. It helps sustain the aspirant through long dry periods. The roshi keeps bringing it up during interviews, helping to preserve its sense of urgency long after the initial heat of passion subsides.[13] But many people in the old days found that it was too stressful to maintain the urgency of a koan

of living link with that long chain of historical persons whose strenuous efforts extend far back into the mist of ancient China.

Second, the students who take on the burden of a koan are already demonstrating great faith in the Zen way in general, and in their roshi. Finally, the koan helps the roshi. It serves him both as a useful teaching function and as a way of testing. He knows it intimately. Like a trained psychologist, he has become well-versed in fielding its standardized "inkblot" responses. But in a sense, he shares the same kind of educational problems as does a one-room schoolteacher: his students vary greatly in age and level of ability. Accordingly, the koan makes it easier for the busy roshi in a large monastery, or one confronted by many new faces at a large sesshin, quickly to discern and keep track of how far along each student is.

In the tradition of the Soto school of Zen, zazen usually implies "just sitting meditation" with no koan. In the Rinzai tradition, one may probe the koan both during the depths of formal meditation practice and at any other time. During zazen, what effect does it have on one's brain waves to concentrate on a koan? Preliminary EEG studies have explored this question in a limited way.[28] During zazen only, the subject's alpha waves fluctuated considerably. In contrast, his alpha activity became higher and more integrated when he also focused on a koan during zazen. Concentrating on his koan enhanced alpha activity more so when he meditated in the standard zazen posture with legs crossed than when he merely sat at ease, or was lying down.

As this meditating subject focused attention on the koan, his external visual awareness waned markedly, even though his eyes were still open. This observation suggested that, in general, a meditator could become less distracted by visual events taking place in the external environment by turning attention internally to concentrate on a koan. On the other hand, while this meditating subject was focusing on his koan, his alpha activity did *not* increase if he merely proceeded to close his eyes. Nor did his alpha activity increase if the room itself was dark.

A koan provides something to work on, push against, strain toward. It takes effort. In humans, mental effort does increase blood flow to the brain. Yet cerebral blood flow reaches its optimal levels when the person's mental effort is accompanied by *medium* anxiety levels, not by low levels or by high levels of anxiety. Earlier studies of normal subjects, using psychological tests, had given results which helped anticipate such findings. These prior test results showed that we also solve problems most creatively in general, and solve standard *verbal* analogy problems most effectively, when we work under only medium levels of anxiety. And it will be at such moderate levels that we increase the blood flow to the brain, chiefly over its *outer, cortical surface*.[29]

Of course, the research just cited on cortical blood flow shows only what happens when our *ordinary* mental processes function under various degrees of stressful circumstances. So studies of this kind, sampling mostly surface blood flow, will not help us understand all that a koan contributes. For a koan is not a conventional verbal analogy problem. A koan requires a *non*verbal approach to concentration, degrees of introspection that go beyond linguistics. Most standard blood flow techniques do not yet provide a useful way to sample accurately the many deeper, and more subtle brain activities that may be involved.

how to interact with the keyboard and pedals of a human brain, the most complex organ in the known universe. How soon, if ever, will Zen aspirants come to a true awakening, to enlightenment? Much of this hinges on the quality of their interactions with the master, the *roshi*.

But Carl Jung held that we in the West didn't have the right background of "mental education" necessary for Zen. "Who among us would place such implicit trust in a superior Master and his incomprehensible ways? This respect for the greater human personality is found only in the East."[3] At the outset, let us take a critical look at Jung's twin preconceptions, superiority and incomprehensibility. They raise issues which lead every skeptic to ask: Does Zen Buddhism have valid messages? If so, do they ever arrive in a form that an average person can decipher?

Let us focus on the rare Zen master who is fully enlightened. He would satisfy most of Jung's criteria for being a "greater human personality." His superiority would be evident in many ways, both in his context and in ours. Only after long years of rigorous training did his own master certify him to train others, both Zen monks and laypersons. Each successive teacher in his long teaching lineage was also certified. The written documentation can usually be traced far back in old Japan and sometimes even to China. Indeed, the word *roshi* is itself a token of this fact. It arose, as have other r/l transpositions, from the way Japanese lips and tongue pronounced the name of Lao-tzu, the Taoist sage of ancient Chinese legend.

