Consciousness-Based Education:
A Foundation for Teaching and
Learning in the Academic Disciplines

A Series of 12 Volumes

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## Table of Contents

**Series Introduction** ................................................................. 1

**Volume Introduction** ............................................................... 13

**Section I: Physiology is Consciousness—Maharishi Vedic Approach to Health**

1.1. Significance of the *Maharishi Vedic Approach to Health* for Modern Health Care and Medical Education .............................................. 21

1.2. Awakening the Body’s Inner Intelligence .............................. 53
   R.H. Schneider & J.Z. Fields

1.3. A New Strategy for Total Heart Health:
   The *Maharishi Vedic Approach to Health* .................................. 63
   R.H. Schneider & J.Z. Fields

1.4. Healing Your Heart Through the Mind ............................... 77
   R.H. Schneider & J.Z. Fields

1.5. How the Transcendental Meditation Program Works .............. 99
   R.H. Schneider & J.Z. Fields

1.6. Perfect Health to Every Individual ................................. 111
   C. Pearson
Section II: Neurophysiology of Enlightenment

2.1. Introduction—The Maharishi Technology of the Unified Field:
The Neurophysiology of Enlightenment.......................... 135
R.K. Wallace

2.2. Physiology, Veda, and Consciousness...................... 143
R.K. Wallace

2.3. The Discovery of the Unified Field
of All the Laws of Nature ............................................ 165
R.K. Wallace

2.4. The Physiological and Biochemical Correlates of the Least Excited States
of Consciousness...................................................... 193
R.K. Wallace

Section III: Clinical Research on Maharishi Vedic Approach to Health

3.1. Review of Controlled Research on the Transcendental Meditation
Program and Cardiovascular Disease:
Risk Factors, Morbidity, and Mortality.......................... 237
K.G. Walton, R.H. Schneider, S. Nidich

3.2. Stress Reduction Programs in Patients with Elevated Blood Pressure: A Systematic
Review and Meta-analysis......................................... 253
M.V. Rainforth, R.H. Schneider, S.I. Nidich,
C.G. King, J.W. Salerno, J.W. Anderson
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3</td>
<td>Disease Prevention and Health Promotion in the Aging with a Traditional System of Natural Medicine—<em>Maharishi Vedic Medicine</em> (MVM)</td>
<td>275</td>
</tr>
<tr>
<td>3.4</td>
<td><em>Maharishi Vedic Vibration Technology</em> on Chronic Disorders and Associated Quality of Life</td>
<td>303</td>
</tr>
<tr>
<td>3.5</td>
<td>Putting It All Together: Integrating the Mind, Body, and Environment Approaches for Total Heart Health</td>
<td>319</td>
</tr>
<tr>
<td></td>
<td>R.H. Schneider &amp; J.Z. Fields</td>
<td></td>
</tr>
<tr>
<td><strong>Section IV: Appendices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modern Science and <em>Vedic Science</em>: An Introduction</td>
<td>331</td>
<td></td>
</tr>
<tr>
<td>Kenneth Chandler, Ph.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bibliography for <em>The Neurophysiology of Enlightenment</em></td>
<td>367</td>
<td></td>
</tr>
<tr>
<td>R. Keith Wallace, Ph.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>401</td>
<td></td>
</tr>
</tbody>
</table>
Higher education faces a complex set of challenges today. We are seeing resources diminish at the same time we are hearing calls for greater access and affordability. Demands for greater transparency and accountability are being sounded by both the general public and the government. Government is exerting increasing controls in this long-independent area.

These challenges, however, are merely financial and political, and they are hardly limited to colleges and universities. The fundamental challenges are educational and center around the students themselves. Challenges include high levels of stress, pervasive substance abuse (particularly binge drinking), lack of preparedness for college-level work, and mental and emotional disabilities. In most of these areas, the problem is serious and worsening. Though colleges and universities are striving to address these challenges, few would claim we are turning the tide.

An encouraging trend is the increasing focus in higher education nationwide on promoting student learning. Yet these laudable efforts do not take into account the powerful forces working in opposition. It is well known that learning is inhibited by stress, sleep deprivation, alcohol, and poor diet—and these are among the most conspicuous features of the college student experience.

Something new is required. Education needs a reliable means of developing students directly from within. We need a systematic method for cultivating their creative intelligence, their capacity to learn, and their natural humanity. All education aims at these goals, of course—but the approach thus far has been from the outside in, and the results have been haphazard at best.

Consciousness-Based education was established to address this need. It integrates the best practices of education and places beneath them a proper foundation—direct development of the student from inside out.

The outcomes of Consciousness-Based education have been unprecedented and scientifically verified. These outcomes include significant
growth of intelligence, creativity, learning ability, field independence, ego development, and moral maturity, among others. These results are remarkable because many of these values typically plateau in adolescence—but Consciousness-Based education promotes this growth in students of all ages, developing potentials that otherwise would have remained unexpressed.

Beyond this rich cognitive growth, Consciousness-Based education significantly reduces student stress, boosts self-esteem, improves health, reduces substance use, and enhances interpersonal relationships. All of this comes together to create exceptional learning environments. This approach even measurably improves the quality of life in the surrounding society.

Consciousness-Based education was founded by Maharishi Mahesh Yogi, the world authority on the science of consciousness. First pioneered at Maharishi University of Management (previously Maharishi International University, 1971–1995) in Fairfield, Iowa, Consciousness-Based education is being adopted by schools, colleges, and universities around the world. It is easily integrated into any school, without any change in mission or curriculum.

Consciousness-Based education recognizes that student learning depends fundamentally on students’ levels of consciousness or alertness. The more alert and awake the student, the more successful and satisfying the learning.

Consciousness-Based education consists of three components:

• a practical technology for directly developing students’ potential from within,
• a theoretical understanding of consciousness that gives rise to a unifying framework for knowledge, enabling students to easily grasp the fundamental principles of any discipline and to connect these principles to their own personal growth, and
• a set of classroom practices, arising from this understanding, that also helps promote effective teaching and learning.
The Transcendental Meditation program

At the heart of Consciousness-Based education is the practice of the Transcendental Meditation technique. The technique was brought to light by Maharishi Mahesh Yogi from the Vedic tradition of India, the world’s most ancient continuous tradition of knowledge. It is practiced for 20 minutes twice daily, once in the morning and once in the afternoon, while sitting comfortably with eyes closed. It is simple, natural, and effortless—so simple, in fact, that ten-year-old children can learn and practice it. It has been learned by more than six million people worldwide, of all ages, religions, and cultures.

The Transcendental Meditation technique differs from other procedures of meditation and relaxation in its effortlessness. It involves no concentration or control of the mind. Neither is it a religion, philosophy, or lifestyle. It involves no new codes of behavior, attitudes, or beliefs, not even the belief it will work.

The Transcendental Meditation program is the most extensively validated program of personal development in the world. It has been the subject of more than 600 scientific research studies, conducted at more than 250 universities and research institutions in more than 30 countries worldwide. These studies have been published in more than 150 scientific and scholarly journals in a broad range of fields, including Science, Scientific American, American Journal of Physiology, International Journal of Neuroscience, Memory and Cognition, Social Indicators Research, Intelligence, Journal of Mind and Behavior, Education, Journal of Moral Education, Journal of Personality and Social Psychology, Business and Health, British Journal of Educational Psychology, Journal of Human Stress, Lancet, Physiology and Behavior, and numerous others. No approach to education has as much empirical support as Consciousness-Based education.

This approach, moreover, has been successfully field-tested over the past 35 years in primary, secondary, and post-secondary schools all over the world, in developed and developing nations, in a wide variety of cultural settings—the United States, Latin America, Europe, Africa, India, and China.

The Transcendental Meditation technique enables one to “dive within.” During the practice, the mind settles inward, naturally and spontaneously, to a state of deep inner quiet, beyond thoughts and per-
ceptions. One experiences consciousness in its pure, silent state, uncolored by mental activity. In this state, consciousness is aware of itself alone, awake to its own unbounded nature.

The technique also gives profound rest, which dissolves accumulated stress and restores balanced functioning to mind and body.

This state of inner wakefulness coupled with deep rest represents a fourth major state of consciousness, distinct from the familiar states of waking, dreaming, and sleeping, known as Transcendental Consciousness.

In this restfully alert state, brain functioning becomes highly integrated and coherent. EEG studies show long-range spatial communication among all brain regions. This coherence is in sharp contrast to the more or less uncoordinated patterns typical of brain activity.

With regular practice, this integrated style of functioning carries over into daily activity. Research studies consistently show a high statistical correlation between brainwave coherence and intelligence, creativity, field independence, emotional stability, and other positive values. The greater one’s EEG coherence, in other words, the greater one’s development in these fundamental areas. At Maharishi University of Management, students even have the option of a Brain Integration Progress Report—an empirical measure of growth of EEG coherence between their first and last years at the University.

The brain is the governor of all human activity—and therefore personal growth and success in any field depend on the degree to which brain functioning is integrated. The increasingly integrated brain functioning that spontaneously results from Transcendental Meditation practice accounts for its multiplicity of benefits to mind, body, and behavior.

Every human being has the natural ability to transcend, to experience the boundless inner reality of life. Every human brain has the natural ability to function coherently. It requires only a simple technique.

**Theoretical component—**
**a unified framework for teaching and learning**

Scholars have long called for a way to unify the diverse branches of knowledge. Current global trends are making this need ever more
apparent. The pace of progress is accelerating, the knowledge explosion continues unabated, and knowledge is becoming ever more specialized.

Academic disciplines offer a useful way of compartmentalizing knowledge for purposes of teaching, learning, research, and publication. But each academic discipline explores only one facet of our increasingly complex and interrelated world. The real world, however, is not compartmentalized—an elephant is not a trunk, a tusk, and a tail. Academic disciplines, consequently, are criticized as inadequate, in themselves, for understanding and addressing today’s challenging social problems.

Today, more than ever, we need a means of looking at issues comprehensively, holistically. We need a way of discovering and understanding the natural relationships among all the complex elements that compose the world, even among the complex elements that compose our own disciplines.

Various attempts to address this need have been made under the rubric of interdisciplinary studies—programs or processes that aim to synthesize the perspectives and promote connections among multiple disciplines. Some of these efforts have been criticized as superficial joinings of disciplinary knowledge. But the chief criticism of interdisciplinary studies—leveled even by its proponents—is that looking at an issue from multiple perspectives does not, in itself, enable one to find the common ground among contrasting viewpoints, to resolve conflicts, and to arrive at a coherent understanding.

The diverse academic disciplines can be properly unified at only one level—at their source. All academic disciplines are expressions of human consciousness—and if the fundamental principles of consciousness can be identified and understood, then one would gain a grasp of all human knowledge in a single stroke.

This brings us to the theoretical component of Consciousness-Based education. Consciousness-Based education does precisely this—and not as an abstract, theoretical construct but as the result of students’ direct experience of their own silent, pure consciousness. In this sense, practice of the Transcendental Meditation technique forms the laboratory component of Consciousness-Based education, where the theoretical predictions of Consciousness-Based education can be verified through direct personal experience.
This theoretical component offers a rich and deep yet easy-to-grasp intellectual understanding of consciousness—its nature and range, how it may be cultivated, its potentials when fully developed. This theoretical component also identifies how the fundamental dynamics of consciousness are found at work in every physical system and in every academic discipline at every level.

With this knowledge as a foundation, teachers and students in all disciplines enjoy a shared and comprehensive understanding of human development and a set of deep principles common to all academic disciplines—a unified framework for knowledge. With this unified framework as a foundation, students can move from subject to subject, discipline to discipline, and readily understand the fundamental principles of the discipline and recognize the principles the discipline shares with the other disciplines they have studied. This approach makes knowledge easy to grasp and personally relevant to the student.

Pure consciousness and the unified field

Consciousness has traditionally been understood as the continuous flux of thoughts and perceptions that engages the mind. Thoughts and perceptions, in turn, are widely understood to be merely the by-product of the brain’s electrochemical functioning.

Maharishi has put forward a radically new understanding of human consciousness. In Consciousness-Based education, pure consciousness is understood as the foundation and source of all mental activity, the most silent, creative, and blissful level of the mind—the field of one’s total inner intelligence, one’s innermost Self. (This unbounded value of the Self is written with an uppercase “S” to distinguish it from the ordinary, localized self we typically experience.) Direct experience of this inner field of consciousness awakens it, enlivens its intrinsic properties of creativity and intelligence. Regular experience of pure consciousness through the Transcendental Meditation technique leads to rapid growth of one’s potential, to the development of higher states of human consciousness—to enlightenment.

But consciousness is more, even, than this.

Throughout the twentieth century, leading physicists conjectured upon the relation between mind and matter, between consciousness and the physical world; many expressed the conviction that mind is,
somehow, the essential ingredient of the universe. But Maharishi goes further. He has asserted that mind and matter have a common source, and that this source is pure consciousness. Consciousness in its pure, silent state is identical with the most fundamental level of nature’s functioning, the unified field of natural law that has been identified and described by quantum theoretical physicists over the past several decades. Everyone has the potential to experience this field in the simplest form of his or her own awareness. Considerable theoretical evidence, and even empirical evidence, has been put forward in support of this position.

Maharishi has developed these ideas in two bodies of knowledge, the first known as the Science of Creative Intelligence, the second as Maharishi Vedic Science and Technology. The Science of Creative Intelligence examines the nature and range of consciousness and presents a model of human development that includes seven states of consciousness altogether, including four higher states beyond the familiar states of waking, dreaming, and sleeping. These higher states, which develop naturally and spontaneously with Transcendental Meditation practice, bring expanded values of experience of one’s self and the surrounding world. Each represents a progressive stage of enlightenment. Maharishi Vedic Science and Technology examines the dynamics of pure consciousness in fine detail. It reveals the fundamental principles of consciousness that may then be identified in every field of knowledge and every natural system.

Most importantly for teaching and learning, these sciences reveal how every branch of knowledge emerges from the field of pure consciousness and how this field is actually the Self of every student.

**Strategies for promoting teaching and learning**

Consciousness-Based education also includes a battery of educational strategies that promotes effective teaching and learning. Foremost among these is the precept that parts are always connected to wholes and that learning is most effective when learners are able to connect parts to wholes. In Consciousness-Based education, the parts of knowledge are always connected to the wholeness of knowledge, and the wholeness of knowledge is connected to the Self of the student.
One means of doing this is through *Unified Field Charts*. These wall charts, developed by the faculty at Maharishi University of Management and used in every class, do three things: (1) They show all the branches of the discipline at a glance; (2) They show how the discipline emerges from the field of pure consciousness, the unified field of natural law at the basis of the universe; (3) They show that this field is the Self of the student, which the student experiences during practice of the Transcendental Meditation technique.

In this way students can always see the relation between what they are studying and the discipline as a whole, and they can see the discipline as an expression of their own pure consciousness. Again, this is more than an intellectual formulation—it is the growing reality of students’ experience as they develop higher states of consciousness.

Another strategy is *Main Point Charts*. Developed by the faculty for each lesson and posted on the classroom walls, these charts summarize in a few sentences the main points of the lesson and their relationship to the underlying principles of consciousness. In this way students always have the lesson as a whole in front of them, available at a glance.

**The next paradigm shift**

If higher education is fundamentally about student learning and growth, then Consciousness-Based education represents a major paradigm shift in the history of education. To understand this change, it is useful to reflect on the encouraging paradigm shift that has already been taking place in education over the past several decades.

This shift involves a move from what many call an *instruction paradigm* to a *learning paradigm*. In the instruction paradigm, the mission of colleges and universities is to provide instruction; this is accomplished through a transfer of knowledge from teacher to student. In the learning paradigm, the mission is to produce student learning; this mission is achieved by guiding students in the discovery and construction of knowledge.

This shift is a vitally important advance in education, leading to more successful outcomes and more rewarding experiences for students and teachers alike. But a further paradigm shift remains, and we can understand it by examining a fundamental feature of human experience.
Maharishi observes that every human experience consists of three fundamental components: a knower, a known, and a process of knowing linking knower and known. We may also use the terms experiencer, object of experience, and process of experiencing, or observer, observed, and process of observation.

This threefold structure of experience is nowhere more evident than in schools: The knowers are the students, the known is the knowledge to be learned, and the process of knowing is what the full range of teaching and learning strategies seek to promote.

Understanding this threefold structure helps us understand the paradigm shifts that are taking place.

The instruction paradigm places emphasis on the known. It focuses on the information students are to absorb and the skills they are to learn. In this paradigm, the instructor’s role is to identify what students need to know and deliver it to them.

The learning paradigm emphasizes the process of knowing. It recognizes that students must be actively involved in the learning process, that knowledge is something individuals create and construct for themselves, that students have differing learning styles and differing interests that must be taken into account. In this paradigm, the instructor’s role is to create learning environments and experiences that promote the process of learning.

The Consciousness-Based paradigm embraces the known and the process of knowing but places primary emphasis on the knower—on developing the knower’s potential for learning from within. The following diagram shows the respective emphases of each approach:
But the learning paradigm does not so much abandon the instruction paradigm as enlarge it, so that it includes the process of knowing as well as the known. And the Consciousness-Based approach completes the enlargement to include the knower:

Consciousness-Based education, in summary, is a theory and practice grounded in a systematic science and technology of consciousness, making available the complete experience, systematic development, and comprehensive understanding of the full range of human consciousness. More than 30 years’ experience and extensive scientific research confirm the success of this approach and its applicability to any educational institution.
INTRODUCTION TO THE SERIES

About this book series
This series of twelve volumes is the result of a unique faculty-wide project that began with the founding of Maharishi University of Management in 1971 and continues to this day. Each volume in the series examines a particular academic discipline in the light of our Consciousness-Based approach to education.

Volumes include:

• an introductory paper introducing the Consciousness-Based understanding of the discipline,
• a Unified Field Chart, if available for publication, for the discipline—a chart that conceptually maps all the branches of the discipline and illustrates how the discipline emerges from the field of pure consciousness and how that field is the Self of every individual. Thus, these charts connect the “parts” of knowledge to the “wholeness” of knowledge and the wholeness of knowledge to the Self of the student;
• subsequent papers that show how this understanding may be applied in various branches of the discipline,
• occasional examples of student work exploring how the Consciousness-Based approach enhances learning in the discipline, and
• an appendix describing Maharishi Vedic Science and Technologies of Consciousness in detail.
<table>
<thead>
<tr>
<th>VOLUME</th>
<th>DISCIPLINE</th>
<th>VOLUME EDITOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maharishi Vedic Science</td>
<td>Frederick Travis</td>
</tr>
<tr>
<td>2</td>
<td>Education</td>
<td>Christopher Jones</td>
</tr>
<tr>
<td>3</td>
<td>Physiology &amp; Health</td>
<td>Kenneth Walton, Robert Schneider, Paul Morehead, Janet Kernis</td>
</tr>
<tr>
<td>4</td>
<td>Physics</td>
<td>Gerald Geer</td>
</tr>
<tr>
<td>5</td>
<td>Mathematics</td>
<td>Paul Corazza, Anne Dow</td>
</tr>
<tr>
<td>6</td>
<td>Literature</td>
<td>Terrance Fairchild</td>
</tr>
<tr>
<td>7</td>
<td>Art</td>
<td>Matthew Beaufort</td>
</tr>
<tr>
<td>8</td>
<td>Management</td>
<td>Dennis Heaton, Jane Schmidt-Wilk, Bruce McCollum</td>
</tr>
<tr>
<td>9</td>
<td>Government</td>
<td>Rachel Goodman, William Sands</td>
</tr>
<tr>
<td>10</td>
<td>Computer Science</td>
<td>Keith Levi, Paul Corazza</td>
</tr>
<tr>
<td>11</td>
<td>Sustainable Living</td>
<td>Mabel Scaroni-Fisher, David Fisher</td>
</tr>
<tr>
<td>12</td>
<td>World Peace</td>
<td>Rachel Goodman</td>
</tr>
</tbody>
</table>

We welcome inquiries and further contributions to this series.

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This volume in the Consciousness-Based education book series focuses on health, especially its relationship to physiology and consciousness. The word health comes from the Indo-European root kailo meaning whole, intact, uninjured. It is the same root from which we get the words whole, holistic, holy, and heal. The study of human physiology examines the specific physical and chemical processes that make up the human body.

When we take a Consciousness-Based approach to the study of physiology, we can begin with a simple dictionary definition of consciousness as the state or condition of being conscious or aware. Everyone recognizes the experience of being aware of something, whether of an object in the external environment or of an inner feeling or thought. Few, however, may say they know the experience of being aware of awareness itself, just pure awareness, without any content. This state of awareness is described in Maharishi Vedic Science as Transcendental Consciousness or pure consciousness. It is a natural state, but one which is rarely realized without a special technique. The Transcendental Meditation technique revived by Maharishi Mahesh Yogi is said to be the simplest technique for having this experience.

From the point of view of Maharishi Vedic Science (please see Appendix for a more complete discussion of Maharishi Vedic Science), the whole (i.e., healthy) human being is not merely a collection of physical and chemical processes but a perfectly balanced combination of these processes, one in which the full nature of consciousness is experienced and lived in daily life. This view is clearly expressed in Maharishi Ayur-Veda (from the Sanskrit ayus, meaning life or life span, and veda, meaning knowledge or science), the branch of the Vedic tradition dealing specifically with health. Although Maharishi Ayurveda deals with diseases
and cures for diseases, its primary focus is prevention, how to avoid becoming sick in the first place. The way to avoid sickness is to attain perfect health, perfect wholeness. And the way to gain perfect health is through gaining the experience of pure awareness, pure consciousness, the “field of all possibilities” within everyone, on a permanent basis. This is a state of maximum resilience, one capable of responding to any challenge in a way that draws on the power of all the laws of nature, automatically. This exalted state is also called “enlightenment.” Maharishi’s greatest contribution to humanity is his revelation of an effortless path to enlightenment through his Transcendental Meditation and Transcendental Meditation-Sidhi programs. To further facilitate the growth to enlightenment with these programs, however, he also has introduced other components of a natural system of health care, from Maharishi Vedic Medicine to Maharishi Vedic Architecture to Maharishi Ghandarva Vedic music, and Maharishi Jyotish science of prediction, as well as other aspects from the Vedic tradition, which have been collectively termed the Maharishi Vedic Approach to Health.

Ancient Ayurvedic texts state: “The very object of this science [Ayurveda] is the maintenance of the equilibrium of the tissue elements [dhatus]” (Caraka, Sutrasthana, I. 53). Accordingly, Ayurveda defines disease as “any disturbance in the equilibrium of the dhatus” and defines health as “the state of their equilibrium” (Caraka, Sutrasthana, IX. 4). This ancient medical system also has a theory of natural homeostasis which states that “the dhatus come to normalcy automatically irrespective of any external causative factor” (Caraka, Sutrasthana, XVI. 27).

If this approach to understanding health is as natural as Ayurveda says, how is it possible that it would be limited to the Vedic tradition? In fact, it is not limited to only one tradition. Others have uncovered many of the same truths of life and health. For example, the legacy of prevention in the West is usually traced to ancient Greece. The Hippocratic writings contain knowledge attributed by the Greeks to the goddess Hygeia. This knowledge has been summarized as follows: “. . . both health and disease are under the control of natural laws and reflect the influence exerted by the environment and the way of life. Accordingly, health depends upon a state of equilibrium among the various internal factors which govern the operations of the body and the mind; this equilibrium in turn is reached only when man lives in harmony
with his external environment” (Dubos, 1959). Furthermore, a belief attributed to Hippocrates states that the sick body calls into play natural forces (laws of nature) that tend to restore the disturbed equilibrium and re-establish health. This concept is a reasonable English translation of the famous expression, *vis medicae naturae*, referring to the healing power of nature. It is almost identical to the earlier statement quoted from Ayurveda, that “the *dhatus* [tissue elements] come to normalcy automatically irrespective of any external causative factor.” (See Walton & Pugh, 1995, for more on this topic.)

This phenomenon is sometimes referred to as the display of the “inner intelligence” of the body. It is this level of nature’s intelligence that is accessed in the experience of transcendental or pure consciousness. This understanding of the relationship between health and consciousness is a key aspect of the Maharishi Vedic Approach to Health.

How do these concepts relate to the modern physiological understanding of health and disease? The answer is “surprisingly well.” Modern physiology has identified “stress” as a major cause of disease. The concept of *stress* is not easy to pin down, because the term is used in different ways. In the branch of physiology that focuses on the study of stress, the term relates to any situation that activates the neuroendocrine mechanisms involved in maintaining a stable equilibrium among the physical and chemical processes that constitute the body/mind. More especially, the term *stress* applies to situations that significantly disrupt the state of equilibrium, most often to a degree that is experienced as a threat—that is, something unpleasant or foreign—and may be accompanied by emotions such as anger, anxiety, or depression. In essence, then, the relationship between stress and disease is that stress disrupts a natural state of equilibrium, and if this disruption continues, disease is a result.

*Homeostasis* is a physiological term applied to the body’s natural tendency to maintain a special state of equilibrium. *Allostasis* is a similar term, but one that implies a wider range of dynamic mechanisms involved in maintaining the equilibrium. *Allostatic load* is a concept that attempts to quantify the total wear and tear on the body from all the activities required to maintain the optimal equilibrium. A person with a higher allostatic load is more likely to suffer a disease state because the mechanisms for maintaining equilibrium are functioning at a less than
optimal level. (For further discussion of these concepts, see Walton & Levitsky, 2003.)

The point here is that the concepts of homeostasis and allostasis involve the same sort of automatic correctional processes as we encountered earlier in our discussion of Ayurveda and the medical system of ancient Greece—processes that draw on the inner intelligence of the body automatically and that maintain the body in a disease-free, balanced state. In Maharishi Vedic Science and the Maharishi Vedic Approach to Health, these displays of inner intelligence are seen as displays of the very nature and mechanics of consciousness itself. The more the state of pure consciousness is experienced, the more the principles of consciousness are manifest in daily living. When the full potential of consciousness and of physiological functioning are realized, the highest state of resilience—perfect health or enlightenment—is achieved. This volume in the series covers the full range of the knowledge of health, from the manner in which the nature of consciousness is structured in the form and functions of the body to the clinical consequences of growing enlightenment in the daily lives of people prone to or suffering from a variety of diseases.

**Section I:**
**Physiology is Consciousness—Maharishi Vedic Approach to Health**
This section begins with an overview of the Maharishi Vedic Approach to Health in the context of modern health care and medical education. The next three articles present the fundamentals of Maharishi Vedic Approach to Health, particularly with reference to heart health. The last two articles in this section summarize the nature and mechanics of the Transcendental Meditation program, the central technology of the Maharishi Vedic Approach to Health, and give examples of studies and personal experiences leading to the conclusion that the nature of consciousness itself is exhibited in the structure and functions of the human body.

**Section II:**
**Neurophysiology of Enlightenment**
Dr. R. Keith Wallace is a pioneer in the research on the neurophysiology of the Maharishi Transcendental Meditation and TM-Sidhi programs. His research into the dramatic changes in the brain and
physiological systems during the practice of these subjective technologies has led the way to a more complete understanding of consciousness and its relation to body. In this section, Dr. Wallace introduces these technologies in terms of the unified field of physics and the unified field of consciousness, pure consciousness. He also explores the correlations between particular physiological and biochemical changes and the least excited state of consciousness that occurs during the practice of these meditation programs.

Section III: Clinical Research on the Maharishi Vedic Approach to Health

This section emphasizes the clinical relevance of the techniques and approaches of the Maharishi Vedic Approach to Health. Of the five articles, four are reviews, focusing on research in the elderly and others with chronic disorders such as hypertension and cardiovascular disease. It is important to note that although the Transcendental Meditation technique and the TM-Sidhi program are performed on the level of the mind, their effects on the body are profound. Dozens of research studies in healthy as well as diseased populations show effects of these individual practices and of other Vedic disciplines on health.

The final article summarizes the practicality of this comprehensive natural health care system, and emphasizes the advantages of using more than one of the approaches. Compelling research expresses the practical benefits of combining the mind, body, and environmental approaches of Maharishi Vedic Approach to Health, including major reversals in several chronic diseases.

In conclusion, we hope the selection of published papers and book chapters in this volume will give readers a representative sample of the modern applications of Consciousness-Based education in the areas of physiology and health. The volume must have made clear how physiology and health can be advanced to a state hardly imagined in the more recent fixation on the physical nature of medical systems that views the body as a complex machine.

Section IV. Appendices

For an overview of Maharishi Vedic Science, the appendices include “Modern Science and Vedic Science: An introduction,” by Ken Chan-
dler, Ph.D. which served as the introduction to the inaugural issue of the journal *Modern Science and Vedic Science*. The second appendix is the bibliography for *The Neurophysiology of Enlightenment* by R. Keith Wallace, Ph.D., which provides references for the four articles in Section 2 and an expanded bibliography. The third appendix is a list of links and resources for this volume.

**References Cited**


Section I

Physiology is Consciousness—
Maharishi Vedic Approach to Health
The Significance
of the Maharishi Vedic Approach to Health
for Modern Health Care and Medical Education

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Robert Schneider, M.D., is Professor of Physiology and Health Director, Institute for Natural Medicine and Prevention. Dr. Schneider is a physician researcher specializing in the field of natural medicine. For more than a decade, he and his collaborators have examined the efficacy of Maharishi Ayurveda and the Transcendental Meditation technique for the prevention and treatment of chronic diseases, especially hypertension and cardiovascular disease. This research, which has been supported by private and government sources, including $18 million from the National Institutes of Health (NIH) and private funding agencies, has resulted in more than 80 professional publications and presentations and brought international attention to the efficacy of Maharishi Ayurveda and the Transcendental Meditation technique in reducing hypertension, cardiovascular disease and associated mortality. Dr. Schneider is one of the founding faculty of the Department of Physiology and Health, and a consultant to the National Institutes of Health and the Center for Disease Control and Prevention on natural medicine.
ABSTRACT

Maharishi Vedic Medicine, brought to light in our time by Maharishi Mahesh Yogi and based on the age-old knowledge of life in accord with natural law of the Vedic tradition, provides prevention-oriented, natural health care without harmful side effects. Maharishi Vedic Medicine aims to eliminate the basis of disease and provides the knowledge and technologies for creating a disease-free society. Modern health care is confronted with critical issues demanding immediate practical solutions: 1) the population suffers from high rates of chronic diseases; 2) modern medical practice often fails to prevent disease; 3) pharmaceuticals and high-technology diagnostic and therapeutic approaches frequently have hazardous side effects; and 4) costs for health care soar.

Maharishi Vedic Medicine, a comprehensive and cost-effective science of health care, provides unique solutions to these problems in the form of comprehensive knowledge of natural law—the inner intelligence of the body at the basis of every aspect of the physiology—and practical technology for accessing the body’s inner intelligence and making it lively in the physiology. The discovery of Veda, the totality of natural law, in the human physiology by Professor Tony Nader, M.D., Ph.D. establishes the holistic foundation for Maharishi Vedic Medicine. Scientific research documents the efficacy of the Maharishi Vedic Approach to Health in promoting physical and mental health, ameliorating chronic diseases, preventing illness and reducing health care expenditures.

Colleges of Maharishi Vedic Medicine are being founded to transform medical education by providing key values missing from medical education today, including 1) knowledge and technology for developing consciousness—the Maharishi Transcendental Meditation and TM-Sidhi programs; 2) pulse diagnosis and associated interventions such as diet and herbal supplements, and daily and seasonal routines—Maharishi Ayur-Veda; 3) knowledge and practices governing the effects of the near environment on health—the orientation of homes and office buildings—Maharishi Sthapatya Veda design; 4) knowledge and technologies addressing the effects of distant environment on health—the influence of the “cosmic counterparts” on the human physiology—Maharishi Jyotish and Maharishi Yagya programs, 5) and collective health—group practice of the technology of consciousness to reduce negative tendencies in society and enhance health—the Maharishi Effect. Addition of these values to medical education promises to make medical practice complete and optimize health and longevity for all mankind.
The centuries-old, medicine-predominant approach to health has failed to eliminate sickness and suffering; this is because medicine alone is too superficial to influence all the innumerable values that constitute the structure of life and its evolution. Only a HOLISTIC approach that takes into consideration all aspects of mind and body together can be successful in handling health.

As every aspect of life is the expression of Natural Law, the approach to health must be based on the knowledge of the origin and evolution of Natural Law—guiding principles of intelligence upholding the balance functioning of the human physiology. (Maharishi Mahesh Yogi, 1995a, pp. ii)

Introduction

Ever since Maharishi Mahesh Yogi began teaching his Transcendental Meditation technique worldwide 40 years ago, he has emphasized that an ideal state of health is the normal state of physiological functioning and a characteristic of life in enlightenment—fully developed human life. Maharishi has always pointed out that disease is not a necessary component of life, and that living according to the laws of nature disallows the ground for sickness and suffering. Over the past 40 years, Maharishi (1963, 1967, 1994, 1995a, 1995b, 1995c, 1996a, 1996b, 1997) has successfully brought to light fundamental values of natural law inherent in the most ancient and complete tradition of knowledge, the Vedic tradition. For the first time in thousands of years, the scattered and unconnected parts of the Vedic literature have been unified in a holistic knowledge that connects the various parts of the literature with the whole Veda, and the Veda has been identified as the underlying field of intelligence, or natural law, that structures the ever-expanding universe (Maharishi, 1994, pp. 251–254).

In addition, he has developed technologies to make this level of natural law accessible in life, rendering it practically useful for promoting health and well-being. This knowledge has been amplified by the research of Professor Tony Nader, M.D., Ph.D., who under the guidance of Maharishi, discovered that the Veda and Vedic literature encompass the laws of nature which underlie and administer all structures and functions of human physiology. It is this knowledge that forms the basis of what is known throughout the world as “Maharishi Vedic Medicine,” also known as the “Maharishi Vedic Approach to
Health.” It has inspired Maharishi’s Campaign to Create a Disease-Free Society. Maharishi’s campaign fulfills the urgent need of the time as it coincides with a growing recognition in every country by health care authorities and the general public of the failures, inadequacies, and hazards of the current system of health care. Maharishi Vedic Medicine, based in the Veda, the total potential of natural law, encompasses the necessary knowledge and technologies to solve the current health care crisis and bring self-sufficiency in health care to every nation.

In consideration of the global crises in health care, a global teleconference was convened on October 16, 1975, to review and present solutions to these dilemmas in health and health care. The physician participants from more than 20 countries recognized that new knowledge is immediately required in medical education to solve the pressing problems confronting governments, health policy makers, and medical educators worldwide and to bring complete knowledge and effectiveness to health care. This global conference culminated in a resolution to establish new medical colleges based on Maharishi Vedic Approach to Health—the most scientific and comprehensive system of prevention-oriented, natural medicine.

The ultimate goal of these new colleges is to train experts in health care to prevent chronic diseases, promote perfect health and longevity, and create a disease-free society. In the following sections, we elaborate on the urgent need for a new approach to health care and the fulfillment of this goal by new programs in Maharishi Vedic Medicine offered by Maharishi Medical Colleges around the world.

**Need for a New Paradigm in Health Care**

Over the last decade, leading observers of health trends in society have highlighted the crises in modern medicine. In a review of this literature, Fuchs (1990) identified at least three themes in the modern health care crisis: 1) widespread chronic disease, 2) high cost, and 3) limited access to preventive health care. Other experts (e.g., Leape, 1994) have drawn attention to the rise of adverse side effects and iatrogenic illness approaching epidemic proportions. We examine these issues more closely below.
Prevalence of Chronic Diseases

A study published in a 1996 issue of *Journal of the American Medical Association (JAMA)* reported that approximately 40% of the population in the United States, or 100 million people, suffer from one or more chronic diseases (Hoffman, Rice et al., 1996). This astonishing finding reveals that modern medicine—allopathy—has been inadequate in its mission to maintain health in society, and that the system of health care has failed and is itself sick. For example, despite advances in acute medical care and surgical interventions, cardiovascular disease still remains the number one cause of morbidity and mortality in industrialized nations and is rapidly increasing in developing nations.

Even with escalating usage of high technology surgical procedures (e.g., coronary artery bypass surgery), little progress has been achieved in widespread long-term modification of risk behaviors for primary prevention of heart disease—since modern medicine continues to focus on acute disease treatment or early detection of active disease rather than on prevention (Leaf, 1993).

Another example of the breakdown in modern medical care is the current rise of infectious disease, the control of which was one of the greatest successes in public health earlier in this century. Escalating incidence of bacterial infections caused by antibiotic-resistant organisms (e.g., tuberculosis and the alarming emergence of antibiotic resistant staphylococci) and deadly, chronic viral illnesses (e.g., AIDS) are being recognized as a new threat to our ability to treat disease and to the credibility of our modern medical system (Brudney and Dobkin 1991; Center for Disease Control and Prevention 1992; U.S. Public Health Service Department of Health and Human Services 1992).

Escalating Health Care Costs

The rapidly increasing cost of modern diagnostic and treatment services is one of the most critical problems confronting our nation. Three-fourths of U.S. health care expenditures are spent on care for chronic diseases in 40% of the population (Hoffman, Rice et al., 1996). In the year 2000, approximately $2 trillion or nearly 20% of the U.S. gross domestic product will be spent on medical services (Congressional Budget Office 1993). In the future, the hospital portion of Medicare could likely become bankrupt.
Research shows that managed care and other cost-containment strategies are unlikely to solve this problem (Jencks, Schieber 1991; Burner, Waldo et al., 1992; Schieber, Poullier et al., 1994). Even though the U.S. spends more on medical services than any other industrialized country, America has some of the worst health outcomes in the developed world (Fuchs 1983; Fuchs 1990).

**Ineffective Prevention**

It has been suggested that most diseases and related health care costs are potentially preventable with known technologies. However, only 1% of the U.S. health care budget is currently used to prevent disease while 99% is spent for acute and chronic care of illness after it occurs (Center for Disease Control and Prevention, 1992). Furthermore, studies indicate that 50% of deaths (Mcginnis and Foege, 1993) and 70% of disease (U.S. Dept. of Health and Human Services, 1991 #1590) in the U.S. are caused, at least in part, by lifestyle patterns such as smoking, drug and alcohol abuse, diet, and physical inactivity.

The nation is suffering from an epidemic of disease-causing behaviors, yet our physicians and health care professionals are not effectively trained to address behavioral causes of disease. Thus, there is an urgent and widely recognized requirement for a reformation of medical education and practice to emphasize more comprehensive and effective approaches to preventing disease and promoting health (The Pew Health Professions Commission, 1995).

**Adverse Side Effects and Iatrogenic Disease:**

**The Hazards of Modern Medicine**

Thousands of articles published in medical journals have shown that modern medicine—allopathy—is itself a major cause of disease. Iatrogenic illness—disease produced by medical treatment—is now recognized to be a health hazard of global proportion (Leaf, 1993; Leape, 1994; Charles, 1995). The harmful side effects of drugs, other therapies, and diagnostic procedures can be serious and even lethal and are associated with every major modality of modern medicine (Leape, 1994).

The continuing high prevalence of chronic illness and the fact that allopathic treatment is frequently the cause of disease indicate that the modern system of health care is incomplete and should be funda-
mentally transformed. Adverse events have become so extensive as to prompt the use of the term iatroepidemic. Reporting in JAMA, Dr. Lucian Leape of the Harvard School of Public Health calculated that “180,000 people die in the U.S. each year partly as a result of iatrogenic injury” (Leape, 1994). Another article in JAMA points out that injury from medical treatment in the U.S. “dwarfs the annual automobile accident mortality of 45,000 and accounts for more deaths than all other accidents combined” (Bates, Cullen et al., 1995).

Adverse drug reactions are the most common cause of disorders produced by medical treatment. An average of 10 percent of all hospital admissions have been noted to be attributable to drug-induced disorders—a figure which is now being called into question as an underestimate (Holland & Degruy, 1997). Moreover, hospitalized patients who also experienced an adverse drug event had an almost two-fold increased risk of death (Classen, Pestonik et al., 1997).

Studies have also increasingly portrayed hospitals as being unsafe in that they are conducive to medical hazards. For example, Steel found that 36 percent of patients admitted to a university hospital suffered iatrogenic injury, with 25 percent of events being serious or fatal. More than half of these injuries were related to the use of medications (Steel, Gertman et al., 1981). The results of an analysis of cardiac arrests at a teaching hospital found that 64 percent were preventable. Inappropriate use of drugs was the leading cause of preventable cardiac arrests (Bedell, Deitz et al., 1991).

Patients are also likely, while in the hospital, to get infectious diseases that can be fatal. The Study on Efficacy of Nosocomial Infection Control estimated that about two million patients or five percent of those hospitalized in the U.S. contract bacterial infections (Girou & Brun-Buisson 1996). Martone and Jarvis found that 77,000 patients die each year due to infections gained in the hospital. The rate of sepsis in hospitals has also been found to be rising, one cause being a higher incidence of nosocomial infections (Bone, 1997). The National Patient Safety Foundation at the American Medical Association released 1997 statistics obtained in a random survey showing that “more than 100 million Americans are touched by what they consider to be a medical mistake” and pointed out that “the number of injuries caused by medical errors in inpatient hospital settings nationwide could be as high as
3 million and could cost as much as $200 billion” (National Patient Safety Foundation, 1997).

It is clear that a new approach is urgently needed. It is deplorable that the accrediting body for medical education essentially accredits hazardous therapies and allows medical care to remain incomplete. Those in a position of responsibility for medical education have long been aware of the hazards associated with medical treatment. Yet, they have accredited the same medical curriculum that propagates a system known to cause serious harm, and which is deficient in educating medical students to prevent disease and create optimal health. It is clear from the state of health in the United States today that those responsible for medical education either do not have complete knowledge about health or are not implementing it. It is not a matter of a personal view of specific individuals. Rather, it is a matter of government policy for the health of the nation as a whole.

**Demand for a New Paradigm in Health Care**

The harmful effects of modern medicine call for a return to the primary principle of medical ethics—“Above all, do no harm.” The damaging side-effects and the ineffectiveness of conventional medicine in preventing and treating many diseases have led to patient and consumer dissatisfaction. This dissatisfaction is evident in the increasing public demand for more complete and prevention-oriented health care, free of harmful side effects. Increasingly, people are turning to what they consider to be “natural” or “holistic” approaches to health.

A recent survey by Eisenberg and colleagues (Eisenberg, Kessler et al., 1993) of Harvard Medical School underscored the extent of this interest. The survey found that one in three Americans consult complementary or natural health care practitioners for the treatment of medical problems, most of which are chronic. According to the survey’s authors, this translates into 425 million visits annually to providers of alternative medical therapies—more than the total number of visits made to all U.S. primary care physicians.

Expenditures associated with the use of natural/complementary therapies were estimated at $13.7 billion, three-quarters paid out-of-pocket—a number nearly equal to out-of-pocket expenditures for hospital services during this same period. The authors concluded that
the frequency of use of natural/complementary therapies is far higher than previously reported, and pointed out the importance of incorporating knowledge about such therapies into standard medical school curricula. Another recent survey found that over 60% of all physicians make referrals to natural practitioners, and that nearly one fourth of physicians use complementary techniques in their practices (Borkan, Neher et al., 1994). This widespread use of complementary or natural health care validates the survey finding of Blendon & Taylor that 89% of the American public is dissatisfied and “sees the need for fundamental change in the direction and structure of the U.S. health care system to the point of rebuilding” (Blendon & Taylor, 1989).

In keeping with these findings, a recent review in the Journal of NIH Research (Fogle, 1993) determined that conventional health care practitioners need to know more about research and medical practice modalities of natural/complementary medicine, and that physicians should be educated to understand how and where natural medical practices fit into the health care delivery system.

In response to this clear need for greater knowledge of complementary, natural medical practice, the U.S. Congress and the National Institutes of Health have established an Office of Alternative Medicine to promote scientific evaluation and application of natural/complementary medicine approaches. Courses on natural or complementary medicine are currently offered in at least 40 U.S. medical schools. While these elective courses may be an important step forward, they provide the student with only brief and fragmented exposures to an eclectic array of approaches. Nowhere in contemporary medical schools is a comprehensive curriculum available that systematically incorporates scientific, prevention-oriented, natural medicine into the education of the future physician.

**The Need for New Knowledge in Medical Education**

The wealth of data documenting the nature and extent of the hazards associated with modern medicine, its high costs, and its ineffectiveness in treating chronic diseases and preventing new diseases, has made clear that fundamental deficiencies exist in the current medi-
cal approach and that new knowledge is urgently needed to effectively address these problems.

As the 1995 Pew Commission report explained, “The knowledge, skills, competencies, values, flexibility, commitment and morale of the health professional work force serving the systems of care will become the most important factors contributing to the success or failure of the system” (The Pew Health Professions Commission, 1995). At no time since the Flexner report on medical education almost a century ago has the need to reevaluate the education of medical practitioners been so evident. Medical education must quickly rise to help resolve the crises of contemporary health. The enormous challenges facing modern medicine demand substantially new knowledge in the field that offers practical and validated solutions.

**Maharishi Vedic Medicine: Comprehensive, Scientific Knowledge of Prevention-Oriented Natural Health Care**

Fortunately, the essential knowledge missing from contemporary health education is now available in Maharishi Vedic Medicine. Maharishi explains that development of consciousness to its highest potential—enlightenment—is synonymous with health. As discussed above, his desire to eliminate all suffering and improve health has led him to bring out this knowledge of perfect health. Maharishi Vedic Medicine extends the range of contemporary medical practice to encompass all aspects of life—consciousness, mind, body, behavior, environment, and collective health for society (Maharishi, 1995a; Nader, 1995). It is based on the complete knowledge and technologies of natural law available in the Veda and Vedic literature and verified by modern scientific research (Nader, 1995). This natural law based system specializes in prevention and provides practical, effective, safe, and time-tested solutions to the crises in health care today.

The knowledge and technologies of Maharishi Vedic Medicine are based on the understanding that the order displayed throughout the

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entire universe, including within the human physiology, is governed by a fundamental underlying intelligence. This underlying intelligence comprises all the laws of nature that structure and govern the universe. It is the inner intelligence of the body that gives rise to all physiological structures and functions.

As Maharishi has discussed, illness arises when there is a lack of coordination between the body’s inner intelligence and its expressions. This lack of coordination leads to violations of natural law which further disrupts the holistic functioning of the physiology and lays the ground for illness or disease. Good health is the natural consequence of a lively connection between the physiology and the inner intelligence which administers it. When the underlying intelligence of nature, the body’s own inner intelligence, is fully lively within the physiology, the individual enjoys perfect health (Maharishi, 1995a).

The evolution of knowledge in the modern scientific age has brought about a health care system based on objective, scientific knowledge of physiology and therapeutics. With few exceptions, this knowledge depends on earlier formulations of classical physics and chemistry. In recent decades, however, modern quantum physics has systematically revealed deeper layers of order in nature, from the atomic, to the subatomic, to the nuclear and subnuclear levels of nature’s functioning. This progressive exploration has culminated in the recent discovery of the unified field of all the laws of nature—the ultimate source of order in the universe (Waldo, Sonnefeld et al., 1989).

This highly unified, integrated, hierarchical structure of natural law has had as yet little impact on physiology, much less its application to medical science. As a result, the knowledge of physiology remains based on the accumulation of many specific, isolated laws of chemistry and biology. It is incomplete, fragmented, and often highly experimental. It is little wonder, therefore, that this incomplete, fragmented, and experimental knowledge of natural law has produced only partially effective health care.

Because modern medical science can grasp only some of the innumerable natural laws governing the human physiology, inadequate treatments and unforeseen, hazardous side effects result. Based, as physiological science is, upon an exclusively objective, relatively outmoded paradigm of knowledge, the possibility of developing fully
effective treatment strategies seems all but precluded. This is evident in conventional treatment of hypertension where blood pressure may be reduced, but when the medications are removed, the underlying disorder of the hypertension is found to remain.

Maharishi Vedic Science and Maharishi Vedic Medicine stand in contrast to this fragmented approach to natural law. For even as modern physics has glimpsed a unified, self-interacting field at the basis of natural law, the ancient Vedic wisdom, understood and reformulated in this scientific age by Maharishi, identifies a single, universal, source of the laws of nature—known as the Self, pure consciousness, or Ātmā. Going beyond modern physics, however, Maharishi Vedic Science is capable, through subjective technologies for research in consciousness, of directly exploring and understanding this unified field that physics has only glimpsed through objective means. More important, Maharishi Vedic Science includes technologies for harnessing the intelligence and organizing power of this source for the benefit of every area of human life. Consequently, Maharishi Vedic Science, complementing and integrating within it the modern sciences of physics, chemistry, and physiology, provides a new basis for holistic, complete, and reliable medical practice.

**Veda, the First Expression of Ātmā.** Maharishi (1995a) describes the unified source of the laws of nature available in transcendental consciousness, Ātmā in this way:

Total knowledge is available in Veda and the Vedic literature—that level of intelligence which is structured in the qualities of consciousness. Consciousness is the abstract level of unbounded intelligence. This quiet intelligence permeates the universe. It is from this level of intelligence that its expressions emerge and constitute all the galaxies, stars, different planets, and different parts of our planet, different countries, different cultures—all that is different emerges from the single Unity, transcendental consciousness, the self-referral state of consciousness. (pp. 308-309)

Thus Vedic Science explains that the first expression of Ātmā, the inner intelligence of nature, is the Veda and Vedic literature. Veda means “knowledge”—pure knowledge—and is embedded in Ātmā, embedded in pure consciousness. Consequently the Veda can be known sim-
ply by opening one’s awareness to the least excited state of one’s own consciousness with the Transcendental Meditation technique; and the detailed exposition of natural law can be found in Veda and the Vedic literature, which is the knowledge of Ātmā expressed in a sequence of sounds and silence. As Maharishi (1995a) has explained:

The structures of consciousness express themselves into the different aspects of creation in a very orderly way. The first structure is the structure of consciousness itself. This structure of consciousness expresses itself in the value of sound. The Veda and Vedic literature are all sound, the frequencies of intelligence, the frequencies of consciousness. (p. 309)

The Veda as the Constitution of the Universe. Maharishi (1995a) goes on to describe how these frequencies of consciousness give rise to matter—that is, consciousness, interacting with itself, gives rise to matter. This description of the material universe arising from a non-material, non-physical underlying field is consistent with modern quantum physics, which has glimpsed the basic field of existence in a single, unified field and which explains that the subatomic particles which structure the matter and energy of the universe are ultimately non-physical frequencies (wave functions), emerging from the self-interacting dynamics of the unified field (Hagelin, 1987; Hagelin, 1989). Based on this understanding, Hagelin (1989) describes the Rk Veda, the primary aspect of the Vedic literature:

According to Maharishi’s Vedic Science, the Rk Veda presents a complete record of the structure and dynamics of the unified field in the form of sound. Indeed, the syllables of the Rk Veda are the actual sounds generated by the self-interacting dynamics of the unified field and the mechanics of symmetry breaking through which the unified field sequentially gives rise to the diversified structure of natural law seen in nature. (p. 309–311)

Furthermore, Maharishi (1997) explains:

The laws governing the self-interacting dynamics of the Unified Field constitute the most fundamental level of Natural Law and the basis of all known Laws of Nature, and therefore can be called the Constitution of the Universe. (p. 221)
The Constitution of the Universe Accessed through the Maharishi Transcendental Meditation program. Pure consciousness or that level of awareness in which the Vedic sounds function as the Constitution of the Universe—the blueprint of creation—is systematically available to personal experience through the practice of the Transcendental Meditation technique (Maharishi, 1994). As Hagelin explains:

The current revival of Vedic knowledge by Maharishi has largely been possible through the rediscovery of the specific subjective technologies, the Transcendental Meditation and TM-Sidhi programs, needed to restore this basic experience. The Transcendental Meditation technique naturally produces this fundamental level of awareness, in which consciousness is identified with the unified field. The TM-Sidhi program then stimulates sequentially all the fundamental modes of the unified field using specific mental formulas or impulses of sound prescribed by Maharishi Patanjali thousands of years ago. The resulting experience of all the fundamental aspects of natural law as modes of one’s own awareness indeed provides the most striking experiential confirmation of the proposed identity between the unified field of pure, self interacting consciousness and the unified field now being glimpsed by modern theoretical physics. (p. 260)

The Constitution of the Universe Expressed in the Human Physiology

The relationship between the unified field of natural law, the intelligence of nature, and the material universe has recently been further clarified. As mentioned above, Professor Tony Nader, M.D., Ph.D., has discovered, with Maharishi’s guidance, that the different aspects of human physiology are an exact expression of the patterns of intelligence expressed in the impulses of sound available in Veda and the Vedic literature. In his landmark book, Human Physiology: Expression of Veda and the Vedic Literature, Professor Nader details one-to-one correspondences between the structure and function of each of the Ṛk Veda and the 40 branches of the Vedic literature and specific structures in human physiology. Professor Nader explains:

The human physiology (including the DNA at its core) has the same structure and function as the holistic, self-sufficient, self-referral reality expressed in Ṛk Veda. The specialized components, organs, and organ
systems of the human physiology, including all the various parts of the nervous system, match the 40 branches of the Vedic literature one to one, both in structure and in function (Nader, 1995).

For example, the 192 Suktas (stanzas) of the first mandala of Rk Veda correspond to specific aspects of the nervous system, particularly the cranial and spinal nerves (Nader, 1995, p. 53). Other precise correlations are drawn between Veda and the DNA, and between the brain stem nuclei and various heavenly bodies, such as the sun, moon, planets, and stars. Thus, human physiology has the same structure and function as the holistic, self-sufficient, self-referral structure found in the microscopic and macroscopic levels of the universe, making clear that the individual is, in a very real sense, cosmic.

The Veda in Human Physiology
as the Basis of Holistic, Effective Health Care

We have discussed above the incomplete knowledge base of modern medicine, leading to ineffective medical practices. Professor Nader’s discovery represents the solution to this problem. The discovery that the deep structure of physiology is the same as the Veda, which is the same as the structure of natural law in the universe, has provided a new, holistic, and effective basis for medical science and medical practice. Maharishi (1996a, p. 58) explains that the “body of everyone is the expression of the Veda and Vedic literature. Sounds of the Vedic literature, which are the impulses of consciousness, are the structuring intelligence of the human physiology.”

This knowledge of the correspondences between ancient Vedic knowledge and modern physiology allows medical science to bridge the gap between mind and body, between consciousness and the physiology, and between the individual and the universe. It provides us with the essential understanding that the laws of nature that structure and govern physiology are the same laws of nature that govern the entire universe, and that these laws of nature are directly accessible to human awareness through the practice of the Transcendental Meditation program, which provides the direct experience of the least excited state of human awareness, Ātmā, the Self.

This discovery that the fundamental laws of nature responsible for the structure and function of the universe, including our physiology,
are available to direct experience provides an essential key to effective health care. Maharishi (1996a) explains:

Maharishi Vedic Approach to Health considers all the elements that constitute health: these are the forty qualities of intelligence—the forty structures of Natural Law, the Veda and Vedic Literature, that are available in the Ātmā, the Self, and are the intelligence at the basis of the structure and function of the individual physiology. (p. 111)

Continuing, he explains why and how medicine derived from the knowledge of these 40 qualities of intelligence expressed in the Veda and Vedic literature, is so effective.

Maharishi’s prevention-oriented Vedic Approach to Health is holistic and most basic. That is why it is free from harmful side effects. It maintains balance between the body and its own inner intelligence and between the inner intelligence of the individual, the collective intelligence of society, and the Cosmic Intelligence of the universe. (p. 111)

**Practical Application of the Discovery of Veda and Vedic Literature in Human Physiology**

The discovery by Professor Nader that human physiology is the expression of the inner intelligence of nature led to the use of Vedic technologies, for example, the Transcendental Meditation technique, as a means to enliven the total intelligence of natural law in the physiology. Maharishi (1997) explains how this occurs:

As the conscious mind identifies more and more fully with the Unified Field of Natural Law—the constitution of the Universe—through Maharishi’s Transcendental Meditation and TM-Sidhi program, the beautiful, evolutionary qualities of the Constitution of the Universe are enlivened in all aspects of life—physiological, psychological, and sociological. (p. 211)

When the total intelligence of nature is awake within the physiology, individual behavior becomes life-supporting and health-supporting.

When the total intelligence of Natural Law—Veda—is lively in the individual physiology, there is perfect synchrony between the functioning of the body as a whole, and between individual intelligence and Cosmic Intelligence. With this complete integration, all thought and
action are spontaneously in harmony with Natural Law and the individual enjoys perfect health. (Maharishi, 1995a, p. 111)

This enlivening of the total potential of natural law in the physiology is the theoretical and practical basis of Maharishi Vedic Medicine. Specifically, numerous preventive and therapeutic modalities from each aspect of the Veda and Vedic literature act on the basis of the inner intelligence of the body to enhance self-repair mechanisms and promote health. Imbalances in the physiology at the basis of disease are addressed by treating their cause—disruptions in the inner intelligence of the body. Maharishi Vedic Medicine provides a sophisticated and comprehensive approach to the health of the individual and society, based on the complete knowledge of natural law contained in the Veda and Vedic literature.

Over 600 scientific research studies conducted in the past 30 years at more than 200 universities and research institutions in 30 countries, verify that the 40 qualities of intelligence displayed in the 40 areas of Veda and Vedic literature and their physical counterparts in the physiology are enlivened in all domains of human life to produce preventive and health promoting effects in the areas of physiology, psychology, and sociology through the technologies of the Maharishi Vedic Approach to Health program (Orme-Johnson and Farrow, 1977; Chalmers, Clements et al., 1990; Sharma, 1993; Alexander, Robinson et al., 1994).

For example, Orme-Johnson found a 50% reduction in health care utilization for those who practice the Transcendental Meditation and TM Sidhi programs (Orme-Johnson, 1987). Herron and Orme-Johnson found an even larger decrease with the application of additional Maharishi Vedic Approach to Health technologies (Orme-Johnson & Herron, 1997).

The remarkable symmetry between the age-old descriptions of nature’s intelligence found in Veda and the Vedic literature and the understanding of the human body, built up over hundreds of years of biomedical research, provides the basis for a more advanced and authentic approach to medical education and health care than that currently taught in modern medical schools (International Association of Physicians for Maharishi Medical Colleges, 1995). Conventional medical education does not include the understanding of the inner intelligence that structures the body and administers its various activities.
As Maharishi (1995a, p. 31–34) has pointed out, until intelligence or consciousness as the fundamental aspect of physiology is taken into account by medicine, health care will never be completely effective. In the following sections, we highlight a number of key elements missing in modern medicine that are provided by Maharishi Vedic Medicine.

**Key Elements of the Maharishi Vedic Approach to Health**

Maharishi Vedic Medicine includes 40 therapeutic modalities grounded in the 40 fundamental impulses of natural law fully explained in the Veda and Vedic literature. Following is a discussion of several of these 40 approaches.