Zen masters continued down through the ages to transmit what was called the "lamp of enlightenment." True, the lamp of illumination did pass from hand to hand. But what constituted the illumination from such a lamp? Nothing that originated in scriptures, said Bodhidharma. No form of didactic teaching that anyone could impose on students from without. Rather it was a form of education in the original sense of that word: a leading forth—from the interior—of something already there. In Zen, it is a slow process to tease out what is "in there." It is one-on-one, very intensive and time-consuming.

Harsh military realities penetrated the culture back in olden times. Moreover, it was already appreciated that each personality would have set up barricades to protect itself against change. So then, as now, it came to be accepted that rigorous discipline would be the way to train a monk to assault these well-defended battlements of his inner space. Young head-shaven monks were sometimes treated like recruits in a Marine boot camp.

But could there ever be justification for a Zen master striking his monks? It may help to interpret such early behavior in the light not only of the turbulent cultural setting of those early days but of the roshi's top priorities. For he began with many raw, young trainees. His task was twofold: (1) to help them shake off their cultural indoctrinations and routine ways of thinking; and (2) to so sharpen their attentive powers that they could start directly experiencing the real world—that world right under their noses.

We in the West also have a hard-nosed military history. Out of the First World War has come an apocryphal story which helps bring home the point. It concerns a young second lieutenant who had failed to get his stubborn army

mule to move. He asked for help from his sergeant, a veteran mule trainer. The trainer picked up a plank of wood. Without changing his expression he crashed it down on the mule's head, right between his ears. The astonished officer remonstrated, saying "That's no way to teach a mule!" The sergeant replied casually, "I haven't started to *teach* him yet. That was just to get his attention!"

The roshi gets his students' attention early. He sometimes uses audacious means. Like any wise teacher, he enlivens the complexities of the subject with pithy examples and humor. But no doubt remains about the most vital matter: it is the student who bears the final responsibility for progress. As Joshu Sasaki-roshi phrases it, "If you have a dependent mind, you better go to other religious that treat you kindly, but not to Zen. You are not children anymore. I'll never be kind to you. You should walk all alone and come to realization by yourself."[4]

The roshi in the Japanese tradition trains students mostly by example and by indirection. He communicates two of his subtler points by example. One is his calm alertness. The other is the fine art of examining life's troubling events with utmost objectivity. As her roshi said to Irmgard Schloegl, "Look at getting mad from this perspective. If you had but five more minutes left to live, and it would still be worth getting mad over, then by all means do so."[5]

But much of the rest of the Zen a roshi transmits is allusive. Does he specify what he is searching for? No, nor what his students' response should be. This is frustrating. It leaves his students groping, stumbling. But as a consequence, they will be discovering Zen *for* themselves, and *in* themselves, on their own terms of reference. It will be a long, slow process of trial and error.

So how accurate is the charge that the roshi's subtle ways are incomprehensible? The word fits none of the contemporary roshi I have known. Quite the reverse; they are all down-to-earth, matter-of-fact communicators. But their methods can appear devious. For what they still do, in common with the old masters, is steer clear of responding with words or by deeds which will only stimulate more abstractions in the minds of those who question them. Frequently this means directing the student's attention to the simplest of examples. Tangible objects are readily at hand in the space in front of them: a bell, a stick, a flower. In this way do roshi train their students constantly *to be aware of explicit sensory experience.*

Nothing abstract, nothing elaborate. Just concrete encounters with everyday perceptions. "This cup is round," says Kobori-roshi, having focused us both on his empty tea cup. Right *here.* Right *now,* in this present moment. Initially, this approach seems so elementary as to appear naive. But how long does it take before one begins to really practice this fine art of immediate, ongoing mindful perception in everyday living?

In the opening quotation, Bankei was emphasizing an important point: a Zen master grasps the essence of a situation with lightning-like speed. Why? Perhaps it was Bankei's way of defining how a master behaves. *This is what finally happens when a person becomes free of discriminations between self and non-self.* It is not a matter of similes, not of being "like" something. This is what it actually *is* when a genuine master finally resonates in natural, selfless harmony with things as they really are. The result is a person who perceives, understands, and verbalizes in

quick, seemingly unorthodox ways, unconstrained by the usual formal, logical structures of language and behavior.

Do many old Zen mondo and behaviors continue, at our usual cognitive level, to express sheer nonsense? Yes, but much of this evaporates when we finally step back and stop trying to force them into *our* own logical frames of reference. Customs were much different back in the Tang dynasty (618–907). It was then more acceptable for a Zen master—somewhat as we now expect of a modern jazz musician—to be at liberty to take off on brief, impromptu, freewheeling flights of improvisation. We can hardly demand today that the artistry of either man must adhere to every strict rule of standard composition. From such a charitable perspective we can begin to glimpse method in the madness, and start viewing it as an expression of the roshi's enlightened, blithe spirit.