**Consciousness**

As has been discussed, the Maharishi Vedic Approach to Health recognizes that the most basic level of health is the field of consciousness or intelligence. This value of consciousness has not been previously addressed by modern health care. Maharishi Vedic Medicine includes the Maharishi Transcendental Meditation and TM-Sidhi programs, technologies of consciousness for development of ideal health. These technologies handle health from its most basic level—the field of consciousness—and have been documented to eliminate stress, promote mental and physiological balance, and unfold the individual’s full potential for health (Orme-Johnson, Farrow, 1977; Wallace, Dillbeck et al., 1982; Alexander, Langer et al., 1989; Chalmers, Clements et al., 1990; Alexander, Swanson et al., 1993; Sharma, 1993; Schneider, Staggers et al., 1995; Zamarra, Schneider et al., 1996). The overall effect of balance and integration created by the Transcendental Meditation program is most graphically demonstrated by studies showing reduced health care utilization due to prevention of disease risk factors, and physiological and psychological effects opposite to the physical deterioration common with aging.

Orme-Johnson (1987) investigated the health insurance records of more than 2,000 people practicing the Transcendental Meditation program over five years. The results showed significantly less health care utilization by the Transcendental Meditation practitioners for all major disease categories when compared to other groups of similar age, gender, profession, and insurance terms. This included 87% less hospital-
ization for heart disease, 55% less for cancer, and 87% less for nervous system disorders. When these data were analyzed by age group, it was found that older Transcendental Meditation program subjects (defined as over 40 years old) showed the greatest reductions in inpatient hospital services (68% less) and outpatient medical services (74% less) in comparison to controls.

These findings indicate a highly significant decrease in the incidence of cardiovascular disease, cancer, and other chronic diseases and physiological and psychological changes that are associated with advancing age. They provide evidence for the holistic enlivenment of the body’s inner intelligence with Transcendental Meditation practice. Studies of aging also show that slowing or even reversal of biological aging occurs (Wallace, 1982 #347; Alexander, 1989 #1155; Wallace, Dillbeck et al., 1982; Alexander, Langer et al., 1989; Schneider, Alexander et al., in press).

Recent research by Orme-Johnson and Herron (1997) of insurance company records, documents the health care usage of other aspects of the Maharishi Vedic Approach to Health (MVAH) in addition to the approach of consciousness. The four year total medical expenditures per person in the Maharishi Vedic Approach to Health group of 700 participants were 59% and 57% lower than the norms for 600,000 subjects and demographically matched control groups (n = 4,148), respectively. The 11-year mean expenditures for the MVAH group was 63% less than the norm. Again, the greatest saving were seen among MVAH patients age 45 years and older who had 88% fewer patient days compared to controls (an improvement of 20% over the 68% decrease in inpatient services in the older group in the 1997 study).

As in the previous studies, lower medical utilization and expenditures were found for all ages and all disease categories. For example, hospital admissions were 11.4 times higher for the controls than the MVAH group for cardiovascular disease, 3.3 times higher for cancer, and 6.7 times higher for mental health and substance abuse. This additional decrease in the need for medical care validates the effectiveness of the other MVAH technologies for restoring and maintaining balance and health.
Pulse Diagnosis, Diet, Herbal Food Supplements, and Physiological Purification Techniques

Maharishi Vedic Medicine utilizes a unique system of pulse reading among its diagnostic approaches (Maharishi, 1995a, pp. 51, 62). A doctor placing his or her fingers on the patient’s pulse assesses the degree of balanced functioning of the system and identifies fundamental physiological imbalances at the basis of disease processes. Pulse diagnosis is important in prevention, as it can allow the practitioner to identify preclinical imbalances and prescribe measures to ameliorate these imbalances before they manifest as symptoms or clinical diseases. As Maharishi has pointed out about pulse diagnosis, “It is also in itself a balancing process on the very fine level of relationship between the whole and the parts of the body” (Maharishi, 1995a, p. 57).

Based on assessment of the pulse, a range of preventive and therapeutic modalities can be recommended to restore physiological balance. These include diet according to pulse, daily and seasonal routines, herbal preparations, Vedic exercise, Maharishi Rejuvenation therapies (physiological purification techniques), and the Transcendental Meditation program (Maharishi, 1995a; Nader, 1995; Sharma & Clark, 1998). In addition, and most importantly, anyone can be trained in a technique of self-pulse reading, which allows one to assess one’s own pulse and take timely preventive measures to restore physiological balance.

Environmental Health

Maharishi Vedic Medicine also incorporates the knowledge of Maharishi Sthāpatya-Veda design, the ancient science of Vedic architecture revived by Maharishi to support health from the standpoint of the near environment (Maharishi, 1995a, p. 428). This body of knowledge goes far beyond correcting currently recognized difficulties such as the “sick building syndrome” associated with building-related illnesses as reviewed by Menzies, and colleagues (Menzies & Bourbeau, 1997). Maharishi Sthāpatya Veda design is an architectural approach that offers precise knowledge to ensure that buildings and cities contribute only health-promoting influences.

According to this ancient science, health is profoundly influenced by the Vastu, which includes the orientation and shape of the building, the slope of the land, the direction of entrances, and the orientation
of the approaching and surrounding roads. Building homes and office buildings in accord with natural law, and using the principles of Vedic architecture, promote health by allowing the environment to support physiological balance and integration. A south entrance to any building is considered to be especially unfavorable. Thus individuals report experiencing new freshness in body and mind, more rewarding behavior, and greater success in daily life simply by changing the entrance of their house to the proper orientation. While ideal architecture may appear to be an abstract approach in health care, the principles have been found to be scientific and practical.

Effects of the Extended Environment—
the Cosmic Counterparts of Human Physiology

The human body is known to respond to global and cosmic influences as evidenced in biological rhythms (following the cycles of day and night, the moon, the seasons, etc.) that affect hormone production, other chemicals produced by the nervous system, and the function of various organs. According to Professor Nader’s discovery, made under Maharishi’s guidance, the internal structures of the body, including the DNA, reflect the structure of the universe, each having their counterparts in the stars, sun, moon, and planets (Nader, 1995). These cosmic counterparts of human physiology have precise correlates in anatomical structures, physiological functions, mind, and behavior. These structures and functions, in turn, are related to every aspect of health all the time, day after day, season after season.

To address the influences of these cosmic counterparts, Maharishi Vedic Medicine (Maharishi, 1995a, pp. 51–52, 203–213) includes the science of Maharishi Jyotish, which uses the correlations between physiology and its counterparts in the environment as the basis of a technology for prediction and diagnosis of adverse health events. The Maharishi Jyotish program is able to mathematically calculate and then predict the nature and timing of the influences of the “cosmic counterparts” and their cycles on the individual. With this knowledge of the intimate connection between the individual and his larger environment, it becomes clear that no one can be completely healthy unless the cycles and rhythms of nature are considered. This knowledge of the cosmic counterparts includes both the knowledge to detect and predict nega-
tive trends, and the traditional Vedic technologies, known as Maharishi Yagya performances which restore balance between an individual physiology and his or her “cosmic counterparts”—sun, moon, planets, stars.

**Collective Health**

The collective health of the whole society has been found to have a direct influence on the health of the individual. Maharishi Vedic Medicine maintains the good health of the community and the nation by removing stress and creating balance in collective consciousness through the group practice of the Transcendental Meditation and TM-Sidhi programs, especially that element known as *Yogic Flying* (Maharishi, 1995a, pp. 52, 6365). This technology of collective consciousness has been demonstrated in over 40 research studies to generate the Maharishi Effect, a powerful environmental influence of coherence, positivity, and harmony that results in reduction of negative social trends such as crime rate, accidents, and illness (Orme-Johnson, 1991). The reduction of war, crime, and accidents has a powerful positive influence on collective health since these negative events pose serious direct and indirect hazards to health and well-being.

The Maharishi Effect has also been shown to directly reduce illness in the general population within range of its effect. For example, Orme-Johnson and Gelderloos (Orme-Johnson, 1991) found decreases in infectious diseases, infant mortality, and hospital admissions correlated with the Maharishi Effect. Some mediating factors which researchers have found to change with the Maharishi Effect and which may account for these decreases in illness include 1) the reduction of stressful negative events, since the stress of negative events is a causal factor for disease; 2) improved ability to handle stress as indicated by changes in cortisol and serotonin metabolites, which have been documented in the general population within the range of the Maharishi Effect, as well as in the group members practicing the Transcendental Meditation and TM-Sidhi programs (Pugh, Walton et al., 1988); and 3) decreases in both the general population and the group practitioners in behavioral risk factors for disease such as cigarette and alcohol consumption (Orme-Johnson, Alexander et al., 1988; Assimakis & Dillbeck, 1995).
Totality of Natural Law

These key elements missing from modern medicine provide a few examples of the essential Vedic approaches to health based on the 40 aspects of natural law that structure the physiology. In reality, however, what is missing is the knowledge of the total field of natural law expressed in all 40 aspects of the Veda and Vedic literature. As Maharishi (1995a) has explained:

The territory of Natural Law ranges from the infinite field of the unmanifest to the infinite field of the manifest; from the holistic value of infinity to the holistic value of infinity and is the total value of Natural Law, which includes all the diversified values of different Laws of Nature within its holistic value.

That is why health, which is defined as WHOLENESS, is structured in both HOLISTIC and SPECIFIC values of Natural Law in a fully integrated and balanced state. Unless the knowledge of this total field of Natural Law is considered, holistic health will not be available, and total health—total balance—will always be lacking. (pp. 34–35)

Founding of Colleges of Maharishi Vedic Medicine

Subsequent to the initial international teleconference, physicians from the United States organized to found Maharishi University of Management College of Vedic Medicine in Fairfield, Iowa. Doctors elsewhere in the world are also founding Maharishi Medical Colleges in their countries. These colleges institutionalize the beginning of a transformation in medical education and health care for the United States and for the whole world. These new centers of medical education will offer the values previously missing in the training of physicians and health professionals. The incomplete education that has prevailed in modern medical schools will now be made obsolete.

The colleges of Maharishi Vedic Medicine will provide the essential knowledge that has been missing in modern medicine, knowledge of the body’s inner intelligence, which is the knowledge and practical application of the discovery of Veda and Vedic literature in human physiology. To maintain the highest standard of Vedic knowledge in the Maharishi Vedic Approach to Health program, Colleges of Vedic
Medicine are affiliated with Maharishi Mahesh Yogi Vedic Vishwa Vidyala (Maharishi Vedic University), Madhya Pradesh, India.

The goal of the colleges of Maharishi Vedic Medicine is to train health consultants and health educators to provide prevention-oriented, natural health care that is free of hazardous side effects and effective in creating perfect health and a disease-free society. Vedic Anatomy and Vedic Physiology and the study of Professor Nader’s discovery documented in *Human Physiology: Expression of Veda and Vedic Literature*—with its key themes of the fundamental structures of natural law expressed in Veda and the Vedic literature and manifested in human physiology, applied to the nervous system and all major systems of the body down to the detailed structure of the cell and molecular biology of the DNA—form the foundation of the curriculum.

Students of the new medical colleges study in an environment, and with a daily schedule, conducive both to learning and to the development of higher states of consciousness. Students practice the technologies of consciousness, the Maharishi Transcendental Meditation and TM-Sidhi programs twice daily to enhance learning, reduce stress, and promote health in themselves and in society at large. The colleges of Maharishi Vedic Medicine also employ the teaching approaches of Consciousness-Based education used by Maharishi University of Management for many years with great success. These approaches have been shown to facilitate learning and enhance development without creating stress for the students (Jones, 1989).

By employing these innovative and effective teaching approaches, students rapidly and easily assimilate all the knowledge required to be capable health consultants. Graduates of the colleges of Maharishi Vedic Medicine are prepared to offer completeness to medical practice with the ability to prevent imbalances at the basis of disease through the total range of approaches of Maharishi Vedic Medicine. On the basis of this training, graduates of the colleges of Maharishi Vedic Medicine will be capable of solving the health care crises in their nations by providing complete knowledge to enliven the inner intelligence of every physiology through natural law-based medicine. In this way, the knowledge and technologies that Maharishi has brought out over the last four decades will be made a permanent part of medical education and health care in the United States and around the world. As a result
of Maharishi’s contributions to health care, humankind’s age-old quest for a disease-free society will finally be realized. 

*Note from the authors: At the time this paper went to press, further advances in Maharishi Vedic Medicine were in progress which could not be systematically treated in this paper. Several centers throughout the United States have been established to provide treatment of chronic health disorders. In addition, a program brought out by Maharishi using Vedic sounds has been shown to bring instantaneous relief to patients suffering from a wide variety of chronic ailments, especially those associated with pain. Through a tender impulse of sound, abnormality can be transformed into normal physiological functioning through this new treatment modality. This new modality is now a part of the Maharishi Vedic Approach to Health program and is currently the focus of clinical research.*

**References**


SIGNIFICANCE OF THE MAHARISHI VEDIC APPROACH TO HEALTH


Charles, B. (1995). *Hazards of modern medicine: An overview based on a selection of findings from the more than 7000 articles, reports, and scientific research studies in the medical literature*. Vlodrop, Netherlands, Maharishi Vedic University Press.


SIGNIFICANCE OF THE MAHARISHI VEDIC APPROACH TO HEALTH


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Awakening the Body’s Inner Intelligence

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Robert H. Schneider, M.D., F.A.C.C., F.A.B.M.R., is a physician, scientist, educator, and one of the nation’s leading authorities on natural medicine and the prevention and treatment of heart disease. He has directed $25 million in research grants from the National Institutes of Health and private foundations for his pioneering research on natural approaches to heart disease. The results of this groundbreaking research have been published in top medical journals and featured in more than 1,000 television, radio, magazine, and newspaper reports, including CNN Headline News, ABC’s 20/20, New York Times, Washington Post, Newsweek, Wall Street Journal, and Time Magazine. He is the principal author of Total Heart Health: How to Prevent and Reverse Heart Disease with the Maharishi Vedic Approach to Health.

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ABSTRACT

Today 150 million Americans suffer from heart disease or one of its risk factors. This heart disease epidemic is the leading cause of death not only in America but in most other countries. Conventional medicine has not prevented the epidemic. Furthermore, the hazardous side effects of modern conventional medicine now rank as the third leading cause of death in this country. This abject failure of modern medicine in preventing heart disease is due mainly to its failure to locate the ultimate cause of the disease—the inability of the body/mind of the patient to fully draw on its “inner intelligence.” In the ancient Vedic civilization of India, this subllest field of life was viewed as the source of every action and every material expression of life. Today, the closest semblance of this ancient view is the unified field of natural law identified by modern physics. The principles and practices of the Maharishi Vedic Approach to Health allow one to access the full potential of this inner intelligence to heal the imbalances that lead to disease and thus to prevent heart disease and other chronic diseases plaguing societies today. Accordingly, the field of physiology and health directly incorporates one of the main components of Consciousness-Based education, namely, a practical technology for directly developing a person’s full potential—both mental and physical—from within.

Introduction

If you are one of the 150 million Americans who suffer from heart disease or one of its major risk factors, such as high blood pressure, high cholesterol, obesity, stress, or diabetes, this information is for you. If you are concerned about developing heart disease because a close member of your family had a heart attack or stroke (as nearly one in every two Americans will), this information is also for you. Whether you want to prevent this debilitating and possibly deadly condition or reverse it in yourself or in a family member or loved one, this information will offer you a completely new understanding and practical approach that will create a major transformation in your health and total well-being.

Heart Disease: An Unchecked Epidemic

Today, heart disease has reached epidemic proportions. It is now the leading cause of death in the United States and throughout the world. It is estimated that nearly half the people in this country will die pre-
maturely because of this disease. Already, 65 million Americans suffer from high blood pressure, a common precursor to heart disease. Unfortunately, conventional medicine has been largely unable to prevent this epidemic despite the tens of billions of dollars spent over the last fifty years on research to develop better diagnostic tests and treatments. Moreover, the hazardous side effects of modern drugs and surgical procedures used to treat heart disease and other diseases now rank as the third-leading cause of death in America. Clearly, modern medicine has not lived up to its promise to eliminate heart disease and, in the eyes of many, is failing.

But why? Because modern medicine has failed to locate the ultimate cause of heart disease and does not operate at this most fundamental level of human health. Because modern heart medicine works on relatively superficial levels. Because modern cardiology focuses on fixing or replacing the parts of a person, such as diseased arteries, instead of on reversing the imbalances at the root of the disease, imbalances that affect all the arteries in the body. The conventional approach to heart disease treats a person as a collection of tubes and valves—albeit a highly sophisticated collection with switches and feedback mechanisms—but ignores the whole person. It also ignores the individual mind-body type.

With a limited approach, one gets limited results. That is, it may be possible to suppress your symptoms of chest pain or to lower high blood pressure or high cholesterol levels with drugs, but if one stops taking the drugs, the symptoms of high blood pressure or high cholesterol or heart disease come right back. Furthermore, a person may have endured many unpleasant and often harmful side effects of these drugs or surgery unnecessarily, instead of reversing—or better yet preventing—the disease at its source, and doing so naturally.

Based on twenty-five years of clinical research into the basic causes of cardiovascular diseases and the most effective means to prevent and treat them (Robert Schneider, M.D., F.A.C.C.) and more than thirty years of research in neuroscience and human physiology (Jeremy Fields, Ph.D.), the authors can safely say that, if one is interested in achieving total heart health, the conventional medical approach to prevention and treatment of heart disease will not adequately work.
A Way out of the Dilemma

As someone who is seeking ways to combat or prevent heart disease effectively and without harmful side effects, one should not give up hope in the face of these staggering statistics and clinical facts about heart disease because a powerful source of intelligence and healing is available. Indeed, this level is deep within a person, underlying both mind and body. And it is easy to gain access to it and benefit from it.

This source is the body’s own inner intelligence. The principles and practices of the Maharishi Vedic Approach to Health allow one to gain access to this source of intelligence and reestablish the flow of biological intelligence within the body. As balance is increasingly reestablished in the physiology with these approaches, the results will be both healing and preventive.

The ancient Vedic scientists, also called rishis or seers, viewed this inner intelligence as a field of unbounded energy and intelligence, a unified field of natural law that gives rise to everything else in the universe. This concept, which was cognized ages ago in the Vedic civilization of ancient India, has been lively in modern science, especially modern physics, for many decades. It may be surprising to learn that modern physics, has, over the last 100 years or so, developed a view of the unified field that completely corroborates the ancient Vedic view. Modern science has come to understand that the unified field is the source of all of the particles and forces of nature and therefore is literally at the basis of everything in the universe.

Discovery of the Unified Field by Modern Science

Over the past 300 years, modern science has progressively uncovered deeper layers of order in nature. Quantum physicists, scientists involved in the branch of physics that studies and predicts the properties of physical systems at subatomic levels and even smaller, have determined that all the known forces in nature can be described in terms of just four main forces called quantum fields. These four fundamental forces are the electromagnetic field, the weak field, the strong field, and the gravitational field.

The electromagnetic field generates heat, light, radio waves, and many other frequencies of electromagnetic radiation. The weak and
strong forces hold atoms together, and the gravitational field is gravity, which anchors objects to the ground. These four forces combine and interact with one another to form a cohesive structure for all the forces and elementary particles that make up physical systems, including our bodies, plants, rocks, planets, solar systems, galaxies, and the whole universe. Gradually, quantum physicists have come to understand that these fundamental fields are simply different aspects, or vibrational modes, of a single unified field of natural law. (See Figure 1.)

Since the unified field is at the basis of all the fundamental forces and particles of the natural world, it is also at the basis of the laws of physics, chemistry, biology, and human physiology. This is why the ancients called this level the inner intelligence of the body. This brings up the main point of the Maharishi Vedic Approach to Health: its diagnostic and therapeutic approaches function on the level of the unified field, which is the deepest level of one’s own physiology. Thus, while this article is not primarily about physics, it is about total heart health, yet the two are intimately related. In order to understand the basis of both heart disease and heart health, one needs to understand the basis of human physiology. Another article describes how the Maharishi Vedic Approach to Health is unified field-based health care and how this knowledge can be used to prevent heart disease and restore complete health in ways that conventional medicine cannot.

Figure 1. The relationship of the four fundamental forces of nature to the unified field of all the laws of nature
The Origins of the Maharishi Vedic Approach to Health

Vedic science is an age-old tradition of knowledge that has its origins in the ancient Vedic civilization of India. Many thousands of years ago, the scientists of the Vedic tradition discovered, through explorations of their own highly developed inner awareness, a unified field from which all the laws of nature emerge. They discovered that this field is at the basis of human consciousness, mind, and body. In the Vedic language of Sanskrit, the unified field is called *Atma*, which means the “the innermost self of everyone.”

This knowledge and the practical applications or technologies of the unified field have been passed down from teacher to student for as long as records of human knowledge exist, and are now considered to be the oldest continuous tradition of knowledge in the world. Although it is primarily an oral tradition, this knowledge was written down in a large collection of verses and books known as the Veda. In Sanskrit, *Veda* means “knowledge.” The Veda is divided into forty disciplines or branches, collectively referred to as the Vedic literature. Each branch specializes in a particular aspect of the traditional knowledge of the unified field of natural law and its practical applications.

While being passed down from generation to generation over the centuries, this original knowledge eventually became fragmented and many of its key elements became lost. The traditional Vedic approach to health came to be practiced without knowledge of its source—the unified field of natural law and the inner intelligence inherent in the person. Fortunately, over the last fifty years, working together with the foremost Vedic physicians and experts of India, Maharishi Mahesh Yogi—who is considered the leading Vedic scholar and teacher in the world today and is the founder of the Transcendental Meditation program—restored the missing knowledge. He revived and systematized this knowledge in a scientific, practical, and easy-to-use framework. He formulated a science and technology of the unified field that restores the ancient unified field-based approach to total health.
Using the Maharishi Vedic Approach to Health to Prevent and Reverse Heart Disease

The Maharishi Vedic Approach to Health is a sophisticated system of prevention-oriented natural health care derived from the ancient and authentic texts of the Veda. The contemporary application of this knowledge to prevent and reverse heart disease and restore complete heart health is the Total Heart Health program. Our fifty years of combined professional experience involving scientific research, clinical practice, and teaching the Maharishi Vedic Approach to Health, as well as the experiences of millions of people worldwide who have used these modalities, form the basis of this program. Each of the forty approaches of the Maharishi Vedic Approach to Health is based on one of the forty major divisions of the Vedic literature. Each of these approaches includes practical techniques to restore the connection of one’s mind and body to inner intelligence, the unified field of all the laws of nature within.

For simplicity, the forty branches of the ancient Vedic approach to health are integrated and divided into the three major domains of influence on health: mind, body, and environment. Balance in all of these areas is required for total heart health. The methods of the Maharishi Vedic Approach to Health restore balance through diagnostic and therapeutic approaches that work through these three spheres of influences. Despite the differences among the approaches within these three major domains, they have in common the ability to enliven the connection of an individual to his or her inner intelligence. Total heart health is possible only when the influences that affect mind, body, and environment are considered together, and all in terms of connecting back to the body’s inner healer.

The practical benefits of this new approach to heart disease have been verified by more than 600 published scientific studies conducted at 200 independent universities and research institutes in thirty countries around the world. In particular, research studies performed at our research institute, the Institute for Natural Medicine and Prevention at Maharishi University of Management in collaboration with several major academic medical centers, have shown that the Total Heart Health program results in significant health benefits. These include substantial and long-lasting reductions in high blood pressure, reduced need for
blood pressure medications, and reductions in high cholesterol, smoking, psychological stress, and drug abuse. Further, studies published in major medical journals indicate slowing or reversal of hardening of the arteries, and an increase in life span in long-term participants in the Total Heart Health program. The results of this scientific research on the Total Heart Health program have been reported widely in the popular media in several thousand television, radio, magazine, and newspaper stories that have made their way around the world. Now for the first time, this program is available to the general public in this book, Total Heart Health.

References

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A New Strategy for Total Heart Health:

*The Maharishi Vedic Approach to Health*

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A NEW STRATEGY FOR TOTAL HEART HEALTH

ABSTRACT
The Maharishi Vedic Approach To Health is the restoration of the world’s most ancient system of natural health care. It is a unique, sophisticated, comprehensive system of scientific knowledge and self-care technologies that considers factors that influence health at all levels—from the innermost mind, to the physical body, to the immediate surroundings of home and community, to the outermost reaches of the cosmos. It connects all these levels to the intelligence that lies deep within us, at the basis of our mind and body.

Because of this connectivity that promotes heart health at its most basic and holistic level, the Total Heart Health program is uniquely effective and free of harmful side effects. In contrast, modern medicine does not provide this depth and range of benefits, addressing for the most part only the symptoms of chronic diseases using diagnostic and therapeutic modalities that are typically associated with harmful or even lethal side effects.

Introduction
The ability of modern medicine to treat or prevent heart disease and its risk factors is limited and inadequate. Conventional treatments address symptoms and, on occasion, the biochemistry or anatomy underlying the symptoms, but they do not address the ultimate causes of heart disease and clearly don’t eliminate them.

In contrast, the Maharishi Vedic Approach to Health addresses the quantum mechanical imbalances that precede and cause disease and suffering. In the case of heart disease (or any disease for that matter), the development of imbalances and, subsequently, of clinical disorders is due to the body’s inability to access its own inner intelligence. Providing this missing link makes the Vedic approach distinctively effective and free from harmful side effects.

In Vedic literature this inner intelligence of the body or inner self is a unified field, called Atma. Through its own self-interacting dynamics, this deepest level of nature’s functioning gives rise to all the diverse laws of physics, chemistry, biology, astronomy, and so on that create and maintain order in the entire universe. All these laws of nature are contained in the verses of the Veda, a term that means, in the ancient language of Sanskrit, “complete knowledge.” Because all the laws of nature emerge from within the unified field through its own self-interacting dynamics, these laws that govern the entire universe are all uni-
fied at their source. Therefore, this unified field of natural law is the intelligence of nature within everyone and everything in the universe, including our bodies.

**Modern Science Corroborates Ancient Vedic Science**

Quantum physics, considered the most advanced level of modern science, is now confirming the view cognized by the ancient Vedic scientists of the fundamental structure of the universe and its emergence from a unified field. Like early Vedic scientists, modern physicists define the unified field as a single, universal source of orderliness in nature.

It is only within the past several decades that quantum physicists have discovered that the structure of the universe and how it operates are fundamentally different from what we previously thought. Today, quantum physicists think that all matter and energy in the universe when reduced to its finest level—the quantum level—is composed of forces and/or energies interconnected by a single unified field of natural law. According to leading quantum physicist Dr. John Hagelin, “It was [originally] Einstein’s deep conviction that the laws of nature had a simple, geometric, unified foundation, and that this unification could be understood by the human intellect. Within the past [four] decades, a number of important breakthroughs in this area have led to a progressively more unified understanding of the laws of nature, culminating in the recent discovery of completely unified field theories.”

The unified field is an unmanifest, invisible field of energy and intelligence that, through interaction with itself, gives rise to all the laws of nature responsible for the manifestation and administration of the entire universe. It is the nonmaterial basis of all material things. It includes all physical phenomenon from the subatomic level of protons, neutrons, and electrons, which make up atoms and molecules, to the body’s cells, tissues and organs, to the cosmic level containing the sun, moon, stars, planets, and galaxies.

The following Figure 4.1 illustrates the unmanifest unified field of all the laws of nature from which the fundamental force and matter fields emerge to provide the basis for the physical world, including our own physiology. All forms and phenomena in the universe, all the laws of the various sciences, sequentially emerge from this field. It is a level where, as the name implies, these laws of science are unified at their source.
Uniqueness of the Maharishi Vedic Approach to Health
The fundamental principle of the Maharishi Vedic Approach to Health is that the body naturally heals itself once it is reconnected to its own inner intelligence. How does this happen? From this viewpoint, heart disease—or any type of disorder for that matter—may be considered the end result of a loss of functioning in accordance with the basic blueprint of one’s physiology, which is found in each person’s DNA and ultimately in the unified field at the basis of our physiologies. Heart disease insidiously develops because the body gradually forgets how to keep the structures of the arteries wide open, how to keep blood flowing with just the right pressure, and how to keep the heart beating in a way that maintains a rhythm and pumping ability that satisfies and is coordinated with the needs of the rest of the body. In the language of Vedic science, this is due to the loss of memory of one’s own inner intelligence or Atma.

A healthy heart is an indicator that an individual has a strong and lively connection to his or her body’s inner intelligence. If you already suffer from heart disease or one or more of its risk factors, it indicates some loss of connection to your natural healing mechanisms. To prevent heart disease from occurring in the first place, the Maharishi Vedic Approach to Health recognizes physiological imbalances before the clinical symptoms of disease arise, before the onset of chest pain or shortness of breath, and long before the onset of a sudden heart attack or stroke. This system of health care can identify physiological imbalances even before the diagnosis of high blood pressure or high cholesterol shows up in an exam or lab test in your doctor’s office. Exactly the same model is used to reverse heart disease. In both scenarios, prevention and reversal, the strategy is to restore and strengthen the body’s own innate healing abilities. Indeed, the same principles are used by the Maharishi Vedic Approach to Health to address any disease or disorder.

Advantages of a Unified Field-Based Approach to Heart Health
Introducing therapeutic and preventive measures that act at this subtle level of life produces the most powerful and beneficial results: a balanced physiology, elimination of the causes of disease, and good health.
This is quite different from conventional medicine, which uses drugs and surgical procedures to intervene at gross and more material levels of physiology and health, and which is considerably less powerful. At best, drugs and surgical procedures only reduce or cover up disease symptoms; at worst, they can cause new disease or even death.

While conventional medical approaches may be helpful for alleviating symptoms under certain conditions, they do not work at the foundation of disease. It should not be surprising, then, to find that the Maharishi Vedic Approach to Health can treat and even reverse heart disease more effectively than can modern medicine alone. As noted throughout this book, this finding is backed up by hundreds of scientific studies and the clinical experience of several million people around the world.

Nor is it surprising that conventional medicine’s view of disease does not consider the body’s own inner intelligence, which operates and coordinates the myriad molecules, cells, tissues, organs, and systems in the body. After all, the unified field is the subtlest level of nature. Just as the vastness of the ocean is hidden under the waves at the surface—and one has to dive into it to appreciate its depths—so the silent field of the body’s inner intelligence is hidden beneath the endless activity of the human physiology.

Approaching human health without knowledge of this underlying intelligence is like building or repairing a house without referring to the blueprints. The wiring and plumbing could be installed or redone incorrectly. All sorts of errors in the house’s structure and function might occur. So it is with your heart’s health. When the knowledge of the unified field is missing as a consequence of incomplete knowledge, errors in structure and function in the cardiovascular system and whole body occur, and the result is the onset of disease and suffering. As the errors accumulate, the potential for harm increases.

Focusing on the fundamental basis of heart disease gives the Maharishi Vedic Approach to Health another advantage. It recognizes imbalances that lead to disease at their earliest stages and is therefore able to more effectively reverse those imbalances. Modern medicine, in contrast, usually recognizes diseases only at later stages, after they have become symptomatic, such as when one goes to the doctor with a complaint. Even screening for high blood pressure or high cholesterol turns
up disorders only after they have already exceeded a threshold level. These disorders are but the tip of the iceberg; the entire iceberg—the disease or disorder—has, by the time it has been discovered by modern medicine, been there a long time, lurking beneath the surface.

Attempts to understand the origin of disease is occurring in some venues of modern medical research. For instance, present-day scientists are attempting to decode the human genome. This is a national effort consuming a great many resources. This search means looking in the DNA molecule for the code behind all physiological processes, and hoping to determine why health is lost and diseases like heart disease occur. While this approach is going in the right direction, that is, searching for ways to prevent and treat heart disease at more subtle and profound levels, it does not go nearly deep enough. Because the traditional Vedic perspective describes the patterns of intelligence at the basis of the human body, patterns that give rise to all specific physiological expressions of the body, it can be said to have already decoded the human genome. In this light, the Maharishi Vedic Approach to Health is the fulfillment of modern molecular medicine. Indeed, the Vedic system may be considered an *ultra modern* system of medicine because it works at the most fundamental level of the physiology—quantum physics—which is also the most advanced level of modern science. It is knowledge of this level that forms the basis of principles and practices that comprise the Total Heart Health program.
### Table 4.1. Forty Aspects of Veda and Vedic Literature in Human Physiology

<p>| Branch Expression in the Human Physiology |<br />
|---|---|
| 1 | Rik Veda | Whole Physiology |
| 2 | Sama Veda | Sensory Systems |
| 3 | Yajur Veda | Processing Systems |
| 4 | Atharva Veda | Motor Systems |
| 5 | Shiksha | Autonomic Ganglia |
| 6 | Kalpa | Limbic System |
| 7 | Vyakarana | Hypothalamus |
| 8 | Nirukta | Autonomic Nervous System and Pituitary Gland |
| 9 | Chhandha | Neurohormones, Neurotransmitters |
| 10 | Jyotish | Basal Ganglia, Deep-seated Nuclei |
| 11 | Nyaya | Thalamus |
| 12 | Vaisheshika | Cerebellum |
| 13 | Samkhya | Cells, Tissues, Organs |
| 14 | Yoga | Cerebral Cortex |
| 15 | Karma Mimansa | Central Nervous System |
| 16 | Vedanta | Integrated Functioning of the Nervous System |
| 17 | Gandharva Veda | Cycles and Rhythms |
| 18 | Dhanur Veda | Biochemistry, Enzymes, Immune System, Vertebral Column |
| 19 | Sthapatya Veda | Anatomy |
| 20 | Harita Samhita | Venous and Biliary Systems |
| 21 | Bhela Samhita | Lymphatic System, Glial Cells |
| 22 | Kashyapa Samhita | Arterial System |</p>
<table>
<thead>
<tr>
<th></th>
<th>Author</th>
<th>Reference Information</th>
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</thead>
<tbody>
<tr>
<td>23</td>
<td>Charaka Samhita</td>
<td>Cell Nucleus</td>
</tr>
<tr>
<td>24</td>
<td>Sushruta Samhita</td>
<td>Cytoplasm, Cell Organelles</td>
</tr>
<tr>
<td>25</td>
<td>Vagbhata Samhita</td>
<td>Cytoskeleton, Cell Membrane</td>
</tr>
<tr>
<td>26</td>
<td>Madhava Nidan Samhita</td>
<td>Mesodermal Tissues</td>
</tr>
<tr>
<td>27</td>
<td>Shamgadhara Samhita</td>
<td>Endodermal Tissues</td>
</tr>
<tr>
<td>28</td>
<td>Bhava Prakasha Samhita</td>
<td>Ectodermal Tissues</td>
</tr>
<tr>
<td>29</td>
<td>Upanishad</td>
<td>Ascending Tracts of the Central Nervous System</td>
</tr>
<tr>
<td>30</td>
<td>Aranyaka</td>
<td>Fasciculi Proprii</td>
</tr>
<tr>
<td>31</td>
<td>Brahamana</td>
<td>Descending Tracts of the Central Nervous System</td>
</tr>
<tr>
<td>32</td>
<td>Itihasa</td>
<td>Voluntary Motor and Sensory Projections</td>
</tr>
<tr>
<td>33</td>
<td>Purana</td>
<td>Great Intermediate Net</td>
</tr>
<tr>
<td>34</td>
<td>Smriti</td>
<td>Memory Systems, Reflexes</td>
</tr>
<tr>
<td>35</td>
<td>Rik Veda Pratishakhya</td>
<td>Cerebral Cortex, Layer 1</td>
</tr>
<tr>
<td>36</td>
<td>Shukla Yajur Veda Pratishakya</td>
<td>Cerebral Cortex, Layer 2</td>
</tr>
<tr>
<td>37</td>
<td>Atharva Veda Pratishakya</td>
<td>Cerebral Cortex, Layer 5</td>
</tr>
<tr>
<td>38</td>
<td>Atharva Veda Pratishakya (chaturadhayi)</td>
<td>Cerebral Cortex, Layer 6</td>
</tr>
<tr>
<td>39</td>
<td>Krishna Yajur Veda Pratishakya</td>
<td>Cerebral Cortex, Layer 3</td>
</tr>
<tr>
<td>40</td>
<td>Sama Veda Pratishakya</td>
<td>Cerebral Cortex, Layer 4</td>
</tr>
</tbody>
</table>
Discovery of Veda and the Vedic Literature in Human Physiology

In addition to modern science’s confirmation of the presence and importance of a unified field of all the laws of nature, another remarkable discovery with far-reaching implications was made during the past ten years, this time by a great neuroscientist, Professor Tony Nader, M.D., Ph.D. under the guidance of the greatest Vedic scholar of our age, Maharishi Mahesh Yogi.

Professor Nader discovered one-to-one correlations between the detailed descriptions of the human body and its many divisions, subdivisions, and processes found in the ancient Vedic literature, and the divisions, subdivisions, and processes discovered by modern scientific research on physiology, from organ systems down to the level of DNA molecules. He found that every division (structure) and every process (function) understood by modern physiology has an exact counterpart within the divisions and descriptions provided by the ancient Vedic literature. Table 4.1 lists the forty traditional branches of the Vedic literature and their correlations with the major branches of human physiology as discovered by Professor Nader.

To help explain this concept, consider the branch of the Vedic literature called Gandharva Veda (Branch 17 in Table 4.1). Gandharva Veda represents harmony in nature. On one level, Gandharva Veda can be thought of as music, whether voice or instrumental. One may listen to a raga, or musical piece, that is specifically suited to the time of day or purpose of the event, such as celebration or relaxation. On another level, Gandharva Veda music is expressed in the human physiology as the cycles and rhythms that keep the body in tune with the rhythms of nature. These rhythms include the secretion of hormones, metabolism, the rhythm of the heart and circadian rhythms of blood pressure, heart rate, and other well-organized patterns in cardiovascular physiology. Because of the one-to-one correspondence noted above, listening to Gandharva Veda music helps reconnect the body’s physiology to the cycles and rhythms of its own inner intelligence. This restores balance and resets the system.

Professor Nader’s discovery validated the ancient Vedic concept of total health in a way that is consistent with modern science, yet it extends beyond the limited boundaries of modern medicine’s under-
standing of the body and of health. It shows that the laws that give structure to the many facets of the Veda and Vedic literature are the same laws of nature that express themselves in the human body and, indeed, throughout the whole universe.

The practical significance of Professor Nader’s discovery is enormous. It means that the field of Veda, the unified field of natural law that structures and governs the whole universe, is deep within us as a blueprint for the orderly functioning and perfect health of our bodies. Furthermore, this inner intelligence, which is the intelligence of nature, is not only fundamental to our bodies, but it is also fundamental to everything else that influences your health, including mind and environment. What is needed is to apply those approaches from within each of these areas of life that most effectively allow our inner intelligence to be fully expressed in our physiologies.

The Maharishi Vedic Approach to Health provides forty approaches that arise from each of the forty different aspects of the Veda and Vedic literature. Each area of knowledge has associated technologies of the unified field. With these technologies or practical methods, not only can one attend to each of the different areas of the body that are associated with the particular aspect of the Vedic literature, but also each approach helps to restore areas in the mind, body, or environment that may not be in harmony with inner intelligence, the unified field of natural law.

As we discussed above, each of us carries within ourselves a copy of this blueprint of natural law—a precise set of plans that will allow us to achieve total health. Professor Nader’s discovery shows how, through approaches associated with each of the forty different aspects of the Vedic literature, one can tend to every aspect of health. The Total Heart Health program provides the practical techniques and practices for heart disease prevention and reversal that are associated with this knowledge. Each approach helps establish a reference point for health in the unified field located deep within the physiology. As one begins to tap one’s own inner intelligence, one’s innate potential will become more available, and imbalances—even long-standing ones—will be eliminated and one’s heart and body will begin to heal. Over time, the end result will be that optimal health becomes the everyday reality.
Summary
There are three diagnostic and therapeutic modalities of the Total Heart Health program: The modalities can be categorized into three broad approaches: the Mind Approach, the Body Approach, and the Environment Approach. The following are brief descriptions of each section. Each approach by itself has been shown to be effective for preventing and treating heart disease. Research has shown that using a comprehensive multi-modality Total Heart Health program results in benefits that are greater than a single modality.

The Mind Approach
A cornerstone of the Total Heart Health program is the Transcendental Meditation program. It is the most powerful means for reducing stress, enhancing mind-body coordination, and restoring the inner intelligence of the unified field to the functioning of your mind and body. Hundreds of scientific studies have shown that the Transcendental Meditation technique reduces psychological stress and its physiological consequences and helps create better mental, emotional, physical, and social health. This simple, natural program is a powerful means for bringing balance to your entire physiology for total health.

The Body Approach
The Body Approach for heart disease and its major risk factors includes recommendations for diet, herbal food supplements, exercise, daily and seasonal routines, and physiological purification therapies all designed to remove the obstacles to the flow of one’s own inner intelligence. Each of these recommendations takes the approach of enlivening the unified field that is at the basis of the physiology and, in the process, restores the orderly and balanced functioning of mind and body.

The Environment Approach
The environment has a dramatic and profound effect on both physical and mental health. Environmental pollutants have been shown to cause cardiovascular disease and mortality. Crime, violence, and war also affect the mind, body, and heart. The Environment Approach addresses these influences on health and offers practical ways to balance both the
near and distant environment. These include Vedic sound therapies to align the body’s rhythms with nature’s rhythms; Vedic architecture for healthy, life-supporting homes and offices; consideration of the stress levels in your community; and knowledge and technologies to diagnose and utilize the cycles and rhythms of nature for total heart health.

References


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Healing Your Heart through the Mind

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ABOUT THE AUTHORS

Robert H. Schneider, M.D., F.A.C.C., F.A.B.M.R., is a physician, scientist, educator, and one of the nation’s leading authorities on natural medicine and the prevention and treatment of heart disease. He has directed $25 million in research grants from the National Institutes of Health and private foundations for his pioneering research on natural approaches to heart disease. The results of this groundbreaking research have been published in top medical journals and featured in more than 1,000 television, radio, magazine, and newspaper reports, including CNN Headline News, ABC’s 20/20, New York Times, Washington Post, Newsweek, Wall Street Journal, and Time Magazine. He is the principal author of Total Heart Health: How to Prevent and Reverse Heart Disease with the Maharishi Vedic Approach to Health.

Dr. Schneider is a specialist in preventive medicine and clinical hypertension, and a Fellow of the American College of Cardiology. He did his postgraduate training in internal medicine and hypertension at the University of Michigan Medical School. Dr. Schneider has been invited to consult with government agencies and lecture at medical centers and professional societies on four continents on prevention-oriented natural medicine.

Currently, Dr. Schneider is Director of the Institute for Natural Medicine and Prevention, Dean of the Maharishi College of Perfect Health and Professor of Physiology and Health at Maharishi University of Management.

Jeremy Z. Fields, Ph.D., has over 30 years of experience in biomedical research and in the field of evidence-based natural medicine. In addition, Dr. Fields has more than 20 years experience as a professional science writer and editor. He has held faculty positions at several medical schools and the Veterans Administration health care system. He has published extensively in biomedical research and prevention-oriented natural medicine. Dr. Fields is co-author of Total Heart Health: How to Prevent and Reverse Heart Disease with the Maharishi Vedic Approach to Health.
ABSTRACT

Over the past forty years, scientific research has repeatedly demonstrated that your mind affects your body and health. In the Total Heart Health program, the Transcendental Meditation program is considered the single most important modality in the Mind Approach for improving overall health. It is a simple, natural technique that restores access to the body’s own inner intelligence. With regular practice, this technique leads to integration and balance of mind and body. Hundreds of studies worldwide on the Transcendental Meditation program consistently confirm its wide range of stress-reducing and health-promoting effects, including its ability to reduce the risk factors for heart disease, prevent and treat the life-threatening effects of this disease, and be instrumental in reversing it.

According to traditional Vedic science, the unified field, through its own self-interacting dynamics, structures all physical and nonphysical phenomena in the universe. From this perspective, the most basic level of the mind is also the unified field. The human mind is described by Vedic scientists as arising from the unified field in the same way that the elementary particles form from the fundamental quantum fields of energy and matter. As Robert Keith Wallace, Ph.D., describes in his book The Physiology of Consciousness, the subjective mental structures of consciousness (that is, the mind) may also be regarded as the major modes of expression of the underlying field of pure consciousness, or the unified field. The mind and body have the same source, one unified field of natural law. Therefore, “subjectivity and objectivity are not separate, discrete aspects of life, never to be reconciled; they are merely different themes of the same fundamental field of life.”

Furthermore, according to Maharishi Mahesh Yogi as described in his book The Science of Being and Art of Living, the mind lies between the unified field and the body. That is, it may be said that the mind is a nonphysical expression of the unified field, which then becomes more manifested or crystallized in physical forms of matter and energy, which in turn make up the physiology of our body. Thus, from this perspective, the state of the mind has a great influence on the state of the body and health.
The Mind’s Role in Heart Disease

Chronic exposure to stressful situations is associated with increased rates of hypertension and heart disease. Job strain, family stress, major losses, other life changes, social isolation, and any situation in which we perceive a threat to our well-being are all major stressors. Our chronic responses to these stressful situations, which may manifest as anxiety, anger, fear, or depression, also add to this increased risk for cardiovascular disease.

One way stress is translated into disorders in one’s cardiovascular system is through the body’s stress-response systems. These systems can become overactive during chronically stressful situations. One of these systems is called the hypothalamic-pituitary-adrenal axis, or HPA axis, an important part of the body’s neurohormonal system. In stressful situations, the hypothalamus in the brain signals the pituitary gland to release factors that cause the adrenal glands to increase their release of the powerful stress hormone cortisol. The other system is called the sympathetic nervous system or the “fight-or-flight” response. In stressful situations, an increase in brain activity increases activity in the sympathetic nervous system, which causes the release of the hormones and neurotransmitters epinephrine and norepinephrine, also called adrenaline and noradrenaline. These excite the heart and cardiovascular system. For example, the heart and blood vessels are stimulated to support the quick fight-or-flight action that is necessary to avoid or address the perceived threat.

If stressful situations are frequently experienced, or are extreme or long lasting, and if our revved-up responses become chronic, that is, if these stress-response systems stay overactive all or most of the time, damage to our tissues and organs can ensue. In particular, this chronic overactivation can stimulate the heart to work harder and the blood vessels to narrow and eventually thicken with plaque. The disruption of the cardiovascular system and other related systems, such as the immune system, leads to heart disease, including hypertension, heart attack, and stroke.

In his book *The End of Stress as We Know It*, neuroscientist Bruce McEwen, Ph.D., describes the effects of prolonged or recurrent stress on the healthy functioning of the brain and body. He introduces the concept of allostatic load, which refers to the burden on the nervous
system that results from the cumulative effect of chronic stress on the body. As this burden—the allostatic load—increases, it limits your ability to reestablish homeostasis or physiological balance during and after stressful situations. In other words, chronic stress limits your ability to adapt to your environment and makes the body susceptible to heart disease.

Like McEwen and other modern medical scientists, the Maharishi Vedic Approach to Health recognizes the detrimental impacts of stress on the mind and body, but unlike them, it perceives the ultimate cause of the problem differently. According to the Vedic approach, the chronic effects of stress are a sign of blockage in the flow of the body’s inner intelligence from its source in the unified field to all parts of your physiology. If expression of the body’s own inner know-how can be restored, then stress will have no impact on the body and on the ideal functioning of the heart.

**Health Benefits of the Transcendental Meditation Program**

The Transcendental Meditation program is the most important modality of the Mind Approach used in the Total Heart Health program. When practiced for fifteen to twenty minutes twice a day, this simple, natural, and effortless technique allows the mind to gain deep rest while remaining wide awake. Because of the body’s intimate relationship with the mind, the body experiences a corresponding state of deep rest and relaxation. This deep rest increases access to one’s inner intelligence, neutralizes existing tensions or stress in both the mind and body, and causes them to become revitalized and enlivened with energy, vitality, intelligence, and creativity.

A vast body of scientific research on the effects of the Transcendental Meditation program conducted by our research institute and at more than 200 universities and research institutes in thirty countries demonstrates that by attending to the mind with this specific technique, you can heal the body as well. The reduction of stress and its physiological consequences manifests in reductions in major risk factors for heart disease, or in the disease itself, and even in longer life span. Following are some of the research findings from our institute and others that demonstrate the positive effects of the Transcendental Meditation program on heart health.
Lowered Stress Hormones

Scientific evidence indicates that the Transcendental Meditation technique works by restoring normal and more ideal functioning in the nervous system, including its two major stress responses systems—the sympathetic nervous system or the fight-or-flight response system, and the neurohormonal system, or the HPA axis. These brain-body systems have major influences on the heart and cardiovascular system. The Transcendental Meditation technique has also been shown to enhance the overall healing ability of the body. This protects the body from the assault of stressful situations and removes and prevents imbalances in the cardiovascular system.

In a study published in the journal *Hormones and Behavior*, Ron Jevning, Ph.D., and colleagues at the University of California–Irvine measured cortisol levels of people while they practiced the Transcendental Meditation technique and compared them with the cortisol levels of a control group. As mentioned, levels of the stress hormone cortisol normally increase during stressful situations. While this increase may be helpful in responding to a physical stress in the short term, chronically elevated cortisol levels end up damaging the blood vessel walls and raising lipid levels. This is one physiological reason why chronically stressed people have more heart disease.

When Dr. Jevning and colleagues compared cortisol levels of subjects practicing the Transcendental Meditation technique (the “meditators”) with cortisol levels of subjects in a control group who simply rested with their eyes closed, they found that the average level of cortisol decreased about 33 percent in the meditators during their practice of the technique. The levels of cortisol did not change significantly in the control subjects. (See Figure 1.4.1.) Indeed, other studies have shown that blood cortisol levels are lowered long term in individuals practicing the Transcendental Meditation program compared to control subjects not practicing the technique.
Subsequent studies have shown that the ability to maintain lower levels of cortisol and other stress-related hormones such as adrenaline is associated with the length of time, that is, number of months or years, a person has been practicing the Transcendental Meditation program. This indicates that the body can build up resiliency to stressful situations. According to one follow-up study published in the journal *Psychoneuroendocrinology*, researchers at the Institute for Natural Medicine and Prevention observed that after four months of Transcendental Meditation practice, young adults exhibited improved adaptation to stress. These people showed reduced blood cortisol levels in nonstressful situations and enhanced cortisol responses during challenging situations with a rapid return to equilibrium. These findings suggest that the practice of the Transcendental Meditation technique increases a person’s ability to adapt to stressful situations through a quicker rise in cortisol and a more rapid recovery after the stressful event has passed.

Other published studies have demonstrated reduced activation of the sympathetic nervous system. This was observed as reductions in levels of adrenaline and noradrenaline circulating in the blood of long-term
Transcendental Meditation practitioners. Further research has shown that Transcendental Meditation practitioners have fewer receptors in their body for adrenaline. Receptors act like tiny locks on the surface of cells that receive the key (in this case, adrenaline) and are switched on by it. The fewer number of receptors is beneficial because it leads to less excitation of the sympathetic nervous system. A less excited, more calm and restful nervous system, in turn, will create less damaging effects on the heart and blood vessels.

Research in mind-body medicine has shown that any type of stress, whether it is mental, physical, social, or environmental can have deleterious effects on the heart and the blood vessels through the neurohormonal and sympathetic nervous systems.

**Reduced Hypertension**

In the late 1980s, a unique collaboration of medical doctors, physiologists, and psychologists at the Institute for Natural Medicine and Prevention and the West Oakland Health Center in Oakland, California, began studying the long-term effects of the Transcendental Meditation program on hypertension and heart disease. The goal was to expand on a series of studies that had been pioneered nearly two decades earlier by neurophysiologist Robert Keith Wallace, Ph.D., at the University of California in Los Angeles, on the physiological effects of the Transcendental Meditation program. Dr. Wallace had found that compared to nonmeditating controls, Transcendental Meditation practitioners had lower metabolic activity, lower blood pressure, and other physiological signs of better health. At the time, few medical scientists had conducted scientifically rigorous controlled studies on the effects of stress reduction on blood pressure.

Over a period of twenty years, we have conducted a series of rigorous clinical studies on the effects of the Transcendental Meditation program on men and women who were at high risk for developing cardiovascular disease or for its recurrence. This research was funded by a series of grants totaling about $20 million from the National Institutes of Health (NIH) and the Retirement Research Foundation (one of the nation's largest foundation for aging research), and other private foundations.
The first study involved 111 people aged fifty-five years and older with mild hypertension, that is, in people with blood pressure over 140/90 mm Hg and less than 160/100 mm Hg on average. Participants were randomly selected to learn either the Transcendental Meditation program or a widely practiced relaxation technique called progressive muscle relaxation, or to join a health education control group. Both the Transcendental Meditation and progressive muscle relaxation groups practiced their respective techniques for approximately twenty minutes twice daily. The control group received health-education sessions monthly. Each participant was studied for three months. Blood pressure readings were monitored before, during, and at the end of the study.

The study findings were so amazing that the American Heart Association published the results in their journal *Hypertension* and the popular media carried the story worldwide. The major finding was that the Transcendental Meditation program reduced blood pressure in individuals with mild hypertension at least as effectively as antihypertensive drugs. Among the meditators, the average reduction in blood pressure was 11 mm Hg systolic and 6 mm Hg diastolic. Participants suffered no harmful side effects. Indeed, there were reports of side benefits such as improved psychological health. In addition, the Transcendental Meditation program proved to be twice as effective in lowering blood pressure as progressive muscle relaxation. Blood pressure values in the health-education control group did not change at all (see Figure 1.4.2).

A follow-up study, published in the *American Journal of Hypertension*, was recently completed by our team at the Institute for Natural Medicine and Prevention on the effects of the Transcendental Meditation program compared with progressive muscle relaxation and conventional health education in people with high blood pressure. This project monitored people with hypertension for a one-year period and showed that those participants who practiced Transcendental Meditation were able to maintain lower blood pressures over the long term. As a result, the meditators were able to reduce their blood pressure medications by about 23 percent compared with the control subjects. This is particularly important because antihypertensive drugs often have unpleasant or harmful side effects. The Transcendental Meditation program was found to be highly effective in lowering blood pressure among all major
subgroups. It didn’t matter whether or not a person’s hypertension was associated with obesity, physical inactivity, a high-salt diet, or chronic psychological stress. Other studies have shown that the Transcendental Meditation program lowers high blood pressure in people of widely varying racial and ethnic backgrounds. As Transcendental Meditation instructors are fond of saying, “Anyone who can think a thought can practice the Transcendental Meditation technique and experience beneficial results.” The following profile of one of the patients in the early clinical studies is a good example.

![Figure 1.4.2. Reduction of High Blood Pressure Through the Transcendental Meditation Program. Source: Data from Hypertension 26 (1995): 820–827](image)

As an associate pastor of a Los Angeles church, Betty’s daily routine included everything from presiding over church services and functions to overseeing daycare. She also tried to balance her professional life with raising her children and helping in her husband’s business. When she was diagnosed with high blood pressure, she decided to do something other than depend on the medications her doctor prescribed.
“It’s hard to help others feel good when you don’t feel your best yourself,” she said. “I couldn’t just sit back and be sick.”

Betty’s doctor recommended that she take part in a unique National Institutes of Health-sponsored study on the effects of the Transcendental Meditation program on hypertension and heart disease. She did some research of her own and found that the Transcendental Meditation program does not involve any lifestyle change, nor did it conflict with her beliefs in any way, and it was the most well-researched stress-management technique around. She signed on immediately as a study participant. She learned the Transcendental Meditation technique, and within one week of regular practice, her blood pressure was normal. Within one month, her doctor cut back her medication.

“I’m back to feeling good about myself and others,” she said. “That’s the way life is supposed to be lived.”

Betty’s successful outcome like many others in the studies mentioned above has been replicated by Vernon Barnes, Ph.D., and colleagues at the Medical College of Georgia in Augusta. Only in these studies, the Transcendental Meditation program lowered blood pressure in adolescents with high blood pressure. This finding is particularly important because, in many cases, high blood pressure, like atherosclerosis, begins in childhood or early adulthood. Prevention at this stage can have life-long benefits.

**Lowered Cholesterol and Oxidized Lipids**
Several studies have found that cholesterol levels significantly decline with the regular practice of the Transcendental Meditation technique. Remarkably, these changes in cholesterol were not due to alterations in diet because the participants did not change their diets during this study period. So, how can this be explained? Since psychological stress is known to raise cholesterol through the stress hormones cortisol and noradrenaline, it is thought that the practice of the Transcendental Meditation technique may have reduced total cholesterol through its ability to reduce levels of these hormones.

Evidence from studies at the Institute for Natural Medicine and Prevention suggest that the Transcendental Meditation program can reduce the form of cholesterol and other fats in the blood believed to be most responsible for atherosclerosis, that is, oxidized lipids, also
called lipid peroxides. The research, which was published in *Psychosomatic Medicine*, found that elderly people who practiced the Transcendental Meditation program showed significantly lower levels of lipid peroxides than those who did not, and these differences could not be explained by diet. With lower levels of lipid peroxides in the bloodstream, there is less damage to the artery walls and less buildup of atherosclerotic plaque. There is lower free-radical activity in the body and less artery-clogging material in the blood vessels.

**Reduced Psychological Stress**

As explained earlier, many types of psychological stress, such as anxiety, depression, anger, and job strain are considered risk factors for hypertension and heart disease. Volumes of research on the Transcendental Meditation program have reported scientific studies on these types of factors. Kenneth Eppley, Ph.D., and colleagues at Stanford University in Palo Alto, California, analyzed the results of 146 studies on the effects of various mind-body techniques on anxiety, the most commonly studied form of psychological stress. These techniques included biofeedback, concentration-type meditation techniques, relaxation techniques such as progressive muscle relaxation, and the Transcendental Meditation technique. The results of this analysis published in the *Journal of Clinical Psychology* showed that the Transcendental Meditation technique was approximately twice as effective in reducing anxiety as other mind-body techniques. The authors of the study suggested that the reason why the Transcendental Meditation program was so effective is because it produces a unique physiological state of restful alertness. This simple yet profound technique restores the mind-body connection, enlivens the body’s own inner intelligence, and reduces and eliminates stress (see Figure 1.4..3).
Figure 1.4.3. Comparison of the Transcendental Meditation Program and Other Mind-Body Techniques for Reducing Stress. Source: Data from *Journal of Clinical Psychology* 45 (1989): 957–974.

**Decreased Smoking and Alcohol Abuse**

Statistics from the Centers for Disease Control and Prevention indicate that the most preventable cause of death in the United States is cigarette smoking. Smoking is a major risk factor for heart disease because it damages the inside of the blood vessels. Alcohol abuse is another risk factor for heart disease because it damages the heart muscle and raises blood pressure, thereby predisposing heavy drinkers to heart failure, hypertension, arrhythmia, and cardiac mortality.

The Transcendental Meditation program has been shown to naturally prevent and reduce smoking, alcohol, and drug abuse. An analysis of 198 studies by Harvard-trained psychologist Charles Alexander, Ph.D., and colleagues, published in *Alcoholism Treatment Quarterly*, analyzed the effects of different meditation procedures (including the Transcendental Meditation program) and self-development techniques on reducing alcohol, tobacco, and drug abuse. The study reported that the Transcendental Meditation program was three to four times more effective in reducing these forms of substance abuse and thus was by far the most effective. (See Figure 1.4.4. *Note: “Standard Prevention” refers to conventional education programs and “Standard Treatment” refers to conventional medical programs, such as those that employ nicotine replacement for smoking cessation.*

The exact physiological mechanisms underlying the ability of the Transcendental Meditation technique to achieve such a surprisingly large effect on drug abuse are not known, although reducing stress and
creating a more orderly style of functioning in the nervous system are likely to be major factors. Nevertheless, it appears that the Transcendental Meditation program offers a uniquely effective technique for treatment and prevention of smoking, alcohol, and drug abuse, all of which are risk factors for heart disease.

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**Figure 1.4.4. Effects of the Transcendental Meditation Program Compared with Other Preventive and Treatment Programs on Smoking, Alcohol, and Drug Abuse. Source: Data from *Alcoholism Treatment Quarterly* 11(1994):13–87.**

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**Regression of Atherosclerosis**

In the spring 2000 issue of the prestigious medical journal *Stroke*, the American Heart Association published the results of another breakthrough study. This study was funded by the NIH and led by Amparo Castillo-Richmond, M.D., at the Institute for Natural Medicine and Prevention. The results were also featured in news reports worldwide. What was so astounding to attract all this attention? This study found that a mind-body technique alone could reduce atherosclerosis and its risk of stroke and heart attack!

In this clinical trial, researchers once again studied African Americans with hypertension. Using ultrasound methods, they measured the thickness of the walls in participants’ carotid arteries. The carotid arteries travel up the sides of the neck and carry oxygen to the brain.
The thicker the walls of these arteries become, the narrower the opening is for blood to flow through. The same disease process of atherosclerosis that occurs in the coronary arteries leading to the heart and in the arteries leading to the brain, if left unchecked, increases the risk of heart attacks and strokes, respectively.

Participants in the study were divided into two groups. The first group learned the Transcendental Meditation program and practiced for approximately twenty minutes twice daily. The second group attended regular health-education classes for the same period of time. Approximately eight months later, the thickness of the artery walls were measured again in all the participants. Incredibly, in the Transcendental Meditation group, the artery walls had become significantly less thick compared with the health-education group who had increased thickening in the artery walls. In other words, the opening inside the arteries, also called the lumen, in people practicing the Transcendental Meditation technique had become wider and could carry more blood to the brain—their atherosclerosis had been reversed. The reductions in the thickness of the artery walls induced by Transcendental Meditation practice alone were comparable to reductions achieved by several conventional medications or by intensive diet and exercise programs; yet there were no other lifestyle changes in the Transcendental Meditation group.

Based on studies done by other scientists, this decrease over the first year alone corresponds to an 11 percent reduction in the risk of heart attack and a 15 percent reduction in the risk of stroke in the Transcendental Meditation group compared with control subjects. Presumably additional decreases would be found if the participants were followed over several years. These conclusions were supported by results from a study conducted by John Zamarra, M.D., at the State University of New York–Buffalo and scientists at our institute, and were subsequently published in the American Journal of Cardiology. This study found that heart disease patients who would otherwise have been candidates for bypass surgery or angioplasty but chose instead to try the Transcendental Meditation program for about a year showed significant improvements in blood flow to their hearts (a reversal of their myocardial ischemia) and in cardiac function as measured by standard exercise-tolerance testing.
Improved Overall Health

Researcher David Orme-Johnson, Ph.D., of Maharishi University of Management, studied health insurance statistics in over 2,000 people practicing the Transcendental Meditation program over a five-year period. He discovered that Transcendental Meditation practitioners consistently had less than half the number of hospitalizations and doctor visits than did other groups with comparable age, gender, profession, and insurance terms. The difference between the meditation and control groups was even larger among older-age brackets (see Fig. 1.4..5). In addition, people who practiced the Transcendental Meditation technique had lower rates of major diseases in seventeen treatment categories, including 87 percent fewer hospitalizations for heart disease and 55 percent less for cancer. This study demonstrates a wide range of health-conferring benefits, including prevention of heart disease and other chronic disorders. This is presumably due to the enlivenment of the body’s own inner intelligence, resulting in a broad and integrated enhancement of health.

Finally, in a striking follow-up study supported by a grant from the NIH’s National Center for Complementary and Alternative Medicine and published in the *American Journal of Cardiology* in 2005, it was demonstrated that people with hypertension from two of our earlier studies, who practiced the Transcendental Meditation program, lived longer compared to other groups with high blood pressure.

![Figure 1.4.5. Redused Need for Medical Care by People Practicing the Transcendental Meditation Technique. Source: Data from *Psychosomatic Medicine* 49 (1987): 493–507.](image)
An average of eight years after the studies, researchers determined who among the original study participants had died and of what causes. The Transcendental Meditation group showed a 23 percent lower risk of dying overall and a 30 percent lower risk of dying from cardiovascular disease specifically compared with the control groups. This finding on mortality has never been shown for any other mind-body intervention. (See Fig. 1.4.6.)

Fig. 1.4.6. Reduced Mortality Rates in Older Men and Women Practicing the Transcendental Meditation Program Compared with Controls. source: Data from the American Journal of Cardiology 2005, 95:1060–1064.

There are many possible explanations for the dramatic increase in longevity of the Transcendental Meditation practitioners. Keep in mind that these results are from two randomized-controlled experiments, so it is unlikely that the individuals in the various treatment groups differed from one another enough to account for these major differences in mortality. It was the Transcendental Meditation program that did it. But how exactly?

We believe that there are two ways to explain the physiological and health effects of the Transcendental Meditation program. First, it is likely that the reductions in cardiovascular risk factors documented in other studies, such as decreases in high blood pressure, psychological stress, cholesterol and oxidized lipids, smoking, alcohol abuse, and even direct markers of coronary heart disease, all contribute to reductions in mortality.
Yet, on a deeper physiological level, neuroscientist Professor Tony Nader, M.D., Ph.D., has hypothesized that practice of the Transcendental Meditation technique restores the body’s self-repair and healing mechanisms in an integrated and holistic way. This theory is supported by the studies of Dr. David Orme-Johnson and others cited in this chapter, which show lower rates of a wide range of diseases and disorders among Transcendental Meditation practitioners in addition to less heart disease.

It was further suggested that the profound changes in physiology caused by regular Transcendental Meditation practice were opposite to declines normally found with aging. This idea is consistent with findings of a landmark study published in the mid-1980s by Robert Keith Wallace, Ph.D., who discovered that Transcendental Meditation practice was associated with slowing of physiological aging. Later on, Charles Alexander, Ph.D., then at Harvard University and subsequently co-director of the Institute for Natural Medicine and Prevention, found that older people (average age eighty-one years old) who began the Transcendental Meditation program showed reversals in measures of psychological and physiological aging.

All of these results taken together suggest a holistic effect of the Transcendental Meditation technique that could explain the enhanced longevity that was documented in our study of mortality rates among older Transcendental Meditation practitioners.

**Conclusion**

It is apparent from the more than 600 scientific studies on the health benefits of the Transcendental Meditation technique that the Mind Approach of the Total Heart Health program restores the mind and body’s own healing mechanisms to prevent heart disease. These studies show that practicing the Transcendental Meditation technique can help overcome stress-related addictions such as cigarette smoking, and can decrease blood pressure, damaging forms of cholesterol, and atherosclerosis—all of which result in lower rates of disease and a longer life. Examined as a whole, this scientific evidence is proof that practicing Transcendental Meditation is one of the most effective things one can do to achieve total heart health.
References


Walton, K.G., Schneider, R.H., & Nidich, S.I. “Review of controlled research on the Transcendental Meditation program and cardio-


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How the Transcendental Meditation Program Works

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ABOUT THE AUTHORS

Robert H. Schneider, M.D., F.A.C.C., F.A.B.M.R., is a physician, scientist, educator, and one of the nation’s leading authorities on natural medicine and the prevention and treatment of heart disease. He has directed $25 million in research grants from the National Institutes of Health and private foundations for his pioneering research on natural approaches to heart disease. The results of this ground-breaking research have been published in top medical journals and featured in more than 1,000 television, radio, magazine, and newspaper reports, including CNN Headline News, ABC’s 20/20, New York Times, Washington Post, Newsweek, Wall Street Journal, and Time Magazine. He is the principal author of Total Heart Health: How to Prevent and Reverse Heart Disease with the Maharishi Vedic Approach to Health.

Dr. Schneider is a specialist in preventive medicine and clinical hypertension, and a Fellow of the American College of Cardiology. He did his postgraduate training in internal medicine and hypertension at the University of Michigan Medical School. Dr. Schneider has been invited to consult with government agencies and lecture at medical centers and professional societies on four continents on prevention-oriented natural medicine.

Currently, Dr. Schneider is Director of the Institute for Natural Medicine and Prevention, Dean of the Maharishi College of Perfect Health and Professor of Physiology and Health at Maharishi University of Management.

Jeremy Z. Fields, Ph.D., has over 30 years of experience in biomedical research and in the field of evidence-based natural medicine. In addition, Dr. Fields has more than 20 years experience as a professional science writer and editor. He has held faculty positions at several medical schools and the Veterans Administration health care system. He has published extensively in biomedical research and prevention-oriented natural medicine. Dr. Fields is co-author of Total Heart Health: How to Prevent and Reverse Heart Disease with the Maharishi Vedic Approach to Health.
ABSTRACT

Extensive Research has verified the health benefits of learning and practicing the Transcendental Meditation technique, the cornerstone of the Mind Approach of the Total Heart Health program. The practice of this technique allows the mind to transcend the thinking process and to experience a unique state of deep rest in body and mind. Simultaneously, a high degree of orderliness or coherence in the brain is gained. Scientists have identified this experience as a fourth major state of consciousness (the first three being sleeping, dreaming, and waking). It is called Transcendental Consciousness. It is a natural state that enlivens the body’s own inner intelligence. Anyone can learn the practice easily. Courses taught by extensively trained and certified teachers are available in every major city.

Uniqueness of the Transcendental Meditation Technique

Scientific confirmation of the unparalleled effects of the Transcendental Meditation program for enhancing mind-body health was published in the American Journal of Health Promotion in 1998. Publication of this article by Drs. David Orme-Johnson and Kenneth G. Walton was particularly exciting because the scope of the study was huge—a review of 600 studies involving more than 20,000 people. The researchers had used meta-analysis and systematic review, rigorous procedures that allow comparison of a wide variety of research designs and measurement scales by creating a standardized measure that can be applied to all studies. “It’s like creating a ‘common denominator’ for the research results from many different universities and research institutions,” explains Dr. Orme-Johnson. “Then all the research on different techniques can be directly compared and grand conclusions can be drawn.”

What does this particular review of the published scientific research on stress reduction and meditation reveal that has such practical importance for one’s heart health? It showed that the practice of the Transcendental Meditation program results in greater physiological and psychological health benefits than other forms of meditation and relaxation that have been scientifically studied. This includes progressive relaxation, mindfulness meditation, meditation learned from a book or magazine, biofeedback, traditional practices such as Zen meditation, and self-taught meditation or self-hypnosis. This objective review of
all the published research literature available at the time showed that the Transcendental Meditation program was approximately twice as effective as other modern or traditional relaxation and stress-reduction techniques for reducing blood pressure and anxiety, increasing physiological relaxation and self-actualization, improving psychological outcomes, and decreasing the use of cigarettes, alcohol, and drugs.

In addition, the conclusion reached by Drs. Orme-Johnson and Walton was that the Transcendental Meditation technique, with its basis in the ancient Vedic tradition, is “far more effective than the clinically derived approaches that are modeled after it in reducing anxiety, and improving psychosocial health.” It is unparalleled in the benefits it can offer to the mind and body.

When one practices the Transcendental Meditation technique, one naturally begin to experience more settled, or less excited, levels of the thinking mind, until finally one transcends to the finest, most quiet level of awareness, and experience the unified field of natural law as one’s own innermost consciousness. At this point, one is experiencing a state of silent wakefulness. In the ancient Vedic tradition, this experience is called *transcendental consciousness*.

**Experiencing Transcendental Consciousness**

Transcendental consciousness is considered a fourth major state of consciousness, in addition to the three usual states of consciousness experienced daily: waking, dreaming, and sleeping. In this state of transcendental consciousness, one directly experience the unified field at the deepest level of the mind. It is simultaneously the deepest level of the body. This state of transcendental consciousness is considered to be the common ground state of both mind and body, which is why enlivening it through Transcendental Meditation practice has such powerful effects on both mental and physical health. (See Figure 1.5.1.)

Contrary to popular perception, transcendental consciousness is not a vague or nebulous state. It has been empirically measured and verified by physiological studies in highly sophisticated laboratories. When someone experiences transcendental consciousness, brainwave recordings called electroencephalographs (EEGs) show that the nervous system is deeply relaxed and yet the practitioner is highly alert, in a highly integrated state, as evidenced by measurements of orderliness
of brainwave activity, which neuroscientists call coherence. The greater the coherence in the EEG (that is, the greater the synchronization), the more the different parts of the brain are working together. This greater coherence becomes a new style of brain functioning that carries over after meditating into daily activities. This is paralleled by increased coherence and orderliness in an individual’s behavior as he or she continues to regularly practice the Transcendental Meditation technique over time.

Scientists have shown that the increased orderliness of brain functioning is associated with greater intelligence, creativity, problem-solving ability, and integration of the nervous system. It is also associated with feelings of rest, relaxation, calmness, and peace. Neuroscientists such as Professor Tony Nader, M.D., Ph.D., refer to the experience of Transcendental Consciousness as “the development of total brain functioning.”

Figure 1.5.2 illustrates early research on the increased coherence in brainwave patterns typically found when people practice the Transcendental Meditation technique daily for shorter (two weeks, left panel) or longer (two years, right panel) periods of time. The figure illustrates that EEG coherence begins within two weeks of practicing the Transcendental Meditation program and increases in amount both during and after meditation over time.

Recent research by Fred Travis, Ph.D., and colleagues at the Center for Brain, Consciousness, and Cognition at Maharishi University of Management shows that the longer one practices the Transcendental Meditation program, the greater the EEG coherence during mental activity in the waking state of consciousness.

The practical benefit of increasing coherence in the brain is that the mind and body take on a more coherent and orderly mode of functioning. Experiencing this state of restful alertness twice a day cultures the mind and body to maintain a state of greater balance. Results of a meta-analysis published in the *American Psychologist* found that Transcendental Meditation practice produces a significant increase in basal skin resistance (an indicator of reduced anxiety) and reductions in breathing rates, indicating rest and relaxation that is deeper than the kind of rest you experience by simply closing your eyes. Practicing the Transcendental Meditation technique was also found to increase the body’s...
Figure 1.5.1 Unified Field Chart for Total Heart Health and the Transcending Process

maharishi’s transcendental meditation allows the conscious mind to identify itself with the unified field of all the laws of nature, the total potential of natural law, in transcendental consciousness.
production of serotonin, a “rest and repair,” mood-elevating hormone. These physiological changes, which correlate with a more intelligent and healthful physiology, occur and accumulate spontaneously as the mind effortlessly settles into a state of transcendental consciousness on a daily basis. These changes are the result of accessing your inner healing mechanisms, the ones that help your body to repair and restore itself. That’s why people like Betty who practice the Transcendental Meditation technique begin to see the benefits almost immediately and why these benefits continue long term.

Figure 1.5.2. Greater Orderliness of Brain Functioning with Transcendental Meditation Practice. Source: Data from Proceedings of the San Diego Biomedical Symposium 15(1976): 237–247.

How to Learn the Transcendental Meditation Technique
Anyone can learn the Transcendental Meditation technique, regardless of their age, level of education, personal beliefs, or lifestyle. It’s simple, natural, effortless, and easy to do. Regular practice of the Transcendental Meditation program brings about a state of deep rest to the body and the mind, eliminating the effects of stress, while it opens the mind to the greater orderliness of the unified field. In short, opening the mind to this level of consciousness restores the inner intelligence of the body, and thereby improves mental, emotional, and physical health.
Practicing this program also creates a healthy influence in the environment—all this from practicing the Transcendental Meditation technique for just twenty minutes twice a day.

**What the Transcendental Meditation Technique Is and Isn’t**
The Transcendental Meditation technique is a simple method of meditation—it’s not difficult or complicated. It is easy to learn and practice. It’s natural—no manipulation or autosuggestion such as in hypnosis is required. It’s effortless—no concentration or control of the mind is needed. Anyone from age ten and up can easily learn. Even younger children can learn a meditation technique specifically for them. The practice requires no physical exercises, special postures, positions, or procedures—only that you sit comfortably with eyes closed (see Figure 6.3). You can practice the Transcendental Meditation technique in the office after work, riding the subway, sitting in a plane, or in the comfort of your home. The technique is practiced for approximately twenty minutes twice daily—once in the morning before breakfast so that you can start the day with vim and energy and once again in the afternoon before dinner to eliminate the stress of the day. The benefits are often noted immediately—it doesn’t take years to notice.

![Figure 1.5.3. A Gentleman Practicing the Transcendental Meditation Technique](image-url)
Personal Instruction

To learn the Transcendental Meditation program requires personal instruction with a trained and certified teacher. The technique cannot be learned from books or magazines, or through cassette tapes, DVDs, or videos. There are several reasons for this.

The first reason is that each person is unique and learns at a different pace with different experiences. A qualified teacher can guide one through the steps of practice at one’s own pace and according to one’s own experiences. Teachers of the Transcendental Meditation technique undergo an intensive training program supervised by Maharishi Mahesh Yogi, the founder of the Transcendental Meditation program, where they learn how to provide instruction for all types of people.

Another reason why it is not feasible to teach yourself the Transcendental Meditation technique by reading a book, listening to a tape, or watching a video is that these ways cannot provide the experience of transcendental consciousness because trying to learn on your own requires effort. Effort increases mental activity while transcendental consciousness is a state of least activation of the mind. Therefore, effort and strain are polar opposites to the successful practice and beneficial effects of the Transcendental Meditation program. Also, these impersonal media can’t answer all of the questions that you might have while learning the practice.

With personal instruction, one can learn how to meditate according to one’s needs to enjoy the technique for the rest of one’s life, as well as enjoy all of the benefits it naturally brings. It is only the correct, natural, and effortless practice of the Transcendental Meditation technique that brings about all the benefits shown by scientific research and clinical experience.

The Transcendental Meditation technique is taught through a seven-step course of instruction over six days. The course consists of an introductory lecture and a preparatory lecture that provide the information needed to understand the benefits and mechanics of the technique, to ask questions, and to make an informed decision. Then there is a personal interview, which is followed by four consecutive days of individual and small group instruction lasting one and a half to two hours each day.
Course Structure Overview

Step 1. Introductory Lecture: Introduces the Transcendental Meditation program and explains the benefits to expect from practicing this meditation technique regularly.

Step 2. Preparatory Lecture: Explains the mechanics of the Transcendental Meditation technique and how the Transcendental Meditation program works, why it’s easy to learn and practice, how it’s different from other meditation techniques, and the origin of the Transcendental Meditation program.

Step 3. Personal Interview: An interview with a certified teacher of the Transcendental Meditation technique gives an opportunity to ask any individual questions and to make an appointment for personal instruction.

Step 4. Personal Instruction: Private personal instruction in the basic steps of practice.

Step 5. First Day of Checking: This is the first of a three-day series of one-and-a-half- to two-hour verification and validation meetings following personal instruction. This first day reviews the mechanics of the technique to verify and validate the correctness of the practice.

Step 6. Second Day of Checking: During this second meeting, there is further instruction to verify the correctness of the practice and discuss the mechanics of how the benefits of the Transcendental Meditation program are stabilized.

Step 7. Third Day of Checking: The purpose of this third day of checking is to answer questions from previous sessions and to learn about the goal of the Transcendental Meditation program—the development of one’s full potential and the achievement of ideal health.

During this session, the long-term follow-up program is discussed. The optional follow-up program provides life-long periodic checking of the practice and advanced lectures or topics relevant to the develop-
ment of higher states of health and well-being—all available without additional charge.

To learn the Transcendental Meditation technique properly or for more details or a free introductory lecture, one may visit one of the 3,000 centers located in major cities throughout the world called Maharishi Peace Palaces or Maharishi Enlightenment Care Centers. There one can learn from a certified teacher the standard course that has been verified to produce all of the health-promoting benefits described above.

References


Orme-Johnson, D. & Walton, K. “All approaches to preventing or reversing effects of stress are not the same.” *American Journal of Health Promotion* 1998; 12: 297–299.


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Perfect Health to Every Individual

Craig Pearson, Ph.D.
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Craig Pearson, Ph.D., is Executive Vice-President of Maharishi University of Management in Fairfield, Iowa, and a leading authority on Consciousness-Based education. He has spoken around the United States and in India on this unique approach to education as well as on Maharishi’s programs to create world peace. Dr. Pearson has held a number of previous positions at Maharishi University of Management, including Dean of Faculty, Dean of the College of Arts and Sciences, Dean of Students, Director of Freshman Composition, and Director of the Maharishi University of Management Press. He is also a member of the Board of Directors of Maharishi School of the Age of Enlightenment. Dr. Pearson is the author of two books, *The Complete Book of Yogic Flying* and *The Supreme Awakening: Higher States of Consciousness—Cultivating the Infinite Potential Within* (forthcoming).
ABSTRACT

Health rests in balance. The key to health is maintaining balance in the physiology. And the key to maintaining balance is maintaining the body’s connection with its own inner intelligence. Should this connection become disrupted at any point, imbalance arises. Rising imbalance in turn expresses itself as disease and disorder.

The most effective way to enliven the body’s connection with its inner intelligence, we have seen, is through the Vedic technologies of consciousness—the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying. These technologies, as a broad spectrum of research has documented, improve health from within.

In addition, Maharishi has systematically restored other branches of Vedic knowledge, each aimed at ensuring life in harmony with natural law and thus health and happiness on every level. Collectively this knowledge comprises Maharishi’s Vedic Science and Technology. Its branches include knowledge for:

- creating perfect physiological balance and health,
- designing buildings and cities in accord with natural law, to promote health, well-being, and good fortune,
- forecasting the future and averting negative trends while promoting positive trends,
- growing the most life-nourishing food, and
- creating music that promotes physiological balance and balance in nature.

Each branch grows out of a central understanding: Underlying life’s infinite diversity is a single field of pure consciousness, pure intelligence, Atmā—the unified field. All of life is grounded in and sustained by this ocean of pure knowledge, power, and bliss. Health has its basis in opening one’s conscious awareness to this transcendental field, total natural law, the Self of everyone. (This unbounded value of the Self is written with an uppercase “S” to distinguish it from the ordinary, localized self we typically experience.)
Maharishi’s Consciousness-Based Approach—Holistic, Prevention-Oriented Natural Health Care

Health care costs are spiraling in America and western nations, placing health care out of reach for more and more people and threatening to bankrupt businesses and national economies alike.

Americans are breaking ranks with modern allopathic medicine. By 1997, Americans were paying more visits to natural and complementary practitioners than to regular physicians and spending as much money out of their own pockets on alternative therapies as on traditional medical services. Why?

Modern medicine does not prevent or cure disease
More than 100 million Americans, or 40% of the population, suffer from one or more chronic disorders—disorders modern medicine cannot cure. These include heart disease, asthma, arthritis, Alzheimer’s, and Parkinson’s disease.

In 1999, the executive editor of the New England Journal of Medicine wrote, “The American health care system is at once the most expensive and the most inadequate system in the developed world.” Indeed, overall health in the U.S. is among the worst for industrialized nations. Modern medicine offers not health care but disease care, adept in suppressing symptoms and repairing damage but not in preventing disease from arising in the first place.

Modern medicine itself causes widespread injury and death
Modern medicine is the third-leading cause of death in the U.S., after heart disease and cancer. According to the Journal of the American Medical Association, conventional medicine kills at least 225,000 Americans per year—from improperly prescribed and administrated medications, infections acquired in the hospital, medication errors and other hospital errors, and unnecessary surgery. A more comprehensive study reported that the American medical system is the leading cause of death and injury in the U.S., killing 783,936 people per year.

Even the lower number, 225,000 deaths per year, equals two 300-passenger jumbo jets crashing every day, or a September 11 attack
every five days, or nearly the total number of deaths in World War II—year in and year out. Modern medicine leads to as much injury and death as continuous warfare.

The acceptance of disease and hazardous side-effects as a consequence of treatment reflects an unconscionable deviation from medicine’s fundamental ethical principle, *primum non nocere*—“above all, do no harm.” Modern medicine is clearly inadequate to maintain health in society and itself has become a leading cause of disease, injury, and death.

**Health Based on Knowledge of Natural Law**

The centuries-old, medicine-predominant approach to health has failed to eliminate sickness and suffering; this is because medicine alone is too superficial to influence all the innumerable values that constitute the structure of life and its evolution. Only a HOLISTIC approach that takes into consideration all aspects of mind and body together can be successful in handling health.

As every aspect of life is the expression of Natural Law, the approach to health must be based on the knowledge of the origin and evolution of Natural Law — guiding principles of intelligence upholding the balanced functioning of the human physiology.  

—Maharishi

**Maharishi’s Consciousness-Based Approach to Health**

In response to this urgent need, Maharishi has brought forth a new approach from the ancient Vedic tradition of knowledge. This approach traces all disease and disorder to a single underlying cause—losing connection with the body’s inner intelligence, which gives rise to imbalance in mind or body. As imbalance grows, it expresses itself as sickness and disease.

The most effective way to restore balance and health, therefore, is to enliven nature’s intelligence within the body. This creates the ideal state of balance and integration that produces perfect health.

Each feature of the Maharishi Consciousness-Based approach to Health—the technologies of consciousness, diet, herbal preparations, daily and seasonal routines—serves to enliven the total intelligence of
natural law within the physiology and thereby integrate and balance all aspects of mind and body.

Perfect health can be achieved. But only through a holistic approach that takes care of all values that constitute health—only through the knowledge of the total range of nature’s perfect intelligence and how to awaken it.

<table>
<thead>
<tr>
<th>Modern Medicine</th>
<th>Consciousness-Based Approach to Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on partial knowledge of human physiology and utilizing partial values of natural law</td>
<td>Based on complete knowledge of human physiology and utilizing the total potential of natural law</td>
</tr>
<tr>
<td>Disease oriented—treats the symptoms of disease</td>
<td>Prevention oriented—treats the source of disease</td>
</tr>
<tr>
<td>Treats parts of the physiology in an isolated manner</td>
<td>Treats the parts and the whole simultaneously, creating well-being for the whole</td>
</tr>
<tr>
<td>Ignores major influences on health</td>
<td>Takes into account all influences on health, including the influences of the near and distant environment</td>
</tr>
<tr>
<td>Produces harmful side effects</td>
<td>Free of harmful side effects—produces side benefits</td>
</tr>
<tr>
<td>Often experimental Often depends on elaborate and costly technologies</td>
<td>Time-tested Cost effective and easy to use and apply—and enjoyable</td>
</tr>
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</table>
The Individual Enjoys Perfect Health

When the total intelligence of Natural Law—Veda—is lively in the individual physiology, there is perfect synchrony between the functioning of the body as a whole, and between individual intelligence and cosmic intelligence. With this complete integration, all thought and action are spontaneously in harmony with Natural Law and the individual enjoys perfect health. – Maharishi

Maharishi’s Consciousness-Based approach—
Complete knowledge of human physiology and health

Modern medicine lacks fundamental knowledge of human health. Maharishi’s Consciousness-Based approach fills this void in five basic areas.

1. Knowledge of consciousness

Modern medicine has no effective, practical technology of consciousness and thus remains ignorant of the physiology’s most basic level and the source of its intelligence. Through the technologies of the Transcendental Meditation and TM-Sidhi programs, the field of pure intelligence can be awakened in the physiology, restoring balance, dissolving stress, and allowing nature’s intelligence to flow without restriction.

More than 600 scientific studies conducted over the past 35 years at universities and research institutions around the world have documented the effectiveness of these programs in promoting physical and mental health—in reversing the aging process, reducing medical care usage and costs, relieving a variety of chronic diseases (including hypertension, heart disease, and asthma), and reducing psychological distress and substance abuse.

2. Knowledge of self-pulse diagnosis

A central diagnostic tool in Maharishi’s Consciousness-Based approach to health is pulse diagnosis (Nādi viyān in Sanskrit). Through pulse diagnosis, a physician can identify the physiological imbalances at the basis of disease. This knowledge is essential in identifying the root cause of the disease and the most effective treatment. Pulse diagnosis also aids prevention. Doctors can identify imbalance at an early stage,
when it’s easier to correct, and prescribe corrective measures before the imbalance manifests as clinical disease.

To restore balance, the doctor may then recommend special therapeutic and preventive measures that include proper diet, daily and seasonal routines, herbal preparations, Vedic exercise, and physiological purification techniques.

3. Proper design of homes and buildings
The very design of the spaces we live and work in, Maharishi points out to us, can create imbalances and otherwise undiagnosable health problems. While modern medicine does not understand how our physical environment influences our health, Maharishi’s Consciousness-Based approach takes advantage of the world’s one architectural system that designs buildings and cities in accord with natural law, so that our living spaces create only health-promoting effects. *Maharishi Sthāpatya Veda* design offers precise formulas for designing homes, buildings, and cities to connect individual intelligence with cosmic intelligence and ensure health and support of natural law for everyone.

4. Knowledge of collective health
Society’s health directly influences our personal health. Social stress creates stress in the physiology, sowing the seeds of disease. Without a healthy society, we will suffer from the effects of other people’s incoherent behavior. We can never be completely healthy unless the society we live in is healthy.

Maharishi’s Consciousness-Based approach promotes health in society by creating balance and removing stress in collective consciousness. This is accomplished through group practice of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying. Nearly 50 scientific research studies demonstrate that Yogic Flying groups improve collective health—by reducing crime, accidents, disease, and other negative social trends and increasing quality of life and well-being throughout society.
5. Knowledge of how the distant environment affects health
The connection between human physiology and the cosmos is evident in the daily and monthly cycles that pervade the human body. The structure of the brain reflects the structure of the cosmos, as we saw in Chapter 10. Brain structures have corresponding cosmic counterparts—the sun, moon, planets, and stars—that directly influence your mind, body, behavior, and health.

For ideal health, we each must live in harmony with our extended environment, the universe as a whole. No one can be perfectly healthy unless these influences are rectified. This knowledge is available in the branch of Maharishi Vedic Science known as Maharishi Jyotish. There we find the knowledge of how to detect the influences of the cosmic counterparts and how to neutralize their negative effects and take maximum advantage of their positive effects, thus, leading healthier lives.

How much healthier do you want to be?
A study published in *The American Journal of Managed Care* shows that people using Maharishi Consciousness-Based Health Care (MCBHC) were much healthier than the average population. Compared across 17 illness categories, MCBHC participants were much less likely to be receiving medical treatment, as follows:

- Bones/muscles/ligaments—94% less;
- Viral/bacterial infections—93% less;
- Cardiovascular disease—92% less;
- Mental health and substance abuse—92% less;
- Glands/metabolism/immune system—92% less;
- Nose/throat/lung—89% less;
- Skin/nails/hair—86% less;
- Symptoms with unknown cause—84% less;
- Nerves/eyes/ears—76% less;
- Benign or cancerous tumors—74% less;
- Injuries/poisonings—73% less;
- Digestive ailments—69% less;
- Perinatal—69% less;
- Genital/urinary—42% less;
- Blood/spleen—41% less.

The result is that on average the MCBHC participants were 80% less likely to need medical care.

Eliminating the Source of Pain
The Maharishi Vedic Vibration Technology program, an aspect of Maharishi’s Consciousness-Based approach to health, has offered relief—often immediately—to patients with various chronic diseases, including chronic pain. The procedure is gentle, noninvasive, and without toxic side effects.
As the unified field expresses itself, it gives rise to waves. All matter, including human physiology, is based on these vibrations of natural law. Their subtest expression lies in the sounds of the Veda and Vedic literature. This is the body’s inner intelligence. Illness arises when the coordination between the body’s inner intelligence and its outer expressions is disturbed.

The Maharishi Vedic Vibration Technology program corrects imbalances by providing the appropriate Vedic sound from outside the body. Just as a vibrating tuning fork causes a nearby tuning fork to vibrate, the appropriate Vedic sound “resets” a specific aspect of physiological functioning from the deepest level, restoring normal functioning quickly and naturally—using the same intelligence that structures the body.6

**Used Successfully in Treating Numerous Illnesses**
Gary Kaplan, M.D., Ph.D., Clinical Professor of Neurology, New York University School of Medicine, comments on how the Maharishi Vedic Vibration Technology program has been used successfully in treating numerous illnesses:

The Maharishi Vedic Vibration Technology (MVVT) program employs sound at its most subtle, vibrational level to directly affect a specific aspect of the anatomy and physiology. To date, this program has been successfully used as an adjunctive treatment of numerous illnesses, and most effectively in chronic illnesses, including neck pain, respiratory ailments, anxiety, digestive complaints, and arthritis. Using sound in MVVT to positively affect some aspect of the physiology is nothing more than giving that area of the physiology a direct experience of its basis in the unified field, thereby bringing back order to an area of the anatomy or a physiologic process that had become disordered.

**Vedic Architecture—Fortune-Creating Buildings**
Cities have become noisy, congested, stressful, even life-threatening. Nearly half the world’s people live beneath an unhealthy layer of smog. Studies show that the air in our homes and offices is commonly more polluted than the air outside, creating sick-building syndrome.

At the deepest level, Maharishi points out, even the design of a home or office can subtly disorient the physiology, leading to illnesses, family conflict, and lack of success, without people knowing why.
We urgently need to rebuild our cities so that we live and work in a nourishing environment, free of pollution, stress, and crime—and free of the negative influence of improper design. Thus Maharishi has brought to light the Vedic knowledge of building in accord with natural law—Vedic Architecture, or Maharishi Sthapatya Veda design, the most ancient system of home, city, and country planning. Here, Maharishi explains, is the supreme science of design, connecting individual intelligence with cosmic intelligence.

In buildings designed using this precise approach, negative influences cannot enter and everything inside nourishes and supports everything else. The result is a fortune-creating home, in which one always has the full support of all the laws of nature in daily life and enjoys health, happiness, and success. We cannot be fully healthy or successful, Maharishi emphasizes, unless we live and work in structures designed in harmony with the laws of nature—and he therefore has called for a complete reconstruction of the world to be in accord with natural law.

Cosmic Harmony and Support to the Individual

Because the individual is cosmic, everything about individual life should be in full harmony with Cosmic Life. Maharishi Sthāpatya Veda design gives dimensions, formulas, and orientations to the buildings that will provide cosmic harmony and support to the individual for his peace, prosperity, and good health—daily life in accord with Natural Law, daily life in the evolutionary direction. —Maharishi
Improper home design causes negative influences

<table>
<thead>
<tr>
<th>Improper home design causes negative influences</th>
<th>Architecture in accord with natural law brings significant positive benefits</th>
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<tbody>
<tr>
<td>According to the tradition of Maharishi Sthāpayata Veda design, houses and offices not built in accord with natural law can create problems:</td>
<td>People who live and work in buildings designed according to Maharishi Sthāpayata Veda architecture find that they:</td>
</tr>
<tr>
<td>anxiety, depression</td>
<td>think more clearly, creatively</td>
</tr>
<tr>
<td>illness, chronic disease</td>
<td>make better decisions</td>
</tr>
<tr>
<td>blocks to creativity</td>
<td>feel happier and healthier</td>
</tr>
<tr>
<td>bad luck, financial loss</td>
<td>feel more alert and refreshed</td>
</tr>
<tr>
<td>obstacles to progress and success</td>
<td>enjoy more restful and refreshing sleep</td>
</tr>
<tr>
<td>disharmony in relationships, breakdown of family</td>
<td>enjoy more energy and less fatigue</td>
</tr>
<tr>
<td>anti-social behavior and even criminal tendencies</td>
<td>experience less stress and greater peace of mind</td>
</tr>
</tbody>
</table>
All buildings in Vedic Architecture face due east, receiving the life-giving rays of the rising sun. Modern science has discovered that the brain functions differently depending on the direction one faces. Cells in your thalamus, for instance, function as a neural compass—their firing patterns change as you change directions. The tradition of Vedic Architecture details these influences and states that the brain functions optimally when the individual and the house face east (or north). Improperly oriented buildings—particularly those with south-facing entrances—create physiological imbalances, leading to illness and personal and professional difficulties. Vedic Architecture also specifies the ideal proportion and placement for every room for maximum support from natural law.

Comments from individuals who live in Vastu housing reveal the positive benefits from this fortune-creating architecture:

“We no longer think of our house as something that we take care of—it takes care of us.” —Walter and Ellen Reifslager, Boone, North Carolina

“Our Maharishi Sthāpatya Veda house has a natural and nourishing feeling. Since we moved in, life has seemed to go more smoothly for our family. The effects are subtle, perhaps because they are so natural.” —Leanne de Freitas, Fairfield, Iowa

“There’s a soft, peaceful feeling that pervades the atmosphere of our whole house. There is more to a healthy home or workspace than green building materials. When I talk to people about Vedic Architecture, they are open, they get it. People intuitively know that buildings affect us deeply—and the best buildings are those that make us feel good and, at their highest, elevate the spirit.” —Jeffrey Abramson, Partner, The Tower Companies, Washington, D.C.
Maharishi Jyotish and Yagya programs—
Securing a Bright, Healthy Future
Physiologists have identified scores of rhythms in the human body and throughout nature that correspond with the cycles of the sun and moon. If the sun and moon influence your physiological functioning, might they exert also subtler influences? Might planets and stars also have some effect?

Traditions both ancient and modern hold that the sun, moon, planets, and stars play a significant role in human life, and now we can understand why.

First, human physiology and behavior is governed by the same underlying field of intelligence that manages the ever-expanding universe. This is the intelligence of the unified field, the Veda. If everything in the universe is an expression of this single underlying field of intelligence, then everything in the universe is interconnected—and thus everything influences everything else. Every rhythm of the universe affects our individual lives, including our health and good fortune. Second, the sun, moon, planets, and stars have precisely corresponding structures in the brain and throughout the body, Cosmic Counterparts of human physiology.

A branch of Maharishi Vedic Science is devoted to understanding the relationships between individual life and cosmic life. A precise mathematical science known as Maharishi Jyotish or Maharishi Vedic Astrology offers the knowledge of past, present, and future to direct the trends of time.

Neutralizing Negativity, Promoting Positivity
When you throw a stone into a pond, you create waves that travel across its surface. Reaching the far shore, they are reflected back, eventually returning to where they were created. In the same way, every thought you think, every action you perform, generates influences in the environment that eventually return to you. This principle, As you sow, so shall you reap, is found in all the world’s traditions. In Vedic Science this is the law of Karma or action.

The influences we create may be positive or negative, life-supporting or life-damaging. In either case, they invariably return to us—positive actions as good luck and good fortune, negative actions as bad luck, problems, or illness.
The Maharishi Vedic Astrology program calculates the types of influences we have created by our past actions, both positive or negative, and determines when they will return. By analyzing the influences of the major planets and constellations, the Maharishi Jyotish program gives you knowledge of the trends in your life. It can tell when important events will occur and identify positive and negative influences on your health, happiness, and success. If the influences are not favorable—if the analysis reveals problems, obstacles, or dangers in your future, a Maharishi Yagya performance (prescribed practices to generate life-supporting influences) is recommended to neutralize their effect. Although these influences still return, you now have a protective shield, akin to an umbrella protecting you from the rain. If the influences are favorable, a Yagya performance can further enhance your good fortune.

The knowledge of the Maharishi Jyotish and Maharishi Yagya programs may be applied not only to individuals but to businesses, organizations, and nations.

By generating the appropriate life-supporting influences that will neutralize negative influences, promote positivity, and restore and maintain balance in the functioning of natural law, Maharishi Jyotish and Maharishi Yagya performances create more support of nature for both the individual and society. They can enhance anyone's success and help anyone ensure a bright future.

**Understanding Your Future . . .**

The Maharishi Jyotish program, one of the 40 aspects of Maharishi Vedic Science, gives knowledge that helps a person: know when important events will occur, either positive or negative; make the right decisions; start enterprises at the most opportune time; find the right partner or partners.

**And Taking Proper Care of It**

The Maharishi Yagya program: creates life-supporting effects that benefit everyone; helps eliminate obstacles and dangers; helps avert negative events before they materialize; strengthens positive trends and tendencies to help you fulfill particular desires or goals in your life; hastens growth to enlightenment; creates a beneficial effect for the whole world by enlivening natural law at its foundation.
Removing Obstacles to Wealth

My husband Victor and I had minimal financial resources, so just to get the ball rolling, we started by requesting the smallest Maharishi Yagya performance. We found that by having Maharishi Yagya performances as regularly as we could afford them, the results became more and more noticeable.

For one memorable Yagya, we had three goals: to live in a home with the proper east or north entrance, buy land to build a Sthāpatya Veda home, and have the resources to build the home. Within a few months we had the first two and the beginning of the third—my real estate business started doing better.

A few months later we did a Yagya for wealth. Within a few more months many elements came together and my income from commissions was four and a half times what it was for all of the previous year.

Most important, these outer results were accompanied by an integrated bouquet of inner results—increased clarity and intuition, a flow of great ideas, more bliss, more confidence, more inner stability, a more powerful influence on the environment—all the qualities of successful people. So it’s not just that nature was giving me more money, but my whole personality, my full potential, was being enlivened, and that resulted in more success.

Before the Yagyas, I felt there was some obstacle keeping me from true success. That feeling is gone. I now expect things to go well and for abundance to come. It’s not something I could have done just from thinking or wishing it—because heaven knows how many years I have wished it and thought positively. Something different was happening. A tangible obstacle had truly been removed. I could feel it. I cannot emphasize what a blessing this is to life.

—Judy Raymond, Jackson, Wyoming
The Main Effects of the *Maharishi Yagya* Program

**Protection**
The first and main effect is to neutralize unfavorable influences. Like a gardener who builds a greenhouse to protect the plants from harmful outer influences, Maharishi Yagya performances create a protective shield.

**Fulfillment**
The second effect: to fulfill your desires. Just as the gardener adds fertilizer to make the plants grow and flourish, there are Maharishi Yagya performances to nourish specific aspects of life to help you achieve your goals.

**Peace and harmony**
Every Maharishi Yagya performance—whether for individuals, companies, or nations—benefits the whole world. By enlivening the total potential of natural law, each one helps create peace and harmony between nations.

*Maharishi Vedic Organic Agriculture*—Food for Perfect Health
Our minds and bodies depend on the quality of the food we eat. Some experts estimate that 80% of all diseases could be prevented through proper diet alone.

Fortunately, people are waking up to the hazards of modern food production—the use of toxic chemicals in farming, the depletion of nutritional value in processing, the additives that unbalance body and mind, even the rising economic pressures faced by farmers worldwide. The organic market has become the fastest growing sector of the food industry.

Now more than ever, what is needed in agriculture is complete knowledge of natural law. Standard organic agriculture is a good step forward—it is pure agriculture, free of poisonous herbicides, insecticides, and fertilizers.

*Maharishi Vedic Organic Agriculture* starts with the most rigorous standards for pure organic food and then adds Vedic technologies that
enliven the plant’s inner intelligence and vitality. The result is food that supports perfect health and growth of higher states of consciousness.

**Bringing Support of Natural Law to Farming**

Every farmer needs the full support of natural law—timely progression of seasons, good weather, absence of pests and diseases. If farmers themselves are living in harmony with natural law, growing toward higher states of consciousness, they will enjoy maximum support of nature. So Maharishi Vedic Organic Agriculture begins by cultivating the farmers themselves, through the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying. And then farms and farm buildings designed in harmony with natural law, using the principles of Maharishi Sthāpatya Vedic design, will add further to farmers’ support of natural law. Maharishi Vedic Organic agriculture also means that farmers take advantage of the nourishing influence of Veda, the total potential of natural law, expressed in the melodies of the Vedic literature. These sounds or vibrations, the creative impulses of natural law itself, promote orderly brain functioning and balance in the human physiology. They also enliven nature’s intelligence in plants, at each stage of the plant’s growth. Sung in the fields by trained Vedic Pandits, these melodies stimulate the plant to grow in its maximum nutritional value and promote the growth of enlightenment. Farmers need to take advantage of the Maharishi Jyotish and Maharishi Yagya programs to avert negative trends and promote positive trends.

Maharishi Vedic Organic Agriculture also includes specific farming practices drawn from the ancient Vedic tradition, covering all aspects of farming, from soil typing to crop seeding, from preventing disease to eliminating pests—all based in the complete knowledge of natural law and how the laws of nature function in specific phases of farming.

Modern agriculture is not sustainable. It depletes the soil, pollutes and destabilizes the environment, yields unhealthy food, and gives the farmer an uncertain future. Organic agriculture is an enormous step of progress. Maharishi Vedic Organic Agriculture, grounded in complete knowledge of natural law, brings the full support of nature to agriculture.
The result: enlightened and prosperous farmers, plants glowing with nature’s total intelligence, food that promotes perfect health and higher consciousness, a healthy environment, and a healthy world economy.

**The Hazards of Modern Agriculture**
Modern agriculture has become hazardous to the life of the individual, the society, and the environment. Large-scale use of chemical fertilizers, pesticides, and herbicides are unhealthy for farmers and consumers and have polluted the entire food chain with poisons and killing agents. Aggressive agriculture, deforestation, and overgrazing have led to catastrophic soil erosion and loss of soil fertility. Fruits and vegetables are harvested long before they are ripe and have developed their full nutritional value. Nutritional value drops sharply during the days or weeks between harvest and eating. Modern food processing further depletes nutritional value and adds chemicals that disrupt normal physiological functioning. Genetic engineering involves the untested, irreversible, and self-perpetuating reprogramming of the plant’s natural DNA blueprint, creating plants that have never been part of the environment. The results to both human and environmental health are potentially catastrophic.

**Maharishi Gandharva Veda Music—Promoting Balance, Harmony, and Peace in the Environment**
Modern science has also begun to confirm what was understood in many ancient cultures—that music influences the environment and even the functioning of the body. With its complete knowledge of natural law, the ancient Vedic tradition of India developed a complete system of music to create balance in nature, eliminate stress in the atmosphere, and produce a healthy influence for the individual and peace for the world.

This is Gandharva Vedic music, the traditional classical music of the ancient Vedic civilization, referred to by Maharishi as “the eternal music of nature,” music in alliance with natural law. Gandharva Vedic music belongs to a branch of Vedic science known today as Maharishi Gandharva Vedic music. This music, Maharishi explains, upholds the natural rhythms that prevail at different times throughout the day and night, using sound, melody, and rhythm to restore balance and harmony in the mind, body, behavior, and environment.
Listening to Maharishi Gandharva Veda music at the appropriate times of day helps the mind and body to function in harmony with the 24-hour cycle of natural law. It is not even necessary to listen to Maharishi Gandharva Vedic music to enjoy its benefits—it can be played in a home or office, 24 hours a day, even when no one is there, creating a powerful influence of balance, harmony, and peace.

A Powerful Harmonizing Influence

From morning to morning the melody of nature is changing, changing. Gandharva music goes with the time, setting its melodies according to the changing nature. It sets forth those very natural melodies which match with the process of evolution. It provides a powerful harmonizing influence in the whole atmosphere to balance imbalances in nature.³

—Maharishi

References


4. Quoted in Relief 1(1) (October 1999), 2.


6. For a summary of research on the Maharishi Vedic Vibration Technology program, see www.vedicvibration.com/Research.htm.


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Section II

Neurophysiology of Enlightenment
Introduction to the

Maharishi Technology of the Unified Field:

The Neurophysiology of Enlightenment

Robert Keith Wallace, Ph.D.
ABOUT THE AUTHOR

Robert K. Wallace, Ph.D., founding President of Maharishi International University (now Maharishi University of Management), received the degrees of B.S. in Physics and Ph.D. in Physiology from the University of California, Los Angeles, and did postdoctoral research at Harvard Medical School. He was awarded the Doctorate of World Peace degree from Maharishi University of World Peace. He serves as Chair of the Department of Physiology and Health, Professor of Physiology and International Director of Research at Maharishi University of Management. A pioneer in the neurophysiology of higher states of consciousness, his work has been published in many journals including Scientific American and The American Journal of Physiology. His ground-breaking research on the physiology of meditation opened the door for its scientific study and application in the field of behavioral medicine. He is the author of The Neurophysiology of Enlightenment and The Physiology of Consciousness, and has lectured in over 50 countries. He serves as co-Chair of the Health and Happiness Committee on the Board of Trustees.
ABSTRACT

History today is witnessing a great transition, one in which ancient and new knowledge are meeting. Up to about the last 300 years, gaining knowledge was primarily a subjective phenomenon. However, over the last 300 years, pursuit of knowledge has become more objective, based largely on application of the scientific method to phenomena observed on a sensory level. In recent years, discovery of the unified field by modern physics has closed the circle of human knowledge, bringing modern science and ancient science to the same basic conclusion—there is an unmanifest unified field underlying every thing and every event in the universe.

Modern science has discovered this unified field through indirect means, while the ancient subjective science of the rishis\(^1\) discovered it through direct experience. Maharishi Mahesh Yogi has revived the subjective technology to open the awareness of any individual to this unified field. Corresponding to this opening of awareness, there is a progressive change of physiological function so that it becomes a more pure reflection of this unified field. The body-mind takes on more properties of the unified field, resulting in greater physical and mental health and resistance to disease, ultimately reaching a state known as “enlightenment.” Moreover, these changes away from stresses and strains in the mind and body of many individuals add up to a transformation in society as a whole, one in which stresses and conflicts that lead to major hostilities can be replaced by cooperation and advancement for all, referred to in this chapter as the “neurophysiology of world peace.”

Introduction

We are witnessing today a great transition in the history of mankind, a remarkable turning point in which the newest and oldest traditions of knowledge are at last converging and being unified into a new level of understanding and technology. While innumerable individuals have contributed to this transformation through their discoveries and insights, the primary recognition for this achievement of a rising new age of enlightenment, as history must show, goes to one man, Maharishi Mahesh Yogi. Over the last 50 years Maharishi, the founder of the Maharishi Technology of the Unified Field, has pioneered the development and understanding of

\(^1\) Vedic seers
an integrated science of life, which unifies the ideas of modern science, in particular the unified field theories of modern physics, with the complete wisdom of ancient Vedic Science. Further, Maharishi has introduced to over three million people of all cultures, religions, and educational backgrounds the practical aspect of this technology—the Transcendental Meditation and TM-Sidhi programs. The result is the availability to all people everywhere of a technology for directly experiencing the unified field of all the laws of nature.

From my point of view as a physiologist, what Maharishi has accomplished is the single most important scientific discovery of our age or for that matter of any age. Perhaps there is no more appropriate time in history for such a discovery, a time when the laws of physics are on the verge of a long sought unification, and yet a time when the entire world lives in fear of total annihilation. For the first time in thousands of years, this ancient tradition of knowledge has been revived in completeness, a tradition that in fact includes a profound science of physiology. Until Maharishi began teaching it widely, this science of physiology was nearly extinct except in the practices of a secluded few individuals. It had for centuries been totally misunderstood by scholars and laymen alike in both the East and the West. The revival of this science has resulted in an unprecedented advance in our understanding of human consciousness and in the availability of a set of procedures for the development of an extraordinary state of neurophysiological functioning—a state traditionally referred to as enlightenment. As defined by Maharishi, the state of enlightenment is a state in which the awareness is established in the unified field of natural law, and in which activity and behavior are thus spontaneously in accordance with all the laws of nature. This state is achieved as a result of neurophysiological refinement and depends upon the perfect and harmonious functioning of every part of the body.

**A Scientific Means to Develop Enlightenment**

What is unique about this technology for the development of consciousness and physiology? First, it has been re-established in its purest and most effective form by Maharishi. Second, it is being expressed in a manner that makes it fully comprehensible and accessible in terms of the most recent theories and experimental procedures of physics,
chemistry, mathematics, physiology and other disciplines of modern science. This meeting of ancient and modern science is removing the understanding of enlightenment from the realm of mysticism and uncertainty. It is showing enlightenment to be a scientific reality that is verifiable, universally available, and of immense practical value.

Enlightenment means, in a physiological sense, maximum orderliness and integration, perfect correlation between all aspects of physiological functioning—from the level of the DNA molecule, the total potential of natural law in living systems, to the highest expression of that potential in the functioning of the human nervous system. It represents the ultimate development of what we ordinarily consider the most valuable qualities of human life. It is something real and natural and develops systematically in a continuous and progressive manner on the basis of neurophysiologic refinement, utilizing the existing mechanics of human physiology.

Scientific research on the Transcendental Meditation and TM-Sidhi programs has revealed several important features of the nature of enlightenment documenting marked improvements in all aspects of mind and body, including a reversal of the aging process. Taken together, this research begins to define physiologically the direction of enlightenment. Furthermore, it provides objective standards by which progress towards enlightenment may be measured. Through the Maharishi Technology of the Unified Field enlightenment can be achieved by anyone without adherence to a special life style or system of belief. The ability to gain enlightenment is innate in the physiology of every man and woman, and therefore every human being deserves to have the knowledge of how to utilize it. As Maharishi has said, “There is no reason today in our scientific age for anyone to remain unenlightened.”

In this article we shall examine the Maharishi Technology of the Unified Field, particularly from an experimental viewpoint, with reference to the many hundreds of scientific studies conducted at over 200 eminent universities and research institutes around the world. First, however, we will briefly introduce the concept of the unified field as it is understood from the perspective of the different disciplines of modern science and from the perspective of ancient Vedic Science.
The Unified Field of Natural Law

Within the last half of this century the various disciplines of modern science such as physics, mathematics, chemistry, and physiology have come to a common understanding that the basis of all physical activity is, in fact, an unmanifest or unexpressed field of knowledge. Modern science has demonstrated over and over that it is impossible to understand the full nature of a system by merely examining the superficial, excited levels of its activity. From the viewpoint of these more excited levels, diversity, differentiation and change predominate, while from the perspective of the lesser excited and more unexpressed, underlying levels, integration, stability and unity predominate. The entire history of modern science is the history of the discovery of deeper levels of unification of the laws of nature, beginning with classical physics, developing into the more profound theories of quantum physics, and finally culminating in recent unified field theories.

The most profound aspect of the recent advances in modern physics is the description of an ultimate level of unification, the unified field of all the laws of nature, or super-field, which has the attributes of complete self-referral, self-sufficiency and infinite dynamism. These unique attributes of complete self-referral, self-sufficiency and infinite dynamism are precisely the same attributes that characterize the field of pure consciousness as described by Maharishi in his formulation of Vedic Science. Modern physics further describes a three-in-one structure of the unified field, in which the force and matter fields are united through the agency of supersymmetry. Likewise, in probing deeply into the ancient Vedic literature, Maharishi describes a three-in-one structure of pure consciousness in which the knower and known are united by the process of knowing.

Thus modern physicists have concluded that the underlying nature of life is remarkably similar to the understanding expressed in ancient Vedic Science—it is a unified field, unmanifest, non-localized, infinitely dynamical, and has the qualities of self-sufficiency and self-interaction or self-referral. The unified field contains the total potential of all the laws of nature in their most compact and integrated state. This achievement of modern physics—to have glimpsed a unified self-referral field of natural law at the basis of creation—is of immense importance, and
is paralleled by similar discoveries in other fields of modern science such as mathematics, chemistry and physiology.

In mathematics we find that the axioms of set theory describe the null or empty set as an unmanifest, self-sufficient and self-referral field of intelligence. From this unmanifest null set, the full range of all mathematical theories, from the finite to the infinite, can be sequentially generated. Similarly, in modern chemistry, the basis of all the diverse chemical reactions and processes is located in the unmanifest quantum mechanical nature of the transition state. The transition state is a self-referral field of all possibilities, which ultimately gives rise to all possible behaviors of any chemical system. In modern physiology the source of all physiological structures and functions is located in the metabolically silent DNA molecule. All physiological processes are ultimately referred back to the knowledge within DNA. DNA acts in effect as the self-referral, self-sufficient source of all biological knowledge in living systems.

The objective approach of modern science has made an enormous advance in describing the nature of reality as an unmanifest field of natural law. However, as Vedic Science reveals, complete knowledge of this ultimate field can only be gained on the level of consciousness through direct subjective experience. This is because of the completely self-referral nature of this field. It is a field of pure consciousness—pure knowledge—and therefore can be known only by itself, by consciousness aware of its own unified nature. Modern science by its very emphasis on the object has excluded from its investigation the subject—the knower—and the process of knowing. Only when these three components—knower, known and process of knowing—are experienced in their completely unified state can complete or pure knowledge be realized.

To achieve this unique experience of pure consciousness being aware of its own nature, one must develop a refined level of neurophysiological functioning. The Maharishi Technology of the Unified Field includes a very specific process designed to culture the nervous system and the entire physiology so it can support lesser and lesser excited states of consciousness until finally it is able to support and spontaneously maintain the least excited state of consciousness—pure consciousness. The ability to maintain this state of pure consciousness gives direct experi-
ence of the unified field, the total potential of natural law, and enables individual awareness, and consequently all individual thinking and action, to be in accord with all the laws of nature at all times.

**Neurophysiology of World Peace**

The implications of this new technology are far reaching, extending beyond the individual to include the whole of society. According to Maharishi, at the basis of individual consciousness is a field of collective consciousness that underlies the coherent behavior of society. By aligning individual consciousness with the unified field it is possible not only to bring individual life in accord with natural law but also to positively influence the overall quality of life in all areas of society.

A peaceful individual is the unit of world peace. The unit of world peace, in turn, is structured in the specific pattern of neurophysiological functioning that is generated by the Maharishi Technology of the Unified Field. We thus have in our possession a technology to structure the neurophysiology of enlightenment for each individual and also to structure the neurophysiological basis of world peace. Given the current world situation, it is very timely that Maharishi has offered the practical means to create world peace, to create a unified field based civilization.

It has always been the characteristic of great scientific discoveries to produce unforeseen technological breakthroughs of immense benefit to human life. It is the very great fortune of this age to have been given this gift of enlightenment by Maharishi. It is also the great responsibility of this age to utilize this precious knowledge and technology revived by Maharishi in order to eliminate, as quickly as possible, suffering and violation of natural law, and to usher in an age of enlightenment.

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Physiology, Veda, and Consciousness

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ABSTRACT

How can we understand the human brain and consciousness? This question has perturbed neuroscientists and non-scientists alike. We may think of the brain as the link between our subjective experience and the concrete, objective world of physical matter and energy. Interestingly, looking at the broad span of history, attempts to understand consciousness have taken both these angles—subjective and objective. Modern neuroscience, taking the objective approach, has tended to view consciousness as just another expression of brain activity. However, according to Maharishi Mahesh Yogi, consciousness is not merely an individual, human, subjective experience but is the most fundamental field of nature, the unified field of natural law.

The ancient science of Veda, as interpreted by Maharishi, has identified consciousness as the all-pervasive, “unmanifest” or invisible field underlying all levels of concrete or “manifest” existence. In the 1980s, Maharishi elaborated upon the nature and principles of this unified field of natural law, and developed a discipline referred to as the Maharishi Technology of the Unified Field. This discipline analyzed all areas of life in terms of the unified field of natural law. It involved both subjective and objective approaches to gaining knowledge. Ultimately, its purpose was to cultivate “higher states of consciousness” in individuals through practical techniques, including the Transcendental Meditation and TM-Sidhi programs.