In today's large classrooms, teachers examine students using questions which are true/false, multiple choice, and of the essay type. Nothing like this for Zen masters. Never any wordy discourse. Nothing to encourage any legalistic judgments about "good" or "bad." Instead, their methods pointed the way to lively perceptions, encouraged quick insights that pierced quibbles, cut off attachments. Intuitively, they had diagnosed a basic human problem: our brain's association networks are already jam-packed with fine discriminating thoughts. Is something really true? Or only partly true? Or mostly false? Each such decision calls up one more hair-splitting deliberation. These resonate way back to old affective circuits, to attitudes which had imprinted us since childhood with sticky notions about "right" or "wrong." So let us regard the older exchanges between master and monk as an open demonstration of another basic Zen theme: *direct, simple, responses quickly bypass all this mental clutter.*

A roshi engages in many lighthearted behaviors. They, too, are less incomprehensible than might first appear. A pixie humor jars students out of fixed ways of looking at things. It serves to counterbalance a sober student's tendencies to heavy thinking. Sometimes the way a roshi responds to boring verbal questions may even resemble the technique used by Peter Ustinov, who once said, "I find that a most effective way of quelling bores is simply to say, suddenly and irrelevantly: 'Now, Singapore—does that mean anything to you?'"[6]

But the roshi has a much more serious role. He is the quality control. In this function, he is a stern taskmaster. He is compass needle in more ways than one. He punctures old belief systems. He denies spiritual significance to hallucinations and to brief affective responses. He insists that spiritual insights—of whatever depth—are but an early milestone on a long, long journey. Moreover, he stresses that his students' insights will remain sterile until they are infused into everyday life behaviors. Any novice, reaching out to a roshi for some quick spiritual face-lift, soon learns that the Way is never finished. No superficial cosmetic surgery for Zen. The overhaul arises deep from within, from pulling on one's own bootstraps.

One of the roshi's crucial functions, then, is to say "no." His role is to afflict the comfortable. He dispenses tough love. Whether he does so gently or firmly, no student remains complacent, certainly not in rigorous Rinzai Zen. His private interviews, *sanzen,* can build up residues of frustration. As I sit before Sasaki-

Winner of 1998 Scientific and Medical Network Book Prize

Zen and the Brain

James H. Austin, M.D.

This book uses Zen Buddhism as the opening wedge for an extraordinarily wide-ranging exploration of consciousness. In order to understand the brain mechanisms that produce Zen states, one needs some understanding of the anatomy, physiology, and chemistry of the brain. Austin, a neuroscientist and Zen practitioner, interweaves his teachings of the brain with his teachings/personal narrative of Zen. The science, which contains the latest relevant developments in brain research, is both inclusive and rigorous; the Zen sections are clear and evocative. Along the way, Austin covers such topics as similar states in other disciplines and religions, sleep and dreams, mental illness, consciousness-altering drugs, and the social consequences of advanced stages of enlightenment.

James H. Austin, M.D., is Professor Emeritus of Neurology at the University of Colorado Health Sciences Center and the author or coauthor of more than 130 publications in the fields of neurochemistry, neuropharmacology, and clinical neurology.

"This is a book written with passion and seriousness."
—*Psychoanalytic Books*

"... Austin has done a beautiful job integrating neurology and mystical states... "
—*Times Literary Supplement*

"... richly textured, allusive... persuasive, fascinating prose."
—David V. Feldman, Ph.D., *Choice*

"This new book is surely THE most important Zen book of the decade... "
—*Zen Unbound*

"*Zen and the Brain* is well worth reading by those interested in cognitive brain function, especially the mechanisms of consciousness. However, it is far from a dry scientific text and would be enjoyable to someone more interested in the philosophical implications."
—*Journal of the American Medical Association*

"*Zen and the Brain* is a groundbreaking work that bridges the gap between the fields of religion and science. . . . Each page is clearly written and fully engages the reader with an exposition that is both simple and profound."
—Ashok Malhotra, *Philosophy East & West*

The MIT Press
Massachusetts Institute of Technology
Cambridge, Massachusetts 02142
http://mitpress.mit.edu

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