The expression “higher states of consciousness” denotes states of human awareness more comprehensive and profound than the familiar states of waking, dreaming, and sleeping. The experiences of individuals advancing toward permanently established higher states of consciousness are evaluated based on each of the three main streams of knowledge contributing to this new discipline, namely, 1. the ancient Vedic tradition of India, as accessed through the Vedic literature; 2. the subjective technologies for attaining direct experience of the field—the Transcendental Meditation and TM-Sidhi programs; 3. the principles and discoveries of modern science. The remainder of this article discusses in detail the first two of these streams and concludes with an illustration of the third, a detailed description of the scientific discovery of enlightenment.
Introduction

For thousands of years man has tried to understand the nature of consciousness and its relationship to the laws of nature. Until less than 300 years ago virtually all of the methods for gaining knowledge were subjective in nature. At the core of almost every cultural tradition of mankind can be found specific subjective techniques which attempt to enliven an inner intuitive understanding of natural law. This is particularly true in the Vedic tradition of India, where refined technologies of meditation were developed to probe into one’s own nature, into the Self, the state of pure consciousness. (This unbounded value of the Self is written with an uppercase “S” to distinguish it from the ordinary, localized self we typically experience.) Even at the beginning of our Western tradition, in Socrates’s famous dictum “know thyself,” the emphasis was to understand man’s essence first, for it was felt that man was but a representation, or microcosm, of the entire universe, and that by knowing the nature of the inner self the essence of natural law might be realized. As a result, life could be lived more in accord with natural law.

The modern approach to understanding the nature of consciousness is the objective methodology of science, which in the last 300 years has become the dominant and effective tool of inquiry into nature. The neurosciences are those disciplines that have been concerned specifically with utilizing this objective methodology to study the nervous system and brain, those physical structures that support the integrity of consciousness. Throughout the history of neurophysiology the primary methodology has been reductionistic in nature: an attempt to localize the subjective nature of consciousness in specific structures or processes within the brain. In so doing a number of questions have been raised, including: What is the physical basis of memory? What are the anatomical structures involved in emotional behavior? How can we define mental health in terms of the balance of specific chemicals in the brain?

While we have gained a great deal of information concerning the basic electrophysiological and biochemical mechanisms of such simple neurophysiological systems as the nerve axon or neuromuscular junction, we still know very little about the neurophysiological basis of more integrated neural systems, let alone the human brain itself. Many students of neuroscience enter this field with a desire to gain a more com-
plete picture of the neurophysiological basis of consciousness. However, after a few years in graduate school, most typically find themselves investigating the electrical or chemical properties of neural membranes in squids or snails, an area of basic importance, but far removed from their original intention to better understand consciousness.

The Nobel laureate David Hubel, in an introduction to a collection of articles entirely devoted to current research on the brain, poses the question, “Can the brain understand the brain? Can it understand the mind? Is it a giant computer or some other kind of giant machine, or something more?” These questions are fundamental not just to research on the brain but to the whole direction of science.

Most brain researchers today, I think, feel that the brain is only beginning to understand the brain. While this beginning is itself one of the most exciting and significant areas of human knowledge, a new direction is clearly needed. Another Nobel laureate, Francis Crick, in an article entitled “Thinking About the Brain,” points out that “the brain is clearly so complex that the chance of being able to predict its behavior solely from a study of its parts is too remote to consider. We sense there is something difficult to explain, but it seems almost impossible to state clearly and exactly what the difficulty is. This suggests that our entire way of thinking about such problems may be incorrect.” In his article Crick emphasizes the importance of new approaches, for, as he says, “There is no scientific study more vital to man than the study of his own brain. Our entire view of the universe depends on it.”

The human brain is indeed the most precious gift of nature. It is the link between the abstract subjective world of consciousness and the concrete objective realm of physical matter. The famous neuroanatomist Ramon y Cajal said, “As long as the brain is a mystery, the universe, the reflection of the brain, will also be a mystery.” How can we understand the brain, and more importantly how can we understand the nature of consciousness?

We can gain an insight into what steps are in fact necessary for a new direction or breakthrough in neuroscience by looking into one of the great breakthroughs in modern science: the formulation of quantum physics, and with it the realization that there exist in fact two very different types of physical reality—the reality of classical physics
and the reality of quantum physics. In the classical realm we assume that particles and events are concrete, localized and predictable. Furthermore, they can be served and measured in space and time, and our observation is independent of the measurement itself; that is, it does not change the thing we are observing.

In quantum physics the situation is entirely different. We cannot picture the quantum realm, for it is based on the behavior of systems that cannot be clearly observed. The particles and events are abstract, non-localized, and in fact are described in terms of probabilities. Further, the quantum world is not independent of the observer, but rather very dependent upon the act of observation, as demonstrated by the famous Heisenberg uncertainty principle. Thus there are two separate realities, the manifest classical world and the unmanifest quantum world.

This realization by modern physicists of two separate realities should also, I believe, be applied to modern neuroscience. The first reality or level is the nervous system; the electrical and biochemical activities of the nervous system are localized and measurable. The second reality is the mind or consciousness, which is abstract and nonlocalized in its nature and difficult to measure directly.

The great success of quantum theory lies in its ability to describe the very fine levels of matter far more accurately than classical physics. It does not discard the observations of classical physics, but rather reveals that the laws of classical physics are correct only on a macroscopic scale where matter and energy exist in excited states. The more fundamental states can be properly described only by the more encompassing and powerful language of quantum field theory. Thus, while the laws of classical physics are in agreement with those of quantum physics in the more excited states of matter they are unable to describe the more fundamental, lesser excited states.

I believe the same situation exists in the field of neuroscience. The present concepts and approaches are classical in their nature and are limited in their ability. They reflect the activities of only the most excited states and are unable to probe into the lesser excited, more fundamental states of the nervous system and of consciousness. A new approach in neuroscience, akin to that taken by quantum theory, is needed, one which deals with the phenomenon of consciousness more directly. This approach, therefore, could more accurately describe the
lesser excited states of the nervous system without discarding all of the
great achievements of classical neuroscience.

In order to create such a new field in neuroscience that deals with
consciousness more directly we must, however, have available a research
tool or technology that is sophisticated enough to study the nervous
system in its purest and least excited states. The Maharishi Technol-
yogy of the Unified Field is just such a research tool. While the origin
of this technology, the Vedic tradition of India, is both unfamiliar and
unexpected to most scientists, extensive research over the last decade
has revealed its immense importance to both science and society.

**Rediscovery of a Science of Consciousness—Vedic Science**

Over the last 50 years Maharishi Mahesh Yogi has
developed a science
and technology of consciousness that provide an entirely new approach
and insight into the nature of consciousness. Consciousness, according
to Maharishi, is not merely an individual human subjective experience
or stream of awareness, but is the most fundamental field of nature, the
unified field of natural law. As we have briefly seen and will elaborate
in greater detail in a later article, Maharishi's description of the field of
pure consciousness is virtually identical to the description of the unified
field or super-field of modern physics. This new science of conscious-
ness, the Maharishi Technology of the Unified Field, has theoretical,
experimental and applied values in all areas of life. The theoretical and
experimental components are derived from three principle sources of
knowledge and research: 1) the ancient Vedic tradition of India, 2) the
Transcendental Meditation and TM-Sidhi programs, and 3) the prin-
ciples and discoveries of modern science. Let us briefly examine the
first of these sources as an introduction to this new field of research.

The Vedic tradition of India is considered by many scholars to be
the oldest living tradition of knowledg preserved by man. Unfortu-
nately, the interpretation of knowledge has been confined, until now,
to a very superficial level. This is primarily because Vedic knowledge
can be properly understood only from the perspective of higher states
of consciousness, and to develop these higher states, a precise set of
procedures is needed. Without an effective methodology to experience
higher states of consciousness, the essential meaning of the Vedas can-
not, according to Maharishi, be realized.
It is Maharishi’s genius to have revived this profound knowledge. With extraordinarily profound insight, he has reinterpreted the Vedic literature in terms of the experience of higher states of consciousness and demonstrated that far from being stories or hymns, they are a remarkably precise description of the dynamical principles underlying the laws of nature.

The word Veda refers to the state of pure knowledge or pure consciousness in which the knower, process of knowing and known are completely unified. Vedic Science, as formulated by Maharishi, provides a very complete and detailed elaboration of this unified state of pure knowledge. Further, it systematically describes a first principle of the inherent dynamism of natural law. This is the principle of self-referral or self-interaction of knower, process of knowing, and known, through which this three-in-one structure gives rise to the vast diversity of natural law.

As a result of this first principle of the self-referral dynamism in nature, consciousness in its self-interacting state becomes aware of itself, leading to the emergence of three distinct components within the one fundamentally indivisible field of pure consciousness. Proceeding in one direction, the one (consciousness) assumes the structure of three (knower, process of knowing, known); and in the other direction, three in turn converge to become one. This fundamental dynamism establishes an inherent pulsation in the unmanifest structure of pure consciousness, which underlies all the expressions of natural law in creation. In the words of the Rk Veda, “Ṛicho Akshare parame vyoman, yasmin Devā adhi vishve nisheduḥ. The verses of the Veda exist in the collapse of fullness (the kṣhara of A or inherent pulsation of the universe) in the transcendental field in which reside all the Devas, impulses of creative intelligence, the laws of nature responsible for the whole universe.”

The four books known as Rk Veda, Sāma Veda, Yajur Veda and Atharva Veda serve to record the words of Vedic literature. However, they themselves are not the Veda. Veda is the field of pure potentiality, pure intelligence, pure knowledge, that indestructible, immortal level of reality which contains all the impulses of natural law structuring the rest of creation. How, then, can one know the Veda? Maharishi refers to a verse from the Rk Veda to answer this question:
Yastanna veda kim richā karishyati, ya ittadvīdus ta ime samāsate.

He whose awareness is not open to this field, what can the verses or impulses of pure knowledge accomplish for him? He whose awareness is open to it, he is established in evenness—wholeness of life.

The impulses of natural law can be cognized only in the state of pure intelligence, pure knowledge. They cannot be known except in a very superficial way in ordinary, excited, waking state consciousness. Their real value can be realized only in the least excited state of consciousness, the state of pure consciousness—the simplest form of human awareness, the Self. In this state consciousness appreciates its own fine structure moving within itself.

The practical value of this state of pure knowledge, consciousness aware of itself, is that grounded in this state the individual begins to act in accord with natural law. Established in this state of wholeness, every impulse of action arises from an impulse of natural law, and thus all activity is most effective and life-supporting. The whole process is very spontaneous, as the Rk Veda explains.

Yo jāgāra tam richāḥ kāmayante.

The richas (impulses of natural law) seek out him who is awake.

To be fully “awake,” according to Maharishi, means to be established in pure consciousness, pure knowledge. This is a prerequisite for gaining knowledge of the Veda. Once one is fully awake no effort is needed; in this state of pure awareness the nature of the underlying threads of pure awareness begin to reveal themselves to themselves. Therefore the Veda is structured in consciousness, and is accessible through the Maharishi Technology of the Unified Field, which refines neurophysiologic functioning such that human awareness is open to the direct experience of consciousness in its pure self-interacting state.

The nature of Vedic cognition is such that the knower, process of knowing and known remain unified within the state of pure consciousness. The richas are experienced not as separate from oneself, but as the modes of one’s own intelligence—consciousness reverberating within itself. Thus, the Veda is the unified state of the knower, the process of knowing and the known—referred to in the Vedic literature
as Sāṁhitā—and its three essential components are known as Ṛishi, Devatā and Chhandas, respectively.

These essential components of experience—Ṛishi, Devatā and Chhandas—are separately elaborated in the extensive body of Vedic literature, including the Brāhmaṇas, Vedāngas, Upāṇgas, Itihāsas, Purāṇas, Smṛitis and Upavedas. The various branches of the Vedic literature are seen to emerge from the Sāṁhitā, from which they derive their vitality and authenticity. In fact, all the disciplines of modern science can also be seen to have their origin in the Sāṁhitā which represents the internal structure and dynamics of the unified field itself.

### Higher States of Consciousness

According to the Vedic tradition of knowledge, what we consider normal waking consciousness is in fact a very limited experience of consciousness that is confined to the more excited levels of the mind. Systematically quieting the internal physiology and at the same time enlivening mental awareness allows the experience of a least excited or ground state of consciousness. This ground state of consciousness is referred to as the state of transcendental or pure consciousness, in which there are no thoughts, no sensory experiences, and no distinction between subject and object—only pure awareness, the experience of consciousness itself.

The Vedic tradition not only describes a ground state of consciousness, which is distinctly different from the waking, dreaming or sleep states of consciousness, but, as we have mentioned, further specifies the existence of a set of “higher” or more optimal states of consciousness. These higher states of consciousness are characterized by simultaneous coexistence of the ground state—pure consciousness—along with the waking, dreaming, or sleep states. Furthermore, they give rise to a more perfect optimal state of neurophysiological functioning.

Why have these descriptions of meditative procedures and higher states of consciousness contained in the Vedic texts, which have such obvious practical advantages, been so ignored and mistrusted in Western and even Eastern civilization? To answer this question, we must keep in mind one critically important fact: the practice of these techniques develops and perfects the physiology of the participants. The knowledge of how to attain higher states of consciousness, and eventu-
ally enlightenment, includes an ancient science or technology of physiology, which contains many procedures designed to purify and refine the body and nervous system. Greater physiological refinement in turn supports deeper subjective experiences. The state of enlightenment thus depends upon, and is defined in terms of, the perfect and harmonious coordination of mind and body, a unique physiological state.

Precisely because enlightenment depends upon a unique physiological state, it becomes difficult to achieve when the technology for gaining it easily is lost. Maharishi explains that this ancient science, which included meditation procedures, was universally known in the time of ancient Vedic civilization in India, but was gradually lost except to a handful of individuals, “due to the long lapse of time.” The technology became distorted because of a lack of proper understanding of how to fully utilize the procedures to refine and perfect the nervous system. Once these systematic methods were lost, there arose in their place an enormous variety of less effective and more difficult techniques. Meditation procedures no longer contained their once universal character, but were replaced by austere practices of renunciation and detachment. Over the course of time the high regard once given to higher states of consciousness and the state of enlightenment was replaced by mistrust and disbelief.

Maharishi, in rediscovering and developing the precise and effective methodology to refine the physiology in a simple, natural, and effortless way, has enabled the experiences and principles contained in the Vedic tradition to be correctly understood and independently experienced by hundreds of thousands of individuals throughout the world.

How did Maharishi revive this knowledge? He continually gives credit for this revival to his teacher, Swami Brahmamanda Saraswati, Jagadguru Bhagawan Shankaracharya (affectionately referred to by Maharishi as “Guru Dev”) who was regarded throughout India as a unique living example of the highest level of inner perfection as expressed in the Vedas.

In India, the traditional means of gaining knowledge is through oral instruction passed from teacher to disciple under the strictest supervision. The tradition from which Guru Dev comes can be traced back many thousands of years to the great Indian saint and philosopher Shankara. The line of Shankara in turn has its origin in the Vedic tra-
dition. Thus the tradition of knowledge Maharishi has revived extends in an unbroken continuum from earliest Vedic culture to modern times. It had for centuries been principally a monastic and reclusive tradition. Even among those who were accepted into it only a small number were recognized as having achieved complete enlightenment; they often lived in solitude inaccessible to all but a few disciples.

In 1941, following a long period in which the principle seat of the Vedic tradition had been unoccupied, Swami Brahmananda Saraswati, in answer to repeated requests by India's most revered philosophers and scholars, left his reclusive life of solitude and assumed the position of the Shakaracharya of Jyotir Math of Northern India. During this time Maharishi became his closest disciple and undertook training in the tradition that for countless generations has preserved and protected in its purity the essence of Vedic knowledge, which includes the procedures for the refinement of physiological functioning and the attainment of enlightenment.

Maharishi spent some thirteen years under the guidance of Guru Dev, and when his teacher passed away in 1953, he went into seclusion in Northern India. After several years Maharishi left seclusion temporarily to make a pilgrimage to South India. The journey, however, became considerably longer than he had expected. While he was in South India, he was asked to lecture on the teachings of his master. After this first lecture the demand became so great for the knowledge Maharishi had to offer that he spent the next fifty years lecturing and teaching around the world. Maharishi took an unprecedented step: he made available on a large scale—to men and women from all walks of life and in all parts of the world—a teaching that had for many years been known only to a handful of monks.

According to Maharishi’s interpretation of the most renowned texts of Vedic literature (such as the Bhagavad Gitā) there were, originally, two types of meditation techniques, one for monks and one for householders. The procedures for monks had lost their effectiveness over time, but had been maintained, at least to some extent, within the walls of the monasteries. The householder procedures, however, were completely lost. It was assumed that one had to first lead a monk’s life before one could learn to meditate. Maharishi revived both types of procedures in their full effectiveness. Further, he taught that anyone could begin the
householder procedures without first having to change his or her lifestyle. These householder procedures, which constitute the experiential component of the technology of the unified field, are commonly known as the Transcendental Meditation program and the more advanced TM-Sidhi program.

The mental image evoked by the word “meditation” is that of an ascetic monk sitting cross-legged in a remote mountain cave, with little protection or clothing and virtually no possessions. To most of the western world, such a lifestyle obviously lacks appeal. Not only would the specific practice of an austere technique of meditation be extremely demanding and time-consuming, but also the prerequisite social and ethical codes would be both incongruous and incompatible with the social and materialistic pattern of life in modern civilization.

The Transcendental Meditation technique is a unique, simple and effective mental procedure. Most people have begun the technique for such practical reasons as the desire for better physical and mental health, increased energy, decreased anxiety and tension, more fulfilling family relations, improved clarity of thought, and greater success and fulfillment. The technique involves no mood, belief, or specialized lifestyle; rather it involves a real and measurable process of physiological refinement. It utilizes the inherent capacity of the nervous system to refine its own functioning and to unfold its full potential. In a spontaneous and natural way during the practice, the attention is drawn to quieter, more orderly states of mental activity until all mental activity is transcended, and the observer is left with no thoughts or sensations, only the experience of pure awareness lively in itself.

While the experience of transcending can be verbally described, (and many beautiful literary descriptions of it exist), it is an experience that depends upon a very specific and delicate state of the nervous system. It cannot properly be learned through books, but must be learned through personal instruction by a trained teacher. This helps prevent forcing, straining or expectation which, according to Maharishi, hold the mind on a gross level and disallow the experience of more delicate and subtle levels of the thinking process.

Most systems of meditation teach that the tendency of the mind is to wander, and that in order to experience quieter levels of consciousness, the mind must be controlled. Maharishi explains that the tendency of
the mind is not to wander aimlessly, but to move naturally in the direction of experiences that bring greater happiness and enjoyment. He states, and this is the common experience reported by meditators, that increasingly quieter and more refined levels of thinking are progressively more enjoyable. Therefore, one needs to know only how to begin the procedure for allowing finer levels of thought—the more delicate stages of the process of the development of a thought—to come to conscious awareness and spontaneously the attention is drawn inward. While this procedure is completely natural to the mind, it is also very delicate. Without proper instruction and checking by a qualified Transcendental Meditation teacher, misunderstandings in meditation can unnecessarily arise, and the individual may not gain the full benefits of the practice.

Personal instruction is necessary for another reason. Although, in principle, any thought could be chosen as a vehicle for transcending, the Vedic tradition, from which the Transcendental Meditation technique is derived, has systemically found that certain particular thoughts or sounds are most conducive to producing maximum beneficial effect. The scientific verification for the appropriateness of these sounds, or “mantras,” is based primarily on thousands of years of the experience of the teachers of this tradition. That the sound value of a thought is chosen rather than its meaning or its value as a visual image is interesting and important in itself.

According to Maharishi, the sound value is chosen because we are most commonly aware of thought as a sound. We “hear” our thoughts in our mind. At subtler levels, the thought may actually acquire multisensory characteristics, that is, it is simultaneously heard, visualized, felt, and so forth. From the point of view of neurophysiology, this is important for it suggests the involvement of more integrative areas of the brain such as the frontal cortex, which receive input from all the major senses.

The **TM-Sidhi Program**

In 1976, approximately 15 years after the introduction of the Transcendental Meditation technique, Maharishi began teaching a set of advanced procedures known as the TM-Sidhi program. These procedures were derived from that part of Vedic literature known
as the Yoga Sutras of Patanjali. Patanjali's Sūtras have been available in translation for a number of years, yet their interpretation and application are still misunderstood. Maharishi recognized that their effectiveness was entirely dependent upon the ability to transcend and maintain the state of pure consciousness, which occurs naturally a result of the regular practice of the Transcendental Meditation technique. It is a misinterpretation of Patanjali's original instructions to attempt these procedures without the ability to transcend.

The Transcendental Meditation technique cultures the nervous system to maintain the state of pure consciousness, a state referred by Patanjali as samadhi. The TM-Sidhi program involves applying Patanjali's sūtras in a very specific way as taught by Maharishi. The procedure provides a unique means of stirring the field of pure consciousness, of transforming the quiet nature of pure consciousness into a dynamic self-sufficient field. Using the sūtras in this way develops extraordinary psychophysiological functioning and mind-body coordination. More importantly, it stabilizes the experience of pure consciousness thus accelerating growth to higher states of consciousness.

Already many thousands of individuals, a number of whom are professionals in the fields of medicine, law and education, have begun this new area of research in the expansion of human potentialities. Perhaps the most interesting of the TM-Sidhi procedures is the Patanjali sūtra for “flying.” Although the full phenomenon of flying has not yet been achieved, the technique has proven itself to be the most powerful of the TM-Sidhi practices in terms of laboratory physiological measurements and personal experience.

The rediscovery of the effectiveness of these procedures and the development of an educational program by which they can be taught to thousands of individuals throughout the world illustrate Maharishi’s extraordinary abilities as both a world teacher and a profound research scholar.

The Scientific Discovery of Enlightenment
Maharishi’s ability to present these Vedic techniques of self development in a scientific manner has encouraged researchers at leading universities around the world to conduct hundreds of physiological,
psychological, sociological, and ecological studies on the effects of the Transcendental Meditation and TM-Sidhi programs. The results of these studies can best be understood in terms of four fundamental questions that underlie the relationship between consciousness and the laws of nature. These four questions are:

1. Is there a least excited state of consciousness and a corresponding least excited state of the nervous system?
2. Are there higher, more optimal states of consciousness, and corresponding higher levels of organization and more optimal states of neurophysiological functioning?
3. Is there a field of collective consciousness that underlies the orderliness and coherence of social behavior?
4. How does this underlying field of pure consciousness influence the physical laws of nature?

The first question can be considered from a theoretical and an experimental viewpoint. From a theoretical perspective we can examine the characteristics of the least excited state of consciousness as developed by Maharishi from the Vedic literature to see if there are equivalent descriptions in the theories of modern science, in particular modern physics. From such an analysis, as we have briefly discussed, we can identify three basic qualities of the state pure consciousness: complete self-sufficiency, self-referral, and infinite dynamism. We might refer to these qualities as the dynamical properties of consciousness. These properties of consciousness are indeed quite similar to the dynamical qualities of matter and energy as formulated by modern physics, particularly as seen in the description of the super-field in unified field theories.

From an experimental perspective the existence of a least excited state of consciousness can be examined by attempting to characterize the physiological and biochemical correlates of this state. The initial research on the Transcendental Meditation technique and a great deal of subsequent research has concerned itself with this identification. These studies suggest that during the Transcendental Meditation technique a state of restful inner alertness is produced. This state is characterized by a number of specific physiological and biochemical changes such as a
marked reduction in oxygen consumption and carbon dioxide elimination, an increase in skin resistance, a decrease in arterial blood lactate and plasma cortisol, and a marked increase in EEC alpha and theta coherence in the frontal and central areas of the brain.

These first studies I shall refer to as phase I studies, because, while they describe the general characteristics of a wakeful hypometabolic state, they are limited in one very important aspect—they do not make the critical distinction as to whether the measurements made corresponded specifically to the subjective experience of the least excited or pure state of consciousness or in fact corresponded to a mixture of this state with more excited states of wakefulness and normal relaxation. Fortunately, a new set of studies has recently been conducted which I shall refer to as phase II studies. These studies reveal that during the Transcendental Meditation technique there may be a mixture of states, i.e., wakefulness, pure consciousness, and drowsiness. Care must be taken to distinguish which substate is being studied and which measurements are used, some being more appropriately sensitive to discriminate between substates. When these criteria are met it is possible to more clearly identify the profound physiological correlates of the state of pure consciousness.

Let us turn now to a brief elaboration of the second of the four questions previously mentioned: Are there higher, more optimal states of consciousness, and correspondingly, are there higher levels of organization and more optimal states of neurophysiological functioning? Another way of asking this question is: Does the experience of the state of pure consciousness during the Transcendental Meditation technique positively influence states of consciousness and physiological functioning outside of meditation? Indeed, a number of studies have shown extremely beneficial changes outside of the Transcendental Meditation technique, such as faster recovery from stressful stimuli; more stable and lower resting levels of basic physiological functions; improvements in a number of cardiovascular risk factors (including reduction of blood pressure and high cholesterol levels); improvement in other disorders such as asthma and insomnia, as well as in mental health; faster reaction time; and better performance on perceptual motor tasks, learning and memory tests, and a variety of psychological inventories.
Several recent studies have demonstrated that the regular practice of the more advanced TM-Sidhi program is accompanied by longitudinal changes in neurophysiological function which are correlated with an increase in intelligence, creativity, concept learning, and moral reasoning. Researchers have suggested that the higher levels of EEC coherence in TM-Sidhi participants are a result of a more integrated style of brain functioning which allows the individual to interact in a more flexible and harmonious manner with his social and physical environment.

Further, if we examine physiological and biochemical studies conducted on the Transcendental Meditation and TM-Sidhi program from the point of view of the aging process, we find that in virtually every case this program produces changes that are in a direction opposite to those which characterize aging. In one study, the biological age of a number of subjects practicing the Transcendental Meditation and TM-Sidhi programs was measured. It was found that the long-term meditators had a significantly younger biological age (12 to 15 years younger than their chronological age) than non-meditating controls and for the general population. In addition there was significant correlation between younger biological age the length of time practicing the Transcendental Meditation and TM-Sidhi programs. These and other studies taken together thus clearly define more optimal levels of physiological functioning which are associated with the development of higher states of consciousness.

The third question we have posed is even more far reaching than the first two: Is there a field of collective consciousness that underlies the orderliness and coherence of social behavior?

If such a field of consciousness exists, it should be possible to test it by measuring its field properties. For example, certain physical systems (for example, lasers) exhibit properties such that if there is a coherent subpopulation of a small number of elements then the system undergoes a phase transition and begins to display macroscopic coherence. Applying this principle to society we might predict that if consciousness is indeed a field, a small coherent subpopulation of individuals could generate a more widespread coherent influence on the whole of society. This coherent influence could then be measured by
changes in specific social indices. This approach has been undertaken in a number of studies.

Maharishi predicted a number of years ago that when one percent of the population of a society practiced the Transcendental Meditation program a measurable improvement, such as a decrease in crime rate, would occur in the quality of life of that society. This effect has been observed in a number of different studies conducted in populations of various sizes. For example, in one study by Dillbeck and coworkers (1981), crime rate trends in 48 different cities were analyzed over a 12 year period. The 24 experimental cities, defined by having one percent of the population practicing the Transcendental Meditation program, showed a significant decrease in crime rate trends as compared to 24 control cities randomly selected from matched cities with similar economic, educational and other demographic characteristics. This decrease in crime rate trends in the “one percent” cities has been shown to be independent of such factors as police coverage, unemployment, prior crime trends, difference in age composition, and ethnic background. This field effect has been appropriately called the Maharishi Effect.

An even more powerful effect has been noted with group practice of the TM-Sidhi program. This effect, known as the Super Radiance Effect, requires only the square root of one percent of a population to produce measurable effects such as reduction of violence and increased economic prosperity. Twenty studies have documented the effectiveness of the Super Radiance Effect in improving the quality of life in numerous cities around the world. The results of these studies cannot be accounted for unless one considers consciousness to be a field which is capable of transmitting effects over long distances. The discovery of these effects is of fundamental importance since it demonstrates both the existence of an underlying field of pure consciousness and, more importantly, a profound technology which, by coherently enlivening this field, can improve all areas of life.

The fourth and final question follows naturally from the previous three. How does this underlying field of pure consciousness influence the physical laws of nature? The relationship between consciousness and physical matter is a recurring theme in the history of science. Most recently, in the development of modern quantum field theory, a number
of physicists have commented on the importance of a more complete understanding of human consciousness and the role it plays in quantum measurement. For example, the Nobel Laureate Eugene Wigner states, “Our inability to describe consciousness adequately, to give a satisfactory picture of it, is the obstacle to our acquiring a rounded picture of the world.” Bernard D’Espagnat expresses a similar perspective. “The doctrine that the world is made of objects existence is independent of human consciousness turns out to be in conflict with quantum mechanics and established by experiments.”

Maharishi, in his reinterpretation of Vedic knowledge, describes very clearly the relationship between consciousness and physical laws. He states that the least excited or pure state of consciousness underlies both mental phenomena as well as physical phenomena and represents a unified level of natural law.

The theoretical and practical applications of this understanding of consciousness for neuroscience are far reaching. In one particular model postulated by Domash (1976), consciousness is seen as a global non-localized phenomenon. Drawing a parallel to the third law of thermodynamics, the Transcendental Meditation technique is viewed as a methodology for the conscious exploration of a very low “mental temperature.” Domash suggests by analogy to physical systems that when the “mental temperature” or internal noise level reaches its lowest level of excitation a phase transition to a distinct and more highly ordered state occurs within the nervous system.

The TM-Sidhi procedures expand this model further. As Maharishi explains, these procedures provide a means by which individual consciousness can come into contact with the unified field of natural law and directly stimulate the impulses of the laws of nature within that field. These impulses of natural law can be seen as the dynamic principles that govern the flow of consciousness. These principles are realized not in the ordinary sense, in terms of understanding specific mathematical relationships, but instead by bringing individual awareness directly in alignment with natural law on the level of consciousness itself.

By refining neurophysiological functioning and thereby establishing the least excited state of consciousness permanently in our awareness, we gain direct access to the unified field of all the laws of nature, the
total potential of natural law. When we act from this level of awareness, all our activity becomes spontaneously in accord with natural law, restoring balance to all physiological functions and promoting ideal health and behavior. The Maharishi Technology of the Unified Field thus offers modern science not only the opportunity to understand the relationship between the nervous system and the underlying field of pure consciousness, but more importantly provides a practical methodology for improving the quality of life on the level of both the individual and society.

The Discovery of the Unified Field of All the Laws of Nature

R.K. Wallace, Ph.D.
ABOUT THE AUTHOR

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ABSTRACT
This article explores the discovery in recent times of testable theories of the unified field, as postulated by Albert Einstein almost a century ago. Experimental evidence is strong for stages of unification that include three of the four fundamental forces of nature—electromagnetism, weak, and strong interactions. The fourth, gravity, has been included in the most recent theories, but these have yet to be fully supported by experimental evidence. An extremely important property of these fields is self-interaction. It is this self-interaction that is thought to result in creation of new expressions of the field. In the same manner, as held by Maharishi, self-interaction of the field of consciousness (which may be identical to the unified field sought by physicists) is the process by which nature creates over and over again, on the level of our human existence and on all other levels. The result is the emergence of ever more integrated and encompassing systems, including living systems with all their expressions.

This process has been further understood through the work of Ilya Prigogine, Nobel Laureate in the field of non-equilibrium thermodynamics. In his theories, the flow of energy through complex systems, especially living systems, can result in processes of self-interaction that lead to the emergence of higher states of orderliness. This is how living systems can evolve states of higher orderliness, a direction opposite to that expressed by the second law of thermodynamics, which states that (closed or isolated) systems move toward states of less order. As Maharishi has interpreted, the Veda and Vedic Science have expressed these principles throughout time, referring to mankind as “Sons of Immortality.” This article also introduces Unified Field Charts for the disciplines of physics and physiology. These charts show diagrammatically how the various branches of physics and physiology emerge from and relate to the underlying unified field of pure consciousness, and they show in parallel how individual awareness contacts that field and emerges to express the full potential of natural law in our lives.

You place matter before life and you decide that matter has existed for all eternity. How do you know that the incessant progress of Science will not compel scientists to consider that life has existed during eternity, and not matter? You pass from matter to life because your intelligence of today cannot conceive things otherwise. How do you know that in ten thousand years one will not consider it more likely that matter has emerged from life?

—Louis Pasteur
Intelligence is the basic value of all creation, and of all processes of progress and evolution in creation. It is the fundamental of all existences. This field of pure intelligence, which is one, nondual, by virtue of its perpetual, eternal, immortal existence, starts to regenerate itself through its own nature, by virtue of its own existence. Intelligence becomes creative intelligence, and creates from its own nature.

—Maharishi

Introduction

In the last ten years modern physics has made enormous achievements in understanding the fundamental basis of the different forces in nature, resulting in the development today of a unified field theory which promises to provide a complete understanding of natural law. In this article we will briefly trace the progress of modern quantum theory and consider in detail the unified field of all the laws of nature. Further we will examine the development of a unified understanding of natural law from the perspective of other scientific disciplines, particularly modern physiology. Throughout this discussion our main consideration will be to theoretically locate the total potential of natural law, the least excited state of both matter and consciousness. This will enable us to formulate the theoretical basis of an integrated science of life.

The Basis of the Physical Laws of Nature

What are the physical laws that govern matter? What in fact is the nature of physical matter itself? At the dawn of Western civilization these were fundamental questions posed by the Greek philosophers. In the fifth century, the Greek philosophers Lisipicus and Democritus expressed the concept of the atom as the basic building block of the universe—the smallest indivisible and indestructible substance of matter. Unlike earlier theories, which inevitably took on some form of animism, Democritus’ view clearly divided spirit from matter. Matter was seen as something that had no life, which was as if dead, moved only by some invisible forces or laws of nature yet to be fully discovered and described.

Some 2,000 years later, as a result of the genius of such men as Galileo and Newton, these early philosophical ideas of matter were revived and formulated into a mechanistic world of indestructible particles of
matter, particles that God had constructed out of material so hard and solid that they would never wear or break. These particles were acted upon by external forces according to certain laws of nature, which could be described by mathematical equations. Newton's view of the world persisted from the second half of the seventeenth century to the end of the nineteenth century. This mechanistic billiard ball model of the universe completely dominated scientific ideas and created a deterministic view of nature, which permeated all philosophical, educational, and social thought. The reality, or underlying substance of life, was perceived as being solid and material.

**Breaking Apart the Atom**

In the last century, several major discoveries in modern physics have completely shattered the classical Newtonian model of the universe. First, matter was found to be neither solid nor static. It was discovered that the atom is in fact mostly empty space in which invisible electrons whirl at velocities of approximately 600 miles per second around a tiny nucleus. The high velocity of the electrons in the atom give it the appearance of solidity, just as a rapidly rotating propeller might appear as a solid disc. Within the nucleus itself are particles that also move about at extremely high velocities—up to 400,000 miles per hour. The nucleus, being very dense, contains almost all the atom's mass. In fact, if the human body were compressed to nuclear density, it would take up less space than a pinhead.

A second major discovery which came out of the very revolutionary theory of quantum mechanics is that matter has a dual aspect—it appears sometimes as particles and sometimes as waves. One of the consequences of the wave aspect of matter is that it is impossible to have a well-defined measurement of the momentum or velocity of the particle and at the same time to have a well-defined, precise measurement of its position. The mathematical form of this relationship between the uncertainty of the position and momentum of the particle is well known among scientists as the Heisenberg uncertainty principle. We may choose to measure with precision either position or momentum, but we may never know the measurement of both at the same time. Thus, the more deterministic models of classical physics were forced to give way to a dynamic, ever-changing description of the universe.
A third important discovery, expressed in Einstein’s theory of special relativity as the famous equation $E=mc^2$, is that matter is not indestructible, but is rather a form of energy that may be transformed into other forms of energy or matter.

We can no longer think of an atom as a solid particle; it is mostly empty space. Matter has a dual aspect—particle and wave. Further, matter is no longer seen as something dead but as a condensation of vibrating energy. In reality, solid matter is only a condensation or a concentrated manifestation of an underlying unmanifest field of energy and intelligence that permeates and upholds everything in creation.

**Unified Field Theories**

According to modern physics, the essence of matter is its underlying field. In the words of Albert Einstein:

> We may therefore regard matter as being constituted by the regions of space in which the field is extremely intense . . .

There is no place in this new kind of physics both for field and matter, for the field is the only reality. The field is seen as a continuum. It is present everywhere in space, and when we want to think of a particle, we have to think of it as being a blemish or discontinuity in the field structure.

For a number of years it was understood that there were four fundamental forces: electromagnetism, weak, strong, and gravity. These forces are described in quantum field theory as force fields. Over the past decades a progressively more unified understanding of the fundamental force fields has occurred, culminating in the recent discoveries of unified field theories. In 1967 the first stage came with the unification of the weak and electromagnetic forces by Weinberg, Salam and Glashow. According to their theory, for which they received the Nobel prize in 1979, at a fundamental scale of nature’s functioning (at a distance of $10^{-16}$ cm which is 100 times smaller than the nuclear dimensions), the weak and electromagnetic forces become indistinguishable. Several years after they received the Nobel prize, experimental confirmation for their theory came with the discovery of two new particles, the W and Z particles.
This unified electro-weak theory established the importance of the so-called “unified non-Abelian gauge theories” and the principle of spontaneously broken symmetry, which locates deep symmetries of nature at fundamental space-time scales. An important property of non-Abelian gauge theories is self-interaction or self-referral. The electromagnetic field by itself does not possess this property: protons do not interact with protons. It is only at deeper levels of unification in quantum field theory, where the electromagnetic field is united with the weak force field, that this property of self-referral, that is, the field’s ability to interact with itself, appears.

Following the development of the electro-weak theory it was discovered that the principle of broken symmetry could be extended to include the strong force. This led to the development of grand unified theories, in which the weak, electromagnetic and strong force were unified, at a distance scale of $10^{-29}$ cm. Finally, in 1974, the profound unifying concept of supersymmetry was introduced, making it possible to unite matter fields (fermi fields) with (bose fields) at the level of the Planck scale, $10^{-33}$ cm. This ultimate level of unification has led in recent years to the introduction of supergravity and supersymmetric unified field theories, such as extended supergravity theory and heterotic superstring theory.

From the perspective of these unified field theories, the property of self-interaction or self-referral reaches its ultimate degree of self-sufficient expression at the Planck scale, the level of unification where the extreme self-interaction of quantum gravity leads to a phase transition in the structure of space-time itself. At this level there is neither space nor time, only an infinitely dynamic sea, or “superfoam,” as it is called. This level of unification is believed to be the dimension of the physical universe at its very inception some 20 billion years ago.

Once the universe began to cool, moments after the big bang, it expanded, and diversity arose on the manifest level of creation. Through the process of spontaneous sequential dynamical symmetry breaking the supersymmetry of the four forces was broken and gravity was separated from the other three. At progressively larger distance scales this process continued so that the remaining three forces, in turn, separated. This process of sequential dynamical spontaneous symmetry breaking refers to the way in which the symmetry breaking is initiated—from
within the supersymmetry itself. By a dynamic process of self-referral, the supersymmetry transforms itself into its expressed parts—the fundamental laws of nature.

Thus all the laws of nature can be seen to be contained in their unmanifest, unexpressed state in the unified field. At this level, as we have discussed, we find the properties of complete self-sufficiency, self-referral and infinite dynamism.

**Unified Field Chart for Physics**

The chart on the following pages illustrates how the unified field of natural law is the source of all the fundamental force and matter fields in nature, and how these fields in turn provide the basis for all areas of physics and technology and their applications throughout society. The Maharishi Technology of the Unified Field unites the knowledge of the unified field discovered by the objective approach of modern physics with the direct experience of the unified field provided by the subjective approach of ancient Vedic Science. It enlivens the unified field of awareness in the awareness of the individual, bringing thought and action spontaneously in accord with natural law.

The picture is precisely equivalent to the descriptions of natural law as revealed by Maharishi in his revival of Vedic Science. The state of pure consciousness is defined by Maharishi as being completely self-sufficient, self-referral, and infinitely dynamic. Maharishi elucidates, in his Apaurusheya Bhashya commentary on the Rig Veda, the mechanics of the unfolding of natural law in Vedic Science, the way in which the structure of natural law is generated from within consciousness. This process is the same as that described by the expression “sequential dynamical spontaneous symmetry breaking.” Step by step, consciousness reveals within itself the complete structure of the laws of nature—as a self-expressed commentary of the full potential of natural law, which resides in its unified state in pure consciousness.

Maharishi’s commentary identifies the property of self-interaction or self-referral as a first principle of the dynamics of nature’s functioning. As we have described, according to Maharishi’s formulation of Vedic Science, the Veda is defined as the unified state of knower, known and process of knowing—the state of pure knowledge or pure consciousness. This three-in-one structure of the Samhita, or unified state of the
Veda, is remarkably similar to the structure of the unified field in which the bose fields (force fields) and fermi fields (matter fields) are unified through the agency of supersymmetry.

Dr. John Hagelin, a leading physicist in unified field theories, has pointed out that the bose fields correspond to the “observer” aspect of the unified field (the knower), the fermi fields to the material or “observed” aspect (the known), and the agency of supersymmetry as the “process of observation” between the two (the process of knowing). The self-referral dynamics of pure consciousness lead to the emergence of this fundamental three-in-one structure in the same manner that the process of spontaneous symmetry breaking leads to the emergence of the three-in-one structure of the unified field as described by physics. Through repetition of this process, a succession of unmanifest impulses of natural law is generated in a manner similar to that described by physicists to have occurred at the beginning of the universe. These impulses natural law interacting within themselves ultimately result in the manifestation and formation of curved space-time (Hagelin, 1984).

In Maharishi’s analysis of the Rig Veda, each word and verse is seen to systematically elaborate on the mechanics of the unfolding of creative intelligence — the mechanics of creativity within consciousness itself. Maharishi explains that the entire mechanics of creativity for the whole universe is contained in the first word of the Rig Veda, Agnim, which describes the dynamics of spontaneous symmetry breaking. In discussing the Sanskrit etymology of each of the first four letters of Agnim, the nature, origin, range, and development of creative intelligence is clarified.

The first syllable, A, represents the totality of knowledge of the entire Veda, fullness. Fullness moving within itself locates in its own nature unmanifest emptiness, expressed by the letter G. As Maharishi explains, fullness would not be full if it did not contain even unmanifest emptiness within itself. Upon locating emptiness within itself, fullness, as if shocked, recoils from the emptiness. This is expressed by the letter N, signifying negation. In this process of negating and recoiling, the unmanifest value of fullness is stimulated to manifest and creation begins.

This development of creation, expressed in the letter I, represents the progression of unmanifest emptiness coming back towards the fullness...
Consciousness

Transcendental Meditation allows the conscious mind to identify itself with the Unified Field in Pure Consciousness

Pure Consciousness
Unified Field of all the Laws of Nature
of A. Finally, M represents the infinite dynamics of consciousness moving within itself, the dynamics which structure all creation. These dynamics are further elaborated in the rest of the first richa of the Rig Veda.¹

In this stepwise manner the entire Rig Veda is expressed. The Rishi (knower), Devat (process of knowing), and Chhandas (known) values of the Rig Veda as a whole are then elaborated respectively in the Sama, Yajur and Atharva Vedas. These values are further sequentially elaborated in the entire Vedic literature. The Veda stands as its own self-expressed commentary. Maharishi explains this process:

Imagine a mass of deep silence, if it could become aware of itself, what it would find would be silence. According to the laws of quantum mechanics, in becoming aware of itself, the observer (silence) observing itself (silence) should have done something to itself. What will have happened is that the moment the awareness realizes, “I am silence,” both an observer and an object of observation are created, and in this process space, time, motion are generated. The unmanifest provides the impetus for creation just by becoming aware of itself. This is the start of the entire time-space geometry—the beginning of creation. From consciousness creation begins.

Vedic Science as rediscovered by Maharishi makes a profound contribution to modern physics in that it not only enriches the description of the unified field to include the principle of self-awareness or self-consciousness, but further provides the technology whereby this level of creation can be directly experienced by each individual.

¹ The 24 gaps between the syllables of the first richa are, in turn, elaborated as the 24 padas in the remaining eight richas of the first sukta. Each pada contains eight syllables, so there are 8 x 24 = 192 syllables in the remaining eight lines of the first sukta. The 192 gaps between the 102 syllables of the first sukta find expression in the 192 suktas of the first mandala of the Rig Veda, 191 suktas plus one avyakta (unmanifest) sukta. The syllables of the second through ninth richas of the first sukta find elaborated expression in the second through ninth mandalas, while the gaps between the 192 suktas of the first mandala give rise to the 192 suktas of the tenth mandala.
The Total Potential of Natural Law as Located in Physiology

In the introduction we briefly examined the latest findings in mathematics, chemistry, and physiology and saw how each one also locates the total potential of natural law in an unmanifest unified field which stands as the basis of the discipline. Here we will elaborate this principle more fully in the field of physiology. We will do so by considering the origin of physiology from the viewpoint of modern physics, in particular unified field theories. By tracing the evolution of life from the unified field, with reference to a branch of physics known as non-equilibrium thermodynamics, it is possible to view evolution in terms of the unique property of self-referral.

The evolution of the universe, according to unified theories, is a consequence of this first dynamical property of nature, the self-interactive nature of the unified field. As we have seen, proceeding from deeper levels of unification to the more expressed level of the four separate fundamental forces of nature, this property of self-interaction or self-referral becomes less apparent. At larger distance scales, it is as if it disappears. It reemerges again only when we reach the macroscopic level of integrated physical, chemical and biological systems. The field of non-equilibrium thermodynamics, as developed by Prigogine, gives perhaps the most descriptive analysis of this property of self-referral or self-interaction (Prigogine and Glansdorff, 1971; Prigogine et al., 1972).

According to non-equilibrium thermodynamics the evolution of any system, whether physical, chemical or biological, involves the dynamical self-interaction of different modes or fluctuations of the system. This process of self-interaction depends upon both the nature of the flow of energy through the system and the specific boundary conditions of the system. Under certain conditions, the fluctuations of a system will interact in such a manner as to eventually stabilize and form a new, more stable structure which is better adapted to the environmental conditions present. For example, when water is drained from a bathtub its flow causes turbulence or fluctuations. The fluctuations are a result of the self-interaction of hydrostatic forces. If the conditions are right, eventually a whirlpool is formed at the drain. The whirlpool is a delicate but stable structure which enables the water to flow out more quickly.
According to this theory, the same principles involved in the formation of the whirlpool are also responsible for the formation of life. Energy must be constantly flowing through the system and there must be a creative self-interaction between the different forces in the system. The more complex and integrated the system, the more apparent is this property of self-interaction or self-referral.

The underlying level of intelligence which enables apparently random self-interactions to form complex systems, ultimately is encoded in the unmanifest laws of nature contained in the unified field, the laws of nature which regulate and maintain all of creation. In physiological systems, this underlying level of intelligence which guides all the complex biological interactions in living systems is encoded in a particular physical structure, the DNA molecule. Let us more closely examine DNA as the self-referral unified basis of physiological systems to see if we can draw parallels to the mechanics of creativity as seen in modern science and Vedic Science.

**Self-Referral DNA**

Virtually every cell in most living organisms contains DNA, and within the DNA is encoded the totality of knowledge of the whole organism. The information in the DNA controls both the holistic development and maintenance of physiological functions. The DNA is, in effect, the unified basis of all the laws of nature for all physiological activities, in the same manner as the unified field is the underlying basis for the entire universe. Further, just as the unified field is characterized by the property of ultimate self-interaction or self-referral, DNA is also characterized by this property.

On the simplest level we can see the quality of self-referral in the basic structure of DNA, in which there is complementary base pairing between the double helical strands of nucleotides. The complementary base pairing is a form of self-referral in which one specific nucleotide always refers to its complementary pair. Complementary pairing, among other attributes, provides an exquisite means of preserving the integrity of the information in DNA both by creating a more stable structure and by facilitating the accuracy and efficiency of self-repair mechanisms.
Another example of self-referral occurs when one strand of DNA folds back on itself and assumes a specific figuration known as a hairpin. This fold-back structure plays a key role in a number of regulatory functions maintaining the stability of certain eukaryotic chromosomes, allowing double precise excision of transportable elements and signaling the termination and even initiation of transcription. Such interactions of DNA within itself inevitably result in a breaking of the original symmetry of DNA’s double helical structure, a process which is necessary for the expression of the information within it.

Perhaps the most obvious example of self-referral in the functioning of DNA is seen in the process of gene regulation. In gene regulation, regulatory molecules such as steroids, hormones, metabolites, and embryonic organizers, which are ultimately created by the knowledge in DNA, refer impulses of physiological information back to the DNA either directly or in cooperation with regulation proteins. This may lead to activation or inactivation of particular genes, and in turn, specific physiological responses. The huge variety and precision of such responses, as seen in the development of the human body from a single cell, would be incomprehensible without knowledge of the self-referral mechanisms of gene regulation which govern the balanced unfoldment of genetic information from DNA.

**The Unified Field Chart of Physiology**

The Unified Field Chart for Physiology on the following pages illustrates how the Maharishi Technology of the Unified Field contributes to modern physiology by providing a new integrated approach in which the whole range of physiology can be appreciated from its source in the self-interaction of the self-referral unified field of all the laws of nature. Practice of the Maharishi Technology of the Unified Field ensures that the homeostatic, self-regulatory processes functioning at every level of physiology fully reflect the self-referral value of the unified field, establishing all aspects of life in accordance with the total potential of natural law—perfect health for the individual and society.

This chart appears on the following pages with an enlargement immediately following.
Consciousness

Transcendental Meditation allows the conscious mind to identify itself with the Unified Field in Pure Consciousness.

Pure Consciousness
Unified Field of all the Laws of Nature
Three-in-One Structure of DNA

In considering the self-referral mechanics by which DNA expresses itself we can identify a three-in-one structure, similar to that described in modern physics and Vedic Science. In terms of DNA we can consider the unified or Saṁhitā value as being the genome, the totality of knowledge contained in DNA. The Rishi (knower), Devata (process of knowing), and Chhandas (known) can be seen to correspond to genetic information, the process of complementary base-pairing and the sequence of nucleotides in the DNA molecule, respectively. Just as Rishi, Devata and Chhandas are simultaneously locatable at every point in the Samhitā of the Veda—the self-referral three-in-one structure of pure knowledge—genetic information, complementary base-pairing and nucleotide sequence are all present at every point in the genome.

On the level of the genome, the knower—Rishi—is the genetic information. Molecular biology speaks of genetic information as the sum total of information specifying every aspect of biochemical, cellular, and organismic structure and function, including the information specifying the regulation and control of the expression of those structures and functions. It is clearly understood in molecular biology that this information is not the DNA molecule itself, but is stored in the medium of the DNA molecule in the same way that information is stored in a book in the media of paper and ink.

Complementary base-pairing is the process of knowing—C—on the level of the DNA molecule. Just as the information in a book becomes lively in the awareness of the knower through the visual process, genetic information is made lively within the DNA molecule through intermolecular interactions, principally complementary base-pairing. On the level of the genome, complementary base-pairing creates a tight self-referral loop between the two strands of the DNA molecule that enlivens the genetic information, but leaves it in its pure knowledge form. In the process of gene expression, complementary base-pairing occurs between the template strand of the DNA and RNA precursors, resulting in the transfer of genetic information from the genomic DNA to messenger RNA (mRNA) molecules. Subsequently, complementary base-pairing occurs between the mRNA and transfer RNA molecules, to express the genetic information carried in the mRNA as a protein molecule.
In the genome, the nucleotide sequence is the known—Chhandas. Genetic information is carried in the physical structure of the nucleotide sequence of the DNA molecule just as information is carried in a book in the sequence of letters on the page. The nucleotide sequence is also not identical to the physical structure of the DNA molecule, but is carried in the medium of the DNA molecule, just as language is not identical to the paper and ink of the book, but carries information in the medium of the book.

The study of DNA in the light of Vedic Science gives us the broadest possible perspective in which the value of intelligence, or knowledge, is seen to be the fundamental basis of physiology. DNA is seen as the knower, process of knowing, and known of all physiological processes.

DNA is the knower because it is the ultimate recipient or experiencer of all the impulses of knowledge of the environment. Because DNA's most immediate environment, the physiology, is nothing other than an expression of the DNA, the pure knowledge contained within itself, DNA is actually experiencing or knowing itself. Knowledge of increasingly expanded values of the environment is experienced by DNA through the physiology. However, the relationship of the physiology with its environment is also stored within the knowledge in DNA. Therefore, all knowing by DNA is of itself.

DNA is also the process of knowing. The knowledge within DNA is responsible for all aspects of the dynamics of experiencing its environment, and this experience is essentially self-referral. These quotes from Erwin Schrödinger (1945) and Maharishi Mahesh Yogi (1985) bear upon this point:

. . . The chromosome structures are at the same time instrumental in bringing about the development they foreshadow. They are law-code and executive power or, to use another simile, they are architect's plan and builder's craft in one . . . .

—Schrödinger

DNA is the knowledge and organizing power in one—rishi, devata, and chhandas in on.

—Maharishi

Further, DNA is the known, because the knowledge within it is responsible for giving rise to its most immediate environment, the physiology. DNA is also the known in that it contains knowledge of the environment beyond the physiology. This is so because the relationship
between the physiology and increasingly expanded values of its environment determines the characteristics of the physiology, and therefore the knowledge expressed from the DNA. This is clearly observed in the evolution of the enormous variety of physiological structures in different species, which enables each in its own specific way to better adapt to a particular niche in the environment.

**DNA, The Material Expression of Samhita**

DNA can be seen as the material expression of the Samhita—the unified state of Rishi, Devata, and Chhandas. It is present in virtually all the trillions of cells of the human body. In each case, the totality of knowledge in DNA is contained within each cell. In terms of the Ŷ of any given individual cell only a small portion of total information in DNA needs to be expressed.

DNA has in effect both an individualized and collective role in regulating the physiology. The expression of specific information controls the highly specialized activity of certain individual cells. The coordinated expression of knowledge in an aggregate of cells controls the coordinated activity of tissues and organs. Finally, the totality of information in DNA acts as an underlying field of knowledge which upholds the overall collective coherence and integrity of the whole body.

In the remarkable process of physiological development, the complete knowledge or blueprint of the body initially contained in the DNA of one single cell, is gradually and sequentially unfolded to form, through the processes of differentiation and morphogenesis, all the hierarchical layers of physiological structure and function.

During differentiation, the dividing cells become committed or specialized to perform a specific task (e.g., liver cells, heart cells, etc.) and as a result only express a small fraction of the complete knowledge which is contained in the DNA. During morphogenesis, there is an orderly migration and replication of cells to form the innumerable structures of the body. The entire orchestration of this highly complex process, which may involve the intricate interconnectedness of literally billions of cells, occurs as a result of the precise and sequential expression of knowledge from DNA.

This presents a marvelous picture of the Samhita of the Veda and its sequential emergence into speech and physiology. The Samhita of the
Veda is present at every point in creation; it is the underlying field of pure knowledge from which all diversity emerges.

The unfoldment of the whole range of Vedic literature is a process of elaboration of the fundamental qualities of the Samhita—Rishi, Devata, and Chhandas. During this developmental process, the complex body of Vedic literature sequentially unfolds as syllables or sounds, the impulses of natural law reverberating within the field of pure intelligence, the unified field of all the laws of nature. The continual self-referral dynamics of these impulses of intelligence give rise to the classical manifest world of matter and ultimately to the DNA. Thus, the name or sound value of the Veda gives rise to the form or matter value of creation. The sound value of the Veda is perfectly reflected in the mechanics by which the name or linear sequence of nucleotides in the DNA gives rise to the three dimensional form or matter of proteins. It is knowledge which ultimately structures matter.

Self-Referral at Higher Levels of Physiological Organization

As we examine the more expressed levels of physiology arising from the knowledge in DNA we can also see the self-referral mechanics of DNA present at higher levels of physiological organization in the form of higher level homeostatic feedback systems. Homeostasis refers to the ability of living systems to maintain internal orderliness and stability in the presence of changes in their external environment through self-regulating feedback systems. The principle of homeostasis is perhaps the single most important concept in physiology. All the various biochemical and cellular processes, as well as the function and structure of tissues, organs, and organ systems are governed by self-referral, homeostatic mechanisms.

Every homeostatic system has a type of three-in-one structure: (1) an integrative center which acts as a kind of knower, witnessing and comparing incoming information to some predetermined set point; (2) a mechanism to transfer information, corresponding to the process of knowing; and (3) an effector mechanism through which the final output is expressed, corresponding to the known.

Homeostatic feedback mechanisms are essential to the regulation of vital parameters such as temperature, blood pressure, acid-base bal-
ance, water and electrolyte balance, oxygen and carbon dioxide levels, and glucose levels. Particularly elegant examples are seen in the endocrine and nervous systems, which regulate the overall functioning of the other systems of the body. The degree to which the homeostatic mechanisms maintain greater physiological balance and self-organization is reflected in the ability of the system to remain free from disorder and aging.

By creating internal stability, homeostatic mechanisms form the basis for the reliable and orderly flow of information from the fundamental level of DNA to the complex functioning of the nervous system. Established in the knowledge of DNA—its own internal source of stability and order—physiological activity is spontaneously balanced and in accord with the total potential of natural law.

This locates in physiology the universal principle of action in nature as described in Vedic Science:

*Yogastab Kuru Karmani* (Bhagavad-Gita, II, 48). Established in the unified field of all the laws of nature—the total potential of natural law—perform action.

The establishment of individual awareness in its own self-referral state—the state of pure awareness, the ground state of all the laws of nature—brings every aspect of life in accordance with natural law. The result of this alliance with natural law through the Maharishi Technology of the Unified Field is to maintain all aspects of life in an evolutionary direction.

Viewing physiology from the broadest perspective, all individual aspects can be seen as the knowledge within DNA interacting and moving within itself. Thus DNA can be seen to display the properties of self-sufficiency, self-referral, and infinite dynamism, which are the attributes of consciousness. Such a unified perspective in physiology becomes a concrete and practical reality only when the full potential of DNA is unfolded. This occurs when the functioning of the human nervous system, with its billions of interconnecting neurons—the highest expression of the knowledge within DNA—is brought to state of perfect coherence and complete self-referral through the Transcendental Meditation and TM-Sidhi programs.

The development of perfect physiological coherence is achieved in the state referred to as unity consciousness, in which all aspects of natu-
ral law are directly experienced in terms of the unified field of natural law, cosmic intelligence, which is the Self of the individual.

In the attainment of unity consciousness, the quest of science to understand and utilize the total potential of natural law is fulfilled. This is the real fulfillment of modern physiology. When modern science is combined with the knowledge and technology of Vedic Science, an integrated science emerges, one which combines both the subjective and objective means of gaining knowledge.

An Integrated Science of Life

One approach to developing an integrated science of life is to locate certain basic qualities and dynamics of natural law which are common to both the subjective and objective spheres of life.

In our analysis of a unified understanding of natural law from the point of view of modern physics and physiology we have observed a specific trend which suggests that the quality of self-interaction or self-referral may be a fundamental characteristic or marker of the dynamics of evolution. As we have seen, according to the most current theories of physics the universe emerged from a perfectly symmetrical super-field. This super-field, best described by current unified field theory, inherently contains the property of self-referral or self-interaction in its most concentrated form.

The property of self-referral expressed in the process of spontaneous symmetry-breaking is the very basis for the expression of diversity at the inception of the evolution of the universe. As the universe evolves and greater physical diversity is expressed the quality of self-referral becomes less and less evident. It is not until the evolution of more complex physical systems, and ultimately the evolution of physiological systems, that self-referral reemerges. With the evolution of more stable and integrated systems this property of self-interaction becomes increasingly evident in the hierarchy of self regulating homeostatic mechanisms.

If the evolution of life can be seen in terms of self-referral, it might also be associated with other fundamental properties such as coherence. Coherence refers to the degree of correlation between the parts of a system. Systems that display higher degrees of self-referral and self-regulation usually display higher levels of coherence and integration.
Thus, for example, the nervous system, with its remarkable ability to coordinate and integrate many seemingly unrelated events, displays a very high level of both self-referral and coherence.

Two other characteristics which seem uniquely related to the property of self-referral are intelligence and consciousness. While these properties at first seem too subjective to consider, they may be viewed independently of what we normally consider to be human intelligence or human consciousness. Consider, for example, the attributes of the unified field as proposed by modern unified field theories. The unified field, according to these theories, is totally self-sufficient and self-interactive. It is also completely unmanifest, existing as a state of perfect symmetry. If we view it as being the most concentrated form of the laws of nature which structure the universe, in the same way that DNA represents a concentrated form of the structure and function of the physiology, then the unified field may be considered a field of pure potentiality or pure intelligence.

Further, since this field has the ability to act on itself or know itself in a completely spontaneous manner, it could be said to display the qualities of pure consciousness or pure awareness. This is precisely the type of argument presented by Hagelin in his comparison of the qualities of the unified field and the subjective state of pure consciousness or pure intelligence as described in the Maharishi Technology of the Unified Field. They are both descriptions of a field which is completely self-sufficient and self-interactive.

As Hagelin points out and we have described above, the evolution of the universe may be seen in terms of an initial state of complete self-referral; this initial state is thus also a state of pure intelligence. It may seem strange at first to assign a level of intelligence or consciousness to a physical system, or even a simple biological system, but when viewed as properties essentially synonymous with the degree of self-referral of the system, then the evaluation of these attributes becomes more meaningful. As we proceed up the scale of biological evolution the entire picture becomes more familiar, each more evolved species displaying greater levels of intelligence and awareness. The highest level of a self-referral system is seen in the human nervous system with its billions of interconnecting neurons and its ability to coordinate all other systems into an integrated whole. This holistic functioning of the
individual human physiology gives rise to the extraordinary property of self-awareness in human consciousness.

Vedic Science has for centuries not only recognized these qualities of self-referral, coherence, intelligence and consciousness as characteristic of the unified field of both subjective and objective creation but, more importantly, has prescribed a set of specific neurophysiologic procedures to unfold their full expression in each individual. Thus the integration of modern science and Vedic Science provides a complete theoretical understanding of the underlying basis of natural law as well as a practical technology to improve all aspects of life.

The advantages of such an integrated science are numerous and far reaching. From the standpoint of modern science the most basic issue of the relationship between consciousness and matter, which has plagued scientists for several centuries, is suddenly resolved. By identifying the self-referral and self-sufficient nature of the unified field of modern science with the self-referral and self-sufficient nature of the field of pure consciousness in Vedic Science, a common basis for all matter and consciousness is revealed.

In terms of modern neuroscience, this unification between consciousness and unified field theory is particularly relevant, for it is clearly the human nervous system that stands as the interface or link between consciousness and the physical laws of nature. It is the nervous system that, by its different styles of functioning, is able to support and express different states of consciousness. Through the technology of the Transcendental Meditation and TM-Sidhi programs the human nervous system is able to support and experience the least excited state or pure state of consciousness. Pure consciousness, the unified field of natural law, is a state that is both the ultimate basis of all subjectivity and also the ultimate basis of all objective states. Thus, the nervous system has the extraordinary capacity to directly experience the laws of nature in the state of pure consciousness.

A scientific instrument, such as a particle accelerator, that would allow us to examine the level of the super-field, would essentially have to be as big as the universe. What the Maharishi Technology of the Unified Field provides is a means to experience what material technology cannot possibly probe—to experience the unified field of all the laws of nature within one's own consciousness.
The Physiological and Biochemical Correlates
of the Least Excited State of Consciousness

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ABSTRACT

Decades of scientific research and thousands of research studies have characterized the physiological and biochemical differences among the three familiar states of consciousness—waking, dreaming, and sleeping. On the other hand, the characteristics of transcendental consciousness or pure consciousness, which is also referred to as the “least excited state of consciousness,” have been somewhat more resistant to study. This is due to multiple reasons, including simply the small number of scientists who have been motivated to undertake such studies. The Transcendental Meditation technique, due to its systematic and universal methods of learning and practice, was introduced as a model for studying the pure consciousness state in the late 1960s.

Dr. Robert Keith Wallace’s Ph.D. dissertation at the University of California at Los Angeles explored the changes in respiratory physiology, the electroencephalogram (brain waves), and some biochemicals in the blood during individual practice sessions of the Transcendental Meditation technique. Indications of unusual changes in each of these three areas have gained widespread recognition. This was the beginning of a research field that has continued to grow in recent decades. The findings in this field continue to uphold the accuracy of predictions Maharishi had made before any experimentation began, especially the reduced metabolic and respiratory rates. Currently, the more refined measurements and methodologies used for characterizing the states attained during practice of the Transcendental Meditation technique have identified a list of characteristics that are different from simple waking, dreaming, and sleep states and that form a beginning to the understanding of higher states of consciousness referred to as “enlightenment.”

Introduction

Advancement in science has always been accompanied by new technologies to probe deeper into nature's functioning. Our current understanding of human physiology has primarily been focused on the study of waking, dreaming and sleep states of consciousness, because of the lack of a technology both to produce and to explore lesser excited states of consciousness.

We have accumulated an extensive body of research on acute states of activation, such as stress, exercise, and physiological changes associated with increased attentional demand. However, because a sufficiently sophisticated technology has been lacking, comparatively little
is known of physiological states of decreased activation in which mental and physical activity is minimal yet, unlike sleep or drowsiness, the essential quality of awareness or consciousness is maintained and even heightened.

For thousands of years, such a state of restful inner alertness—referred to as “pure consciousness” or Samadhi—has been described not only as a relatively common experience but actually as the goal of various traditions of meditation. Unfortunately, within many of these meditation traditions the specific physical and mental technologies intended to produce this experience have been either inaccessible, impractical, or ineffective. Thus certain key questions concerning the validity of a least excited state of consciousness and the neurophysiological mechanisms which might support it have remained unanswered. With the introduction of the Maharishi Technology of the Unified Field the means to produce this state of pure consciousness have suddenly become available. The result has been an upsurge of scientific investigation at leading institutions around the world.

Objective explorations into various types of meditation techniques have been undertaken in the past. Unfortunately, the primary interest of many of these investigations was peripheral to the study of the nature of consciousness. Their concern was more with the unusual physiological feats that meditating subjects could supposedly perform. Despite this and the fact that many of the physical and mental procedures used were often impractical and difficult, several of these studies do reveal unique physiological changes associated with experiences in meditation, and thus deserve further consideration. In the following section of this article we will first briefly review the early research on meditation techniques and then focus on the more recent research concerned with the Maharishi Technology of the Unified Field.

**History of Research on Meditation Techniques**

In 1935 a French cardiologist, Therese Brosse, travelled India and made what appeared to be the first physiological measurements on yogis. In 1947 she reported that one of her subjects was apparently able to stop his heart (Brosse, 1946). It was not until some 20 years later that other researchers monitored subjects practicing various physical and
mental yoga techniques (Wenger et al., 1961). In an attempt to follow up and extend Brosse’s original study, they measured a number of other physiological variables and found decreased respiratory frequency and increased skin resistance, but no consistent change of heart rate, blood pressure, or EEG during physical and mental yoga exercise. They suggested that the disappearance of the electrical signals from the muscles contracting (as a result of the type of physical maneuver the yogi had performed) obscured the heart impulse signal; this, combined with a limitation in Brosse’s equipment, caused the disappearance of the signal of heart activity she had reported.

The conclusions of the authors were that (a) direct control of "involuntary" autonomic functions such as heart rate was probably accomplished through intervening voluntary mechanisms; (b) yogic meditation represented deep relaxation of the autonomic nervous system without drowsiness or sleep; (c) there were possible beneficial applications; and (d) further research was necessary (Bagchi and Wenger, 1957; Wenger and Bagchi, 1961).

The authors also commented on the problems in obtaining and selecting expert subjects. They were primarily interested in individuals who claimed they could control their autonomic functions (heart, breath rate, blood pressure, etc.). Due to the authors’ interest in phenomenal changes of self-control (such as extreme decrease of heart rate), many of the subjects they chose to study primarily utilized techniques of physical control; and it is possible that few were actually experts in meditation.

The problem of subject selection and measurement in a conventional and consistent manner is found in most research on yoga. Today there are many techniques that are referred to as “yoga”; most of the research has investigated rather difficult and awkward techniques that demand deep concentration and impractical conditions. Perhaps for these reasons results are often inconsistent. Studies of oxygen consumption illustrate some of these points. Independent studies by two researchers, Rao (1962) and Miles (1964), report significant increases in oxygen consumption during various physical yoga exercises while three other teams of researchers (Hoenig, 1968; Karambelkar et al., 1969; Rao, 1968) suggest a decrease of oxygen consumption during yoga meditation techniques.
Another problem is that in some studies on yogic techniques rather unconventional methodologies have been used. For example, in one study the subject was buried in an “air tight pit” and was found comatose after 72 hours (Vakil, 1950). Needless to say, the unconventional nature of the procedures and wide variety of techniques studied leave a great deal to be desired as far as scientific procedure and credibility is concerned.

In the area of electroencephalography or brain wave research, early studies utilized more reliable procedures. Since its discovery by Hans Berger (1929), the surface recording of human brain wave patterns, known as the electroencephalogram (EEG) has been a widely utilized tool to study consciousness. Today the EEG patterns are broadly classified, according to the frequency of the electrical wave, into the following categories (see table 1).

<table>
<thead>
<tr>
<th>Type of Wave</th>
<th>Frequency</th>
<th>Condition When Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>beta</td>
<td>18 – 30</td>
<td>awake, active, eyes open</td>
</tr>
<tr>
<td>alpha</td>
<td>8 – 12</td>
<td>awake, relaxed, eyes closed</td>
</tr>
<tr>
<td>theta</td>
<td>5 – 7</td>
<td>awake, in children</td>
</tr>
<tr>
<td>delta</td>
<td>.5 – 4</td>
<td>asleep</td>
</tr>
</tbody>
</table>

In one of the first pilot studies on EEG during meditation two French researchers, Das and Gastaut (1957), studied EEG in a yoga practitioner. They reported the occurrence of so-called alpha waves during meditation. During what they described as a deeper state of meditation these alpha waves gave way to periods of faster beta and gamma waves. Anand and co-workers (1961) studied four yoga practitioners and reported prominent alpha wave activity before and during the practice of their meditation, with an increase in alpha-wave amplitude during meditation.

Some of the most interesting and extensive early studies on meditation states were conducted in Japan on Zen meditators. Kasumatsu and Hirai (1966) reported that the Zen meditators showed abundant alpha wave activity, even with their eyes half open. During their meditation, the alpha wave also increased in amplitude and regularity especially in the frontal and central areas of the brain. The more experienced Zen
monks showed such changes as significant decreases in oxygen consumption, respiration rate, and slight increases in pulse rate and blood pH during meditation (Akishige, 1968; Sugi and Akutsu, 1968).

Taken together, the consistent changes seen in Zen meditators and in several of the yoga meditators suggested a unique physiological state. However, especially in the studies on various yoga practices, several problems, such as a lack of a systematic meditation procedure among subjects and interest in manipulative procedures rather than genuine meditation techniques, have limited the studies.

**Early Studies on the Transcendental Meditation Technique—A Proposed Fourth Major State of Consciousness**

For scientists, the introduction of the Transcendental Meditation technique by Maharishi offered a great opportunity to objectively measure the physiological, biochemical, and psychological correlates of meditation. From the moment Maharishi first introduced the Transcendental Meditation technique into the West in the early 1960’s, he encouraged research in all areas. In England and Germany some preliminary work was undertaken. However, no major research study actually began until the late 60’s, perhaps because of a still pervasive atmosphere of uncertainty and lack of interest in meditation procedures among the scientific community. For my doctoral thesis in the Department of Physiology at the University of California at Los Angeles, I had the opportunity to conduct a comprehensive study entitled “The Physiological Effects of the Transcendental Meditation Technique—A Proposed Fourth Major State of Consciousness” (Wallace, 1970a). The work was conducted in collaboration with and under the supervision of several excellent researchers, particularly Drs. Archie Wilson and Donald Walter, then with the Department of Physiology and the Brain Research Institute at UCLA.

To a large extent, Maharishi had predicted the basic types of changes that were to be found in the early studies and in more elaborate studies to follow. For example, in his book *The Science of Being and the Art of Living*, published in 1963, he wrote:

> When the mind transcends during Transcendental Meditation, the metabolism reaches its lowest point; so does the process of breathing; and the nervous system gains a state of restful alertness which, on the
physical level, corresponds to the state of bliss consciousness or transcendent Being.

In other sections of the book, Maharishi describes this state of restful alertness as a fourth major state of consciousness distinct from waking, dreaming, and sleeping. The first major publication to verify Maharishi’s predictions occurred in 1970 in the journal *Science* in an article entitled “Physiological Effects of the Transcendental Meditation Technique” (Wallace, 1970b). This early research, conducted by myself and coworkers, was extended and published in several other journals (Wallace et al, 1971, Wallace et al, 1972). Very briefly, since a more detailed description of these findings is given later, the results of the studies were:

(a) deep rest as indicated by a marked and significant decrease in oxygen consumption and carbon dioxide elimination,

(b) significant decreases in respiration rate, minute ventilation, and heart rate,

(c) deep relaxation as indicated by a significant and sharp increase in skin resistance,

(d) normal maintenance of critical physiological functions as indicated by stable arterial levels of partial pressure of oxygen and carbon dioxide, pH and blood pressure (blood pressures were quite low throughout the experiments),

(e) significant decrease in arterial blood lactate, and

(f) restful alertness, as indicated by EEG changes showing an increase and spreading of alpha and theta wave activity to the more central and frontal areas of the brain.

The overall conclusion of the studies was that Transcendental Meditation produces a unique state of restful alertness, indicative of a fourth major state of consciousness that is physiologically and biochemically unique. Since these initial findings, many hundreds of studies have been completed in all fields which, when taken together, support and enrich the concept of a transcendental or fourth state of consciousness.

Later research has helped clarify several important issues that were not clearly defined in the earlier research, perhaps the most important being the identification of the state of pure consciousness itself. During
the practice of the Transcendental Meditation technique there appears to be a mixture of states; the technique itself is a dynamic one having both an “inward phase” and an “outward phase.” In the inward phase subjects report their mental activity settling down to quieter levels until they eventually transcend all mental activity and reach a ground or least excited state. In the outward phase they report emerging from the state of pure consciousness and the gradual appearance of more excited states of mental activity, until they begin the inward phase once again. The degree of clarity of the experience of pure consciousness subjectively reported varies greatly, as does the frequency and duration of each of these inward and outward phases. Subjects who are overly tired before practicing the Transcendental Meditation technique report having short periods of drowsiness or even sleep during meditation. Through the entire 20 or 30 minutes of the Transcendental Meditation technique there is often a mixture of active waking state, drowsiness, sleep or relaxation, quiet waking state, and transcending to a least excited state of pure consciousness.

According to Maharishi, if the nervous system were free from any functional or structural abnormalities, then the state of pure consciousness would be maintained for long periods. This is confirmed by other studies on advanced practitioners of the Transcendental Meditation and TM-Sidhi programs which we will examine later. If however, some abnormalities in the physical system exist, as the nervous system begins to settle down to the least excited state it automatically normalizes itself; it causes itself either to rest through drowsiness or sleep, or to return to a more excited state. The mixture of states that occurs during the practice of the Transcendental Meditation technique thus is a direct consequence of the dynamics of the procedure and the initial condition of the individual’s nervous system. That the earlier research, which we could refer to as phase I studies, did not carefully discriminate between this mixture of states during meditation, has to some extent led to confusion over the difference between the physiological correlates of pure consciousness and those of relaxation and drowsiness. Later studies, which we could refer to as phase II studies, have taken care to selectively study periods of pure consciousness, and as we shall see, have demonstrated far more marked and unique physiological changes.
Another difficulty that has sometimes arisen in the attempt to discriminate between the state of pure consciousness and other states is the tendency of researchers to use physiological parameters that are too few and too limited. A classic example of the problems of using limited measurements can be seen in the first attempts to distinguish between dreaming and waking through the use of EEG patterns. The EEG pattern during dreaming looks extremely similar to that during waking, and yet behaviorally the states are entirely different. Based on these EEG patterns dreaming was initially referred to as “paradoxical” sleep. It was not until the observation by Aserinsky and Kleitman (1965) of so-called rapid eye movements (REM) and the subsequent recording of electrooculograms (EOG) and electromyograms (EMG) during dreaming that clearly defined criteria were established which enabled physiological discrimination between dreaming, sleep and wakefulness. Researchers have further characterized dreaming by variations in other physiological parameters (Dement and Masserman, 1964; Jouvet, 1962; Oswald, 1962; Synder et al., 1964).

The same point applies to research on the Transcendental Meditation program. If only one or a few parameters are used it may not be possible to discriminate among the various mixtures of states that occur during the Transcendental Meditation technique. In early research a number of parameters were used in an attempt to undertake a multidisciplinary approach to the study of consciousness. Subsequent research has demonstrated, however, that there exist other, more discriminating, parameters which are able to better characterize the state of pure consciousness. Unless these measures are utilized, the unique characteristics of this state may remain obscured. In the following sections we will consider various studies conducted on the Transcendental Meditation technique in the light of these methodological issues.

**Metabolism and Respiration**

The metabolic rate is perhaps the most fundamental measurement of the overall level of activity or rest in a system. In almost all animals the main metabolic pathways responsible for the vital processes of life are aerobic, that is, they depend upon the presence of oxygen. Since oxygen is such a critical component of aerobic metabolism, its measurement is most commonly used as an indirect means of assessing the metabolic
rate of the body. There are a number of standard procedures for the measurement of oxygen consumption, the most reliable being the so-called open circuit method (Benedict and Benedict, 1933).

In the first studies on the Transcendental Meditation technique at UCLA, oxygen consumption and carbon dioxide elimination were measured in 20 subjects—a closed circuit method was used for the first 5 and the more reliable open circuit method for the remaining 15 subjects. We reported (Wallace et al., 1971) a marked decrease in oxygen consumption of about 40 cc/min., or 16% during the meditation period as compared to the premeditation period (each acting as his own control). The carbon dioxide elimination decreased about 30 cc/min. while the respiratory quotient (the ratio of the volume of carbon dioxide over the oxygen consumed) remained unchanged. Respiration rate and minute ventilation also decreased significantly without significant change of arterial $P_{O_2}$ and $P_{CO_2}$. However, arterial pH declined to a mild but significant metabolic acidosis. These and electrophysiological measurements (reviewed in detail below) suggested that the Transcendental Meditation technique produced a wakeful hypometabolic state with decreased sympathetic activity which is physiologically distinct from ordinary waking and sleep.

Seven subsequent studies have confirmed these initial findings. Studies done by Corey (1973) on 20 subjects replicated the early findings at UCLA, showing a decrease in oxygen consumption of approximately 20%, and further showing a decrease in airway resistance. Dhanaraj and Singh (1973) also showed a similar, significant decrease—approximately 15%—in oxygen consumption in subjects practicing the Transcendental Meditation technique, while nonmeditating relaxing controls showed no significant change. Likewise Reddy (1976) showed a similar decrease in oxygen consumption and carbon dioxide elimination in Transcendental Meditation subjects as compared to controls. One further study by Farrel (1979) showed a significant decrease in oxygen consumption with no change in respiratory quotient in nineteen subjects practicing the Transcendental Meditation technique.
Finding: Metabolic rate was obtained by measuring oxygen consumption in 20 subjects during the Transcendental Meditation technique. The study showed that during the Transcendental Meditation technique oxygen consumption markedly decreases. The average decrease was 16 percent within the first ten minutes of a session of the Transcendental Meditation technique. Further, the study showed that the partial pressures of oxygen and carbon dioxide in the blood remained essentially constant. The decrease in metabolic rate during the Transcendental Meditation technique was deeper and much quicker than during deep sleep.


In addition, Throll (1982) measured oxygen consumption, total volume, respiration rate, heart rate, and systolic and diastolic blood pressure in 39 subjects learning the Transcendental Meditation technique, and in 21 subjects learning Jacobson’s Progressive Relaxation. Subjects were tested both during the techniques and also on a longitudinal basis,
before learning either technique, immediately after, and at five, ten, fifteen weeks later. There were no significant differences between groups for any of the variables at pretest; the Transcendental Meditation group displayed more significant decrease during meditation than the progressive relaxation group in respiration rate, oxygen consumption, and total volume. The Transcendental Meditation group also showed significant long-term reductions (as compared to the progressive relaxation group), in the following parameters: heart rate, respiration rate, total volume and diastolic blood pressures.

Gallois (1984) compared 10 subjects practicing the Transcendental Meditation technique with 10 subjects practicing autogenic training and 10 control subjects. The results of the study showed a marked decrease in respiration rate in the Transcendental Meditation group as compared to the other groups, with the appearance of frequent respiratory suspensions in the Transcendental Meditation group, reaching a maximum duration of 50 seconds. In addition, simple reaction time decreased slightly in the Transcendental Meditation group, whereas it increased slightly in controls. Finally, Garnier and coworkers (1984) studied pulmonary ventilation before, during, and after the Transcendental Meditation technique as compared to relaxing controls. The oxygen uptake per kilo weight of the Transcendental Meditation subjects was reported to be 15.6% below that of the control group during meditation. This value decreased by a further 8.5%, indicating that the Transcendental Meditation subjects showed values below their calculated basal metabolic rate.

The results of certain of these studies suggest the importance of looking at continuous measurements so that the “deeper” periods of meditation can be identified, and, further, of studying more advanced subjects who report clear experiences of pure consciousness. To some extent, this was done in one of the first studies on the Transcendental Meditation technique. Allison (1970), in a report on one advanced subject, found that respiration rate decreased from 12 breaths/min. before meditation, to 4 breaths/min. during, and again returned to 12 breaths/min. after meditation, with no evidence of compensatory breathing.

A recent more extensive study by Farrow and Hebert (1982) has helped clarify these previous results. This study analyzed specific peri-
Periods of Transcendental Consciousness during the Transcendental Meditation Technique. The subject was asked to press an event-maker button after each subjective experience of transcendental consciousness (upper trace in each set). Each mark the subject made closely corresponds to the end of a period of markedly reduced breath flow (lower trace in each set).
ods during the Transcendental Meditation technique that more carefully isolates and studies the experience of the least excited state of consciousness. In four independent experiments Farrow and Hebert attempted to determine frequencies of breath-stoppage episodes during the Transcendental Meditation technique and whether these episodes were correlated with the experience of pure consciousness.

In the first experiment, 95 subjects who had been practicing the Transcendental Meditation technique from one month to 13 years were studied before, during, and after meditation. Eleven of the subjects exhibited a total of 151 breath suspension episodes, almost all occurring during the Transcendental Meditation technique. In this experiment respiration was considered suspended if for ten seconds or more the pen tracing did not fluctuate significantly. In the second and third experiments the following improvements were made: 1) the criteria were altered so that they accounted for individual variations in average respiration time (respiratory suspension was noted if the pen tracing did not fluctuate significantly for two respiratory cycles); 2) more advanced Transcendental Meditation subjects (some practicing the TM-Sidhi program) were studied as well as nonmeditating controls; and 3) the measuring equipment was less intrusive. As a result, the frequency of breath suspension episodes was greater. For example, in the second experiment, 21 of the 28 Transcendental Meditation subjects exhibited a total of 116 episodes while 9 of the 23 controls exhibited only a total of 14 breath suspensions. The frequency of episodes and mean, maximum, and total episode lengths were all substantially greater in the Transcendental Meditation group than in the control group.

In experiment three there was an attempt to correlate the occurrence of breath suspensions with the subjective experience of pure consciousness. In this experiment all subjects had participated in advanced courses designed to deepen and extend the clarity of experience in meditation; all reported frequent and sustained experiences of pure consciousness during meditation. Subjects were given an event marker button and instructed to push the button after each experience of pure consciousness. Respiration was measured in a nonintrusive manner (using a two-channel paramagnetometer). Eight of 11 subjects exhibited 57 periods of breath suspension. A large percentage of the button presses noting the experience of pure consciousness, occurred within 10 seconds of the
offset of one of the 57 breath suspensions. The temporal distribution of button presses was significantly related to the distribution of breath suspension episodes, indicating that breath suspension is a physiological correlate of some, but not all, episodes of pure consciousness.

In experiment four one very advanced Transcendental Meditation meditator, who reported frequent clear experiences of pure consciousness, was studied over six sessions. Respiration rate, minute ventilation, oxygen consumption, basal and phasic skin resistance, heart rate, electrooculogram (EOG), and electroencephalogram (EEG) were measured. In three sessions the subject was given an event marker button to press after each experience of pure consciousness. In almost all cases the event marks occurred immediately after a period during which breath flow decreased to nearly zero, indicating a clear and consistent correlation between periods of respiratory suspension and the subjective experience of pure consciousness. Event marks and periods of breath suspension were not present in the records during either the precontrol, eyes-open period or the postcontrol, eyes-closed, and eyes-open periods; however, some did occur near the end of the precontrol, eyes-closed period. As in the case with many subjects, there is often a spontaneous drifting into the practice of the Transcendental Meditation technique during the precontrol eyes-closed period.

Over five sessions, there were 191 breath suspensions, occurring at a mean rate of one every 52 sec. The mean period breath suspension and experience of pure consciousness was about 18 seconds, with the longest period about 35 seconds. A detailed analysis of the air flow during periods of breath suspension showed that it did not stop but continued with high frequency, low fluctuations at about 2Hz and 4.5Hz.

Two key questions asked by Farrow and Hebert in this experiment were whether or not the breath suspension periods were intentional and whether they reflected a true reduction in the metabolic needs of the body. Concerning the first question, in all experiments subjects were blind to the purpose of the experiment; several sessions employed further equipment and conditions which reduced or eliminated the subject’s awareness that respiration was being measured. In a number of the sessions, multiple electrodes were attached for other measurements, thus further lessening the subjects’ awareness of the purpose of the experiment. To determine whether the breath suspensions were inten-
tional, the compensatory hyperventilation seen after intentional breath suspension periods was analyzed and compared to breathing activity following respiratory suspensions during the Transcendental Meditation technique. A subject asked to intentionally hold his breath for time periods similar to the Transcendental Meditation respiratory suspensions showed a significant and marked increase in minute ventilation (2.71 liters per minute), as compared to a nonsignificant increase (0.57 liters per minute) after the periods of respiratory suspension during Transcendental Meditation practice.

Another concern was to distinguish the periods of respiratory suspension seen during sleep apnea from those during the Transcendental Meditation technique. This was determined by the fact that EOG measurements during the Transcendental Meditation technique did not show the typical, slow-rolling eye movements preceding or associated with sleep apnea.

Several measurements were made to answer Farrow and Hebert’s second question: whether the periods of respiratory suspension represented a true reduction of the metabolic needs of the body. Measurements of respiration rate during the Transcendental Meditation technique as compared to the mean of the pre and post control periods showed a 50% decrease, while measurements of minute ventilation showed a significant decrease—approximately 35%—during meditation. Oxygen consumption was monitored in one session and was found to decrease a mean of 40% during the Transcendental Meditation period, reaching a maximum of 60%. However, because the technique used to measure oxygen consumption was novel, the researchers felt the need for further replications.

These findings, while not completely answering the question of whether these periods represent a dramatic decrease in metabolic requirements do clearly distinguish between the experience of pure consciousness during the Transcendental Meditation technique and mere relaxation during rest or some specific relaxation procedure. The patterns of respiratory suspensions which accompany the subjective experience of pure consciousness are different from those seen in other states. By using advanced subjects with clear experiences of this ground state of consciousness and by attempting to isolate the experience of pure consciousness rather than averaging over a mixture of states, a
much more detailed analysis was achieved. A further description of the other physiological parameters, such as skin resistance and EEG power and coherence, utilized by Farrow and Hebert to characterize the periods of pure consciousness, will be discussed in a later section along with one other study which includes a comprehensive analysis EEG coherence changes during periods of respiratory suspension.

Several other recent studies have extended Farrow and Hebert’s results and have more carefully analyzed the neurophysiological control of respiratory patterns during the Transcendental Meditation technique. For example, Wolkove and co-workers at McGill University in Canada, comparing long-term Transcendental Meditation subjects with nonmeditation controls at rest, confirmed Farrow and Hebert’s findings of both a significant decline of minute ventilation and the observation of periods of respiratory suspension in Transcendental Meditation subjects. Further these researchers along with another researcher in Australia both found that when Transcendental Meditation subjects were given increasing amounts of carbon dioxide in inspired air there was a reduced respiratory response. This suggested a decreased sensitivity to high carbon dioxide concentration and an alteration in the neurophysiological mechanisms which regulate breathing (Wolkove et al., 1984; Singh, 1984).

The most extensive investigation in this area is that of Kesterson (1986). In this study a cross section of groups of Transcendental Meditation and TM-Sidhi participants were tested during their group practice of the TM-Sidhi program. Three categories of subjects were identified according to their pattern of breathing while practicing the Transcendental Meditation technique.

The first group showed no changes in the frequency of breathing with meditation, the second a large decrease in the rate of breathing, and the third group prominent, frequent periods of respiratory suspension. The subjects in the third group were studied extensively in order to determine the underlying neurophysiological mechanisms producing the suspensions. Similar to Wolkove and co-workers, and Singh findings, these subjects demonstrated decreased sensitivity to high levels of carbon dioxide in ambient air during meditation. Further, they showed an increased sensitivity to low levels of oxygen. It was also discovered that many of the subjects demonstrating spontaneous suspensions dur-
ing meditation were, in fact, breathing apneustically, i.e. the suspension began with a full inspiration and continued with a gradual inspiration of between 100 to 300 ml/min during the suspension. He theorized that the decreased sensitivity to carbon dioxide that occurs with the onset of meditation (probably due to an inhibition of the off-switch mechanism controlling inspiration) results in a decrease in the frequency breathing which, in turn, causes an increase in the carbon dioxide in the blood. The increase in carbon dioxide the blood changes the sensitivity of the carotid bodies to the lack of oxygen such that they begin to fire more rapidly at higher partial pressures of oxygen. The increased sensitivity to lack of oxygen then causes the termination of the prolonged inspiration (apneusis) and the initiation of expiration (normally it is the buildup of carbon dioxide that controls the onset of expiration).

Interestingly, the carotid bodies project to both the respiratory nuclei and the reticular activating system (RAS) which is partly responsible for “wakefulness” or arousal. At the end of a suspension these subjects not only begin to breathe again, but are aroused from the experience of transcendence by the increased afferent traffic from the carotid body to the RAS, thus explaining the high correlation of button presses and suspensions as reported by Farrow and Hebert (1984). The subjects are not aware of the state of transcendental consciousness while they are experiencing it, but realize that they were absorbed in it upon arousal.

Furthermore, Kesterson discovered a drop in the respiratory quotient (RQ—the ratio of carbon dioxide produced/oxygen consumed) for almost all subjects in his experiment during meditation. He hypothesized that this drop was a consequence of mild hypoventilation, which is known to decrease RQ. He demonstrated in a series of separate experiments that, in fact, alveolar ventilation decreased significantly greater than oxygen consumption for meditators but not for non-meditating controls while relaxing, an argument in favor of hypoventilation. He cites this change as further evidence for brainstem inhibition of respiratory control during TM.

Kesterson suggests his findings are contrary to previous models hypothesizing that the respiratory changes during Transcendental Meditation originate in decreased metabolic needs. His findings indicate that they are a result of specific alterations in neurophysiological centers within the brain, more specifically those respiratory centers in
the medulla involved with the regulation of inspiration and expiration. Kesterson’s research, as well as several other studies suggests that oxygen consumption may not be as good a discriminator of transcending as respiratory patterns. Oxygen consumption is sensitive to bodily movements and any state of rest or relaxation will result in a gradual decrease in metabolic rate. The specific patterns of respiratory activity during the Transcendental Meditation technique seem to be better indicators of the subjective experience of transcending, especially when coupled with other physiological measurements such as EEG coherence.

The most important conclusions drawn by Kesterson, however, are those concerning changes in states of consciousness. Sullivan (1980) has noted that respiratory pattern is a good discriminator between sleep, dreaming and wakefulness, i.e. states of consciousness. In fact, he suggests that if respiratory physiologists had discovered REM sleep instead of EEG researchers, it would have been called RERM, Rapid Erratic Respiratory Movements. Deep sleep is characterized by slow, periodic monotonous patterns, REM sleep by irregular variations unrelated to carbon dioxide control, and wakefulness provides a major component of respiratory drive during daily activity. Brainstem inhibition of respiratory centers, a buildup of carbon dioxide, a drop in RQ and mild hypoventilation are all known to accompany the transition between these states of consciousness. The respiratory patterns demonstrated by advanced Transcendental Meditation meditators, and investigated by Kesterson, are indicative of a transition in the state of consciousness and a state of restful alertness. The subjects who showed the greatest changes in breathing pattern while meditating were also the most alert and reported the best experiences. Kesterson argues that the changes in breathing pattern signify an integration of the three separate states of consciousness into a single, unified state.

**Lactate Generation**

One of the first biochemical findings noted in subjects during the Transcendental Meditation technique was a marked decrease in level of lactate in arterial blood and a continued low level afterward (Wallace et al., 1971). Lactate or lactic acid is the byproduct of a less efficient type of metabolism known as anaerobic metabolism, which occurs
when cells are not able to utilize oxygen. Even under normal conditions anaerobic metabolism exists and, as a result, a certain amount of lactate is constantly being produced by various cells in the body. Lactate production is dramatically increased in situations where the oxygen supply is eliminated or decreased in certain cells in the body—for example, in the skeletal muscle cells of a runner who is sprinting the last hundred yards of a mile race. The cells must rely on anaerobic metabolism even though it is less efficient. During these last hundred yards the runner is building up what is known as an oxygen debt, which is indicated by the increased production of lactic acid or lactate. If too much builds up too quickly, an excessive acidic condition can be created in the body, which can be detrimental to health.

**Finding:** During the Transcendental Meditation technique the concentration of blood lactate markedly decreases and remains low some time after practice of the technique.


At the University of California at Irvine Drs. Jevning and Wilson replicated and extended the early findings on decreased levels of arterial lactate during the Transcendental Meditation technique in a series of well-controlled experiments, comparing Transcendental Meditation meditators to nonmeditating controls (Jevning et al., 1978a, 1983a). Perhaps the most interesting of these experiments involved an in vitro study on lactate generation in arterial red blood cells during the Transcendental Meditation technique (Jevning et al., 1983a).

Meditators and a nonmeditating control group were studied in 40-minute periods before, during, and after meditation or simple relaxation. Samples of arterial blood were drawn during each of these periods and incubated for 90 minutes at 37 degrees C to determine rate of lactate generation. The nonmeditating control group showed no significant changes while the Transcendental Meditation subjects showed a marked decrease in lactate generation. The samples were analyzed for pH, PO2 and PCO2 and hematocrit. No significant alteration in these parameters was seen for either meditation or relaxation periods. The authors concluded that the Transcendental Meditation technique is associated with the inhibition red blood cell glycolysis and hypothesized the possible production of a plasma factor, which is not one of the ordinary factors involved in lactate generation during glycolysis. Further research in this area is continuing at Drs. Jevning and Wilson's laboratory, supported by research grants awarded from the National Institutes of Health. Jevning and Wilson feel their results suggest that an unknown chemical factor, which affects basic metabolic processes, is being produced and released into the blood as a result of the Transcendental Meditation technique.

Redistribution of Blood Flow and Muscle Metabolism

A number of circulatory changes have been reported in subjects practicing the Transcendental Meditation technique as compared to nonmeditating controls. In one study, hepatic blood flow was reported to decrease 40% in Transcendental Meditation subjects, but not at all in controls; cardiac output increased 15% in Transcendental Meditation subjects, but not at all in controls; and renal blood flow decreased 20% in both Transcendental Meditation subjects and controls (Jevning et al., 1978a). Jevning and coworkers concluded that, since arterial blood
pressure has been reported to be constant (Wallace et al., 1971), and since there is a marked reduction in hepatic and renal blood flow, there must be an increase in blood flow to some other major organs than the heart, namely the muscles or brain.

Earlier experiments examined forearm muscle blood flow using a water plethysmograph, and found a small but significant increase in blood flow during the Transcendental Meditation technique as compared to a pre-test period (Levander et al., 1972). The same subjects, when tested on different days and asked to sit quietly and not meditate during the experiment, showed slight decreases in blood flow during the test and post-test periods. Jevning, Wilson and also coworkers (1983b), using a different type of technique, also found a significant but small increase in forearm muscle blood flow during the practice. According to their calculations increase in forearm muscle blood flow was not nearly enough to account for the postulated increase in total blood flow. Jevning and coworkers therefore reasoned that there might be an increase in brain blood flow. Using a noninvasive impedance technique (rheoencephalography), they demonstrated a significant and marked increase in brain blood flow (Jevning et al 1978b).

Jevning and Wilson’s further studies of forearm muscle blood flow reveal another intriguing and unexpected finding. In addition to measuring blood flow they measured the partial pressure and absolute levels of oxygen and carbon dioxide of the arterial and venous blood in the forearm of Transcendental Meditation subjects during meditation and in nonmeditating controls during rest. From these measurements they were able to calculate the metabolic activity of the forearm muscles. They found the normal difference in oxygen content of the arterial and venous blood was significantly reduced in Transcendental Meditation meditators during meditation, as compared to controls during rest. This suggests that less oxygen was being used by the cells, indicating a state of lower metabolism and deeper rest in the muscles of the Transcendental Meditation subjects.

More interestingly, they found the normal difference in carbon dioxide content of arterial and venous blood was markedly reduced in Transcendental Meditation subjects during meditation, with a less marked reduction in the controls during rest. These findings indicated a decreased or complete cessation of carbon dioxide production by the
forearm muscles after 20-30 minutes practice of the Transcendental Meditation technique. Calculations of the respiratory quotient during meditation showed a value of almost zero, as compared to the normal value of about .60. Thus a dramatic alteration in local metabolism occurs as a result of the Transcendental Meditation technique. This change is particularly interesting in the light of the earlier research, which showed changes in the systemic levels of oxygen and carbon dioxide as reflected by arterial $P_{O_2}$ and $P_{CO_2}$ (Wallace, et al., 1971).

Wilson (1984) speculates that the changes may be due to an alteration in fat metabolism. In order for carbon dioxide not to be produced, it is necessary to postulate that the two or three carbon fragments produced do not enter the tricarboxylic acid cycle. Two metabolic pathways which may not involve carbon dioxide production are beta-oxidation of fatty acids and glycolysis. Wilson and coworkers suggest that fatty acid oxidation is the more likely of these pathways for a number of reasons: one is that the previously observed decrease in blood lactate during the Transcendental Meditation technique suggests that the end products of glycolysis are not being formed. In order to account for the low arterial-venous carbon dioxide content, it is also necessary to explain why the products of fatty acid metabolism do not enter the tricarboxylic acid cycle. Wilson and coworkers speculate that under the resting conditions of the experiment the energy production may exceed utilization, producing conditions which inhibit the further normal metabolism of these products. These unmetabolized products must undergo further oxidation at some other site or organ in the body. The reported marked increased in brain blood flow suggests that perhaps oxidation of these products is occurring there. Further research is being conducted in this area in order to reveal the mechanics and significance of these findings.

**Biochemical and Hormonal Changes**

Several different research groups have investigated biochemical and hormonal changes during the Transcendental Meditation technique. In a series of experiments by Jevning, Wilson and co-workers (Jevning et al., 1977; Jevning et al., 1978c, 1978d) plasma levels of cortisol, prolactin, testosterone growth hormone, and thirteen neutral and acidic amino acids were studied before, during, and after practice of the Transcendental Meditation technique. The design of these experi-
ments involved three groups consisting of: 1) a nonmeditating relaxation group of subjects who volunteered for the study prior to learning the Transcendental Meditation technique, 2) the same group restudied after four months of Transcendental Meditation practice, and; long-term regular participants in the Transcendental Meditation program. During the experimental period the controls were asked to relax maximally without specific instructions; those practicing the Transcendental Meditation technique were asked to meditate. All subjects had been fasting for 12 hours, and an arterial catheter had been inserted into their brachial artery at least two hours before the experiment began, thus allowing for hormonal levels to normalize. Samples were then drawn every 20 minutes throughout the experiment. Measurements were taken in the afternoon when circadian changes, especially in cortisol, are relatively stable.

Plasma cortisol level decreased by a small but significant amount in long-term Transcendental Meditation meditators during the meditation period, as compared to the pre and post experimental control periods. Plasma cortisol levels did not change in the nonmeditating relaxation group. After this group was taught the Transcendental Meditation technique and retested three to four months later, cortisol levels decreased but did not reach statistical significance. No significant change in growth hormone and testosterone concentration was found in any of the groups. Meditators did not, however, exhibit a post-experimental decrease in testosterone, which was seen in the nonmeditating controls after relaxation.

Prolactin concentration remained stable during meditation but increased significantly afterwards. The nonmeditating relaxation control group showed no such effect. When this group was later taught the Transcendental Meditation technique and retested, it also showed an increase in prolactin in the post meditation period.

Of the thirteen neutral and acidic amino acid levels studied only phenylalanine was shown to change. Phenylalanine concentration increased significantly (20%) during meditation. This change was seen only in long-term meditators and not in the nonmeditating group the restudied controls.

Jevning indicates that these changes, particularly the decrease in plasma cortisol, are in agreement with other, physiological findings.
such as decreased oxygen consumption, heart rate, and breathe rate. Jevning further suggests that, since there is a close qualitative relationship between ACTH and cortisol, the decline of plasma cortisol during and after the Transcendental Meditation technique reflects decreased pituitary-adrenal activation, rather than a nonspecific increase in the metabolic clearance of cortisol. The finding of decreased blood flow to the liver, the principal site of cortisol degradation, further supports this hypothesis. Concerning the significant increase in plasma levels of phenylalanine in long-term meditators as compared to controls, the authors suggest that since phenylalanine is a precursor to the synthesis of a number of important brain neurotransmitters, such as adrenalin and dopamine, its increase in the blood during Transcendental Meditation may indicate an alteration in the utilization of these neurotransmitters by the brain.

Jevning further interprets the combined changes in cortisol, plasma phenylalanine, prolactin, and blood flow as distinguishing the Transcendental Meditation technique from other hypometabolic states such as sleep. He notes that in slow wave sleep, for example, there are no acute changes in plasma cortical and plasma phenylalanine, while other amino acids may decline. The changes in prolactin are particularly interesting since they suggest possible changes in the neurotransmitter dopamine. Dopamine inhibits secretion of prolactin, and changes in levels of prolactin have been used by some researchers as an index of dopamine activity.

Bevan et al. (1976, 1980), in an extensive study of both long and short-term changes in Transcendental Meditation participants, measured urinary catecholamine levels (UCA), plasma and urinary free cortisol (UFC), serum thyroxine (T4), and triiodothyronine (T3). Three separate studies were performed on normal subjects to examine endocrine effects of various relaxation procedures. First chronic endocrine effects were investigated in subjects practicing the Transcendental Meditation technique, progressive relaxation autohypnosis, and yoga meditation, both before training and at regular intervals over eight months during training. A control group that was given no specific relaxation instruction and a group of experienced (more than one year of practice) Transcendental Meditation subjects were studied concurrently. Second, acute endocrine effects were studied in all groups by
serial blood sampling before and after a half-hour midafternoon relaxation session on a Sunday. Urine samples were collected over the same weekend and the following Monday. The third study was conducted during a Transcendental Meditation weekend residence course on subjects practicing meditation for longer periods of time. Both experienced and novice Transcendental Meditation subjects were investigated.

The results of the first study showed that during the eight months no trends in endocrine levels relating to the relaxation technique practices were apparent for all groups. Overall, however, urinary free cortisol levels of experienced Transcendental Meditation subjects were significantly lower than those of novice Transcendental Meditation subjects. No significant differences were seen between urinary free cortisol levels of novice meditators and controls, and no significant group differences in urinary catecholamine were found.

In the second study, a highly significant decrease in plasma cortisol following meditation was observed in the experienced Transcendental Meditation group. No significant plasma cortisol changes were found in any of the other groups. Levels of T4 fell immediately following meditation in the experienced Transcendental Meditation group; however, no significant changes in T3 were observed. Analysis of urinary free cortisol and urinary catecholamine showed a general decline from Saturday to Sunday and an increase on the following Monday, although these trends were not significant.

In the third study, urinary free cortisol levels of experienced Transcendental Meditation subjects fell significantly from the Saturday to the Sunday of the Transcendental Meditation residence course, and levels remained lower on the following Monday. Novice meditators showed a similar pattern, however, the decrease in the novice group was not statistically significant. No significant changes in urinary catecholamine in any group occurred over the weekend.

The authors concluded that the most significant observations were the highly significant decreases in plasma and urinary free cortisol levels during the Transcendental Meditation technique, the effect being cumulative with increased meditation experience. It would appear from this research that the primary effect of the state produced by the Transcendental Meditation technique seems to be on the adrenal cortex rather than the adrenal medulla. However, as we shall see in the next chapter,
other long term studies have reported distinct changes in adrenalin and noradrenalin levels.

Changes in Neurotransmitter Profile

Metabolites of Noradrenaline
Adrenaline, and Serotonin

Lower levels of the adrenaline and noradrenaline metabolite, vanillomandelic acid (VMA) and higher levels of the serotonin metabolite, 5-hydroxyindole-acetic acid (5-HIAA) were found in meditators, both before meditation and during the meditation and post-meditation periods, than in nonmeditating controls at the same time of day. Lower VMA excretion is consistent with reduced arousal levels, while high 5-HIAA levels are consistent with reports of decreased depression and increased feelings of satisfaction, happiness, and bliss.
Bujatti and Riederer (1976) analyzed urinary metabolites of several major neurotransmitters: serotonin (primary metabolite 5-hydroxyindole-3-acetic acid, 5-HIAA), norepinephrine (primary metabolite vanillic-mandelic acid, VMA) and dopamine (primary metabolite homovanillic acid, HVA). Samples were taken over a four-and-half hour period, from mid-afternoon to early evening, two hours before and two hours after a 30-minute meditation. Controls practicing no form of relaxation were sampled over the same time interval. The study controlled for circadian rhythm effect and diet. The urine concentrations of all metabolites measured in the controls did not change significantly during the experimental period. Meditator samples showed a significant increase in 5-HIAA after meditation, with 5-HIAA concentrations at significantly higher levels than controls throughout the experiment. Resting concentrations of urinary VMA were considerably lower in meditators than controls, but no significant change was found during meditation.

Bujatti and Riederer suggest that the increase of 5-HIAA in subjects practicing the Transcendental Meditation technique indicates an increase in serotonin output by the enterochromaffin (EC) system in the gas storage gastronintestinal mucosa, a main site of production and storage of serotonin in mammals. They suggest that the EC system, via serotonin secretion acts as the mediator of a “rest and fulfillment” parasympathetic response produce by the Transcendental Meditation technique.

Kochabhakdi and Chentanez (1980) have found an increase in 5-HIAA and also in the amino acid tryptophan, the precursor of serotonin, during the Transcendental Meditation technique. They also found that plasma levels of serotonin did not change, thus suggesting that there was an increased serotonin turnover during the Transcendental Meditation technique. They also found an increase in white blood cells during and after the Transcendental Meditation technique while hematocrit did not change.

In an interesting study by McCuaig (1974), salivary electrolytes, protein, and pH were measured before, during, and after Transcendental Meditation practice. During meditation there was a general increase in salivary minerals, especially sodium (70%), magnesium (42%), and calcium (36%). Ten minutes after meditation these returned to pre-medi-
tation levels. Total protein content also increased during meditation by 60%. Salivary pH decreased during meditation (0.4 unit) and increased slightly (0.1 pH unit) one minute afterwards. The decreased salivary pH was thought to reflect the mild metabolic acidosis found by Wallace and coworkers (1971). McCuaig felt that these changes reflected alterations in specific processes involving these substances and could not be completely explained by an overall change in water concentration. A more careful study of salivary proteins would be very interesting since important growth factors are known to be present in the salivary glands.

### Autonomic Effects

A number of studies have attempted to measure various parameters of the autonomic nervous system, such as skin resistance and heart rate as they are affected by the practice of the Transcendental Meditation technique. In the early studies, a very slight decrease in heart rate was noted along with a marked increase in resting skin resistance. Orme-Johnson (1973) also reported a significant increase in resting skin resistance in 12 out of 13 subjects, while nonmeditating control subjects, during rest with eyes closed, showed nonsignificant changes.

Several later studies have attempted to compare the effects of the Transcendental Meditation technique with those of relaxation techniques. In general, the results of these studies show that all these techniques, by causing some degree of relaxation, can effect autonomic measures. We will not attempt to describe the details of these studies. Even though, in some cases, they include a very careful experimental design, they unfortunately utilize only autonomic measures (i.e., dependent variables) which by themselves are not enough to distinguish between different states of rest and relaxation. Also, a number of these studies utilize an insufficient number of subjects to adequately distinguish statistically between different procedures (Orme-Johnson and Dillbeck, 1986).

Any conclusions drawn from these studies are inherently limited due to the fact that these autonomic measures change with almost any type of relaxation. Perhaps the most interesting and valuable use of autonomic measures is in those studies examining the effects of the Tran-
scendental Meditation technique on people in challenging situations outside of meditation.

**EEG**

EEG is one of the measures used most frequently to study techniques of meditation.

The first EEG studies on the Transcendental Meditation technique showed increased intensity (mean square amplitude) of slow alpha waves in the central and frontal regions of the brain, interspersed with occasional high voltage trains of theta in the frontal channels (Wallace, 1970a; Wallace et al., 1971). The intensity of beta and delta waves either decreased or remained constant during meditation. In subjects who reported feeling tired and drowsy at the beginning of meditation a flattening of the alpha activity along with low voltage, mixed frequency waves were observed. As these subjects continued meditation, this pattern was replaced by regular alpha activity. The five subjects measured showed no change in electrocolograms.

Banquet (1973) examined 12 Transcendental Meditation meditators and compared their EEGs to those of 12 matched non-meditating controls about to learn the Transcendental Meditation technique. Banquet used the pre and post meditation control paradigm and also supplied each subject with push-buttons to signal five internal events: body sensation, involuntary movement, visual imagery, deep meditation, and transcendence (the state of pure consciousness). He reported finding three distinct stages of meditation, the first stage being characterized by alpha activity, which increased in amplitude and slowed to 1 to 2 Hz initially in the frontal channel. This pattern was found to repeat at the end of meditation with increased alpha abundance. These alpha periods usually were not blocked in response to flash and click stimuli. A second stage was characterized by a dominant theta pattern. Short theta bursts of high voltage (up to 100 microvolts) were seen simultaneously in all channels (or first frontally), usually followed by longer rhythmic theta trains (10 seconds to several minutes) at 60–80 microvolts.

Banquet notes that the theta activity was unlike that of drowsiness (stage I sleep) in that the pattern was blocked by click stimuli but reappeared spontaneously within few seconds. In drowsiness, click stimuli
produce the alpha rhythm of an arousal reaction. The spectral array analysis revealed morphological differences between meditation and drowsiness. Meditation theta rhythms appeared as continuous trains of a specific frequency. Drowsiness, on the other hand, produced a mixture of discontinuous theta frequencies combined with alpha and low delta.

Four of the meditators showed a third state similar to that reported by Das and Gastaut (1957), which was characterized by fast beta spindle bursts (20 and 40 hz) alternated with alpha or theta rhythms. These bursts reached an amplitude of 30-60 microvolts and maintained a constant frequency. There was a tendency for them to become continuous on a background of slower activity. They occurred predominantly in the anterior channels, but were present (sometimes simultaneously) in all channels. This EEG activity was correlated with experiences of “deep meditation” and “transcendence” and was unaffected by click stimuli. Tonic electromyogram activity (electrode placement below chin) disappeared and breathing became very slow and shallow. Behaviorally, however, the subject was able to respond to questions readily and accurately.

Topographic changes in the EEG were also observed. There was a tendency toward synchronization of anterior and posterior channels. Alpha rhythms spread from occipito-parietal regions forward. Theta and beta frequencies generally appeared in frontal channels first and diffused posteriorly. Transient asymmetry could occasionally be seen between right and left hemispheres in shifting from slow to fast frequencies. There were periods uniformity of wave form frequency and amplitude in channels simultaneously.

Banquet noted that the EEG stages during meditation tended to occur in cycles. All stages appeared sequentially again if the meditation time were long enough. In advanced Transcendental Meditation subjects, alpha and sometimes theta waves persisted in the eyes open period after meditation.

The control subjects showed changes different from those seen in the Transcendental Meditation subjects. Control subjects were divided into two groups. The first group did not develop stable alpha rhythms, but showed beta-dominant mixed frequencies throughout. In the second group, alpha activity appears primarily in the posterior region of the
brain and tended to alternate with beta activity. Some members of the second group also showed EEG signs of drowsiness and sleep.

In another paper, Banquet and Sailhan (1974a) performed statistical analyses of the EEG during Transcendental Meditation practice and found significant differences between eyes closed rest and the end of meditation. The data also clearly distinguished the Transcendental Meditation technique from sleep and drowsiness.

In addition, they noted that meditation generally produced an increased phase synchrony between adjacent parts of the brain. Two subsequent studies replicated these findings. Kras (1974) found a significant increase in alpha wave activity in all parts of the brain in subjects practicing the Transcendental Meditation technique, as compared to relaxing controls. Wescott (1973) found similar increased synchrony EEG activity within each hemisphere of the brain and also a more even distribution in EEG alpha activity between the right and left sides of the brain as compared to controls.

Hebert and Lehmann (1977) investigated the frequency of occurrence of the high amplitude (more than 100 microvolts) theta bursts reported during the Transcendental Meditation technique. They examined 78 long-term meditators who had been practicing the Transcendental Meditation technique from 24–140 months, with a mean of 56.1 months. All were healthy, normal people, socially well-adjusted with no history of recent drug use, brain damage, seizures or fainting. These were compared to 54 control subjects who had not learned the Transcendental Meditation technique. EEGs were recorded both during meditation and sitting quietly with eyes closed.

Of the 78 meditators tested, 21 demonstrated intermittent prominent bursts of frontally dominant theta activity. Theta bursts occurred an average of every two minutes, with an average duration of 1.8 seconds and average maximal amplitude of 135 microvolts, ranging as high as 300 microvolts. The bursts usually were preceded and followed by alpha rhythm. Subjective reports elicited during the theta burst activity indicated pleasant states with frequent references to “peaceful” or “comfortable” and descriptions of “drifting” or “sliding.” The subjects

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1 These data were derived from the average of the power spectra, using the following ratios: depth of sleep coefficient, delta (alpha and theta); wakefulness coefficient, alpha/delta; activation coefficient beta/alpha. Cross-correlations were also computed between monopolar derivations of a transverse montage.
maintained intact situational orientation and reported no experiences related to sleep. The 54 non-meditating controls exhibited no theta bursts either during relaxation or sleep onset. The authors hypothesized that theta burst may be the manifestation of an adjustment mechanism, which comes into play during prolonged low arousal states such as that produced by the Transcendental Meditation technique.

**EEG Coherence**

Perhaps the most important development in the EEG research on the Transcendental Meditation program has come through the application of EEG coherence measurements. EEG coherence is derived from a computer analysis of the EEG signals from spatially separated areas of the brain. Coherence provides a measure of the correlation between two EEG records for each frequency and attains a high value at a given frequency if the phase relationship between two channels is nearly constant over a specified time interval.

One of the first applications of this measurement was by Drs. Donald Walters and W. Ross Adey and co-workers working at the Brain Research Institute at U.C.L.A. In a series of articles Walter and co-workers utilized coherence to distinguish between various functional states. For example, they noted a decrease in alpha and theta coherence during sleep. They further speculated on the location of key centers of the brain possibly responsible for the generation and synchronization of EEG signals. One of the most interesting findings of their studies was a marked increase in theta EEG coherence in Astronaut Frank Borman in his Gemini Flight, during a 40-minute period in the second half of the first orbit, when he was in very relaxed yet awake state (Walter, et al. 1966, 1967a, b).

Coherence measures have also been used in a number of other studies (Gevins, et al. 1980), for example, by John in his Neurometric testing program, which includes a variety of computerized EEG and evoked potential measures and which has been utilized to successfully distinguish certain child learning disabilities (John, et al., 1970; John, 1977).

In order to examine EEG coherence during the Transcendental Meditation technique, Levine (1975) developed a computerized technique known as the coherence spectral array (cospar). Levine used digital filtering techniques designed to register coherence peaks in the
array only if they exceeded 0.95 (1.0 being perfect coherence) and if the coherence relationship existed for more than 10 seconds. This procedure biased the cospar in favor of showing relationships of only high and long-term coherence and thereby increased the likelihood that a given coherence peak represented true long range order in the EGG.

Since Transcendental Meditation-specific changes had been reported mainly in the frontal and central regions of the brain, cospars were computed only for these areas (electrode placement at F3, F4, and C3, C4) on the 25 subjects studied. The most common effect was an increase in the height and/or incidence of coherence peaks in the alpha band with the beginning of the Transcendental Meditation technique but without a marked decrease at the end of that period. The second most frequent effect during meditation was the spreading of coherence peaks to other, generally lower, frequencies. The third was an abrupt onset of strong coherence with the start of the Transcendental Meditation technique and an abrupt decrease at the end.

Also, intrahemispheric Transcendental Meditation-specific effects appeared more frequently and dominantly in the frontal channels. One of the most interesting cospars observed was that of a long-term meditator of 15 years, in which continuously strong coherence was seen concurrently in delta, theta, alpha, and beta bands both during and outside of meditation. Levine points out the alpha coherence is not unique to the Transcendental Meditation technique, although the patterns of change observed, particularly in the spread of coherence to other frequencies, appear to be characteristic of the Transcendental Meditation practice. This was not observed in control subjects during either extended periods of eyes-closed relaxation or in “mock” meditations involving repetitive backwards counting in a nontaxing fashion. In the “mock” meditation any strong alpha coherence which may have been present upon closing the eyes initially tended to be reduced.

Levine found that drowsiness and sleep were characterized by a loss of any consistent, strong interhemispheric coherence which may have been present in the alpha band, and a gradual decline in total coherence.
Coherence of the Brain
during the Practice of the Sidhis

CASE a
TWO-WEEK MEDITATOR

COHERENCE ABOVE 0.95 THRESHOLD
VERSUS FREQUENCY AT SUCCESSIVE
TIME INTERVALS (minutes)

FREQUENCY (cycles/second)

COSPAR: New meditator (two weeks' practice of the TM technique). Note that the strong coherence in the alpha band (near 10 Hz) is specific to the period of the TM technique.

CASE b
FOUR-MONTH MEDITATOR

COHERENCE ABOVE 0.95 THRESHOLD
VERSUS FREQUENCY AT SUCCESSIVE
TIME INTERVALS (minutes)

FREQUENCY (cycles/second)

Varieties of coherence increase specific
to the TM technique (four months' practice of the TM technique).
BEL, U. EEG coherence during the Transcendental meditation technique. Psychophysiology Laboratory, Centre for the study of Higher States of Consciousness, Maharishi European Research University, Switzerland, 1975.

**Increased Coherence**

COSPAR of a long-term meditator. In the most experienced subject studied, the highest levels of coherence were found. Note how during the period of the Transcendental Meditation technique the coherence peaks extend over a major portion of the 0–25 Hz band. The strong beta coherence—possibly harmonically related to the alpha/theta
activity—is particularly unusual. Strong theta coherence near 6 Hz begins abruptly with the start of the period of the technique (EO = Eyes open, EC = Eyes closed).

In REM sleep there was significant coherence in the delta band, along with an increase in total coherence. Also, sleep spindles were sufficiently coherent to be picked up by the cospar. These findings of changes in coherence during certain stages of sleep are consistent with the earlier sleep studies on nonmeditators (Dumermuth et al., 1972). They further help to clearly distinguish the physiological changes seen during the Transcendental Meditation technique from those seen in sleep or drowsiness (Levine et al., 1975).

Farrow and Hebert (1982), as part of their extensive analysis of periods of respiratory suspension during the Transcendental Meditation program, studied detailed changes in skin resistance, heart rate, and EEG power and coherence in one advanced subject. Again, periods of respiratory suspension were highly correlated with the subjective experience of pure consciousness. While the periods of respiratory suspension were abrupt, discrete, and relatively uniform, changes in other parameters associated with the experience of pure consciousness were graded and more variable. Basal skin resistance increased before and during these periods and often dropped abruptly at the end of the periods. The mean heart rate decreased during the episodes and then increased after the periods.

Inspection of the EEG showed bursts of beta activity immediately after the end of the respiratory suspension periods. Delta band power was usually low and stable before and during these episodes. Averaged signal tracing showed that theta band power peaked sharply at the onset of breath suspension periods and decreased sharply at the end. Changes in alpha band power were relatively large but inconsistent, showing no obvious relationship to the subjective experience.

EEG coherence in the alpha and beta bands was high before and during the first half of the respiratory suspension period, decreased gradually during the second half, and then decreased abruptly at the end of the period. Coherence in the delta band was much more variable, but also dropped at the end of the respiration suspension period. The mean coherence changes in the theta, alpha and beta bands were statistically significant. Widespread changes in coherence over many
EEG leads were seen. Of the ten EEG coherence derivations studied (F3-F4, C3-C4, F3-C4, F4-C4, P2-O2, T3-C3, T3-F3, F4-O2, F4-C3, F3-C3), theta band coherence exhibited significant change in eight derivations, alpha band coherence in six, beta band coherence in three, and delta band coherence in only one.

In a more recent study (Badawi et al., 1984), the preliminary results of Farrow and Hebert were replicated in a much larger group involving more than 100 subjects and including several additional meditating and nonmeditating control groups. EEC alpha coherence, especially in the frontal areas of the brain, was found to increase during periods of respiratory suspension. The first control group, consisting of nonmeditators showed no periods of respiratory suspension during relaxation with eyes closed. In the second control group, Transcendental Meditation subjects were asked to voluntarily hold their breath while EEG coherence was measured. There was no significant change in EEG coherence during these periods. One of the conclusions of this study was that EEG coherence was more sensitive to periods of pure consciousness than were EEG power measures and that further studies should utilize markers such as periods of respiratory suspension in order to more precisely study the physiological characteristics of the pure consciousness state.

From these EEG studies as well as the other physiological studies on breath suspension during the Transcendental Meditation technique, it appears there are distinct physiological correlates associated with the experience of pure consciousness. These physiological correlates also clearly indicate that a variety of other possible states may occur during the technique. For example, a state of deep relaxation has been reported which is characterized by increased frontal alpha wave activity, the appearance of high voltage theta spindles and increases in basal skin resistance. Also reported particularly in unusual experimental conditions, are occasional periods characteristic of various EEG sleep stages.

The most definitive studies by far are those which have attempted to carefully distinguish the state of pure consciousness from other states. These studies have noted specific periods of low metabolic rate, respiratory suspension, and high intra and interhemispheric EEG coherence in alpha and theta frequencies, especially in the frontal and central areas.
of the brain, which are highly correlated with the subjective experience of pure consciousness.

By using more careful subject selection, coupled with subjective reports, simultaneous electrophysiological measurements, and/or more in-depth physiological measurements, a more precise analysis of the state of pure consciousness has been obtained.

**Refinement of Methodologies to Study**

**The Least Excited State of Consciousness**

In the most thorough review article on all the physiological studies on the Transcendental Meditation technique, Orme-Johnson and Dillbeck (1986) used meta-analysis to compare the state produced during the Transcendental Meditation program with ordinary rest or relaxation. Their analysis clearly distinguished the state produced during Transcendental Meditation from rest and indicated several methodological problems in previous review articles.

The first problem has been a tendency to aggregate data from different meditation techniques that are procedurally quite different and have different effects.

Second, previous reviews do not always fully utilize the information present in the studies of meditation that was cited. Two possible approaches can be taken, narrative and quantitative, each giving quite different conclusions. In the narrative approach, some studies are excluded on design considerations and the remaining results verbally integrated. This can lead, unfortunately, to a great degree of variability due to a number of factors such as different criteria of what is a “good” study, differences in interpretation of results, and use of crude criterion measures such as presence or absence of statistical significance while ignoring such considerations as statistical power.

The importance of statistical power and sample sizes is a critical issue given the sample sizes of many of the studies on meditation. As Orme-Johnson and Dillbeck point out, for a moderate effect size to be detected, there should be a minimum of 15 subjects per group for between-subject comparisons and 10 subjects per group for within-subject comparisons.

In their review, Orme-Johnson and Dillbeck adopted a quantitative approach in which the statistical measure known as effect size was
calculated. In order to do so they first completed a series of computer searches, locating all studies listed in the following databases through 1985 with the keywords “meditation” or “relaxation response”: *Psychological Abstracts, Science Citation Index, Social Science Citation Index, Index Medicus,* and *Sociologies Abstracts.* The reference section of each paper listed was also searched for additional citations. Studies that assessed physiological effects of the Transcendental Meditation technique were selected. In addition, other papers also listed in previous reviews were included for their measures of change during the eyes-closed rest control condition.

Orme-Johnson and Dillbeck then calculated effect sizes for each of the studies. Because they wished to make use of all the information possible from all studies, effect sizes were calculated separately for the Transcendental Meditation technique and rest as the number of standard deviations of change from the pre-meditation or pre-rest mean (using the standard deviation of the pre-period).

Using the statistical technique of meta-analysis on physiological research on the Transcendental Meditation technique they demonstrated that the effect size for the Transcendental Meditation technique is significantly larger than for ordinary eyes-closed rest for findings of increased basal skin resistance and decreased respiration rate, oxygen consumption, and plasma lactate. No significant difference between eyes-closed rest and Transcendental Meditation was found for heart rate or spontaneous skin resistance responses, although Transcendental Meditation participants were found to have significantly lower levels of these two variables, as well as lower respiration rate and plasma lactate levels, during the pre-meditation or pre-rest baseline periods.

Orme-Johnson and Dillbeck made two major recommendations for future research. The first was methodological. Studies comparing the Transcendental Meditation technique and rest should have an adequate sample size, should be designed with explicit calculation of statistical power, and should also take closer account of the relevant confounding variables (e.g., dynamics and sub-stages of the Transcendental Meditation technique, individual differences, recent and long-term life experiences of stress, differences over time in the quality of experience, and length of time practicing the technique.)
The second recommendation was that researchers studying the effects of the Transcendental Meditation technique should be familiar with the traditional theoretical framework of the technique. In particular, the three most important concepts for those studying this technique at present are: (1) there is a state of transcendental consciousness that is predicted to have unique physiological correlates, including global physiological integration characteristic of a restfully alert state rather than just reduced somatic arousal; (2) the Transcendental Meditation technique is best viewed as a dynamical process with alternating sub-stages of transcendental consciousness and physiological normalization; and (3) the regular practice of the Transcendental Meditation technique is predicted to develop better health and adaptive efficiency.

In summary the refinement of methodologies and measurements utilized, as well as the increase in the number of studies, has helped provide a more detailed description of the physiological correlates of this least excited state of consciousness, as well as a deeper understanding of basic neurophysiological mechanisms involved. This more complete objective physiological description of pure consciousness, the fourth major state of consciousness, is an extremely important step in the integration of modern science and ancient Vedic Science. For the first time the concept of the development of higher states of consciousness has been taken out of the realm of philosophy and mysticism and shown to be a scientific reality. We now have the foundation for objectively understanding the neurophysiological basis of growth toward the state of enlightenment.

Section III

Clinical Research on the
Maharishi Vedic Approach to Health
Review of Controlled Research
on the Transcendental Meditation Program
and Cardiovascular Disease:
Risk Factors, Morbidity, and Mortality

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ABSTRACT
Because of growing evidence for stress as a major factor contributing to cardiovascular disease (CVD), techniques of meditation are being increasingly used. The Transcendental Meditation technique is distinct from other techniques of meditation not only in its origin and procedure, but also in the amount and breadth of research testing it. Evidence for its ability to reduce traditional and novel risk factors for CVD includes: 1) decreases in blood pressure, 2) reduced use of tobacco and alcohol, 3) lowering of high cholesterol and lipid oxidation, and 4) decreased psychosocial stress. Changes expected to result from reducing these risk factors, namely, reversal of atherosclerosis, reduction of myocardial ischemia and left ventricular hypertrophy, reduced health insurance claims for CVD, and reduced mortality, also have been found with Transcendental Meditation practice. Research on mechanisms suggests that some of the CVD-related benefits as a result of this technique could arise from normalization of neuroendocrine systems whose function has been distorted by chronic stress. Further randomized clinical trials are in progress with a focus on underserved minority populations.

Key Words: complementary and alternative medicine, cardiovascular disease, psychosocial stress, Transcendental Meditation

Introduction
Current evidence indicates that psychosocial stress contributes to cardiovascular disease (CVD). Effects of stress are evident in each of the recognized mechanisms leading to cardiac events, namely, clustering of traditional risk factors, endothelial dysfunction, myocardial ischemia, plaque rupture, thrombosis, and malignant arrhythmias (see for review, reference 1). Although a variety of stress reduction approaches are currently being applied to prevention and treatment of CVD, the Transcendental Meditation technique has been the most widely researched.

Among the more than 600 published studies on the Transcendental Meditation technique, many support its usefulness in preventing and treating CVD. As a result of space limitations, only the studies most directly related to CVD, and with the strongest experimental designs, are described in the next sections.
Cardiovascular Disease Risk Factors

Blood Pressure

The first results of fully randomized clinical trials of the Transcendental Meditation technique for hypertension were published in the mid-1990s. These results, after dozens of studies demonstrating reduced substance use, reduced psychologic indicators of stress, and cross-sectional demonstrations of reduced blood pressure, were unambiguous. Three months of the Transcendental Meditation program reduced both systolic and diastolic blood pressure in older blacks with hypertension. Reductions in the Transcendental Meditation group were large (11 mm Hg for systolic and 6 mm Hg for diastolic) and highly statistically significant compared with a health education control. Blood pressure reductions by the Transcendental Meditation technique were found in subjects of both sexes and in subjects at low risk as well as subjects at high risk (allocating by median split) on 6 indicators of hypertension risk: psychosocial stress, obesity, alcohol use, physical inactivity, dietary sodium–potassium ratio, and a composite measure of all these. Progressive muscle relaxation, another technique for stress reduction, also produced significant reductions compared with the health education controls, although these changes were significantly smaller than those obtained with the Transcendental Meditation program.

Cigarette Smoking and Alcohol Use

All studies (as of 1993) of the effects of the Transcendental Meditation program on cigarette smoking and use of alcohol or other addictive substances were combined in a statistical meta-analysis. The analysis covered a total of 4524 subjects, including adolescents, college students, working adults, elderly individuals, and even skid-row alcoholics. The effect size for the Transcendental Meditation technique on cigarette use was .87 ($p = 0.00003$). Effect sizes for use of alcohol and drugs were slightly smaller, but remained highly significant. The strength of the experimental design was controlled for in the analysis.

Cholesterol Levels and Lipid Oxidation

A controlled trial of the Transcendental Meditation program for hypercholesterolemia, in subjects whose serum level was at least 200
mg/dL but who had no history of heart, renal, or thyroid disorders and were not on medication, showed a significant reduction in fasting serum cholesterol after 11 months of Transcendental Meditation practice. An observational study found that Transcendental Meditation program practitioners had significantly lower lipid peroxide levels than controls matched for age and gender. Lipid peroxides reflect the degree of exposure to free radicals and correlate with oxidized cholesterol, a component of arterial plaque.

**Psychosocial Stress**

Because of the large number of studies of Transcendental Meditation effects on psychosocial stress, metaanalyses again could be the most accurate indicators of relative effectiveness. One of the largest of these examined all studies that could be located for stress reduction and trait anxiety (146 independent outcomes). The effect size for Transcendental Meditation (.70) was significantly greater than for “other types of meditation,” progressive relaxation, and other relaxation techniques.

Other metaanalyses have examined indicators of positive psychologic health. For example, Alexander et al. examined 42 treatment outcomes for self-actualization, a widely used indicator of comprehensive psychologic health. The effect size for Transcendental Meditation (.78) was 3 times as large as for other forms of meditation lumped together (.26) as well as for relaxation techniques (.27). Similar results were obtained for positive psychologic outcomes such as self-concept and internal locus of control and negative psychologic measures (e.g., depression, anger, hostility) in a meta-analysis of heavy abusers of alcohol and other substances.

**Morbidity and Mortality**

In general, CVD morbidity and mortality are proportional to the number and severity of CVD risk factors. With the effects on risk factors that the Transcendental Meditation program appears to have, the technique would be expected to reduce CVD morbidity and mortality as well. Evidence from initial studies appears to uphold the results on risk factors, with confirming studies on atherosclerosis, myocardial ischemia, left ventricular hypertrophy, health insurance claims, and mortality.
Atherosclerosis
Perhaps the most striking evidence to date that the Transcendental Meditation technique not only reduces risk factors, but actually reduces CVD morbidity and mortality, is the reduction of atherosclerosis. The 2 studies completed to date (both randomized, controlled trials) examined carotid artery intima–media thickness, a noninvasive measure of peripheral atherosclerosis and surrogate measure of coronary artery atherosclerosis. Both reported reductions in atherosclerosis. One was in inner-city blacks with hypertension, \(^{10}\) whereas the other was in older white Americans.\(^ {11}\) The latter also included 3 additional treatment modalities from a traditional system of health care, Maharishi Vedic Medicine, and perhaps because of these added modalities, showed larger reductions in atherosclerosis than those found for the Transcendental Meditation technique alone. In the latter study, a subgroup of subjects with 2 or more risk factors for cardiovascular disease showed a reduction in atherosclerosis that would be expected to reduce the likelihood of a heart attack or stroke by 33% after only 1 year of this intervention. Treatment with Transcendental Meditation alone reduced likelihood of heart attack or stroke by 11% after 8 months in the study of blacks with hypertension.

Myocardial Ischemia and Left Ventricular Hypertrophy
Further studies found beneficial effects of the Transcendental Meditation program on ischemia and left ventricular hypertrophy. The ischemia study was in patients with preexisting coronary artery disease.\(^ {12}\) Compared with control subjects, patients with coronary artery disease who learned Transcendental Meditation and practiced for 8 months showed greater exercise tolerance, higher maximal workload, delayed onset of ST-segment depression, and a decrease in double product at each exercise interval. Supporting results were obtained in a similar pilot study of patients with cardiac syndrome X.\(^ {13}\) The left ventricular hypertrophy study was conducted in blacks with hypertension and showed that 1 year of practicing the Transcendental Meditation program reduced left ventricular hypertrophy by 10%.\(^ {14}\)
Reduced Health Insurance Claims

Results of the 2 studies on the use of health insurance by practitioners of the Transcendental Meditation program also are consistent with reduced CVD. The first study, comparing 5 years of claims by 2000 Transcendental Meditation practitioners with claims for the entire database found 87% fewer inpatient and outpatient admissions for CVD in the Transcendental Meditation group. A second study found similar results, although subjects in this study were also using alternative medicine approaches in addition to TM. Nondisease-related admissions (childbirth, for example) were the same for the 2 groups, suggesting that the Transcendental Meditation group had not reduced its insurance use because of a change in philosophy concerning medical care.

The possibility that reduced insurance claims arise because individuals who choose to learn and practice the Transcendental Meditation program are healthier at the outset appears unlikely. Studies in which the subjects’ use of medical doctors was monitored for 3 years before and several years after learning the Transcendental Meditation program found no difference from control subjects and no trend over time before learning the Transcendental Meditation technique, but a continual decline over time after learning this program.

Mortality

The first randomized, prospective study of the effects of the Transcendental Meditation program on mortality was in a group of volunteer subjects in rest homes for the elderly. The majority (82%) of these subjects (average age at outset was 81 years) had high normal blood pressure or stage 1 hypertension. After 1 year, the Transcendental Meditation group showed significantly greater improvements in several measures of quality of life and in blood pressure than the comparison groups. After 3 years, the number surviving in the Transcendental Meditation group was significantly higher than for the usual care control group and the relaxation-response group. In a 15-year follow up of this study, the Transcendental Meditation group showed lower CVD mortality rate than the combined control subjects, adjusting for age, gender, and pretest systolic blood pressure. More recently, in the only other known study on Transcendental Meditation and mortality, a meta-analysis combining all 77 subjects from the previously mentioned study on rest
home residents and all 125 subjects from the first randomized study on older subjects with hypertension found a highly significant reduction in all-cause mortality and a strong trend toward reduction of CVD mortality ($p = 0.056$) in the Transcendental Meditation group compared with the active-treatment and usual-care control subjects combined.  

### Practice, Theory, and Mechanism of Effects of the Transcendental Meditation Program

The Transcendental Meditation technique was introduced to the West by Maharishi Mahesh Yogi, a scholar of the ancient Vedic tradition of India.  

It is a simple, psychophysiological procedure practiced for 20 minutes twice a day. Although it can result in changing lifestyle preferences, no particular changes or beliefs are required. It is taught by specially trained instructors and can be practiced in conjunction with most conventional medical treatments.

During the practice, a reduction in mental and physical activity occurs as a result of experience of a state called “transcendental consciousness,” which is different from usual waking, dreaming, or sleep states.  

This experience is thought to be responsible for the “normalization,” that is, restoration of normal function, of various systems in the body, particularly those involved in adapting to environmental “stressors” or challenges. This process and the Transcendental Meditation practice itself are effortless, not involving concentration, contemplation, mind control, or visualization.

Practice of the Transcendental Meditation technique has beneficial effects even in apparently healthy individuals. In view of the origins and theoretical conception of this technique, this is not surprising. In the Vedic tradition from which the technique derives, the intellectual understanding of both subjective and objective realms is deep and, in important ways, more complete than that of modern science.

The Transcendental Meditation technique is not intended primarily as a treatment of disease, but rather as a means of enhancing growth of human awareness to its highest state. To understand the mechanism of effects of the technique, one needs to understand the Vedic perspective on higher states of consciousness. Higher states do not preclude experiences of the usual waking, dreaming, and sleeping states, but, nevertheless, are characterized by physiological and mental phenom-
ena distinct from these. Evidence of the reality of these higher states includes descriptions in the Vedic literature, personal reports of practitioners of the Transcendental Meditation program, and a growing body of empiric studies, all of which indicate these states confer greater abilities for successful interactions with internal and external environments.9,22,23,25–27

The ability of the Transcendental Meditation technique to reduce the risk for CVD is probably most directly related to its ability to lower psychosocial stress and to correct deleterious effects of stress. Evidence supporting these effects and the restoration of adaptive mechanisms by this technique is more than suggestive.28–32 Adaptive mechanisms involving the autonomic nervous system, neuroendocrine axes, and the cardiovascular and immune systems are responsible for maintaining a stable and efficient functional state of the physiology through the changing conditions of life.33–35 These mechanisms are altered by psychosocial stress in ways that decrease their ability to foster effective adaptation, and this appears to cause both physical and mental declines.

From the perspective of the Vedic tradition, including Maharishi Vedic Medicine (see the “Conclusion”), it is the inner intelligence of the body that maintains optimal mental and physical functioning in life.36 The ability of the Transcendental Meditation technique to restore normal functioning of adaptive mechanisms is consistent with this Vedic understanding.

**Conclusion: Transcendental Meditation, Maharishi Vedic Medicine, and Cardiovascular Disease Health**

From a broader healthcare perspective, the Transcendental Meditation technique is the central component of “Maharishi Vedic Medicine,” a time-tested, prevention-oriented, natural system of health care. Maharishi Vedic Medicine is a comprehensive system that includes approaches based on all 40 branches of the Vedic literature, including Ayurveda.36–39 Several other institutions around the world that are patterned after the of Maharishi College of Perfect Health (MCPH) in Fairfield, Iowa, are now offering training in this field.

Techniques of meditation and relaxation available today have a variety of sources, from ancient traditions to the modern clinic. Many
of these could be useful for clinical conditions, but confusion exists because of insufficient attention to differences among techniques, including widely different degrees of effectiveness.

The prevalence of differential effectiveness among various meditation and relaxation techniques is not widely known, despite the results of hundreds of studies supporting marked differences. An overview of 10 metaanalyses covering 475 studies found that approaches based on long traditions outperformed the newer, clinically derived ones on most measures, even though the latter tend to be patterned after the former. Accumulated research now suggests that such variations in effectiveness are a major source of error in medical practice.

Perhaps largely as a result of the ability of the Transcendental Meditation program to reduce the long-lasting effects of stress, the program is clearly useful in the prevention and treatment of CVD. The results of ongoing studies will further clarify the extent of its usefulness. However, because of the wide variety of promising research already available, it seems appropriate that Transcendental Meditation is considered a leading component of “mind–body medicine.” Its applicability for CVD in high-risk, underserved populations is strongly supported, and although not yet directly tested, its cost-effectiveness for CVD is likely to be highly competitive with modern drug-based and surgical approaches.

References:
15. Orme-Johnson, D. & Schneider, R. Reduced Health Care Utilization in Transcendental Meditation practitioners; Maharishi Ayurveda as preventive medicine. *Society for Behavioral Medicine Annual Meeting; 1987.*


the Beth Israel Deaconess Medical Center. Massachusetts Medical Society; 1998.

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Stress Reduction Programs
in Patients with Elevated Blood Pressure:
A Systematic Review and Meta-analysis

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Maxwell V. Rainforth (Ph.D., 2000, psychology, Maharishi University of Management) is Assistant Professor of Statistics at Maharishi University of Management, where he is also Biostatistician with the Institute for Natural Medicine and Prevention. Since 1992 Dr. Rainforth has served as the statistician on 12 major research grants to study effects of the Transcendental Meditation program in the areas of education and health. Dr. Rainforth has co-authored over 30 published scientific papers and conference presentations on the effects of the Transcendental Meditation program on crime, substance abuse, psychological functioning, education, health productivity, and societal quality of life. His work has appeared in peer-reviewed scientific journals such as Journal of Social Behavior and Personality, Alcoholism Treatment Quarterly, Hypertension, Journal of Offender Rehabilitation, and Social Indicators Research. Dr. Rainforth is the lead author of a meta-analysis on effects of stress reduction programs on high blood pressure that was published in Current Hypertension Reports. He has also authored two other meta-analyses on the effects of stress reduction programs on substance abuse and on psychological health. His doctoral dissertation included two studies that evaluated the effectiveness of the Transcendental Meditation program for crime prevention and rehabilitation.
ABSTRACT

Substantial evidence indicates that psychosocial stress contributes to hypertension and cardiovascular disease (CVD). Previous meta-analyses of stress reduction and high blood pressure (BP) were outdated and/or methodologically limited. Therefore, we conducted an updated systematic review of the published literature and identified 107 studies on stress reduction and BP. Seventeen trials with 23 treatment comparisons and 960 participants with elevated BP met criteria for well-designed randomized controlled trials and were replicated within intervention categories. Meta-analysis was used to calculate BP changes for biofeedback, $-0.8/-2.0 \text{ mm Hg (P = NS)}$; relaxation-assisted biofeedback, $+4.3/+2.4 \text{ mm Hg (P = NS)}$; progressive muscle relaxation, $-1.9/-1.4 \text{ mm Hg (P = NS)}$; stress management training, $-2.3/-1.3 \text{ mm (P = NS)}$; and the Transcendental Meditation program, $-5.0/-2.8 \text{ mm Hg (P = 0.002/0.02)}$. Available evidence indicates that among stress reduction approaches, the Transcendental Meditation program is associated with significant reductions in BP. Related data suggest improvements in other CVD risk factors and clinical outcomes.

Introduction

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) recommends lifestyle modifications for prevention and treatment of hypertension [1]. Lifestyle modifications are recommended as sole therapy when blood pressure (BP) is greater than 120/80 mm Hg and less than 140/90 mm Hg (prehypertension), and as adjunctive therapy when blood pressure is equal to or greater than 140/90 mm Hg (stage I or II hypertension). Thus the first line of treatment for high BP is modifying lifestyle risk factors, including recommendations about weight, physical activity, and dietary intake of sodium, fruits, vegetables, saturated and total fats, and alcohol [1].

Another lifestyle risk factor that has been shown to contribute to high blood pressure is psychosocial stress [2]. Yet, the JNC 7 guidelines do not include recommendations for patients to reduce stress. However, the 2007 Canadian Hypertension Education Program recommends considering stress reduction intervention for normotensive and hypertensive patients [3].
Stress, Hypertension, and Cardiovascular Disease

Recent reviews [2,4•] have concluded that psychosocial stress is a major independent risk factor for hypertension, coronary artery disease, and cardiovascular mortality. Whereas earlier reviews found only weak or inconsistent evidence, several new lines of evidence have emerged.

Longitudinal studies of more than 3000 European adults found that chronic stress for a period of several years predicts high blood pressure during three to seven years of follow-up [5]. This finding was replicated in young American adults in the Coronary Artery Risk Development in Young Adults (CARDIA) study, where impatience and time pressure at baseline predicted hypertension 15 years later [6]. The INTERHEART study of 24,767 adults in 52 countries showed that myocardial infarction (MI) was associated with chronic psychosocial stress [7]. In terms of MI risk, psychosocial stress was as important in magnitude as traditional cardiovascular disease (CVD) risk factors, including smoking, obesity, diabetes, and hypertension.

In addition, studies have shown that individuals who exhibit exaggerated cardiovascular responses to mental stress tasks are at increased risk for developing hypertension in subsequent years [8]. These experiments are particularly noteworthy because, whereas “stress” is often considered difficult to define and measure, the stress variables were under laboratory control. Cardiovascular responses represent plausible mediators between daily experience of stress and long-term impact on the cardiovascular system. Responses to acute stress are triggered through the sympathetic nervous system and the hypothalamic-pituitary-adrenocortical axis and increase cardiac output, heart rate, and peripheral resistance [8]. Chronic stress is believed to lead to chronically elevated BP levels through persistent hyperactivation of the sympathetic nervous system and hypothalamic-pituitary-adrenocortical axis [4•,9].

Stress Reduction Programs

It has been suggested that therapies such as relaxation, meditation, or biofeedback may help patients to reduce the effects of stress by reducing physiologic arousal and restoring autonomic balance, thereby reducing blood pressure [10].
Relaxation therapies aim to enable patients to achieve physical and mental relaxation. Examples include progressive muscle relaxation, using exercises to tense and release muscle groups [11], and autogenic training, which involves concentrating on somatic sensations and using autosuggestion [12]. Frequently, these therapies are combined with use of mental imagery or breathing exercises.

Meditation practices aim to cultivate a state of inner awareness and calm [13]. The most widely researched form is the Transcendental Meditation technique [13,14]. It is described as a unique and effortless process of taking the attention to successively finer states of a thought, until thought is transcended and the mind experiences pure awareness [15]. Instruction requires a qualified teacher who is certified through Maharishi Vedic Education Foundation [16]. Other meditative practices usually involve a form of contemplation or concentration and include mindfulness meditative practice [17]. Some mind-body practices, such as tai chi and qi gong, include meditative elements [13] but also involve significant exercise training effects and are usually categorized as forms of exercise [18]. Hence these practices are not included in the present review.

Biofeedback [19] involves use of electronic devices to monitor information on physiologic indicators of states of relaxation, such as muscle tension, skin temperature, skin conductance levels, or blood pressure. There are two major biofeedback categories: simple biofeedback (i.e., as a stand-alone therapy), and relaxation-assisted biofeedback (i.e., biofeedback plus relaxation training) [19].

Stress management training involves modification of psychologic and behavioral responses to stress. Psychologic approaches include cognitive restructuring and adaptive learning [20]. Often these approaches are combined with relaxation training [20].

Below we summarize the existing meta-analyses on stress reduction and elevated blood pressure, followed by a critique and an update and re-analysis of the data.

**Previous Meta-analyses on the Efficacy of Stress Reduction Programs**

To identify meta-analyses on stress reduction programs and high blood pressure, we conducted computer searches of MEDLINE for articles
on stress reduction programs published from its inception through July 2007. Search terms used included “relaxation,” “meditation,” “biofeedback,” “stress management,” “lifestyle modification,” “blood pressure,” and “hypertension.” We also conducted hand searches of the bibliographies of these reviews. These searches located nine published meta-analyses [12,13,18–24].

Another recent review by Linden and Moseley [10] examined seven of the published meta-analyses [12, 19–24] on stress reduction programs and hypertension. The authors of this review concluded that stress reduction programs yield reliable decreases in systolic BP of 6 to 10 mm Hg, with slightly larger BP reductions for multicomponent interventions [10]. This review focused on BP reductions within active treatment groups. It should be noted that within-group changes in BP do not take into account the control group and do not discriminate real treatment effects from BP changes due to BP monitoring, habituation to BP measurement, or effects of attention from trainers. Although Linden and Moseley [10] noted inconsistency between meta-analyses of technique-specific effects, they did not attempt to control for these differences by pooling the primary studies. Differences between categories of treatments were attributed, at least in part, to differences in study selection and categorization.

Two of the meta-analyses [20,21] reviewed by Linden and Moseley [10] underscored the importance of adequacy of the baseline period and of control for attention and subject expectancy factors. Eisenberg et al. [20] found that poor control of either factor resulted in positively biased estimates of treatment effects. Reductions in BP were larger by 10.6 mm Hg systolic and 7.7 mm Hg diastolic in poorly designed studies compared with well-designed studies. Key experimental design features included adequacy of baseline measurement and control for intentional factors. However, the review by Linden and Moseley [10] did not attempt to quantitatively account for these factors.

In contrast to the large treatment effects suggested by Linden and Moseley’s review, a more recent meta-analysis by Dickinson et al. [18] reported a reduction of −4.0/−3.1 mm Hg across all stress reduction trials. Moreover, it was found that treatment effects were only significant when comparisons were made with no treatment and not relative to attention controls.
Eisenberg et al. [20] found that for randomized controlled trials with multiple baseline sessions and comparison with an attention-control group, the average BP changes were −2.8/−1.3 mm Hg and were not statistically significant. Jacob et al. [21] found that the magnitude of BP reductions depended on the strength of the research design, including protocol for baseline BP measurements and type of control groups used (no treatment or waitlist vs attention-control or self-monitoring). They concluded that the data did not support recommendations concerning the efficacy of stress reduction interventions for high BP, and did not provide an estimate for the overall average BP reductions. These reviewers cautioned that evidence regarding efficacy of stress reduction interventions was sparse in view of the small number of well-designed studies [20,21].

Several meta-analyses have examined effects of different types or categories of stress reduction interventions. Relaxation techniques formed the largest treatment category in Jacob et al.’s [21] meta-analysis and also among the well-designed studies in Eisenberg et al.’s [20] meta-analysis, but were among the least effective of all types of intervention. Stetter and Kupper [12] examined health outcomes of autogenic training, a specific type of relaxation therapy. In the hypertension studies they examined, positive effect sizes were observed within groups and relative to no treatment, but not relative to attention-control groups.

Nakao et al. [19] performed a meta-analysis of randomized controlled trials that administered biofeedback to hypertensive patients. Significant effects were reported for biofeedback combined with relaxation therapy but not for biofeedback alone. The overall net reduction in BP across all biofeedback studies was significant, yet the comparison of active intervention with attention controls was not significant. Similarly, a meta-analysis by Yucha et al. [24] found significant effects of biofeedback only in comparison to untreated controls. Eisenberg’s [20] results suggested that, in general, biofeedback is ineffective. Thus, there is at best weak evidence from these meta-analyses that biofeedback is effective in reducing chronically elevated high BP.

In summary, previous meta-analyses have provided only limited evidence that stress reduction programs are associated with significant BP reductions.
AHRQ Review of Meditation Practices for Health

Recently, a health technology assessment of meditation practices was commissioned by the Agency for Healthcare and Research Quality (AHRQ) and funded by the National Institutes of Health (NIH)-National Center for Complementary and Alternative Medicine (NCCAM) [13]. It was notable because the authors endeavored to exhaustively locate all available studies and analyzed each meditation technique separately. Among the 813 studies of meditation and health outcomes located, there were 27 controlled trials on hypertension, including 24 randomized trials. The main conclusions of the report on high BP were that, with exceptions, the majority of meditation research was of low methodologic quality and that selected meditation practices may be effective in reducing hypertension.

The AHRQ report [13] suffered from severe limitations associated with data collection, analytic, and reporting procedures [25]. The review methodology failed to use study design factors that have shown to bias results in behavioral trials of hypertension. The adequacy of baseline BP measurement protocols and the quality and adequacy of controls were ignored. Most of the trials in the AHRQ report compared meditation practices to untreated or waitlist controls. Relevant trials on adolescents and youth were not incorporated [34,35]. An important methodologic factor that was not considered was blinding of BP assessment. The authors focused on whether trials were double-blinded, which is generally not feasible in behavioral trials, in contrast to pharmacologic trials [10]; indeed, no double-blinding was found among the trials on hypertension. However, no attempt was made to identify single-blinded trials, even though this reduces experimenter bias and several such trials on stress reduction and hypertension exist among the studies included in the AHRQ report [26–28,29••]. Whereas the report repeatedly emphasized the overall poor quality of meditation studies, appropriate analyses were not conducted on a selected set of well-designed trials.

Revisiting the Evidence for Stress Reduction Programs and High BP

Based on previous meta-analyses, it is not entirely clear whether any stress reduction treatments are consistently effective in treating high BP. Two meta-analyses [18,22] did not report results for specific treat-
STRESS REDUCTION PROGRAMS AND ELEVATED BLOOD PRESSURE

ments, and two [20,21] did not include trials published after 1991. Criteria for study inclusion varied, complicating comparisons of findings. Three meta-analyses [13,21,23] included non-randomized trials. Outcomes reported were not always comparable: some reported net BP change [13,18,20,24], others reported BP changes within the intervention groups only [22], or effect sizes only [12,23], and another reported residual BP change after adjusting for study characteristics [21]. Six of the previous meta-analyses [12,13,18,19,23,24] did not account for adequacy of baseline protocols as a potential confound. Only four of the meta-analyses controlled for attentional factors by performing analyses that included only comparisons with attention-control groups [12,19,20,24].

In view of variations in review methodology applied in previously published meta-analyses on stress reduction programs and high BP, the only way to draw sound, up-to-date inferences was to pool all the primary studies available to date and rigorously apply uniform criteria for study selection and meta-analysis. Hence, following criteria used in meta-analyses by Dickinson et al. [18] and Eisenberg et al. [20], we collected all studies in the published literature that met the following inclusion criteria: 1) randomly allocated subjects to experimental or control interventions; 2) compared BP changes for a stress reduction program versus a minimally treated or attention-control group; 3) assessed baseline BP levels over multiple clinic visits or used 24-hour ambulatory BP recording in lieu of multiple clinic visits; 4) were of at least 8 weeks in duration from baseline to post-test or follow-up assessment; and 5) published in peer reviewed English-language journals.

Criteria 1, 2, 3, and 5 were based upon Eisenberg et al. [20]; criterion 4 was based upon Dickinson et al. [18]. However, none of the previous meta-analyses used all of these criteria. Articles were located by performing a series of MEDLINE searches from its inception through July 2007. Search terms were “hypertension” or “blood pressure,” in conjunction with “relaxation therapy,” “relaxation training,” “progressive muscle relaxation,” “autogenic training,” “guided imagery,” “meditation,” “mindfulness,” “relaxation response,” “biofeedback,” and “stress management.” In addition, we performed hand searches of bibliographies of published meta-analyses and reviews [12,13,18–24]. All studies that met the above criteria were extracted.
The sixth criterion was that studies included prehypertensive and/or hypertensive subjects. This was done because the JNC 7 recommendations advise lifestyle modifications for patients with high BP in both the prehypertensive and hypertensive ranges [1]. Data from randomized controlled trials with a crossover design was incorporated only from the first phase of the study, before treatment crossover.

The previous meta-analyses and MEDLINE searches provided a pool of 107 primary studies. Of these, 75 were randomized controlled trials, of which 37 employed an attention-control group. Among these, 15 trials lacked an adequate BP baseline measurement protocol and two others were shorter than eight weeks’ duration. Hence, 20 trials met the above criteria, and these provided 27 comparisons of an active treatment group with an attention-control group [11,26–44]. (A list of excluded studies and reasons for exclusion is available from the authors.)

Following the approach taken in the AHRQ report [13], the present systematic review focused on specific categories of stress reduction programs. We synthesized evidence by meta-analysis from categories with two or more studies on the same intervention. Review Manager 4.2 software (The Cochrane Collaboration, http://www.cc-ims.net/RevMan) for meta-analysis was used to estimate the mean BP change for each type of program and to calculate P-values and 95% CIs, based on a random effects model.

Table 1 lists the data for the 27 treatment group comparisons and their BP outcomes according to category of stress reduction intervention from the 20 trials [11,26–28,29••,30–44]. As shown in Table 1, six treatment groups from four trials [30–33] involved simple biofeedback. Three involved relaxation training [31,26,27]. Two relaxation studies employed progressive muscle relaxation [26,27]. Six trials studied the Transcendental Meditation technique [26–28,29••,34,35]. In 11 interventions, two or more types of stress reduction modalities were combined [11,37–39,40–44]. Four of these interventions combined biofeedback with relaxation training (relaxation-assisted biofeedback) [11,37–39] and five combined stress-management training with relaxation training [11,40–42]. Four interventions were not replicated: one on autogenic training [31], one trial on other meditation (SRELAX—“self-relaxation”) [36], and two studies on miscellaneous treatment combinations that did not fit into any category [43,44].
Table 1
Well-designed trials of stress reduction interventions on BP change in patients with elevated BP levels

<table>
<thead>
<tr>
<th>Study</th>
<th>Active treatment</th>
<th>Control treatment</th>
<th>Experimental/ control</th>
<th>Net change SDP/ DBP, mm Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanchard et al. [30]</td>
<td>BF</td>
<td>S-R</td>
<td>10/9</td>
<td>+6.1/+4.1</td>
</tr>
<tr>
<td>Blanchard et al. [31]</td>
<td>BF</td>
<td>S-R</td>
<td>20/18</td>
<td>-4.3/-5.7</td>
</tr>
<tr>
<td>Blanchard et al. [32]</td>
<td>BF</td>
<td>BPM</td>
<td>11/12</td>
<td>+1.2/-2.9</td>
</tr>
<tr>
<td>Blanchard et al. [32]</td>
<td>BF</td>
<td>BPM</td>
<td>10/12</td>
<td>-0.8/-4.7</td>
</tr>
<tr>
<td>Blanchard et al. [33]</td>
<td>BF</td>
<td>BPM</td>
<td>21/21</td>
<td>-3.1/-2.9</td>
</tr>
<tr>
<td>Chesney et al. [11]</td>
<td>BFR</td>
<td>PMR</td>
<td>24/24</td>
<td>+4.3/+2.7</td>
</tr>
<tr>
<td>Frankel et al. [37]</td>
<td>BFR</td>
<td>Sham BF</td>
<td>7/7</td>
<td>+3.0/+2.0</td>
</tr>
<tr>
<td>Jacob et al. [38]</td>
<td>BFR</td>
<td>Stress education</td>
<td>10/9</td>
<td>+3.9/+5.2</td>
</tr>
<tr>
<td>Schneider et al. [26]</td>
<td>BF</td>
<td>Restricted sensory stimulation + AT</td>
<td>11/6</td>
<td></td>
</tr>
<tr>
<td>Schneider et al. [27]</td>
<td>AT</td>
<td>S-R</td>
<td>21/18</td>
<td>-6.2/-3.8</td>
</tr>
<tr>
<td>Barnes et al. [34]</td>
<td>PMR</td>
<td>Health education</td>
<td>37/38</td>
<td>-4.7/-3.3</td>
</tr>
<tr>
<td>Barnes et al. [35]</td>
<td>TM</td>
<td>Health education</td>
<td>15/18</td>
<td>-7.4/-4.7</td>
</tr>
<tr>
<td>Castillo-Richmond et al. [28]</td>
<td>TM</td>
<td>Health education</td>
<td>50/50</td>
<td>-3.5/-3.8</td>
</tr>
<tr>
<td>Paul-Labrador et al. [29••]</td>
<td>TM</td>
<td>Health education</td>
<td>29/31</td>
<td>-1.1/-2.4</td>
</tr>
<tr>
<td>Schneider et al. [26]</td>
<td>TM</td>
<td>Health education</td>
<td>39/45</td>
<td>-6.0/-0.7</td>
</tr>
<tr>
<td>Schneider et al. [27]</td>
<td>TM</td>
<td>Health education</td>
<td>36/38</td>
<td>-10.7/-6.4</td>
</tr>
<tr>
<td>Seer and Raeburn [36]</td>
<td>Other meditation</td>
<td>Sham meditation</td>
<td>14/14</td>
<td>+0.3/+1.2</td>
</tr>
<tr>
<td>Amigo et al. [40]</td>
<td>SMT + PMR</td>
<td>Mild exercise</td>
<td>15/15</td>
<td>-4.5/-5.0</td>
</tr>
<tr>
<td>Chesney et al. [11]</td>
<td>SMT + PMR</td>
<td>PMR</td>
<td>24/24</td>
<td>-2.4/+0.0</td>
</tr>
<tr>
<td>Chesney et al. [11]</td>
<td>SMT + BFR</td>
<td>PMR</td>
<td>25/24</td>
<td>+1.3/+5.2</td>
</tr>
<tr>
<td>Irvine et al. [41]</td>
<td>SMT + BFR</td>
<td>Mild exercise</td>
<td>16/16</td>
<td>-7.0/-7.6</td>
</tr>
<tr>
<td>Johnston et al. [42]</td>
<td>SMT + relaxation</td>
<td>Mild exercise</td>
<td>40/32</td>
<td>-0.2/-0.5</td>
</tr>
<tr>
<td>Bali [43]</td>
<td>PMR + mantra meditation + breathing exercises</td>
<td>Counseling + rest</td>
<td>9/9</td>
<td>-12.0/-8.0</td>
</tr>
<tr>
<td>van Montrans et al. [44]</td>
<td>Yoga + PMR + AT + RR</td>
<td>S-R + counseling</td>
<td>18/17</td>
<td>+0.3/+0.7</td>
</tr>
</tbody>
</table>

AT—autogenic training; BF—simple biofeedback; BFR—relaxation-assisted biofeedback; BP—blood pressure; BPM—blood pressure self-monitoring; DBP—diastolic blood pressure; PMR—progressive muscle relaxation; RR—relaxation response meditation; SBP—systolic blood pressure; SMT—stress management training; S-R—simple relaxation without instructions; TM—Transcendental Meditation.

* Criteria for well-designed trials: 1) randomized controlled trial in prehypertensive and/or hypertensive patients; 2) adequate baseline BP assessment; 3) used attention control group; 4) duration of at least 8 weeks; and 5) published in peer-reviewed journal.

† Net BP change is change in experimental group minus change in control group. Change is from baseline to posttest; negative numbers indicate decreased BP.
Table 2 shows the results of meta-analyses for treatment categories with at least two studies employing the same intervention. These meta-analyses included 23 treatment comparisons from 17 trials and involved 960 subjects. Three trials did not have an intervention group that was replicated in another trial [26,43,44]. The mean BP changes shown in Table 2 represent the average net change in BP for the active treatments relative to attention controls. These are weighted mean differences (obtained from the random effects model), in which averages are weighted according to the numbers of subjects in the treatment-control comparisons and the variability in BP outcomes. Mean BP changes for progressive muscle relaxation, simple biofeedback, relaxation-assisted biofeedback, and stress management training ranged on systolic BP from −2.3 mm Hg to +4.3 mm Hg, and on diastolic BP from −2.0 mm Hg to +2.4 mm Hg. These results were not statistically significant. Studies on the Transcendental Meditation program formed the largest category, with six clinical trials and 449 research subjects. The mean BP reductions across these trials were −5.0 mm Hg systolic and −2.8 mm Hg diastolic and were statistically significant (P = 0.0002 and P = 0.02).

Among the studies from Table 1 that were synthesized in Table 2, there were eight single blinded trials [26–28,29••,30,38,39,41]. Four single-blinded trials investigated effects of the Transcendental Meditation program [26–28,29••] and yielded an average net BP change of −5.1/−2.1 mm Hg (95% CI = −9.4 to −0.8 mm Hg, P = 0.02 for systolic BP; and 95% CI = −5.4 +1.4 mm Hg, P = 0.22 for diastolic BP), which was similar to the results for all six studies on the Transcendental Meditation program. Both of the studies on progressive muscle relaxation (PMR) listed in Table 1 [26,27] and summarized in Table 2 were single-blinded. The results for these two studies showed BP reductions of −1.9/−1.3 mm Hg, which were not statistically significant (95% CI = −6.8 to +3.1 mm Hg, P = 0.46 for systolic; 95% CI = −4.3 to +1.4 mm Hg, P = 0.32 for diastolic). The only other category with at least two single-blinded studies was relaxation-assisted biofeedback [38,39], which showed BP increases of +4.3/+2.4 mm Hg, which were not statistically significant (95% CI = −2.9 to +11.7 mm Hg, P = .24 for systolic; 95% CI = −3.5 +8.3 mm Hg, P = .43 for diastolic).
<table>
<thead>
<tr>
<th>Treatment category (study)</th>
<th>No. of treatment comparisons (total no. of subjects)</th>
<th>Systolic blood pressure, net change</th>
<th>Diastolic blood pressure, net change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean, mm Hg 95% CI</td>
<td>P</td>
</tr>
<tr>
<td>Simple biofeedback</td>
<td>6 (141)</td>
<td>−0.8 [−4.1, +2.6]</td>
<td>NS</td>
</tr>
<tr>
<td>(Blanchard et al. [30],</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blanchard et al. [31],</td>
<td></td>
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<tr>
<td>Blanchard et al. [32],</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Blanchard et al. [33])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relaxation-assisted biofeedback</td>
<td>4 (98)</td>
<td>+4.3 [−0.8, +9.3]</td>
<td>NS</td>
</tr>
<tr>
<td>(Chesney et al [11],</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frankel et al. [37],</td>
<td></td>
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</tr>
<tr>
<td>Jacob et al. [38],</td>
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<td></td>
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<tr>
<td>McGrady et al. [39])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progressive muscle relaxation</td>
<td>2 (171)</td>
<td>−1.9 [−6.8, +3.1]</td>
<td>NS</td>
</tr>
<tr>
<td>(Schneider et al. [26],</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schneider et al. [27])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transcendental Meditation</td>
<td>6 (449)</td>
<td>−5.0 [−7.6, −2.3]</td>
<td>0.0002</td>
</tr>
<tr>
<td>(Schneider et al. [26],</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schneider et al. [27],</td>
<td></td>
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</tr>
<tr>
<td>Castillo-Richmond et al.</td>
<td></td>
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<tr>
<td>Paul-Labrador et al. [29*],</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Barnes et al. [34],</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barnes et al. [35])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress management,</td>
<td>5 (207)</td>
<td>−2.3 [−5.0, +0.5]</td>
<td>NS</td>
</tr>
<tr>
<td>including relaxation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Chesney et al. [11],</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amigo et al. [40],</td>
<td></td>
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<td>Johnston et al. [42])</td>
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NS—not statistically significant.

*Means for each treatment category are weighted mean differences, indicating net change relative to control groups in systolic BP and change in diastolic BP. Because some intervention categories shared the same control subjects, numbers of subjects are not additive.
Consistent with earlier reviews [13,20] reporting that well-designed studies were in the minority of randomized controlled trials on stress reduction and high BP, 75 eligible trials were located, of which 20 met the inclusion criteria for well-designed studies. The criteria were met by four of 15 studies on simple biofeedback [30–33], four of 12 on relaxation-assisted biofeedback [11,37–39], two of 20 on relaxation training [26,27], four of 14 on stress management training [11,40–42], and six of seven on the Transcendental Meditation program [26–28,29••,34–35].

**Comparison with Previous Meta-analyses**

The findings of this updated systematic review and meta-analysis agree with results of previous meta-analyses in some respects, particularly in the finding that when only well-designed randomized controlled trials were analyzed, the results for most interventions were not significant in lowering high BP. However, the present meta-analysis of well-designed clinical trials indicates that the Transcendental Meditation program is associated with significantly reduced systolic and diastolic BPs.

Results on the Transcendental Meditation program from the current meta-analysis differ significantly from the AHRQ report [13] for several reasons. Overlapping studies were removed, data collection errors were corrected, and additional studies were identified [25]. Two trials of adolescent subjects with high normal or prehypertensive BP levels were included here, consistent with NIH guidelines that require including children in medical research [34,35]. A 2006 trial [29••] not included in the AHRQ report due to its relatively recent publication was included in the present analysis.

The BP reductions of −5.0/−2.8 mm Hg found with the Transcendental Meditation program were similar to or greater than the reported effects of other lifestyle modifications recommended by JNC 7. Systolic BP reductions with these other lifestyle interventions were weight-reducing diet, −5.0 mm Hg; aerobic exercise, −4.6 mm Hg; alcohol restriction, −3.8 mm Hg; and sodium restriction, −3.6 mm Hg. Corresponding diastolic BP changes ranged from −3.7 to −2.5 mm Hg [18].

The results of this systematic review and meta-analysis indicate lack of homogeneity among stress reduction approaches, that is, all stress reduction categories do not result in similar decreases in BP. In fact,
the data indicate that most do not significantly lower elevated BP. This heterogeneity of effects is consistent with other meta-analyses on stress reduction and anxiety, psychologic health, substance abuse, and physiologic indicators of autonomic arousal [45].

**Additional Effects of the Transcendental Meditation Program on CVD Risk**

Meta-analyses and controlled studies have found related effects of the Transcendental Meditation program on modulating CVD risk factors, surrogate markers, and clinical outcomes: anxiety and psychologic health [17,45], smoking and alcohol abuse [46], need for anti-hypertensive medications [27], myocardial ischemia [47], and carotid atherosclerosis [28]. For example, a systematic review and meta-analysis found that the Transcendental Meditation program is substantially more effective than other categories of stress reduction for reducing trait anxiety [17]. A meta-analysis of randomized controlled trials of subjects with elevated BP and average follow-up of eight years showed a 23% lower rate of all-cause mortality and a 30% lower rate of CVD mortality in the Transcendental Meditation group compared with controls [48••]. This result is particularly salient because no other stress reduction or lifestyle modification recommended for hypertension has been shown in randomized controlled trials to reduce mortality rates [1,3].

Finally, in terms of mechanism, the Transcendental Meditation program may promote cardiovascular balance and homeostasis through integrated neurophysiologic, neuroendocrine, and cardiovascular mechanisms [49••]. It has been documented that the brain triggers physiologic stress responses through cortical modulation of the autonomic nervous system and hypothalamic-pituitary-adrenocortical axis [9]. Of primary importance are the prefrontal cortex and the limbic system, which process cognitive and emotional responses to potentially stressful situations [9]. Studies indicate that the Transcendental Meditation practice modulates neurophysiologic, neuroendocrine, and physiologic mechanisms associated with stress. For example, controlled studies have reported reduced sympathetic nervous system and hypothalamic-pituitary-adrenocortical axis activation along with more coherent neurophysiologic functioning with the Transcendental Medi-
tation program [49••,50]. This more coherent and integrated functioning of the nervous system may facilitate adaptive physiologic responses to stress, thereby helping to prevent negative physiologic consequences such as hypertension and CVD [49••].

Conclusions
Results of meta-analyses showed that simple biofeedback, relaxation-assisted biofeedback, progressive muscle relaxation, and stress management training did not show statistically significant reductions in elevated BP. Analysis of trials of the Transcendental Meditation program showed clinically and statistically significant changes in BP (−5.0/−2.8 mm Hg). Other published research on the Transcendental Meditation program suggest complementary effects on other CVD risk factors, disease markers, and clinical events for reducing psychosocial stress, smoking, alcohol abuse, myocardial ischemia, carotid atherosclerosis, and mortality rates. Thus, there is sufficient evidence that, among stress reduction programs, the Transcendental Meditation program is effective and warrants recommendation to patients with elevated blood pressure in preventing or treating hypertension and CVD.

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References and Recommended Reading

Papers of particular interest, published recently, have been highlighted as: • Of importance and •• Of major importance.

8. Moseley, J.V., Linden, W. Predicting blood pressure and heart rate change with cardiovascular reactivity and recovery: results from


29••. Paul-Labrador, M., Polk, D., Dwyer, J.H., et al. Effects of a randomized controlled trial of Transcendental Meditation on components of the metabolic syndrome in subjects with coronary heart disease. *Arch Intern Med* 2006; 166: 1218–1224. [PubMed: 16772250] This clinical trial in CHD patients showed changes in components of the metabolic syndrome (blood pressure and insu-
lin resistance) with corresponding changes in autonomic nervous system activation.


Meditation program. To our knowledge, this is the only set of RCTs on lifestyle modifications for hypertension and mortality.


This article, “Stress Reduction Programs in Patients with Elevated Blood Pressure: A Systematic Review and Meta-analysis,” by Maxwell V. Rainforth, Ph.D., et al., here revised or updated, and reprinted with permission, was originally published in *Current Hypertension Report*. 2007 December; 9(6): 520–528.

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Disease Prevention and Health Promotion in the Aging with a Traditional System of Natural Medicine—

*Maharishi Vedic Medicine*

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Robert Schneider, M.D., is Professor of Physiology and Health Director of the Institute for Natural Medicine and Prevention. Dr. Schneider is a physician researcher specializing in the field of natural medicine. For more than a decade, he and his collaborators have examined the efficacy of Maharishi Ayurveda and the Transcendental Meditation technique for the prevention and treatment of chronic diseases, especially hypertension and cardiovascular disease. This research, which has been supported by private and government sources, including $18 million from the National Institutes of Health (NIH) and private funding agencies, has resulted in more than 80 professional publications and presentations and brought international attention to the efficacy of Maharishi Ayurveda and the Transcendental Meditation technique in reducing hypertension, cardiovascular disease and associated mortality. Dr. Schneider is one of the founding faculty of the Department of Physiology and Health, and a consultant to the National Institutes of Health and the Center for Disease Control and Prevention on natural medicine.
**Abstract**

This review focuses on a comprehensive and sophisticated system of natural medicine that appears to hold promise for prevention of chronic diseases and disabilities, loss of independence, suffering, and enormous health care costs often associated with ‘usual’ aging. We first discuss the negative impact of usual aging on our society, with its rapidly-growing percentage of elderly, and the challenge of how to promote “successful aging.” Emphasis is given to the research literature suggesting that Maharishi Vedic Medicine* (MVM) is particularly effective in retarding ‘usual’ aging. Proposed mechanisms for the anti-aging effects of MVM include reductions in physiological and psychological stress and enhancement of homeostatic and self-repair processes. We conclude that this set of innovative strategies may help society achieve recommended health objectives for disease prevention and health promotion in older adults, and that wide-spread implementation of this self-empowering, prevention-oriented approach in the elderly is feasible, cost-effective and timely.

* Maharishi Vedic Medicine is now more commonly referred to as Maharishi Vedic Approach to Health

**Introduction**

The U.S. is an aging society. In 1996, the elderly (those over 65 years) constituted more than 13% of the population; by 2030, the proportion of elderly will nearly double (Perry, 1999). Concomitantly, disability and morbidity associated with an aging population have also increased (Guralnik, 1993; Fries, 1999). The reductions in infectious diseases earlier in this century have been subsequently offset by increases in the prevalence of chronic diseases (e.g., cardiovascular disease and cancer) that have become the dominant causes of disability and mortality in the elderly (Hoffman, 1996). A decreasing mortality rate, healthier lifestyles, and advances in medical technology and in public health have prolonged the life-span but not the health-span and have contributed to the increasing number of individuals with chronic conditions.

Despite improvements in public health, however, the ten leading causes of death for persons over age 65 have not changed appreciably in the past few decades. The major diseases that have greatly increased
in prevalence and severity with advancing age include coronary heart
disease, stroke, cancer, dementia, osteoporosis and musculoskeletal dis-
orders (Alliance for Aging Research, 1995; Perry, 1999).

The costs of aging have also gone up. In 1998, Medicare outlays for
hospital and medical services for some 33 million older Americans with
aging-related disorders exceeded $200 billion or more than 10% of the
federal budget. This is almost double the cost of Medicare as recently as
1990. Given this exorbitant rate of increase, it has been projected that
Medicare may go bankrupt by 2007, four years before the first baby
boomer turns 65 (Perry, 1999). Given the staggering costs of medical
care for the unhealthy elderly, gerontological experts and health care
policy makers are seriously asking themselves whether they should con-
tinue to devote resources to the provision of acute care or allocate more
of them to prolong independent functioning of seniors in the commu-
nity setting (Institute of Medicine, 1990; Hodes, 1996; Butler, 1999).
It has been posited that the successful containment of health care costs
will depend on our collective ability to prevent age-related diseases
and disabilities that generate the greatest needs for long-term care
(Schneider, 1990; Mendelson, 1993).

**Successful Aging vs. Usual Aging**

Rowe and Kahn proposed a distinction between usual aging and suc-
cessful aging (Rowe, 1987; Rowe, 1997; Rowe, 2000). They distin-
guished between two groups of non-diseased older persons—a usual
aging group that is nonpathologic but at high risk, and a successful
aging group that is at low risk and high function. By making this
distinction, they countered a long-standing belief that usual aging
is determined by intrinsic aging processes, primarily genetic (Rowe,
1997). They concluded that successful aging has three main compo-
nents: 1) a low probability of disease and disease-related disability, 2) a
high capacity for cognitive and physical functioning, and 3) an active
engagement with life including interpersonal relations and productive
activity (Rowe, 2000).

It is now clear that usual aging and the risk associated with it for
adverse health events may be both preventable and even reversible. Indeed, recent research strongly indicates that, with appropriate inter-
ventions, many processes associated with usual aging can be slowed, or
even reversed. For example, carbohydrate intolerance, osteoporosis, and high blood pressure—all correlates of usual aging—can be modified by behavioral, lifestyle interventions such as exercise, diet, and/or stress reduction (Rowe, 1987; Schneider, 1990; Schneider, 1995; Sticht, 1995). Similarly, neurobehavioral aging, including cognitive declines, may not be inevitable (Finch, 1987). According to gerontological experts, the health care and self-care strategies likely to be effective in facilitating the transition from usual to successful aging are interdisciplinary approaches that include behavioral, biomedical, nutritional, and other interventions (Committee on a National Research Agenda on Aging, Division of Health Promotion and Disease Prevention, 1991; Rowe, 1991; Steel, 1997; Swan, 1999).

**Aging as an Integrated Phenomenon**

Although the causes of aging are heterogeneous and incompletely understood (Harman, 1991) some common principles have been suggested. One such principle is integration, originally proposed by Cannon (Cannon, 1939). This integration or interconnectedness of physiological systems may underlie and explain theories of aging that have been advanced (Bjorksten, 1968; Walford, 1969; Rockstein, 1974; Hayflick, 1987; Warner, 1987; Medvedev, 1990). Of all these theories of aging, the free radical theory is most prominent (Harman, 1994; Ji, 1999).

This integrative theory suggests that damage due to ubiquitous oxygen free radicals (e.g., superoxide) and non-radical oxidants (e.g. hydrogen peroxide) is a fundamental physiological process of aging-related deterioration. Moreover, it has been suggested that free radical activity or oxidative stress may be accelerated by psychosocial stress (Santos, 1988; Adachi, 1993; Patterson, 1993; Scarpellini, 1994; Schneider, 1998). Therefore, it would appear that health care strategies that effectively reduce the chronic consequences of psychosocial stress and oxidative stress, improve internal stress resistance and recovery and simultaneously promote balance and homeostasis among integrated physiological systems may be an important strategy for minimizing ‘usual aging’ and achieving ‘successful’ aging.

In the following section, we review a traditional and comprehensive system of natural health care which has been purported to slow aging and extend longevity and has recently been reevaluated for its applica-
tion in modern society. To date, a considerable body of research has shown that several modalities of this health care approach substantially reduce chronic stress related diseases, promote health, vitality, mental well-being and cognitive functioning which are consistent with prevention of usual aging and promotion of successful aging as described by Rowe and Kahn (Rowe, 1997; Rowe, 2000).

**Maharishi Vedic Medicine—Background and Theoretical Perspective**

Maharishi Vedic Medicine (MVM) has been described as a time-tested, comprehensive system of prevention-oriented natural medicine (Nader, 1995; Maharishi Mahesh Yogi, 1995a; Schneider, 1997). MVM is reported to be the oldest continuously practiced medical system, having its heritage in the ancient Vedic civilization of India. (World Health Organization, 1978; Bannerman, 1983; Thatt, 1986; Kurup, 1993; Sharma, 1998). *Veda* in Sanskrit means “knowledge,” and the Vedic tradition with its classical literature has been described as “total knowledge” of health. (Maharishi Mahesh Yogi, 1994; Nader, 1995). Vedic medicine, including Ayur-Veda, has been recognized by the World Health Organization as a sophisticated system of natural medicine with a detailed scientific literature consisting of classical medical texts, an uninterrupted oral tradition of classical knowledge predating the written texts, a comprehensive *materia medica*, and a wide breadth of clinical procedures relevant to prevention and treatment of acute and chronic diseases (Bannerman, 1983; Thatt, 1986). The recent availability of Vedic Medicine worldwide has resulted from the systematic investigation and restoration of the original texts and practical applications by Maharishi Mahesh Yogi in collaboration with leading traditional physicians, scientists and Vedic scholars (Nader, 1995; Maharishi Mahesh Yogi, 1995a; Schneider, 1997). Over the last 30 years, more than 600 scientific research studies have been conducted on various MVM treatment and prevention modalities at over 200 research institutions and universities in 33 countries (Orme-Johnson, 1977; Chalmers, 1990; Wallace, 1990; Sharma, 1996).

Recently, remarkably precise correlations between human neurophysiological structures and function and the 40 aspects of the Veda and Vedic literature have been reported (Nader, 1995). These correla-
tions suggest a coherent framework for contemporary understanding of Maharishi Vedic Medicine.

In Maharishi Vedic Medicine, therapeutic, diagnostic and preventive modalities are drawn from the broad range of Vedic literature and are said to holistically enhance the body’s innate self-repair and homeostatic mechanisms, thereby preventing disease and promoting health. Diseases are reportedly addressed by treating their ultimate causes—disruptions of the body’s ‘inner intelligence’ (Nader, 1995). According to MVM, it is this ‘inner intelligence’ which structures and governs the human body and is seen as a lively and orderly expression of the same intelligence of natural law which structures and governs the entire universe. (Maharishi Mahesh Yogi, 1995a; Schneider, 1997). To further elucidate:

When the total intelligence of Natural Law—Veda—is lively in the individual physiology, there is perfect synchrony between the functioning of the body as a whole, and between individual intelligence and cosmic intelligence. With this complete integration, all thought and action are spontaneously in harmony with Natural Law and the individual enjoys perfect health. (Maharishi Mahesh Yogi, 1995a)

This ancient Vedic perspective of an underlying field of ‘intelligence’ is consistent with modern theories of quantum physics (Hagelin, 1989). For example, Einstein originally postulated a single unified field of natural law at the basis of all the force fields and matter fields in the universe (Hagelin, 1989). In the quantum mechanical view, the physical particles which structure the universe are ultimately frequencies of wave functions of the self-interacting dynamics of the unified field. Similarly, from the Vedic perspective, the universe, including the human body, is the expression of self-interacting impulses of intelligence (Hagelin, 1989; Nader, 1995). MVM further identifies this unified field as being identical to the field of human consciousness (Hagelin, 1987).

Approaches of MVM include techniques to reduce psychosocial stress: pulse diagnosis, diet and herbal food supplements for the systematic detection and dissolution of physiological imbalances. Other strategies involve physiological purification and behavioral recommendations. Still others take advantage of knowledge of the effects of the near environment (Vedic architecture) and distant environment on health. Finally, there are technologies for reducing social stress and
enhancing collective health (group practice of the Transcendental Meditation and advanced TM-Sidhi programs). These approaches are largely missing from modern medicine (Schneider, 1997). The experimental data relevant to aging on these different approaches are reviewed below. In the last 30 years, the majority of studies on MVM have been on 1) the Transcendental Meditation program; 2) herbal nutritional supplements, and 3) traditional physiological purification procedures. The remainder of this paper reviews the scientific research on these three traditional MVM modalities.

1) The Transcendental Meditation Program

Description of the Transcendental Meditation program—Over 6 million individuals worldwide have learned the Transcendental Meditation program over the last 40 years. The Transcendental Meditation technique is described as a simple, natural and effortless procedure practiced twice a day for 20 minutes while sitting comfortably with eyes closed (Roth, 1994). It requires no changes in beliefs, philosophy, religion or life-style. Clinical reports indicate that this technique can easily be learned by individuals of any age, level of education, occupation, or cultural background (Alexander, 1993; Roth, 1994).

During the practice of the Transcendental Meditation technique, one’s awareness gradually settles down to states of lesser excitation and is eventually experienced as remaining silently awake within itself (Maharishi Mahesh Yogi, 1963; Roth, 1994). The attainment of this state, which is one of restful alertness, is reported by Transcendental Meditation practitioners as an experience in which the ordinary thinking process is “transcended.” This state also serves to distinguish the Transcendental Meditation technique from other meditation and relaxation techniques that use contemplation and concentration and thus may increase mental activation (Orme-Johnson, 1998).

According to the MVM model, the consideration of consciousness is the fundamental element missing from modern medicine. In the Maharishi Vedic Approach to Health (synonomous with MVM), development of consciousness is achieved through the Transcendental Meditation and TM-Sidhi programs (Maharishi Mahesh Yogi, 1963; Maharishi Mahesh Yogi, Schneider et al. page 4 1967; Roth, 1994; Nader, 1995). The prevention and health promotion effects of these pro-
grams for aging are thought to occur through the enhancement of the body’s inner intelligence, thereby allowing the physiology to eliminate accumulated stress. This, in turn, is proposed to promote mental, emotional and physiological balance, and mind/body integration (homeostasis). Studies evaluating the validity of this model are reviewed below using outcome measures associated with the aging process.

**Effects of the *Transcendental Meditation* program on physiological correlates of aging**—Wallace, et al., used a previously validated and standardized index of biological aging—the Morgan Adult Growth Examination (auditory discrimination, near-point vision accommodation, and systolic blood pressure) (Morgan, 1972)—on 84 subjects (mean age = 53 years) (Wallace, 1982). Results indicated that long-term Transcendental Meditation practitioners (> 5 years meditating) had a mean biological age 12 years younger than their mean chronological age. Short-term Transcendental Meditation meditators were five years younger and the non-meditator controls were two years younger. Transcendental Meditation groups differed significantly from age-matched controls. The study statistically controlled for potentially confounding effects of diet and exercise.

Levels of serum dehydroepiandrosterone sulfate (DHEAS) have been shown to decline with age (Orentreich, 1984). Glaser, Brind, et al. compared DHEAS levels in 328 Transcendental Meditation practitioners to 1462 controls (Glaser, 1992). Both male (+23%) and female (+47%) Transcendental Meditation subjects had significantly higher levels of DHEAS, the difference being especially pronounced for older subjects (age > 45) whose DHEAS levels were comparable to levels in controls 5–10 years younger. This finding was supported by a second cross-sectional study in women Transcendental Meditation practitioners which found that DHEAS correlated with months of practice of the Transcendental Meditation program (Walton, 1995).

**Effects of the *Transcendental Meditation* program on neurophysiological correlates of aging**—practice of the Transcendental Meditation program in adults was also associated with enhancement of neurocognitive function including reaction times (Holt, 1978; Cranson, 1991), efficiency of reflex responses (Warshal, 1980; Wallace, 1982) and audi-
tory thresholds (Wallace, 1982). Transcendental Meditation practice has been shown to increase alpha power and coherence in the EEG which are correlated with improved cognitive performance (Dillbeck, 1981). Measuring electrodermal activity, adult Transcendental Meditation practitioners had larger skin conductance responses along with faster habituation to loud stressful tones (Orme-Johnson, 1973). This suggests a more adaptive style of functioning characterized by initially faster and greater orienting responses to novel or significant stimuli, followed by faster habituation. In contrast, usual aging is associated with less adaptable, less flexible neurophysiologic patterns of response (Birren, 1995).

**Effects of the Transcendental Meditation program on cognitive correlates of aging**—Consistent with neurophysiological findings, practice of the Transcendental Meditation program also appears to produce long-term changes in cognitive functioning that appear to be opposite in direction to those associated with usual aging. These Transcendental Meditation program-induced changes include enhanced short-term and long-term memory, and organization of memory as evidenced in learning tasks (Miskman, 1977; Dillbeck, 1982); incremental gains on fluid intelligence over a two- to four-year period (Cranson, 1991), improved perceptual flexibility (Dillbeck, 1982); and increased perceptual motor speed (Jedrczak, 1984).

**Effects of the Transcendental Meditation program on chronic disease and health patterns associated with aging**—The healthcare utilization patterns of individuals with several clinical conditions and diseases which commonly afflict the elderly have been shown to improve with practice of the Transcendental Meditation program. Investigating the health insurance records of more than 2000 people practicing the Transcendental Meditation program over five years, Orme-Johnson found significantly less health care utilization by the Transcendental Meditation practitioners for all major disease categories when compared to other groups (N ~ 400,000) of similar age, gender, profession, and insurance terms (Orme-Johnson, 1987). This included 87% less hospitalization for heart disease, 55% less for cancer, and 87% less for nervous system disorders. When these data were analyzed by age
group, it was found that older Transcendental Meditation subjects (> 40) had the greatest reductions in need for inpatient services (68% less) and outpatient medical services (74% less).

A later study (Orme-Johnson, 1997) of archival data from Blue Cross/Blue Shield Iowa confirmed and extended this research to persons using, in addition to the Transcendental Meditation program, a variety of other MVM modalities including herbal supplements. The four-year total medical expenditures per person in the MVM group, for all ages and all disease categories, were 59% and 57% lower, respectively, than the norm (n = 600,000) and a demographically matched control group (n = 4,148). The greatest savings were seen among older MVM users (age > 45) who had 88% fewer inpatient days compared to controls. For example, hospital admissions were 11.4 times higher for the controls than the MVM group for cardiovascular disease, 3.3 times higher for cancer, and 6.7 times higher for mental health and substance abuse (Orme-Johnson, 1997).

**Effects of the Transcendental Meditation program on hypertension and cardiovascular disease in the aging**—At least 11 published studies have reported beneficial effects of the Transcendental Meditation program on individuals with hypertension (Schneider, 1992). A review and quantitative meta-analysis of 26 studies indicated that the Transcendental Meditation technique produced a significantly larger reduction of high blood pressure than did other forms of meditation or meditation-like techniques (Orme-Johnson, 1998). For example, in a prospective randomized controlled study by Alexander et al. on the effects of the practice of the Transcendental Meditation program in the elderly (mean age = 80), the Transcendental Meditation group showed a mean reduction of 12 mm Hg over a 3-month period compared to modest change or no change for the two other relaxation treatment conditions (Alexander, 1989).

In the most rigorous study to date on Transcendental Meditation and hypertension in the elderly, Schneider, et al. (Schneider, 1995) conducted a randomized controlled, single-blind clinical trial on 127 African Americans (average age 66 years) with mild hypertension. This included a three month follow-up period in a primary care, inner city health center. Compared to a lifestyle modification education control
Transcendental Meditation intervention significantly reduced systolic blood pressure by 10.7 mm Hg and diastolic blood pressure by 6.4 mm Hg. A parallel progressive muscle relaxation (PMR) intervention lowered systolic blood pressure by 4.7 mm Hg and diastolic blood pressure by 3.3 mm Hg, but practice of the Transcendental Meditation program lowered BP significantly greater than PMR. Regularity of practice for the Transcendental Meditation group was 97% (81% for PMR).

**Effects of the Transcendental Meditation program on mortality in the elderly**—A randomized controlled study exclusively targeted the effects of the practice of the Transcendental Meditation program to the advanced elderly (mean age = 81 at intake) (Alexander, 1989). Over a three-year period, the Transcendental Meditation group improved most, followed by mindfulness training, and then by the no-treatment and relaxation groups, for the following measures: paired associate learning, two measures of cognitive flexibility, systolic blood pressure, self-ratings of behavioral flexibility and aging, multiple indicators of treatment efficacy, and mental health after 18 months. After three years, survival rate for Transcendental Meditation was 100% and mindfulness 87.5% in contrast to mental relaxation (65%) and no treatment (77%). The baseline survival rate for the 478 nonparticipating elderly was 62.5%.

### 2) Maharishi Vedic Medicine Herbal Supplements

The classical Vedic medicine texts describe certain herbal preparations for specific diseases, and other herbal preparations called *Rasayanas*, which are proposed to promote general health by increasing resistance to disease, activating tissue repair mechanisms, and arresting or reversing deteriorative effects associated with aging (Sharma, 1984). Each herbal preparation contains various herbs or plant parts, each herb having hundreds or thousands of phytochemicals (Sharma, 1997). According to traditional Vedic and modern theories, by using the combined herbal preparation rather than using the isolated chemical active ingredients, the various chemical constituents may function synergistically and mitigate adverse side effects associated with individual components (Sharma, 1996).
To date, the majority of research on these herbal preparations called *Rasayanas* has involved two compounds collectively called Maharishi Amrit Kalash (MAK), its commercially available name. MAK-4 and MAK-5 contain distinctly different combinations of herbs. MAK-5, available in tablet form, consists of Gymnema aurantiacum, Hypoxis orchiodes, Tinospora cordifolia, Sphaeranthus indicus, butterfly pea, licorice, Vanda spatulatum, Lettsomia nervosa, and Indian wild pepper. MAK-4, available as a ‘fruit paste’, consists of raw sugar, ghee (clarified butter), Indian gallnut, Indian gooseberry, dried catkins, Indian pennywort, honey, nutgrass, white sandalwood, butterfly pea, shoeflower, aloewood, licorice, cardamom, cinnamon, Indian cyperus, and turmeric. Although quantitative chemical analyses has not been performed, both MAK-4 and MAK-5 have been shown on qualitative chemical analysis to include a mixture of low-molecular weight substances and antioxidants, such as alpha-tocopherol, beta-carotene, ascorbate, bioflavonoids, catechin, polyphenols, riboflavin, and tannic acid (Rao, 1987; Kapoor, 1990) (Kar, 1986) (Duke, 1985). In the classical literature, MAK has been reported to promote longevity, vitality, physiological balance, youthfulness, and resistance to disease (Sharma, 1984; Sharma, 1996).

Below we review several studies relevant to prevention and treatment of aging-related disorders.

**Antioxidant properties of MAK**—Researchers have found that both MAK-4 and MAK-5 scavenge oxygen free radicals in a dose-dependent manner, thereby ameliorating their deleterious effects. Reactive Oxygen Species (ROS) scavenged by MAK-4 and MAK-5 include superoxide, hydroxyl, and peroxyl radicals, and hydrogen peroxide generated both in cellular (neutrophil) and noncellular (xanthine-xanthine oxidase) systems (Niwa, 1991; Bondy, 1994). MAK-4 and MAK-5 have also been shown to reduce levels of lipid peroxide, a marker of free radical damage, and inhibit oxidation of low-density lipo-proteins (LDL), reduce platelet activation and reduce angina pectoris and the development of atherosclerotic lesions (Sundaram, 1997).

**Antioxidant effects of MAK**—Analysis of MAK components identifies a large number of natural antioxidants (Bondy, 1994). Niwa et
found MAK-4 and MAK-5 to be efficient scavengers of common free radicals and oxidants including superoxide anion, hydroxyl radical, and hydrogen peroxide (Niwa, 1991). Aqueous and alcoholic extracts of MAK-4 and MAK-5 inhibited hepatic microsomal lipid peroxidation (Dwivedi, 1991). Sharma et al. found that MAK-4 and MAK-5 were approximately 103 times more potent than probucol in preventing 50% oxidation of LDL (Sharma, 1992). Animals pre-treated with MAK showed no evidence of toluene-induced free radical damage to the cerebellum compared to toluene-exposed control rats (Bondy, 1994).

Whereas usual aging is thought to be related to oxidative tissue damage caused by free radicals and non-radical oxidants, MAK, in contrast, has been shown to have a powerful anti-oxidant effect and therefore should have an anti-aging effect.

**Anticancer effects of MAK**—Sharma et al. found that a 6% MAK-4 diet provided greater than 60% protection against DMBA-induced breast cancer in rats both during initiation and promotion phases. Control animals who developed tumors showed tumor regression in 60% of the cases when later supplemented with MAK-4 in the diet for four weeks (Sharma, 1990). Since the above cancer model may involve free radical mechanisms and MAK appears able to scavenge free radicals in vivo; hence it is also likely that MAK would have anti-cancer and anti-aging effects in humans.

**Cardiovascular disease and MAK**—Cardiovascular disease is the #1 cause of death among the elderly. MAK’s ability to prevent both LDL oxidation, platelet aggregation and lipid peroxidation due to a high-cholesterol diet, suggests that MAK may help prevent atherosclerosis in humans.

A study by Sundaram et al. found that hyperlipidemic patients supplemented with MAK-4 for 6 months had a profound time-dependent reduction in their LDL oxidation by Cu\(^{2+}\) and endothelial cells (Sundaram, 1997). Lee et al., found significant reductions in lipid peroxides, increased glutathioneperoxidase and resistance of LDL to endothelial cell-induced and cupric ion-catalyzed oxidation in Wantanabe Heritable Hyperlipidemic (WHHL) rabbits receiving MAK-4 for six months (6% diet) (Lee, 1996). In addition, there was a significantly lower per-
DISEASE PREVENTION AND HEALTH PROMOTION IN THE AGING

centage area of atheroma in the MAK-4 group compared to controls. Lee et al. also tested organ functions in WHHL rabbits on a six month 6% MAK-4 supplemented diet. Functional tests for liver, kidney, pancreas, carbohydrate metabolism, immunity, inflammation and tissue damage indicated significant prevention of organ damage by MAK-4.

Platelet aggregation occurs abnormally under a variety of stresses, and may trigger myocardial infarction, strokes, and other vascular diseases. In vitro studies showed that MAK-5 prevents platelet aggregation when platelets are exposed to any of several well-known aggregation inducers (Sharma, 1989).

**Immune effects of MAK**—Weakened immune function has been implicated in the detrimental effects of usual aging (Walford, 1969). MAK appears to have an anti-aging effect on the immune system. Dilleepan et al. used animal and cell models to study the effects of MAK under a number of different conditions of immune challenge (Dilleepan, 1990). There were increases of 100% to 160% in T-lymphocyte proliferation depending on the MAK dosage.

**Nervous system effects and MAK**—In humans, it is known that many neuronally-based functions decline with age. MAK’s central nervous system mechanisms may involve interactions with a variety of important neurotransmitter receptors or uptake sites including opioid receptors (Sharma, 1991b). A double-blind placebo controlled study was conducted to test the effect of MAK on an age-related alertness task (Gelderloos, 1990). Forty-eight men over 35 years of age were randomly assigned to receive MAK-5 tablets or a closely matched placebo twice daily for six weeks. The MAK group improved significantly more in their performance of this task after three and six weeks of treatment relative to the placebo group. Performance was highly correlated with age, and because successful performance apparently requires an unrestricted flow of homogeneous attention as well as focalized concentration, it is concluded that MAK may enhance attentional capacity or alertness, and thus reverse some of the detrimental cognitive effects of aging.
Summary: The experimental literature on MAK suggests that by producing antioxidant, antineoplastic, anti-atherosclerotic, immunomodulatory and central nervous system effects, this traditional medicine herbal preparation may have broad anti-aging effects in human populations.

3) Physiological Purification Techniques
In the area of physiological purification, MVM recommends multimodality purification therapies on a seasonal basis for enhancement of physiological homeostasis, removal of impurities (toxins) that accumulate over time, promotion of mental and emotional well-being and overall physical health (Sharma, 1996). These procedures have been described in the classical Vedic medicine texts and have been recently and collectively termed Maharishi Rejuvenation Therapy (MRT). These procedures are all prescribed and supervised by trained physicians. Briefly, MRT consists of home preparatory procedures to loosen and remove superficial impurities by taking ghee (clarified butter) on several consecutive days followed by purgation with castor oil. This is followed by several days of an in-residence set of procedures to remove deeper-seated impurities, which are prescribed according to the individual’s physiological imbalances and include whole-body medicated oil massage (abhyanga), flowing of medicated oil on the forehead (shirodhara), herbalized fomentation (swedena), nasal administration of herbs (nasya), and herbalized enemas (basti). Proposed physiological mechanisms of action for several of these procedures have been described (Smith, 1992).

In a controlled study, Schneider and coworkers found that 142 patients undergoing similar purification treatments had reported, after a one-week treatment period, significantly greater improvements in well-being, energy-vitality, strength-stamina, appetite, and significantly less anxiety, depression and fatigue than 60 control subjects who participated in a didactic class on MVM (Schneider, 1990). A more recent study found that following a typical five-day purification program, total cholesterol fell acutely and HDL cholesterol rose significantly three months following treatment. Lipid peroxides and diastolic blood pressure also dropped while state anxiety measures improved significantly. Vasoactive intestinal peptide (VIP), a coronary vasodilator, rose significantly by 80% (Sharma, 1993).
Conclusion and Future Directions

Both the absolute number of elderly and the percentage of elderly in the society is rapidly increasing. Nevertheless, a growing body of evidence suggests that what has been long been described as “usual aging” may actually be modifiable by behavioral and other interventions to promote more widespread successful aging. The challenge of how to promote successful aging—aging with enhanced health, rather than as usual with disabilities—has therefore become critical for our society. Accordingly, national policy makers and gerontological experts have established national health objectives that call for studies of innovative health promotion strategies for the elderly. Experts in behavioral medicine and health care policy (Institute of Medicine, 1990; U.S. Dept. of Health and Human Services, 1990; Rakowski, 1992; Schmidt, 1994) have suggested the following: {1} Utilize treatment strategies that address the causes of disease, not just the symptoms; {2} Provide Americans with a health care choice that is holistic; {3} Ensure cost-effective medical care; {4} Provide prevention as well as cure; {5} Incorporate positive lifestyle changes in treatment planning; {6} Incorporate treatments that have high compliance rates; {7} Close the health gap for the underserved including ethnic minorities and the elderly; and {8} Consider natural alternatives or complements to pharmacological/surgical procedures when appropriate and feasible.

The research studies reviewed here on several modalities of MVM suggest that this traditional medicine approach may fulfill all eight of the above recommendations and, thus, is worthy of widespread implementation. Another advantage of MVM is high compliance compared to conventional programs of lifestyle modification.

The hypothesized integrated mechanism of action of Maharishi Vedic Medicine is the enlivenment of the body’s underlying ‘inner intelligence’ so that fundamental self-repair and defense mechanisms are enhanced including those controlling physiological, cellular, biochemical and psychophysiological functions. This re-organization and repair appear to reduce accumulated stress, improve the function of organ systems, and allow for many beneficial neurophysiological and behavioral changes.

Forty percent of the general public has now used some form of natural complementary and alternative medicine (Eisenberg, 1993; Eisenberg,
1998). However, these approaches are often applied in an unsystematic framework that has not been adequately subjected to rigorous empirical verification. In contrast, Maharishi Vedic Medicine offers the potential for a comprehensive, integrated, multi-dimensional approach that has been subjected to substantial empirical investigation. The implications of this comprehensive system of natural medicine for disease prevention and health promotion in the field of aging appear to be highly relevant to the needs of modern society.

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References


Eisenberg, D.M., Davis, R.B., Ettner, S.L., Appel, S., Wilkey, S., Van Rompay, M., Kessler, R.C. Trends in alternative medi-


Sticht, J.P. & Hazzard, W.R. Weight control and exercise: Cardinal features of successful preventative gerontology (Editorial). *Jour-


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Maharishi Vedic Vibration Technology
on Chronic Disorders
and Associated Quality of Life

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Robert Schneider, M.D., is Professor of Physiology and Health and Director of the Institute for Natural Medicine and Prevention. Dr. Schneider is a physician researcher specializing in the field of natural medicine. For more than a decade, he and his collaborators have examined the efficacy of Maharishi Ayurveda and the Transcendental Meditation technique for the prevention and treatment of chronic diseases, especially hypertension and cardiovascular disease. This research, which has been supported by private and government sources, including $18 million from the National Institutes of Health (NIH) and private funding agencies, has resulted in more than 80 professional publications and presentations and has brought international attention to the efficacy of Maharishi Ayurveda and the Transcendental Meditation technique in reducing hypertension, cardiovascular disease and associated mortality. Dr. Schneider is one of the founding faculty of the Department of Physiology and Health, and a consultant to the National Institutes of Health and the Center for Disease Control and Prevention on natural medicine.
ABSTRACT

There is a growing interest for more effective, innovative programs to address chronic illness suffered by approximately 40 percent of the U.S. population. The purpose of this study was to evaluate the effects of a new Maharishi Vedic Medicine program—the Maharishi Vedic Vibration Technology—on the quality of life of individuals with chronic disorders. A total of 213 individuals took part in the study (mean age=48.55 years; average length of time of chronic illness=18.42 years). Results showed that over three sessions, the average self-reported improvement in chronic illness was 40.97 percent. Conditions related to neck pain improved the most (51.25%), followed by respiratory ailments (48.00%), digestive problems (46.90%), mental health, including anxiety and depression (46.34%), arthritis (41.57%), insomnia (37.38%), back pain (36.32%), headaches (35.83%), cardiovascular conditions (22.31%), and eye problems (21.19%). Findings also showed significant reductions in frequency of discomfort or pain (p<.000001), intensity of discomfort (p<.000001), and disabling effects of the discomfort in daily activity (p<.000001), in addition to overall improvement in mental health (p<.000001) and vitality (p<.000125). Possible mechanisms of action are presented.

Keywords: Maharishi Vedic Medicine, Maharishi Vedic Vibration Technology, Quality of Life, Chronic Disorders

Introduction

The impact of chronic illness on the daily life of the individual and society is a growing concern among the public and the U.S. health care system (1-4). A study published in a 1996 issue of the Journal of the American Medical Association reported that over 45% of people in the United States—123 million people out of the current population—suffer from one or more chronic diseases (5). National surveys indicate that one-third of the population is afflicted by chronic pain, especially backaches, neck pain and migraines (6-8). Other surveys of the adult population have shown the prevalence of chronic mental disorders—20% for major or minor depression, and 19% for anxiety disorders (9,10).

The economic impact of chronic diseases has been estimated at $659 billion annually, and is a major contributor to escalating health care...
costs (5). Severe chronic illnesses affect 17% of the general population but account for 47% of medical expenditures (5). This has led to pressure to contain the costs of treating individuals suffering from these diseases through “managed care,” and controversy over the ethics of controlling health care utilization of those with extreme needs (11).

The high prevalence and social costs underscore the limitations of modern health care practices in preventing and treating these disorders. Moreover, the adverse side effects of standard medical treatments are widely recognized, and are of special concern when medication is prolonged over several years (4,12). Side effects of drugs may also discourage patient compliance with their prescribed treatment regimen (12). As a consequence there is a growing interest among the public and professional practitioners for health care programs that can either substitute for or complement standard conventional medicine without harmful side effects. This is reflected in 42% of adults reporting use of alternative medicine therapies in 1997 (13).

Maharishi Vedic Medicine is a comprehensive system of prevention-oriented natural medicine, based on the ancient Vedic approach to health—recently restored by Maharishi Mahesh Yogi, in collaboration with leading expert practitioners and scientists (2,15,22). It includes a wide breadth of clinical procedures applicable to the prevention and treatment of acute and chronic diseases, as well as health promotion (14,15). There has been extensive clinical research previously conducted on several modalities of Maharishi Vedic Medicine, including the Transcendental Meditation program (16–20).

The Maharishi Vedic Vibration Technology, a component of Maharishi Vedic Medicine, utilizes sounds, derived from the Veda and Vedic literature, to enliven the inner intelligence at the basis of the physiology (21). According to Nader, the 40 aspects of the Veda and Vedic literature are the laws of nature, the impulses of intelligence, that structure the human physiology (22). The structures and functions of the different aspects of the Vedic literature have been shown by Nader to have an exact correspondence with the structures and functions of the human physiology, leading to the conclusion that the human body is a replica of the Veda (22). When the sounds of these Vedic texts are applied in the Maharishi Vedic Vibration Technology program, the predicted effect is that of restoring the orderly functioning of specific
areas of the physiology while having a general positive effect on the body as a whole (21).

Previous research on the Maharishi Vedic Vibration Technology program was conducted by Nader and colleagues on 358 cases of chronic disorder in the categories of arthritis, back problems, headaches, digestive problems, asthma, and skin problems (21,23). The research was designed as a double-blind experiment. Significant percentage of improvement in the six categories of chronic disorder was found for experimental vs. placebo control conditions over one session.

The current study was conducted to further evaluate the effects of the Maharishi Vedic Vibration Technology on the quality of life of individuals suffering from chronic disorders. Quality of life refers to patients’ appraisal of and satisfaction with their current level of functioning compared to what is perceived to be ideal (24). Quality of life includes self-perception of one’s physical, functional, emotional, and social well-being (25). Subjective evaluations of health status have been found to significantly predict health care utilization and mortality due to chronic disease (26).

The specific objectives of the study were to assess: 1) percentage of improvement in chronic illness across a wide-range of categories; 2) change in frequency of discomfort or pain from chronic illness, intensity of discomfort, and the disabling effects of the discomfort in daily activity; 3) the extent to which change in the frequency and intensity of discomfort and the disabling effects of discomfort in daily activity contributed to subjects’ reported improvement in chronic illness; and 4) change in overall mental health status and vitality.

**Materials and Methods**

A total of 213 individuals with 352 cases of chronic disorders were studied in Fairfield, Iowa. The mean age of the subjects was 48.55 years (SD = 11.16), with a range of 11 to 86 years. Fifty-two percent of the subjects were female. The average length of time of chronic illness was 18.42 years and the average severity of illness was moderate (2.3 on a scale of 1 to 4).

Each subject participated in three sessions, lasting about 20 minutes per disorder, over an average of five days. The Maharishi Vedic Vibration Technology program was administered by trained experts who
have been specially instructed how to apply the sounds of the program from the field of pure consciousness, which has been described as the unified field of natural law (21,28). Using this technique of consciousness, the expert directs his or her attention towards the area or problem being addressed.

To assess the primary outcome of the study, all subjects were asked to report percentage of change in their specific chronic illness. Subjects responded to a test item, indicating percentage of improvement, immediately after their third session was completed.

A within-group design, with subjects serving as their own controls, was used to assess change in the secondary quality of life variables described below. Subjects were asked to fill out a three-question pain questionnaire, based on items from the Clinical Back Pain Questionnaire (27), at baseline and immediately after the last session. This questionnaire had a five-point Likert scale:

1. How often have you experienced discomfort or pain from your health disorder? (Not at all to Almost always)

2. Please rate the intensity of your discomfort or pain by circling the number that best describes your pain. (No discomfort at all to Severe discomfort)

3. Does the discomfort prevent you from carrying out your work/housework and other daily activities? (Not at all to Severely affected)

A subgroup of the study sample (n = 87 cases) volunteered to take the standardized Short-Form (SF)-36 mental health (five items) and vitality (four items) subscales at baseline and immediately after the last session. These quality of life subscales had a six-point Likert response set.

The primary outcome of the study, percentage of improvement in chronic illness, was reported in terms of the mean for all cases combined and for each category of chronic illness with 10 or more cases. Two-tailed paired t-tests were used for statistical analyses of all secondary outcomes. In addition, multiple regressions was used to determine the extent to which change in the frequency and intensity of discomfort and the disabling effects of discomfort in daily activity contributed to subjects’ reported improvement in chronic illness.
Results

The average reported improvement in chronic illness after three sessions of the Maharishi Vedic Vibration Technology program was 40.97 percent. An analysis of 10 categories (in which there were 10 or more cases) found that conditions related to neck pain improved the most (n = 16; average improvement of 51.25%), followed by respiratory ailments (n = 20; 48.00%), digestive problems (n = 71; 46.90%), mental health, including anxiety and depression (n = 64; 46.34%), arthritis (n = 23; 41.57%), insomnia (n = 21; 37.38%), back pain (n = 33; 36.32%), headaches and migraines (n = 12; 35.83%), cardiovascular conditions (n = 13, 22.31%), and eye problems (n = 16; 21.19%). All other categories combined (n = 59), with fewer than 10 cases per category, had an average reported improvement of 36.20% (figure 1). No significant relationships were found between percentage of improvement in chronic illness and either severity of illness or number of years having the illness.

Figure 1. Chronic disorders. Average percent improvement by disorder
Table 1.
Change in Frequency and Intensity of Discomfort, Disabling Effects in Daily Activity, Mental Health, and Vitality

<table>
<thead>
<tr>
<th>Factor</th>
<th>N</th>
<th>Pretest Mean±SD</th>
<th>Posttest Mean±SD</th>
<th>T-test</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Discomfort or Pain</td>
<td>254</td>
<td>3.81±1.13</td>
<td>2.85±1.14</td>
<td>13.37</td>
<td>.000001</td>
</tr>
<tr>
<td>Intensity of Discomfort or Pain</td>
<td>277</td>
<td>3.21±0.95</td>
<td>2.59±1.02</td>
<td>11.16</td>
<td>.000001</td>
</tr>
<tr>
<td>Disabling Effect in Activity</td>
<td>275</td>
<td>2.55±1.19</td>
<td>2.02±1.07</td>
<td>8.94</td>
<td>.000001</td>
</tr>
<tr>
<td>Mental Health</td>
<td>87</td>
<td>4.22±0.98</td>
<td>4.62±0.91</td>
<td>5.19</td>
<td>.000001</td>
</tr>
<tr>
<td>Vitality</td>
<td>87</td>
<td>3.32±1.11</td>
<td>3.75±1.00</td>
<td>4.02</td>
<td>.000125</td>
</tr>
</tbody>
</table>

Subjects also reported significant reductions in frequency of discomfort or pain from chronic illness (mean = -0.96, \( p < .000001 \)), intensity of discomfort or pain (mean = -0.62, \( p < .000001 \)), and the disabling effects of discomfort from chronic illness in daily activity (mean = -0.53, \( p < .000001 \)) over the three sessions (table 1). The effect size for reduction in frequency of discomfort was large (ES = -.85), the effect size for reduction in intensity of discomfort was moderate to large (ES = -.65), and the reduction in disabling effects in daily activity was moderate (ES = -.45).

Table 2 describes the association between these three discomfort variables and subjects’ reported percentage of improvement in chronic illness. In terms of all disorders, significant relationships were found between change in all three factors and percentage of improvement in chronic illness. The multiple correlation coefficient, indicating the overall contribution of the three variables to subjects’ reported improvement in chronic illness, was .336 (\( p < .001 \)). When considering only severe to very severe cases across all disorders, again all three factors were found to significantly correlate with percentage of improvement in chronic illness. The multiple correlation coefficient was .489 (\( p < .01 \)).
In terms of change in overall mental health and vitality, a significant improvement in both of these factors was found across all cases (table 1). For mental health there was an improvement of 0.40 (\( p < .000001 \)) and for vitality an increase of 0.43 (\( p < .000125 \)) was observed. The effect sizes for both mental health (ES = .41) and vitality (ES = .39) were in the moderate range.

**Table 2.**

**Contribution of Change in Frequency and Intensity of Discomfort and Disabling Effects in Activity to Subjects’ Reported Improvement in Chronic Illness**

<table>
<thead>
<tr>
<th>Disease Category</th>
<th>Change in Quality of Life Variable</th>
<th>Correlation With Global Improvement</th>
<th>Multiple Correlation, R</th>
</tr>
</thead>
<tbody>
<tr>
<td>All disorders (N=252)</td>
<td>Frequency</td>
<td>-.307 ***</td>
<td>.336 ***</td>
</tr>
<tr>
<td></td>
<td>Intensity</td>
<td>-.309 ***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Disabling effects</td>
<td>-.253 ***</td>
<td></td>
</tr>
<tr>
<td>All disorders:</td>
<td>Frequency</td>
<td>-.263 *</td>
<td>.489 **</td>
</tr>
<tr>
<td>Severe and very severe</td>
<td>Intensity</td>
<td>-.330 **</td>
<td></td>
</tr>
<tr>
<td>cases only (N=61)</td>
<td>Disabling effects</td>
<td>-.424 ***</td>
<td></td>
</tr>
</tbody>
</table>

* \( p < .05 \) ** \( p < .01 \) *** \( p < .001 \)

**Discussion**

The above findings suggest that the Maharishi Vedic Vibration Technology was effective in improving the short-term condition of subjects, suffering from a range of chronic illnesses. The average reported improvement in chronic illness was 41%. These results did not appear to be associated with duration of chronic illness or level of severity.

The results of this study are promising in that they show that individuals suffering from a wide-range of chronic disorders may achieve a substantial improvement in only three sessions of an innovative, nonpharmacological, natural medicine approach. The disorders which showed the most improvement included neck pain, respiratory ailments, digestive problems, mental health disorders, and arthritis. These categories demonstrated 40% or greater improvement. Other categories, which showed at least 35% improvement included insomnia, back pain, and headaches and migraines. Also, an average improvement of
36% was observed when all other disorders—which had fewer than 10 cases each—were combined. The finding that eight major categories of chronic disorders showed more than 35% improvement is consistent with the theory presented by Nader that the proper application of Vedic sounds can restore the orderly functioning of specific areas of the physiology (21,22).

The above findings, indicating substantial improvement in subjects’ chronic illness, are supported by more specific quality of life outcomes, showing improvement in physical, functional, and emotional well-being. Significant reductions were found in frequency and intensity of discomfort or pain and the disabling effects of discomfort from chronic illness in daily activity. Significant increases in mental health and vitality were also observed over three sessions. The improvements in mental health and vitality suggest a positive effect on the mind and body as a whole due to the Maharishi Vedic Vibration Technology program.

Additional findings of the study showed that change in all three discomfort variables—frequency of discomfort, intensity, and disabling effects in daily activity—appeared to significantly contribute to subjects’ reported improvement in chronic illness. Those subjects who tended to report the highest percentages of improvement also tended to report the largest decreases in frequency of discomfort, intensity of discomfort, and disabling effects of discomfort in daily activity. The same pattern of responses was observed when taking into account only those cases rated severe to very severe.

While an alternative explanation of the above results could include a placebo effect, Nader et al. in a series of double-blind placebo-controlled trials previously reported significant improvement in chronic disorders due to the Maharishi Vedic Vibration Technology compared to well-designed placebo controls (21,23). This suggests that the study results reported here are due to an active intervention rather than the prescribed program acting as a placebo.

Nader, Smith et al. discuss in detail several physical and physiological mechanisms for the effects of the Maharishi Vedic Vibration Technology (23). This theory is based upon principles from Maharishi Vedic Medicine, unified quantum field theories, and self organization. From the perspective of Maharishi Vedic Medicine, the body is the expression of fundamental laws of nature, or impulses of intelligence, which
not only underlie the structures and functions of all levels of the physiology—including cells, tissues, organs, and the whole physiology—but underlie and govern the orderly functioning of the entire universe. The unified basis of these laws is an unmanifest field of pure intelligence, or consciousness, referred to in modern quantum field theory as the unified field of natural law (22,28,29). It is proposed that the laws of nature emerging from this ‘unified field’ are first expressed in the physical universe as waves, whose subtle expression is available in the sounds of the 40 aspects of the Veda and Vedic literature (23). These subtle ‘vibrations,’ or sounds of the Veda and Vedic literature are applied to specific ‘disordered’ parts of the physiology to enliven the underlying intelligence of that part, thereby transforming a disorderly condition of bodily functioning into a more orderly one.

A further understanding of how this inner intelligence of the body can directly transform ‘disorder into order’ may be understood from self-organization and chaos theories. These theories are useful in explaining how a specific delicate impulse or stimulus, in the form of the sounds used in the Maharishi Vedic Vibration Technology program, is capable of producing a relatively instantaneous orderly change in the functioning of the physiology (23). This has been studied mathematically in autocatalytic cyclic reaction chains, whose dynamic patterns easily shift from chaos to order if one slightly varies specific control parameters (30). Related to the physiology, Freeman (31), for example, discovered that a faint stimulus of the receptor neurons in the nasal passages is sufficient to induce an orderly shift in the firing patterns of neurons.

Together, the above principles from Maharishi Vedic Medicine, quantum field theory, and self-organization theory help to broadly explain the underlying mechanics of how the Maharishi Vedic Vibration Technology program can effect rapid improvement in chronic illness conditions. Future research studies on Maharishi Vedic Vibration Technology can elucidate more detailed underlying mechanisms.

The following three examples of subjects’ experiences provide a narrative description of the effects of the Maharishi Vedic Vibration Technology program on chronic disorders:

I went into the Maharishi Vedic Vibration Technology consultation as a last resort, resigned to live with pain and numbness in the hips and thigh caused by a back injury. My first session was a wonderfully
nourishing and blissful experience that produced immediate results. And with the bliss came a life-giving energy, a dynamism that also had receded.... I feel happier and more a part of the pace of normal life (case #1).

I had consultations for three disorders: anxiety, insomnia, and depression. These were long-standing problems which interfered greatly with my quality of life. After the first session, I felt about 80 percent relief. I felt a profound change taking place in my body and mind, including a very clear experience of healing in my brain physiology. Since my consultation I have continued to enjoy relief of perhaps 60 to 70 percent. I am sleeping better, am far less anxious and depressed and, for the first time in a very long time, am experiencing happiness, peace and hope (case #2).

For the last two years, due to whiplash from an auto injury, I have experienced lack of mobility in my neck and the loss of functioning in my arm. On the first day of the Maharishi Vedic Vibration Technology consultation I felt a profound change. At the beginning of the session the injured arm and the area around the neck felt heavy, thick, and full of inertia, but during the session they became sweet, light, and comfortable (case #3).

These three examples illustrate the potential of the Maharishi Vedic Vibration Technology program to immediately relieve pain and restore balance to the affected part of the body (cases #1 and 3) and improve mental health (case #2).

The question of whether these short-term changes would persist over time is an important one when considering clinical applications. While this study was not designed to address this question, it is recommended that future studies on the Maharishi Vedic Vibration Technology program build into their protocols the evaluation of longer-term effects of this program. The use of physiological measures to assess objective change in specific chronic disorders would further advance the knowledge of the potential benefits of this program.

In view of the prevalence of chronic disorders, side effects of standard treatments, and the economic impact of treating these disorders, continuing research on new treatment approaches should be a high priority in the field of preventive medicine. Based upon the findings of this study and that of Nader, Smith et al. (23), the Maharishi Vedic
Vibration Technology program shows great promise in the improvement of chronic illness.

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References


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Putting It All Together—
Integrating the Mind, Body, and Environment
Approaches for Total Heart Health

Robert H. Schneider, M.D., F.A.C.C.
Jeremy Z. Fields, Ph.D.
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Dr. Schneider is a specialist in preventive medicine and clinical hypertension, and a Fellow of the American College of Cardiology. He did his postgraduate training in internal medicine and hypertension at the University of Michigan Medical School. Dr. Schneider has been invited to consult with government agencies and lecture at medical centers and professional societies on four continents on prevention-oriented natural medicine.

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Jeremy Z. Fields, Ph.D., has over 30 years of experience in biomedical research and in the field of evidence-based natural medicine. In addition, Dr. Fields has more than 20 years experience as a professional science writer and editor. He has held faculty positions at several medical schools and the Veterans Administration health care system. He has published extensively in biomedical research and prevention-oriented natural medicine. Dr. Fields is co-author of Total Heart Health: How to Prevent and Reverse Heart Disease with the Maharishi Vedic Approach to Health.
ABSTRACT
The three major approaches of the Maharishi Vedic Approach to Health for achieving complete heart health, include (1) the Mind Approach and the Transcendental Meditation program; (2) the Body Approach with Vedic diet, exercise, daily routine and seasonal routines, and physiological purification techniques; and (3) the Environment Approach that can be obtained using Vedic architecture, collective consciousness, the cycles and rhythms of nature, and Vedic sounds.

One can start the Total Heart Health program with any one of these approaches at any time. Scientific research and clinical experience have shown that all of the Vedic technologies recommended in this article are effective on their own and will contribute to better health. However, for those who prefer a more intensive approach or faster pace, using more than one of these approaches at the same time to prevent or reverse heart disease will bring results faster and with greater efficacy. Put simply, the more one does from different angles, the more benefits received from those angles. This is an additive effect. Moreover, when Mind, Body, and Environment Approaches are used in combination, the total effect on the heart is even greater than the sum of their individual effects. This is the power of synergy. This article presents the scientific research on the value of adopting a multifaceted approach for total heart health.

Introduction
Scientific research and clinical experience with thousands of participants has demonstrated that utilizing any one of the three approaches of the Maharishi Vedic Approach to Health will bring benefits to health and the health of the heart. Additional research and experience with patients has shown that using two or all three approaches will result in more complete benefits faster. Indeed, it is a major principle of the Maharishi Vedic Approach to Health that all three levels of influence—the mind, the body, and the environment—contribute to heart disease. Therefore, an ideal Total Heart Health program would incorporate modalities aimed at all three of these levels.

Many people who have followed the Total Heart Health program find that as they begin to experience a decrease in symptoms, they also experience more energy and vitality, and naturally want to accelerate their progress by doing more for their health. For many people, the
The centerpiece of their heart disease prevention and treatment program is the Transcendental Meditation technique. This unique form of meditation has holistic benefits not only for the mind, but also for the body and environment. All three approaches are complementary to modern medical care, but everyone always consult one’s physician or healthcare provider before making any changes in one’s conventional medical care.

The Benefits of Using More than One Approach

One of the most persuasive studies on the increased benefit of simultaneously using multiple approaches of the Total Heart Health program was conducted recently at St. Joseph’s Hospital and Health Center in Chicago, in collaboration with our team at the Institute for Natural Medicine and Prevention at Maharishi University of Management. The surprising results were published in the *American Journal of Cardiology*. In this randomized-controlled clinical trial, fifty-seven men and women over age sixty-five, who were normally healthy, were assigned to one of three groups. All groups were matched at baseline for similarity of cardiovascular risk factors.

One group followed both the Mind and Body Approaches of the Total Heart Health program. The specific techniques included the Transcendental Meditation program, Vedic diet and exercise, and the herbal antioxidant supplement *Maharishi Amrit Kalash*. The second group followed a conventional heart disease prevention program designed to provide advice that mainstream doctors in the community give their heart patients. This comparison program involved attending health-education classes, maintaining a low-fat diet, engaging in aerobic exercise, and taking a conventional multivitamin and mineral supplement. The third group continued their usual health care with their conventional doctors with no extra treatment program. All the men and women continued with their usual medical care of medications and/or other recommendations provided by their conventional physicians. Subjects were randomly assigned to their respective programs (thus avoiding self-selection bias). The participants followed their programs for one year.

Before each participant began the program, researchers measured the extent of atherosclerosis present in the carotid artery of each person using a high-resolution ultrasound technique known as ultrasonogra-
The thickness of the wall of the carotid artery in the neck has been found to be an accurate predictor of risk for future heart attack and stroke. After one year of home-based participation, forty-six of the participants returned for retesting.

What did researchers find? In the group using the Total Heart Health program’s Mind and Body Approaches, there was a reduction in the thickness of the artery wall, which corresponds to a 10 percent reduction in the probability of future heart disease compared with the controls. Yet, surprisingly, those participants who were at highest risk for heart disease—that is, those who already had one or more of the conventional risk factors for heart disease (hypertension, high cholesterol, obesity, diabetes, and cigarette addiction)—exhibited a reduction in atherosclerosis, which corresponds to a 33 percent decrease on average in the risk for future heart attacks or strokes compared with the other groups. This outcome was greater than the effects reported in other studies using several cholesterol-lowering and blood-pressure-lowering medications, or with practicing the Transcendental Meditation program alone.

In addition, in the Total Heart Health program group, there was more than 80 percent compliance. In the group following the conventional medical recommendations, there was an average of 54 percent compliance. This means that most people in the Total Heart Health program group found their program easier to stick with than the dietary restrictions and exercise programs traditionally recommended for heart disease prevention. And finally, in the Total Heart Health program group, 80 percent of all subjects and 100 percent of high-risk individuals (defined above) showed a regression in atherosclerosis.

What are the implications of these findings? The results suggest that when two or more approaches of the Total Heart Health program are used together, they do indeed have a synergistic effect that stimulates the body’s own self-repair and balancing mechanisms to a greater extent than is predicted by adding their individual effects. The result is a healthier cardiovascular system and more effective prevention of heart disease than is typically found with conventional medical approaches to heart disease.

A study conducted by Dr. David Orme-Johnson and colleagues at Maharishi University of Management also reinforced the idea of
extra benefits from using multiple approaches of the Maharishi Vedic Approach to Health to prevent heart disease. The results were published in the *American Journal of Managed Care*. In this research, nearly 700 normally healthy individuals who selected their own modalities from among the three approaches of the Maharishi Vedic Approach to Health were studied. Their choice of modalities included the Transcendental Meditation and TM-Sidhi programs, Vedic diet, Vedic exercise, daily and seasonal routines, herbal supplements, physiological purification procedures, and techniques from the Environment Approach.

Researchers analyzed data for these men and women, and compared their healthcare utilization patterns to those of 4,000 normally healthy control subjects matched for age, geographical location, and occupation. (Subjects in both groups were faculty and staff at Midwestern universities.) Comparisons were also made to norms determined for 600,000 subjects whose data were accumulated in an insurance company database over an eleven-year period. The researchers observed that those using multiple modalities of the Maharishi Vedic Approach to Health, on average, showed about 60 percent lower rates of medical-care utilization than the control subjects. Hospital admission rates for cardiovascular disease were more than ten times lower than for the control group. The greatest reductions were seen for participants older than age forty-five.

Two additional studies were published by Professor Tony Nader, Dr. Stuart Rothenberg, and colleagues in collaboration with the Institute for Natural Medicine and Prevention that reached a similar conclusion about the effects of combining approaches used in the Total Heart Health program. In both studies, the participants had long-standing, difficult-to-treat chronic diseases. Each of these studies presented outcomes from a series of patients with difficult-to-treat chronic disorders. The number of cases was not large, nor were the studies randomized, controlled clinical trials, as were the earlier studies mentioned. However, the results were encouraging.

Patients in these studies participated in in-residence physiological purification programs, practiced the Transcendental Meditation and advanced TM-Sidhi programs, followed Vedic diets, exercise and daily routines, used multiple herbal preparations, learned self-pulse diagnosis, utilized Maharishi Vedic Sound therapies, and Vedic engineering
INTEGRATING THE MIND, BODY, AND ENVIRONMENT APPROACHES

procedures. After leaving the in-residence program, subjects continued with home programs of meditation, diet, exercise, and herbal supplements. Some incorporated Maharishi Vedic Architecture into their homes and continued their participation in Maharishi Vedic Astrology and Vedic engineering programs.

Using standard clinical measures for their respective disorders such as office blood-pressure measurements, blood glucose and hemoglobin A1C (for diabetes), standard tests by their neurologists for Parkinson’s disease and multiple sclerosis, and others, the results showed improvements in symptoms and objective measures of advanced hypertension, diabetes, Parkinson’s disease, multiple sclerosis, chronic back pain, and obesity. Many of these results were remarkable. One patient who had experienced kidney damage decades earlier was put on antihypertensive medications, and was told that she would have to be on these medications for life. However, by the end of the in-residence portion of the program, she was able to be tapered off the medications and maintain normal blood pressure.

Many inferences can be drawn from these studies. But the most important finding is the consistency and effectiveness with which those who used multiple approaches of the Total Heart Health program were able to tap into the body’s own healing mechanisms, an accomplishment that resulted in disease prevention or chronic disease regression in extraordinary ways.

A Vision of Total Heart Health

The Total Heart Health program with its multifaceted Mind, Body, and Environment Approaches gives the foundation for developing and maintaining total heart health to live a longer, happier, more vibrant life. Because all three approaches operate at the basis of everyone’s physiology, at the level of the unified field of natural law, each technique within these categories—be it mental, physical, or environmental—will have profound effects on the entire physiology.

The Mind Approach offers the Transcendental Meditation program with its holistic benefits of reducing stress, a major contributing factor in heart disease and most illnesses, while promoting the health of both the mind and body. Physiological research has shown that practicing the Transcendental Meditation program develops orderliness of brain...
functioning, simultaneously lowers stress hormone levels, blood pressure, lipid levels, and smoking, and slows or reverses atherosclerosis, heart disease, and biological aging. This is all due to regularly experiencing the fourth state of consciousness, transcendental consciousness, which enlivens the body’s own inner intelligence.

The Body Approach restores balance at the quantum mechanical level of the physiology as described thousands of years ago by ancient Vedic texts and confirmed by modern science. This approach uses diet, herbal and nutritional supplements, exercise, daily and seasonal routines, and physiological purification procedures. Scientific research on these techniques has shown that they elicit holistic improvements in mental and physical health, including the prevention and treatment of heart disease and its major risk factors. Modern medicine has corroborated the value of a diet high in fruits and vegetables, whole grains, and healthy fats, as recommended by the Total Heart Health program, in large studies that demonstrated less cardiovascular disease and mortality with this type of diet. Studies of Maharishi Vedic herbal preparations indicate that they are among the most powerful antioxidants known to modern science, which helps to explain their potent effects on restoring physiological balance.

The Environment Approach addresses the effects of your one’s and workplace, the surrounding collective consciousness around you, and the influences of cycles and rhythms of nature associated with the sun, moon, stars, and planets. Maharishi Vedic Architecture, the Maharishi Effect (on collective consciousness), Maharishi Vedic Astrology and Vedic engineering, and Maharishi Vedic Sound programs all help to strengthen the connection of the individual’s physiology with the unified field of natural law that governs the structures and functions of the entire universe around us. Scientific research and extensive clinical experience with these modalities has demonstrated lower rates of heart disease and other chronic disorders in individuals living in buildings designed according to principles of healthy architecture; rapid reductions in symptoms of heart disease and others chronic conditions with the application of Vedic sound therapies; and reduced stress, warfare, and sickness in society when a small group of people reduce their own stress and radiate coherence through the field effect of consciousness.

Finally, when the three approaches of the Total Heart Health pro-
gram are used together, their effects are more than additive—they are multiplied. The more one does, the more one benefit. Studies have shown major reversals of heart disease, as well as other serious chronic diseases, when the Mind, Body, and Environment Approaches are used together. This is due to the infinite organizing and healing power of one’s inner intelligence made accessible through these approaches. Yet, no matter whether one chooses to take advantage of one, two, or all three approaches or selected modalities within these categories, one will experience major benefits. These approaches take different angles with the same end result, which is to remind the body what it is really like to operate as it was meant to, in tune with the intelligence of the universe. This is what truly prevents and reverses heart disease without harmful side effects and with only positive side benefits.

One’s innate growth toward total health will be reflected in the society in which one lives and in the world in which one exists. A natural byproduct of stress-free, healthy individuals is a stress-free, healthy world. This is the ultimate purpose and promise of the Maharishi Vedic Approach to Health and the Total Heart Health program: the unfoldment of the full potential of every individual and the creation of a world that is disease-free and problem-free, without suffering, a world that is healthy, harmonious, and peaceful.

This article, “Putting It All Together—Integrating the Mind, Body, and Environment, Approaches for Total Heart Health,” revised/updated, and reprinted here with permission, was originally published as an Epilogue in Total Heart Health: How to Prevent and Reverse Heart Disease with the Maharishi Vedic Approach to Health, Robert H. Schneider and Jeremy Z. Fields. Laguna Beach, CA: Basic Health Publicaitons, 2006.
Part IV

Appendices
Modern Science and *Vedic Science*:

An Introduction

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ABOUT THE AUTHOR

Kenneth Chandler holds a Ph.D. in Philosophy from the University of Texas at Austin. He served as Head of the Department of the Science of Creative Intelligence at Maharishi International University (today, Maharishi University of Management). Dr. Chandler continues his research into consciousness and is currently at work on a book on descriptions of the experience of transcending and pure consciousness in the mainstream classics of philosophy, science, religion, and the arts. It will be a three-volume set covering from the Vedic tradition to the present.
(The following article served as the Introduction to the inaugural issue of the journal *Modern Science and Vedic Science*.)

**Modern Science and *Vedic Science*: An Introduction**

This journal (*Modern Science and Vedic Science*) provides a forum for research on the forefront of mankind’s expanding knowledge of the universe. It is devoted to exploration of the unified field of all the laws of nature through the combined approaches of modern science and ancient Vedic science, as brought to light by Maharishi Mahesh Yogi. The identification of the unified field by modern physics is only the first glimpse of a new area of investigation that underlies all disciplines of knowledge, and which can be explored not only through objective science but through a new technology of consciousness developed by Maharishi.

The unified field is now beginning to be understood through modern physics as the unified source of the entire universe, as a unified state of all the laws of nature from which all force and matter fields sequentially emerge according to exact dynamical principles. As each science and each academic discipline progresses to uncover its own most basic laws and foundational principles, each is beginning to discover that the roots of these laws and principles can be traced to the unified field.

This journal recognizes a new method of gaining knowledge of the unified field that combines the approach of the modern sciences with that of the most ancient of sciences, the ancient tradition of Vedic science. Many thousands of years ago, the seers of the Himalayas discovered, through exploration of their silent levels of awareness, a unified field where all the laws of nature are found together in a state of wholeness. This unity of nature was directly experienced to be a self-referral state of consciousness which is unbounded, all-pervading, unchanging, and the self-sufficient source of all existing things. They experienced and gave expression to the self-interacting dynamics through which this unified field sequentially gives rise to the diversity of all laws of nature. That experience is expressed in the ancient Vedic literature.
In our own time, Maharishi has brought to light the knowledge of this ancient science and integrated it with the modern sciences in such a way that Vedic science and modern science are now seen as complementary methods of gaining knowledge of the same reality—the unified field of all the laws of nature. The knowledge of this ancient science that Maharishi has brought to light is known as Maharishi Vedic Science.

Maharishi Vedic Science is to be understood, first of all, as a reliable method of gaining knowledge, as a science in the most complete sense of the term. It relies upon experience as the sole basis of knowledge, not experience gained through the senses only, but experience gained when the mind, becoming completely quiet, is identified with the unified field. This method, examined in relation to the modern sciences, proves to be an effective means of exploring the unified field of all the laws of nature. On the basis of this method, complete knowledge of the unified field becomes possible. It is possible to know the unified field both subjectively on the level of direct experience through exploration of consciousness and objectively through the investigative methods of modern science. Maharishi Vedic Science gives complete knowledge of consciousness, or the knower, complete knowledge of the object known, and complete knowledge of the process of knowing. In knowing the unified field, all three—knower, known, and process of knowing—are united in a single unified state of knowledge in which the three are one and the same.

Maharishi has developed and made available a technology for the systematic exploration of the unified field. This technology is a means by which anyone can gain access to the unified field and explore it through experience of the simplest and most unified state of consciousness. As this domain of experience becomes universally accessible, the unified field becomes available as a direct experience that is a basis for universal knowledge. The technology for gaining access to the unified field is called the Transcendental Meditation technique and its advanced programs, and the science based on this experience, which links modern science and Maharishi Vedic Science in a single unified body of knowledge, is called the Science of Creative Intelligence.

Maharishi is deeply committed to applying the knowledge and technology of the unified field for the practical benefit of life. He has
developed programs to apply this knowledge to every major area of human concern, including the fields of health, education, rehabilitation, and world peace. These applications of Maharishi’s technologies of consciousness have laid it open to empirical verification and demonstrated its practical benefit to mankind. Hundreds of scientific studies have already established its usefulness. From these results, it is clear that Maharishi’s technologies of consciousness are far more beneficial than technologies based on present day empirical science; they promise to reduce and even eliminate war, terrorism, crime, ill health, and all forms of human suffering.

These technologies, which are the applied value of Maharishi Vedic Science, represent a great advance in methods for gaining knowledge. Past science was based on a limited range of knowledge gained through the senses. This new technology opens to mankind a domain of experience of a deeper and more far-reaching import. It places within our grasp a new source of discovery of laws of nature that far exceeds the methods of modern science, yet remains complementary to these methods.

Modern science and Maharishi Vedic Science, explored together, constitute a radically new frontier of knowledge in the contemporary world, opening out vistas of what it is possible for mankind to know and to achieve, which extend far beyond present conceptions, and which demand a re-evaluation of current paradigms of reality and a reassessment of old conceptions of the sources and limits of human knowledge.

This introductory essay will provide a preliminary understanding of what the unified field is, what Maharishi Vedic Science is, and how Maharishi Vedic Science and modern science are related. It also defines fundamental concepts and terminology that will be frequently used in this journal and surveys the practical applications of this new technology. We begin with a description of the unified field as understood in modern science.

The Unified Field of Modern Science
Within the last few years, modern theoretical physics has identified and mathematically described a unified field at the basis of all observable states of physical nature. Einstein’s hope of finding a unified field theory to unite the electromagnetic, gravitational, and other known
force fields has now been virtually realized in the form of unified quantum field theories. Instead of having several irreducible and distinct force fields, physics can now mathematically derive all four known force fields from a single supersymmetric field located at the Planck scale ($10^{-33}$ cm or $10^{-43}$ sec.), the most fundamental time-distance scale in nature. This field constitutes an unbounded continuum of non-changing unity pervading the entire universe. All matter and energy in the universe are now understood to be just excitations of this one, all-pervading field.

Physics now has the capacity to describe accurately the sequence by which the unified field of natural law systematically gives rise, through its own self-interacting dynamics, to the diverse force and matter fields that constitute the universe. With a precision almost undreamed of a few years ago, the modern science of cosmology can now account for the exact sequence of dynamical symmetry breaking by which the unified field, the singularity at the moment of cosmogenesis, sequentially gave rise to the diverse force fields and matter fields. It is now possible to determine the time and sequence in which each force and matter field decoupled from the unified field, often to within a precision of minute fractions of a second. This gives us a clear understanding of how all aspects of the physical universe emerge from the unified field of natural law.

Mathematics, physiology, and other sciences have also located a unified source and basis of all the laws of nature in their respective disciplines. In mathematics, the foundational area of set theory provides an account of the sequential emergence of all of mathematics out of the single concept of a set and the relationship of set membership. The iterative mechanics of set formation at the foundation of set theory directly present the mechanics of an underlying unified field of intelligence that is self-sufficient, self-referral, and infinitely dynamic in its nature. Investigations into the foundations of set theory are ultimately investigations of this unified field of intelligence from which all diversity of the discipline emerge in a rigorous and sequential fashion. In physiology, it is the DNA molecule that contains, either explicitly or implicitly, the information specifying all structures and functions of the individual physiology. In this sense, therefore, it is DNA that unifies the discipline by serving as a unified source to which the diversity of physiological functioning can be traced.
Each of the modern sciences may indeed be said to have glimpsed a unified state of complete knowledge in which all laws of nature are contained in seed form. Each has gained some knowledge of how the unified field of natural law sequentially unfolds into the diverse expressions of natural law constituting its field of study. Modern science is now discovering and exploring the fundamental unity of all laws of nature.

**Maharishi Vedic Science**

Maharishi Vedic Science is based upon the ancient Vedic tradition of gaining knowledge through exploration of consciousness, developed by the great masters in the Himalayas who first expressed this knowledge and passed it on over many thousands of years in what is now the oldest continuous tradition of knowledge in existence. Maharishi’s work in founding Maharishi Vedic Science is very much steeped in that ancient tradition, but his work is also very much imbued with the spirit of modern science and shares its commitment to direct experience and empirical testing as the foundation and criterion of all knowledge. For this reason, and other reasons to be considered below, it is also appropriately called a science. The name “Maharishi Vedic Science” thus indicates both the ancient traditional origins of this body of knowledge and the modern commitment to experience, system, testability, and the demand that knowledge be useful in improving the quality of human life.

The founders of the ancient Vedic tradition discovered the capability of the human mind to settle into a state of deep silence while remaining awake, and therein to experience a completely unified, simple, and unbounded state of awareness, called pure consciousness, which is quite distinct from our ordinary waking, sleeping, or dreaming states of consciousness. In that deep silence, they discovered the capability of the mind to become identified with a boundless, all-pervading, unified field that is experienced as an eternal continuum underlying all existence. They gave expression to the self-sufficient, infinitely dynamic, self-interacting qualities of this unified state of awareness; and they articulated the dynamics by which it sequentially gives rise, through its own self-interacting dynamics, to the field of space-time geometry, and subsequently to all the distinct forms and phenomena that constitute the universe. They perceived the fine fabric of activity, as Maharishi explains it, through which this unity of pure consciousness, in the pro-
cess of knowing itself, gives rise sequentially to the diversity of natural law and ultimately to the whole of nature.

This experience was not, Maharishi asserts, on the level of thinking, or theoretical conjecture, or imagination, but on the level of direct experience, which is more vivid, distinct, clear, and orderly than sensory experience, perhaps much in the same way that Newton or Einstein, when they discovered the laws of universal gravitation or special relativity, enjoyed a vivid experience of sudden understanding or a kind of direct “insight” into these laws. The experience of the unified field of all the laws of nature appears to be a direct experience of this sort, except that it includes all laws of nature at one time as a unified totality at the basis of all existence—an experience obviously far outside the range of average waking state experience.

The ancient Vedic literature, as Maharishi interprets it, expresses, in the sequence of its flow and the structure of its organization, the sequence of the unfoldment of the diversity of all laws of nature out of the unified field of natural law. The Veda is thus to be understood as the sequential flow of this process of the oneness of pure consciousness giving rise to diversity; and Maharishi Vedic Science is to be understood as a body of knowledge based on the direct experience of the sequential unfoldment of the unified field into the diversity of nature. It is an account, according to Maharishi, of the origin of the universe from the unified field of natural law, an account that is open to verification through direct experience, and is thus to be understood as a systematic science.

These ancient seers of the Vedic tradition developed techniques to refine the human physiology so that it can produce this level of experience, techniques that were passed on over many generations, but were eventually lost. Maharishi’s revival and reinterpretation of ancient Vedic science is based on his revival of these techniques which have now been made widely accessible through the training of thousands of teachers of the Transcendental Meditation program. He has thus provided a reliable method of access to this field of direct experience where the oneness of pure consciousness gives rise to the diversity of the laws of nature; and he has also developed applications of this technology that render it open to experimental testing. These applications will be considered below.
Maharishi describes the experience of this unified field of consciousness as an experience of a completely unchanging, unbounded unity of consciousness, silently awake within itself. Gaining intimate familiarity with the silence of pure consciousness, Maharishi holds, one gains the ability to experience within that silence an eternal “fabric” or “blueprint” of all laws of nature that govern the universe, existing at the unmanifest basis of all existence. This unmanifest basis of life, where all laws of nature eternally reside in a collected unity, is experienced as the fabric of the silent field of consciousness itself, which is not in space and time, but lies at the unmanifest basis of all manifest activity in space and time. Through Maharishi’s work, this experience comes to be understood (as we see below) as a normal state of consciousness that arises in the natural course of human development.

Glimpses of this universal domain of experience, where all possibilities reside together in an eternally unified state, have been reported in almost every culture and historical epoch, from Plato to Plotinus and Augustine, and from Leibniz to Hegel and Whitehead. Scientists like Kepler, Descartes, Cantor, and Einstein also appear to have written of it and seemingly drew their insights into the laws of nature from this experience. Descartes (1908) writes, for example, of an experience that he had as a young man of “penetrating to the very heart of the kingdom of knowledge” and there comprehending all the sciences, not in sequence, but “all at once.” Scientists and writers from many traditions have described this experience of unity, which confirms that it is completely universal, and not a product of a particular cultural tradition. Just as the Vedic tradition has been misunderstood, however, so have those descriptions of consciousness found in these different cultural traditions; for without a technique that makes the experience systematically accessible to everyone, the understanding that this is a universal experience of the most fundamental level of nature’s activity has been obscured, and has not before now emerged into the light of universal science.

According to Maharishi Vedic Science, it is not only possible to gain direct experience of the unity of natural law at the basis of the manifest universe, but one can also directly experience the unity of nature sequentially giving rise to the diversity of natural law through its own self-interacting dynamics. Maharishi’s most recent research has
centered on delving deeply into the analysis of these self-interacting dynamics of consciousness.

**The Self-Interacting Dynamics of Consciousness**

When one gains the capability, through practice of the Transcendental Meditation technique, of remaining awake while becoming perfectly settled and still, one gains the ability to experience a completely simple, unified, undifferentiated, self-referral state of pure consciousness, which is called Saṁhitā in the Vedic literature, in which knower, known, and process of knowing are one and the same. Consciousness is simply awake to itself, knowing its own nature as simple, unified pure consciousness. Yet in knowing itself, the state of pure consciousness creates an intellectually conceived distinction between itself as knower, itself as known, and itself as process of knowing. In Vedic literature, this is reflected in the distinction between Ērishi (knower), Devatā (process of knowing), and Chhanda (object of knowledge). According to Maharishi, from the various interactions and transformations of these three intellectually conceived values in the unified state of pure consciousness, all diverse forms of knowledge, all diverse laws of nature, and ultimately all diversity in material nature itself sequentially emerge.

The conscious mind, awake at this totally settled and still level of awareness, can witness the mechanics by which this diversification of the many out of the unity of pure consciousness takes place. The mechanics of Ērishi, Devatā, and Chhanda transforming themselves into Saṁhitā, Saṁhitā transforming itself into Ērishi, Devatā, and Chhanda, and Ērishi, Devatā, and Chhanda transforming themselves into each other are the mechanics by which the unity of pure consciousness gives rise to the diversity of natural law. These mechanics are expressed in the sequential unfoldment of Vedic literature. These are the self-interacting dynamics of consciousness knowing itself, which, Maharishi asserts, sequentially give rise to all diversity in nature.

Maharishi (1986) describes this self-referral state of consciousness as the basis of all creative processes in nature:

This self-referral state of consciousness is that one element in nature on the ground of which the infinite variety of creation is continuously emerging, growing, and dissolving. The whole field of change emerges from this field of non-change, from this self-referral, immortal state of
consciousness. The interaction of the different intellectually conceived components of this unified self-referral state of consciousness is that all-powerful activity at the most elementary level of nature. That activity is responsible for the innumerable varieties of life in the world, the innumerable streams of intelligence in creation. (pp. 25–26)

The Structure of Maharishi Vedic Science
One of Maharishi’s most important contributions to Vedic scholarship has been his discovery of the Apaurusheya Bhashyā, the “uncreated commentary” of the Rk Veda, which brings to light the dynamics by which the Veda emerges sequentially from the self-interacting dynamics of consciousness. According to Maharishi’s analysis, the Veda unfolds through its own commentary on itself, through the sequential unfoldment, in different-sized packets of knowledge, of its own knowledge of itself. All knowledge of the Veda is contained implicitly even in the first syllable “Ak” of the Rk Veda, and each subsequent expression of knowledge elaborates the meaning inherent in that packet of knowledge through an expanded commentary. The phonology of that syllable, as analyzed by Maharishi, expresses the self-interacting dynamics of consciousness knowing itself. As pure consciousness interacts with itself, at every stage of creation a new level of wholeness emerges to express the same self-interacting dynamics of Rishi, Devatā, and Chhandas.

Thus the body of Vedic literature reflects, in its very organization and structure, the sequential emergence of all structures of natural law from the unity of pure consciousness. Each unit of Vedic literature—Rk Veda, Sāma Veda, Yajur-Veda, Atharva Veda, Upanishad, Āraṇyakas, Brāhmaṇa, Vedāṅga, Upāṅga, Itihās, Purāṇ, Smṛiti, and Upaveda—expresses one aspect or level of the process. As Maharishi (1986) describes it:

The whole of Vedic literature is beautifully organized in its sequential development to present complete knowledge of the reality at the unmanifest basis of creation and complete knowledge of all of its manifest values. (p. 28)

Veda, Maharishi asserts, is the self-interaction of consciousness that ultimately gives rise to the diversity of nature. The diversity of creation sequentially unfolding from the unity of consciousness is the result of
distinctions being created within the wholeness of consciousness, as consciousness knows itself. Thus from the perspective of Maharishi Vedic Science, the entire universe is just an expression of consciousness moving within itself: All activity in nature is just activity within the unchanging continuum of the wholeness of consciousness.

Through the texts of ancient Vedic science, as interpreted by Maharishi, we possess a rich account of the emergence of diversity out of the unity of natural law. On the basis of this account, it becomes feasible to compare the Vedic description of the origin of the universe with that of the modern sciences.

**Modern Science and Maharishi Vedic Science**

When Maharishi heard from major scientists of the recent advances of unified field theory in physics, he asserted that modern science had glimpsed the unified field described in ancient Vedic science. “The knowledge of the unified field,” he said (1986, p. 29), “has been discovered by modern science during just the last few years, but the complete knowledge of the unified field has always been available in the Vedic literature.” Modern science, he proposed, had now arrived at the edge of comprehending, through unified quantum field theories, what Vedic science had described on the basis of exploration of the least excited state of consciousness since ancient times: that all diversity in nature sequentially emerges from a unified source through a precise self-interacting dynamics. Modern experimental science and Maharishi Vedic Science could now be seen as two diverse yet mutually complementary approaches to knowing the same underlying reality—one through the empirical method, the other through the exploration of the least excited state of consciousness. Through Maharishi’s inspiration, this has become a major research program that has engaged the attention of many scientists and that has yielded very rich results.

Over the past decade, Maharishi has participated in numerous symposia with major scientists on the theme of exploring modern science and Vedic science to discover detailed structural similarities in their descriptions of the unified field. These symposia have attracted eminent unified field theorists, mathematicians, and physiologists, including a number of Nobel laureates, as well as many of the most highly recognized Pandits of the Vedic tradition. Out of these interactions has come
a meeting of two traditions, East and West, on the ground of their common theme: the investigation of the unified field. Those who have followed these symposia have recognized a deep and impressive structure of knowledge common to both traditions. Both identify a boundless, all-pervading field underlying all states of matter and energy in the universe; both locate it on the most fundamental time-distance scale of nature; both assign to it the same properties of self-sufficiency, self-interaction, infinite dynamism, unboundedness, and unity, among many other common attributes; both identify a threefold structure at the basis of all nature; and both describe a dynamics by which the diversity of nature sequentially emerges from this unified field according to precise laws. The result of these symposia has been that many scientists, following Maharishi’s lead, now feel confident to assert that the unified field described by physics and the unified field of consciousness described by Vedic science are one and the same.

In the first issue of *Modern Science and Vedic Science*, the lead article by John Hagelin explored many of the deep connections between contemporary unified field theory in physics and Maharishi Vedic Science from the standpoint of an active field theorist. His work brought these two diverse methods of inquiry into close relation, drawing upon both the latest developments of unified field theories and the direct experience of the unified field.

Dr. Hagelin presented evidence for Maharishi’s assertion that the unified field of consciousness and the unified field of physics are the same. His main empirical evidence for this new paradigm was drawn from experimental research in the social sciences on the “Maharishi Effect”—the measurable effects on society resulting from the practice of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying. As further evidence for the identity of consciousness and the unified field, he cited deep parallels between the descriptions of the unified field found in physics and Maharishi Vedic Science. These strikingly similar descriptions support the conclusion that modern science and Maharishi Vedic Science are two complementary methods of approach to the same underlying unity of nature.
The New Paradigm of the Unity of Nature

It is a common belief that the unified field of physics is an objective reality of nature and that consciousness is a subjective experience, and that the two belong, consequently, to different categories of existence. According to this understanding, one is purely material, the other is purely mental, and the two cannot, therefore, be equated.

Through the experience of pure consciousness described in Maharishi Vedic Science, that unified level of intelligence is experienced, not as a mere subjective and localized phenomenon of thought or sensation, but as a non-changing, unbounded field of Being, pervading all forms and phenomena in the universe on a non-active, silent, unmanifest level. Objective and subjective aspects of nature are seen as but two manifest modes of this unified field at the unmanifest basis of existence. A thorough examination of the nature of the unified field in physics and the descriptions of unbounded consciousness brought to light by Maharishi support the thesis that they are but two complementary modes of apprehending a single underlying reality.

The view of nature as consisting of billiard-ball-type objects, each separate, discrete, and isolated from the other, belongs to the old classical Newtonian view of the world. Quantum field theory in modern physics no longer views nature in this way, but provides a new understanding in which the primary reality is that of quantum fields. All forms of matter and energy are understood to be excitations of these underlying fields. In the last year and a half, the apparently different fields of gravity, electromagnetism, and the weak and strong interactions have been theoretically unified as different levels of expression of one single underlying field. All forms and phenomena in the universe are just modes of vibratory excitation of this one all-pervading unified field.

Today, the success of modern physics in unifying our understanding of physical nature is mirrored in the success of Maharishi Vedic Science in unifying our understanding of consciousness. When the unbounded level of pure consciousness is gained as a direct experience, all activity in nature is experienced as an excited state of that one all-pervading field. Since quantum field theory also describes all activity in the universe as excitations of one underlying field, the simplest interpretation is that there is a single unified field which can be known both
through direct experience and through the objective sciences. In this new understanding of the unity of nature, mind and matter cease to be viewed as ultimately different and come to be seen as expressions of a deeper unity of unbounded consciousness.

The unity of nature is not merely a hypothetical unity, nor a unity of intellectual understanding or interpretation. It is a unity of direct experience that has been described in almost every tradition and every historical epoch. Maharishi Vedic Science only brings to light what has been the experience of many of the greatest minds throughout history. What is radically new is that Maharishi has provided a systematic and reliable method by which anyone can gain access to this level of experience. This method of access is the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying.

The Transcendental Meditation and TM–Sidhi Programs, including Yogic Flying

The Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, have been introduced by Maharishi as an effective means for opening the unified field to all as a direct experience. In this way, the unified field becomes universally accessible to systematic exploration.

The key component of these programs is the Transcendental Meditation technique, which provides a systematic procedure by which the mind is allowed to settle naturally into a state of restful alertness, the self-referral state of pure consciousness, in which the mind is completely silent and yet awake. In this way, the state of pure consciousness, which has been the subject of philosophical speculation throughout the centuries, can now be investigated on the basis of direct experience. Maharishi’s immensely important contribution to the clarification and elucidation of this experience of pure consciousness will be a theme for analysis in future issues of this journal.

This quiet, still level of consciousness has rarely been experienced in the past because no systematic and effective technique has been available for providing that experience. The Transcendental Meditation technique is a simple, natural, and effortless procedure for allowing the awareness to settle into a state of deep silence while remaining awake. It has proved to be uniquely effective in making this level of experience widely accessible. Through the deep rest gained during the
practice of the technique, balance is systematically created on all levels of physiological functioning, and the nervous system is habituated to a more settled, coherent, and alert style of functioning. In time, a state of completely integrated functioning is gained, in which pure consciousness is spontaneously and permanently maintained. Once this state is established, the silent, self-referral field of awareness is always present as a stable, non-changing ground underlying all changing states of awareness. This integrated state of consciousness, Maharishi holds, is the basis of all excellence in life and provides the foundation for the further development of higher states of consciousness through the practice of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying.

**Maharishi’s Programs for the Development of Higher States of Consciousness**

The ultimate purpose of all aspects of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, and Vedic Science is the development of consciousness, the unfoldment of the full human potential to live life in enlightenment. Enlightenment is that fully developed state of life in which one enjoys complete knowledge and lives in total fulfillment. In this state, one lives in harmony with all the laws of nature, enjoying the full support of natural law to achieve any desire without making mistakes.

Maharishi has identified a specific sequence of higher states of consciousness, each distinct from waking, dreaming, and sleeping, which, he asserts, arise in the normal full course of human development. Each state of consciousness unfolds on the basis of a concrete shift in the mode of the individual’s neurophysiological functioning. These states can be distinguished from waking, dreaming, and sleeping on the basis of their distinct physiological correlates. The higher states of consciousness that arise in this developmental sequence are, Maharishi asserts, a source of greater joy, knowledge, and fulfillment than ordinary waking state life.

The attainment of these higher states of consciousness is the basis for fully understanding and applying the theoretical assertions of Maharishi Vedic Science. Maharishi Vedic Science is just the exposition of the full range of direct experience that unfolds during the course of the natural
development of human consciousness. These states of consciousness are universal stages of human development accessible to everyone through the practice of Maharishi’s technologies of consciousness. What before was shrouded in the veil of mysticism is now scientifically understood as a normal, natural stage of human life available to anyone.

An article in the first issue of Modern Science and Vedic Science, by Dr. Charles Alexander and others (1987) examined the empirical evidence, drawn from behavioral and neurophysiological research, for the existence of these higher stages of human development. This article unfolded the scientific basis for understanding and verifying higher states of consciousness from the standpoint of a developmental psychologist, and laid the basis for a new paradigm of human development.

Research on the Relation between Modern Science and Maharishi Vedic Science

Each individual nervous system, when refined through Maharishi’s technologies of consciousness, is an instrument through which the silent field of pure unbounded consciousness becomes accessible as a field of inquiry. Since the unified field is all-pervading and everywhere the same, a nervous system finely enough attuned in its functioning can gain the ability, according to Maharishi, to experience and identify itself with that unbounded, undifferentiated, and unified field underlying all activity in nature. By taking one’s awareness from the gross level of sensory objects to perception of finer levels of activity, one gains the ability to experience that level of nature’s functioning at which the unity of pure consciousness gives rise to diversity. Gaining this unified state of consciousness is the means by which anyone can experience and confirm the structure of knowledge and reality described in Maharishi Vedic Science. This is partly what makes Maharishi Vedic Science a precise, verifiable science: All theoretical structures of the science can be verified through a reliable, systematic, effective technology. Other foundational aspects of this science will be considered below.

Maharishi’s technologies of consciousness become, in the modern world, a method for the investigation of the unified field and the most refined level of nature’s activity through direct experience. Modern physics, through its objective method of inquiry, has glimpsed a unified field underlying all of nature, but physics has reached a fundamental
impasse in its ability to experimentally investigate the unified field, because the energies required to probe these finer scales exceed those attainable by any conceivable particle accelerator technology. When physics can go no further, Maharishi’s technologies of consciousness facilitate inquiry beyond the limitations of the objective approach by providing an effective means of exploring the unified field on the level of direct experience.

This exploration of the unified field through the subjective experience of consciousness is a well-structured program of research. It is guided by the knowledge of Maharishi Vedic Science set forth by Maharishi in conjunction with the modern sciences. When descriptions of the unified field from the standpoint of modern science, of Maharishi Vedic Science, and of direct experience coalesce, the three together provide a basis for complete knowledge. This program of research is based on Maharishi’s exposition of the Vedic literature as a complete and detailed expression of the unified field.

According to Maharishi’s exposition of the Veda, the sequential emergence of the diverse laws of nature from the unified field can be directly experienced in the field of consciousness as a sequence of sounds; these are presented in the sequential emergence of phonological structures of the Vedic texts. Veda is just the structure of the self-interacting dynamics through which the unified field gives rise to the diverse expressions of natural law. Fundamental theoretical concepts in physics and other disciplines, insofar as they are valid descriptions of nature, should therefore correspond to different aspects of Vedic literature that describe these realities from the standpoint of direct experience.

The basic program of research of modern science and Maharishi Vedic Science, as conceived by Maharishi, thus has three major goals: (1) to develop an integrated structure of knowledge by fathoming the depth of correspondence between the principles of modern science and Vedic Science; (2) to provide, from Maharishi Vedic Science, a foundation in direct experience for the most profound theoretical concepts of modern science; and (3) to resolve the impasse faced by the objective approach of modern science through the addition of the subjective approach of Maharishi Vedic Science, which provides complete knowledge of nature on the basis of the complete development of the knower.
In another issue of *Modern Science and Vedic Science* [see Vol. 5, Pt. 1 of this series], Dr. M.H. Weinless (1987) explored set theory and other foundational areas of modern mathematics in relation to Maharishi Vedic Science. In a proposed issue, Drs. R.K. Wallace, D.S. Pasco, and J.B. Fagan (1988) explore the fundamental relationship between Maharishi Vedic Science and the foundational areas of modern physiology, such as molecular biology. Their paper also discusses the extent to which fundamental principles of Maharishi Vedic Science can be used to further investigation of DNA structure and function.

The discovery of deep structures of knowledge and principles common to Maharishi Vedic Science and modern science represents such a profound contribution to our understanding of nature that this journal was founded to foster continued scholarly investigation of the interrelations between these complementary methods of gaining knowledge. Knowledge gained by direct experience of the fine fabrics of nature’s activity, and knowledge gained by the experimental methods of modern science coalesce in a new integrated method of inquiry that offers both the fundamental principles of modern science and the expressions of direct experience in Maharishi Vedic Science as two facets of one reality of nature’s functioning.

Maharishi (1986) sums up the relation between Maharishi Vedic Science, modern science, and his technologies of consciousness:

Maharishi Vedic Science is applied through the Technology of the Unified Field. We speak of the unified field in connection with Maharishi Vedic Science because of the similarity of what has been discovered by physics and what exists in the self-referral state of human consciousness. The Technology of the Unified Field [That is, Transcendental Meditation and TM-Sidhi programs, including Yogic Flying—Eds.] is a purely scientific procedure for the total development of the human psyche, the total development of the race. This is a time when objective, science-based progress in the world is being enriched by the possibility of total development of human life on earth, and this is the reason why we anticipate the creation of a unified field-based civilization. (p. 35)

On the basis of the universal availability of this domain of experience, an empirical science of consciousness becomes possible for the first time.
The Science of Creative Intelligence: Foundations of a New Science of Consciousness

The unified science that links the objective method of modern science and the subjective method of Maharishi Vedic Science, while preserving the integrity of each, is called the Science of Creative Intelligence (SCI). Maharishi himself has laid the foundations of this new science by showing, first, how a precise subjective science of consciousness is established on the basis of the direct experience of consciousness in its pure form; and second, how the experimental method can be used to test empirically the assertions of the subjective science. Through Maharishi’s work, for the first time in history, the full potential of human consciousness can be investigated both through direct experience and through the objective methods of modern science. The foundations of this new science linking the subjective and objective method will now be considered.

Experiential Foundations

Prior to Maharishi’s work, the term consciousness was considered too vague and indefinite to be allowed into scientific discussion. It was excluded from science as a metaphysical term because consciousness was not objectively observable, and therefore apparently not amenable to scientific investigation. Through Maharishi’s work, the concept of consciousness has been given a precise, well-defined meaning on the basis of direct experience, and its relation to the objective framework of science has been precisely specified.

The experience of pure consciousness, available to anyone through regular practice of the Transcendental Meditation technique, is a basis for precise experiential knowledge of consciousness in its simplest, most fundamental, and most unified state. Even though consciousness can never be an object of experience, when the conscious mind becomes completely settled in a wakeful state, it experiences its own nature as pure wakefulness, pure consciousness, without any activity or objective content. Through the repeatable, systematic experience of this silent but wakeful state of mind, the concept of pure consciousness, which has been subject to conjecture and debate throughout the centuries, is now available to direct experience.
Having laid the basis for introducing consciousness into science as a precise concept, it remained for Maharishi to develop a program of applied research to test theoretical predictions of Maharishi Vedic Science. Identifying consciousness with the unified field provides a precise understanding of where consciousness is located in the framework of the sciences. To create an empirical science of consciousness, however, it was also necessary to account for how consciousness could be investigated through experimental research.

**Empirical Foundations**

Maharishi’s work has laid the foundation for an experimental investigation of consciousness. He has led the way in drawing out predictions of Vedic science that are open to testing, translating discussions of consciousness, derived from experience of higher states of consciousness, into predictions of experimentally observable phenomena. Three examples will illustrate this principle.

Pure consciousness, as was noted above, is experienced during the practice of the Transcendental Meditation technique as a state of pure restful alertness. This purely subjective experience does not, however, establish objectively whether it is in fact a state of deep rest and alertness, or only seems to be. If a person is in a deep state of rest and alertness, Maharishi has asserted, then physiological evidence of deep rest and alertness should be observable. Reduced levels of oxygen consumption, reduced breath rate, and other measures of more refined physiological activity would be predicted. Patterns of EEG coherence in the alpha range, indicative of restful alertness, should also be observed. Early pioneering research by Dr. R.K. Wallace (1986) found that these changes do indeed occur. In this way, statements about the subjective experience of consciousness were translated into empirically verifiable assertions. The basis of this correlation between consciousness and physiology is a principle, fundamental to Maharishi’s thinking, that for every state of consciousness there is a corresponding state of physiological functioning. The range of physiological correlates of the experience of pure consciousness is a subject of continuing research.

Consider a second example. Pure consciousness is understood in Maharishi Vedic Science as a clear and settled state of awareness. Anyone who gains this state is said to have a mind like a placid lake, unrippled
by waves, and thus able to reflect the world in a precise, non-agitated manner. Maharishi drew from this several predictions. One is that a person growing in the ability to experience pure consciousness would experience more stable and orderly physiological functioning. This can be translated into the testable prediction that subjects regularly practicing the Transcendental Meditation program display increased stability of the autonomic nervous system. Another prediction is that the practice of the Transcendental Meditation program will produce greater perceptual clarity and greater orderliness of thinking. Translated into specific terms, this leads to the prediction that practicing the Transcendental Meditation program will produce measurable increases on such scales as auditory discrimination, brain wave coherence, and problem solving ability. Research has been designed, carried out, and reported in the literature which measures the growth of these parameters in groups practicing the Transcendental Meditation program by comparison to control groups, thus providing objective verification of the predicted correlates of the subjective experience of pure consciousness.

A third example of how assertions of Maharishi Vedic Science can be translated into testable form is found in the sociological experiments on the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying. The hypothesis is that a group of people practicing this technology in one place, by bringing their awareness to the level of perfect orderliness in the unified field, will enliven qualities of harmony and orderliness in collective consciousness, thus producing measurable positive changes in the quality of societal life. Many experiments have been designed by Maharishi and carried out, demonstrating the power of this technology to produce significant changes in the level of coherence, positivity, balance, and stability in society, even on a global scale. (See Experimental Research, below.) The results of these experiments strongly support Maharishi’s assertion that consciousness is identical with the unified field.

Experimental Research

Over 600 hundred experimental studies in the areas of physiology, psychology, and sociology provide substantial confirmation of many basic assertions of Maharishi Vedic Science in the arena of empirical science. Many of these studies, now published in major scientific jour-
nals throughout the world, have been collected in the volumes called *Scientific Research on the Transcendental Meditation Programme: Collected Papers, Vols. 1–6* (1977–1991). This research provides experimental validation of the efficacy of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying. Because this research—from over 600 scientific studies at over 300 universities and research institutions in 33 countries, published in more than 100 scientific journals—is too extensive to summarize here, the reader is referred to the *Collected Papers* for articles cited in this and other professional journals. Overall, this research probably represents the most concerted, well-designed research program on a potential means to benefit mankind ever conceived. Its present standing is that, taken together as a body of research, it is one of the most impressive confirmations of a theory of human potential ever executed.

Although it is beyond the scope of this introduction to go into the details of this research, it is worthwhile to mention some of the broad categories of scientific investigation that have evolved to guide the research program of the Science of Creative Intelligence. The main areas of research include studies on the individual and society. Research on benefits to the individual may be further subdivided into studies of physiological changes (both during and after the practice); cognitive, psychological, and behavioral changes; benefits to health and social behavior; and benefits to athletic performance, performance in business, and academic performance. Research on social benefits through collective practice may be further grouped into research on families, city populations, national populations, and global population. These research studies fall into the categories of crime prevention, accident prevention, benefits to economy, health, violence reduction, and world peace.

On the basis of this research, basic assertions of Maharishi Vedic Science become verifiable through empirical science. There is, moreover, a unity of theory underlying these diverse predictions and tests. These studies, taken as a whole, constitute a coherent research program that tests the prediction that repeated experience of the unified field results in greater orderliness, coherence, and positivity, in both individual and social life. Research on these changes not only tests fundamental theory, but demonstrates the practical benefits of this new
technology. Maharishi’s technologies of consciousness become open to experimental testing precisely because they have significant practical applications in improving every area of human life.

**Practical Applications of the Transcendental Meditation and TM-Sidhi Programs, including Yogic Flying**

Maharishi has frequently asserted that the purpose of Maharishi Vedic Science is to benefit life, not merely to give knowledge for its own sake. Knowledge, he holds, is for action, action for achievement, and achievement for fulfillment. The ultimate purpose of Maharishi Vedic Science and its applied technology is, therefore, to bring human life to fulfillment.

Maharishi’s technologies of consciousness bring fulfillment to individual life by unfolding the full potential of consciousness. When higher states of consciousness are realized, Maharishi emphasized, life is lived in “twenty-four-hour bliss.” Gaining contact with the unified field, one enjoys spontaneous right action, lives life in total accord with all the laws of nature, and accomplishes any life-supporting desire. Violations of natural law cease, and all suffering, which is caused by violation of natural law, comes to an end. Life is lived free from mistakes, in inner and outer fulfillment. Such is the fundamental purpose of the technologies Maharishi has created.

**Perfect Health**

Maharishi’s technologies of consciousness have important practical applications in the area of health. According to Maharishi, sickness arises from imbalance. Perfect health means wholeness, balance on all levels of life. When individual life is established in the unified field of all the laws of nature, all actions are spontaneously in accord with natural law. In terms of physiological functioning, this means perfect integration and balance, from the biochemical and molecular levels to the macroscopic, organismic levels.

Maharishi Ayurveda is an integral part of Maharishi Vedic Science. It is a revitalized form of the ancient ayurvedic science of life and health, restored to its original purity and effectiveness by Maharishi.
According to Maharishi, the cornerstone of Ayurveda is the development of consciousness.Perfect health in mind, body, and behavior is the result of perfect balance in consciousness and physiology. This develops through the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, when the mind identifies itself with the unified field, the field of perfect balance and wholeness.

Maharishi Ayurveda combines Maharishi’s technologies of consciousness with specific procedures to treat and prevent illness and promote longevity. Maharishi Ayurveda Medical Centers have been established in many countries to eliminate the basis of sickness, create perfect health, and reverse the aging process. Over the last fifteen years, research into the effects of Maharishi’s technologies of consciousness, on health have been carried out at research institutions all over the world, and Maharishi’s recent emphasis on Ayurveda provides many new research opportunities for investigating the applications of Vedic Science in the area of health.

Maharishi’s technologies of consciousness also include technologies to accomplish specific goals of individual and social life. The TM-Sidhi program has been founded by Maharishi to utilize the knowledge and the organizing power of the unified field for improving achievements in every area of human endeavor.

Unfolding Full Human Potential through the Transcendental Meditation and TM-Sidhi programs
When one gains the level of experience of the self-interacting dynamics of consciousness, Maharishi holds, one gains command over all the laws of nature. Stationed at the source of all the laws of nature, at the “central switchboard” of nature’s activity, human consciousness can command all the laws of nature to create any desirable effect in the material world. Maharishi has brought forth a program for gaining mastery over all the laws of nature, based on the formulations found in the ancient Yoga Sūtras of Patanjali, one of the principal books of Vedic literature. This is the TM-Sidhi program, in which the mind gains the ability to function from the level of the self-interacting dynamics of the unified field. Once established in pure self-referral awareness through the practice of the Transcendental Meditation program, an individual
gains the ability to draw upon the organizing power of the unified field to accomplish anything. Since the unified field is the source of all existence, its organizing power is infinite, and one who functions from this level has unlimited organizing ability. Established in that unified field of all possibilities on the unmanifest level of existence before consciousness assumes the form of matter, all possibilities open to one’s awareness and one can govern the expressions of the unified field as it transforms itself into matter. As Maharishi (1986) expresses it:

In this program, human awareness identifies itself with that most powerful level of nature’s functioning and starts to function from there. The purpose of the TM-Sidhi program is to consciously create activity from that level from where nature performs. (p. 74)

Through the practice of the TM-Sidhi program, Maharishi predicts, it will become possible to achieve levels of body-mind coordination hitherto deemed impossible. It will be possible, he asserts, to realize the ancient dream of flying through the air, and to develop highly enhanced powers of hearing, seeing, and intuition that extend the senses far beyond the limits currently conceived to be possible. In the Yogic Flying technique, which Maharishi developed from the Yoga Sūtras, the silent state of self-referral consciousness is integrated most fully with outer activity as the body lifts in spontaneous hops, generating inner bliss and maximum coherence in brain functioning. Other Vedic texts describe the ability to move through the air at will as a result of perfection of this Yogic Flying technique. By activating laws of nature that are now hidden to ordinary methods of scientific investigation, the TM-Sidhi program provides a research methodology to explore what is possible for mankind to achieve on the basis of functioning from that level where the conscious mind has become identified with the unified field. This is the basis of a technological revolution more powerful and beneficial to life than any conceived through empirical science.

The Maharishi Effect
The TM-Sidhi program, when practiced in groups, is even more powerful than the TM-Sidhi program practiced alone. The collective practice of the TM-Sidhi program can produce an influence that affects the entire world in measurable ways. This global influence of coherence
generated through the group practice of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, has been called the “Maharishi Effect.”

As early as 1960, Maharishi predicted that when individuals practice the Transcendental Meditation and TM-Sidhi programs in sufficiently large groups, a measurable increase in orderliness, coherence, and positive trends would be observed in society. By enlivening the life-supporting and evolutionary qualities of the unified field, such as perfect orderliness, infinite dynamism, and self-sufficiency, Maharishi held, these qualities would be enlivened in collective consciousness and this would have positive, measurable effects on a wide social scale.

Over the years, social scientists developed formulas for predicting the size of the group necessary to create a “phase transition” in society to a measurably higher quality of life. These formulas, calculated on the basis of analogous phase transitions, from disorder to orderliness, studied in physics, came out to be approximately one percent of a population practicing the Transcendental Meditation program, and a much smaller percentage, on the order of the square root of one percent, practicing the TM-Sidhi program.

Since 1978, many experimental studies have been performed to measure the effect of large groups practicing the TM-Sidhi program. Experimental confirmation of the principle has been the consistent result. The Maharishi Effect is now as well documented as any principle of modern social science. In creating this technology, Maharishi has provided an effective method of social change that operates from the silent, harmonizing level of the unified field to produce a transformation in the quality of collective consciousness, thereby effortlessly creating coherence on a global scale. Maharishi (1986) describes how this effect is produced:

The transcendental level of nature’s functioning is the level of infinite correlation. When the group awareness is brought in attunement with that level, then a very intensified influence of coherence radiates, and a great richness is created. Infinite correlation is a quality of the transcendental level of nature’s functioning from where orderliness governs the universe. (p. 75)

D. W. Orme-Johnson and M. C. Dillbeck (1987) have summarized the empirical research on the Maharishi Effect. They surveyed
experimental studies documenting the sociological improvements resulting from the group practice of the TM-Sidhi program. Based on these results Maharishi asserts that the collective practice of the TM-Sidhi program in groups of 8000 (the square root of one percent of the world’s population) would produce coherence in the collective consciousness of the entire world. Statistically significant reductions in crime, accidents, fatalities, and disease, and other positive benefits on a global scale observed during experimental periods have established this as an effective means of changing collective consciousness and thereby changing the quality of life in the world—simply by enlivening the source of order and coherence at the basis of nature, from the level of the unified field.

**Maharishi’s Program to Create World Peace**

The most dramatic application of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, is Maharishi’s program to create world peace through the creation of a permanent group of 8000 collectively practicing Maharishi’s technologies of consciousness. These technologies are a basis for eliminating negativity and destructive tendencies throughout the world. Large groups of experts in the TM-Sidhi program, creating coherence, during experimental periods, have provided ample opportunity for scientific research. During these experimental periods, conflict and violence have been reduced in war-torn areas and negative trends have been reversed. Over thirty studies have established the efficacy of this technology to eliminate conflict and promote life-supporting, positive trends throughout the world.

Maharishi clearly lays out the basis of his program to create world peace. Stress, he holds, is the basic cause of all negativity, violence, terrorism, and national and international conflicts. Stress generated by the violation of natural law causes strained trends and tendencies in the environment. Through the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, human intelligence can be identified with the unified field, and violations of natural law will cease. “Reinforcement of evolutionary power in world consciousness is the only effective way,” Maharishi holds, “to neutralize all kinds of negative
trends in the world and maintain world consciousness on a high level of purity” (Maharishi’s Program to Create World Peace, 1986, p. 7).

The global applications of this new science and technology are almost beyond present levels of imagination. Yet scientific research has found measurable reductions in levels of violence, crime, and other indications of negativity during the practice of the TM-Sidhi program in sufficiently large groups during experimental trial periods. Here for the first time in history is a scientific basis for creating world peace, ending terrorism, and reducing the negative trends of society.

On the basis of these studies, Maharishi holds that world peace can be guaranteed now, within a few years, through the establishment of groups of 8000; he holds that perfect health and unlimited longevity can be achieved for individual life, and that balance, coherence and health in society can be established in our generation. War, crime, poverty, and all problems that bring unhappiness to the family of man can be entirely eliminated. Life, he holds, can be lived in absolute abundance and fulfillment. Maharishi has called upon every significant individual in the world to act now to adopt this program for world peace by creating groups of 8000 collectively practicing the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, to establish world peace and guarantee its perpetuation.

The practical benefits that Maharishi foresees through these new technologies are far greater than those achieved by the technology based on present science. As science has investigated deeper levels of nature, from microbes to molecules to atoms, new technologies have emerged which apply the knowledge in areas such as medicine and nuclear power. In drawing upon the deepest and most powerful level of natural law, the level of the unified field, Maharishi Vedic Science lays the basis for much more powerful technologies still. Where modern medicine has been able to eliminate some diseases by drawing upon microscopic levels, Maharishi Vedic Science lays the basis for the elimination of all disease, and more importantly, for the creation of perfect health and reversal of aging. While modern science has produced nuclear technology but no technology for peaceful resolution of conflict, Maharishi Vedic Science draws upon the infinite organizing power of the unified field at the basis of nature to create social harmony
and world peace while preserving cultural integrity and stimulating prosperity and progress.

**Maharishi’s Technologies of Consciousness as a New Method of Gaining Knowledge**

The bold assertions about what is practically possible through the application of Maharishi’s technologies of consciousness must be understood in the context of the new method of gaining knowledge that Maharishi has founded. The history of science testifies that as new methods of gaining knowledge of deeper and more unified levels of natural law become available, more powerful and useful technologies become available. Maharishi’s technologies of consciousness are based on the deepest and most unified level of knowledge of nature. It should not be surprising, therefore, that this technology provides a radically new source of organizing power to fulfill the highest goals of mankind.

These technologies of consciousness offer a fundamentally new approach to knowledge that has not been available before. In asserting that it is possible for one individual to know all the laws of nature and the entirety of the universe within his or her own consciousness, Maharishi is well aware that he is introducing an account of human potential that goes well beyond the concept of the limits of knowledge that has dominated in the scientific era. This new paradigm of knowledge must be examined in a new light.

It is a widespread belief in the modern age that the only valid method of gaining knowledge is by moving outward through the senses, that is, through the methods of the empirical sciences. It is, however, only the historical failure of subjective approaches that has led to this belief. It cannot be thought that the senses are the only way of gaining knowledge, and those who cling to the belief that it is, only allow old habits to stand in the way of exploring new possible sources of knowledge.

Subjective approaches to knowledge in the past failed to bear fruit because they failed to provide an effective and reliable method of access to an invariant and universal domain of direct experience. They thus failed to establish independent standards of knowledge, they failed to produce methods of distinguishing truth from error, they failed to produce consensus even among those practicing the same method, and
they failed to produce practical technological benefits through the practice of the method.

Maharishi’s technologies of consciousness are different from subjective approaches in the past, and must therefore be considered on separate grounds. They provide an effective, reliable method of opening the mind to an invariant and universal level of nature which is everywhere, and yet not ordinarily open to experience because the mind usually functions on more active levels. By providing a technology to make this non-active level of nature available as a direct experience, Maharishi has made this domain available to all as a new field of inquiry; and, where there is a new source of experience of something universal, unchanging, and objectively verifiable, a new source of knowledge is available.

The Science of Creative Intelligence gives a new account of how complete knowledge is possible. When the mind becomes completely settled and still, according to this account, it gains the ability to perceive on the most refined levels of nature’s functioning—the all-pervading unified field where all laws reside in a collective totality. It not only experiences this unified field, it becomes identified with it; it is the unified field and thus knows the unified field as its own universal Self. On this level of knowledge, there is no separation of knower from the known. Nothing lies outside the range of the knower. All laws of nature and everything in the universe can be known as intimately as one’s own Self. Mind and body cease to be seen as separate realities. Maharishi (1986) says:

In reality our self-referral state of consciousness is the unified field—not an object of knowledge as a rose is when we say, “I see that rose.” The unified field is not an object in this way; it is the subject itself. The unified field is a self-referral state of awareness that knows itself, and in knowing itself is the knower and the known, both together. (p. 96)

On this account, there is no distinction between the knower and the reality that it knows. Since it is the Self that knows itself, there is nothing ultimately outside the consciousness of the knower, and there are therefore no limits on what can be known. [This unbounded value of the Self is written with an uppercase “S” to distinguish it from the ordinary, localized self we typically experience.] If true, this account of knowledge provides a fundamentally new source of discovery of the
laws of nature, like the empirical sciences, in that it relies on experience as a source of knowledge, but distinct from these sciences in that it draws upon a wider range of experience. As a new source of discovery, it extends the power of scientific investigation; yet it remains within the scope of empirical science by being subject to procedures of objective verification.

**Maharishi University of Management**

Maharishi University of Management, formerly Maharishi International University, was founded by Maharishi in 1971, based on the principles of the Science of Creative Intelligence. One of the major functions of this University is to show how each discipline and each level of natural law arises from the unified field of pure consciousness. The specialty of Maharishi University of Management is the knowledge of the unified field of pure consciousness from the standpoint of each academic discipline. At Maharishi University of Management, each modern discipline traces the diversity of laws back to a unified source in the unified field of pure consciousness and shows how the diversity of laws emerge from this unified field through the self-interacting dynamics of consciousness. Just as physics and mathematics have discovered increasingly unified levels of natural law at the basis of their discipline, thus tracing the diversity of its laws to their source in the unified field, so every academic discipline can ultimately show how its laws derive sequentially from the unified field. This project of unification of knowledge, a long sought goal throughout Western intellectual history, is now being systematically pursued and completed at Maharishi University of Management.

This enterprise includes developing charts to show how each modern discipline arises from the unified field of pure consciousness. For each discipline, a Unified Field Chart has been constructed to show how the discipline sequentially emerges from the unified field through the self-interacting dynamics of knower, known, and process of knowing. These Unified Field Charts constitute a major unification of knowledge, showing at a glance how all the diversity of knowledge emerges from a unified source.

Since the unified field is understood as a field of consciousness, and consciousness is the most fundamental level of each student's own Self,
the study of the unified field at Maharishi University of Management constitutes a method of systematically relating all knowledge to the student’s Self. The success of Maharishi University of Management’s Consciousness-Based education is due in part to this program of relating all knowledge to the unified field and the unified field to the Self. Because all students and faculty at Maharishi University of Management collectively practice the Transcendental Meditation technique, regularly gaining the direct experience of the unified field of pure consciousness, this unified field increasingly becomes a living reality. This unified field ceases to be an abstract concept and becomes as intimate as the Self. The experience of faculty and students has been that learning and inquiry is joyful and most fulfilling in this environment of Consciousness-Based education.

[The reader is referred to other issues of the journal Modern Science and Vedic Science as well as to other volumes in this book series Consciousness-Based Education: A Foundation for Teaching and Learning in the Academic Disciplines for articles illustrating how Maharishi Vedic Science is transforming our understanding of modern academic disciplines. —Eds.]

Maharishi’s Work in Historical Perspective: An Appreciation

Maharishi has created a major watershed in world intellectual history. He has laid the foundation for a fundamental change both in intellectual history and in the history of technology and civilization itself. His work has created a new paradigm of the unity of human knowledge, and, we may expect, will unify the sciences and humanities in a more integrated way than ever before. He has, moreover, brought to an end the old notion that man is born to suffer and that life is a struggle. The practical programs he has founded provide a scientifically validated basis for reducing and even eliminating crime, war, terrorism, poverty, and other problems that beset mankind; more importantly, his discoveries make it possible to live life in the fulfillment of pure knowledge and permanent bliss consciousness and to achieve the highest goals of human endeavor. He has laid the basis for a new civilization, founded on new principles of complete, reliable, useful, fulfilling knowledge—
the knowledge of the unified field of pure consciousness as the perfectly orderly, unified source of nature.

Maharishi is unique in the world today. He has not offered conjectures and hypotheses about reality and human potential, nor does he set himself up as a final authority on matters of knowledge when he speaks rather of experience as the ultimate basis of knowledge. The experience of which he has spoken is derived from a new source, from the level of fully developed human life gained when one’s awareness is open to the unified field of pure consciousness. Maharishi’s life is an example of that which he taught. Unlike those whose teaching is based solely on the personal authority of the individual, Maharishi has founded universities, sciences, technologies, and other institutions based on universal principles through which any individual can gain the direct experience of the fully unfolded nature of life and validate the truth of what is described in the science. Because of this, Maharishi is held in highest esteem by millions of people around the world.

Maharishi has provided the means of unfolding the dormant creative genius within everyone, and he has established institutions through which the knowledge of how to unfold this potential will be perpetuated generation after generation. He has, moreover, used this knowledge to found programs to create perfect health, progress, prosperity, and permanent peace for the world—programs to end suffering and allow life to be lived in spontaneous accord with natural law. These institutions are not just ideals, but functioning institutions whose practical achievements are now well documented and available for all to examine.

Everyone now has the ability, with the availability of the Transcendental Meditation and TM-Sidhi programs, including Yogic Flying, to engage in this great experiment of identifying one’s awareness with the total potential of natural law and to spontaneously live in accord with all the laws of nature while established in the awareness of the unified field of pure consciousness. The experience of approximately three million people who have learned the Transcendental Meditation technique testifies to its practicality and its effortlessness and ease of practice. Experimental studies have shown that its benefits are real and concrete. On this basis, Maharishi has foreseen the creation of a new era of civilization—Heaven on Earth—in which life will be lived
in fullness and abundance without suffering. Maharishi’s work eliminates the very basis of stress and suffering and lays the ground for a new civilization, a unified field-based, ideal civilization that draws on the infinite organizing power of the unified field of pure consciousness to bring human life to fulfillment.

References


Wallace, R. K., Orme-Johnson, D. W., & Dillbeck, M. C. (Eds.).


Kenneth Chandler’s “Modern Science Vedic Science: An Introduction,” here revised/updated, was originally published in *Modern Science and Vedic Science, 1(2),* p. v-xxvi. It is reprinted with permission of the publisher.
Bibliography

Neurophysiology of Enlightenment

Robert Keith Wallace, Ph. D.
ABOUT THE LEAD AUTHOR

Robert K. Wallace, Ph.D., founding President of Maharishi International University (now Maharishi University of Management), received the degrees of B.S. in Physics and Ph.D. in Physiology from the University of California, Los Angeles, and did postdoctoral research at Harvard Medical School. He was awarded the Doctorate of World Peace degree from Maharishi University of World Peace. He serves as Chair of the Department of Physiology and Health, Professor of Physiology and International Director of Research at Maharishi University of Management. A pioneer in the neurophysiology of higher states of consciousness, his work has been published in many journals including *Scientific American* and *The American Journal of Physiology*. His groundbreaking research on the physiology of meditation opened the door for its scientific study and application in the field of behavioral medicine. He is the author of *The Neurophysiology of Enlightenment* and *The Physiology of Consciousness*, and has lectured in over 50 countries. He serves as co-Chair of the Health and Happiness Committee on the Board of Trustees.
Bibliography


Alexander, C.N., Marks, E.J. (1982). Ego development, personality, and behavioural change in inmates practicing the Transcendental Meditation technique or participating in other programs: A summary of cross-sectional and longitudinal results. Doctoral thesis of first author (summary), Department of Psychology and Social


Das, N.N., Gastaut, H. (1957). Variation de l’activite electrique du cerveau, du coeur at des muscles squeletiques au cours de the medi-


Dillbeck, M.C. (1979). The Transcendental Meditation program and a compound probability model as predictors of crime rate change,


Rao, S. (1968). Oxygen consumption during yoga-type breathing at altitudes of 520m and 3800m. *Indian Journal of Medical Research* 56: 701–705.
Reddy, M.K. (1976). The role of the Transcendental Meditation programme in the promotion of athletic excellence: Long and


RESOURCES

Electronic Resources and Publications

LINKS

Education

Maharishi University of Management: www.mum.edu
Maharishi School of the Age of Enlightenment:
    www.maharishischooliowa.org
Maharishi’s Consciousness-Based Education: www.CBEprograms.org
International Foundation of Consciousness-Based Education:
    www.CBEfoundation@ifcbe.org
David Lynch Foundation for Consciousness-Based Education and
World Peace: www.davidlynchfoundation.org

Transcendental Meditation Program

Maharishi’s Technologies of Consciousness: www.tm.org
Maharishi Channel: www.maharishichannel.in
Maharishi Lectures and Interviews (film clips): www.tm.org/maharishi
Invincible America Assembly: www.invincibleamerica.org
Global Country of World Peace: www.globalcountry.org
Global Good News Site: www.globalgoodnews.com
Fortune Creating Homes: www.FortuneCreatingHomes.com
Sthapatiya Veda: www.sthapathyaveda.com

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Center for Brain, Consciousness, and Cognition: www.drfredtravis.com
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PUBLICATIONS

These publications are available from Maharishi University of Management Press: http://mumpress.com and at the MUM Bookstore.

Books by Maharishi Mahesh Yogi

Science of Being and Art of Living
Bhagavad-Gita: A New Translation and Commentary, Chapters 1–6
Celebrating Perfection of Education
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Vedic Knowledge for Everyone
Inaugurating Maharishi Vedic University

Consciousness-Based Books Imprint from MUM Press

The series Consciousness-Based Education: A Foundation for Teaching and Learning in the Academic Disciplines contains 12 volumes, available in 2011.

Maharishi Vedic Science       Education
Physiology and Health         Physics
Mathematics                   Literature
Art                           Management
Government                   Computer Science
Sustainable Living            World Peace

Each volume includes a paper introducing the Consciousness-Based understanding of the discipline and a Unified Field Chart that conceptually maps all branches of the discipline, illustrating how the discipline emerges from the field of pure consciousness, the Self of every individual. These charts connect the “parts” of knowledge to the “wholeness” of knowledge and the wholeness of knowledge to the Self of the student.

Subsequent papers show how a Consciousness-Based approach may be applied in various branches of the discipline; these papers include occasional examples of student work. Each volume ends with an appendix describing Maharishi Vedic Science and Technologies of Consciousness in detail.