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Introduction

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Mr. Richard H. Nolte
Institute of Current World Affairs
535 Fifth Avenue
New York, New York 10017
U.S.A.

Dear Mr. Nolte:

You know that I am here in Latin America to look at things that might not be as visible in other parts of the world, in particular the uses of natural drugs by primitive peoples and positive applications of altered states of consciousness. I really have seen nothing so far in Mexico that is directly relevant to my interests, nor was I planning to at this stage. I have learned Spanish to the point that I feel comfortable about venturing into the hinterlands, I have grown pleasantly accustomed to many aspects of life in Mexico, but, to date, no shamans, brujos, magic mushrooms, group consciousness rites, or miracle cures have passed my way. Consequently, I have not come across any single external thing I have genuinely wanted to write about.


At the same time, I have had a number of interesting internal experiences that have been triggered in some manner or other by simply being in Mexico. For example, I have been thinking more about the autonomic nervous system and ways of learning to modify its operations consciously. In this case, the connection with external experience is clear: an American coming to Mexico is bound to have his attention focused on his gastro-intestinal tract more than usual, and gastro-intestinal function is markedly open to the influence of consciousness.

In a book I finished just before leaving the United States, I argued at a very general level that so-called "involuntary" functions like digestion appear to be beyond conscious control only because we do not use existing channels between conscious and unconscious awareness -- between the reality of ordinary experience and the reality of non-ordinary experience (the sort composing trances, daydreams, highs, meditations, ecstasies, and other altered states of consciousness). In other words, we have the neurological apparatus to affect internal functions like heartbeat, blood pressure, and digestion consciously, but we have forgotten, so to speak, where the controls are.

Because you have read the manuscript of this book, you are familiar with this idea and know how it derives from my understanding of altered states of consciousness and their relationships to drugs that appear to cause them (including the drugs that are provoking such a flap in the United States at the moment). But I think I can write about the autonomic nervous system for people who have not read the manuscript, since the subject of autonomic control is introduced in the book only as an example of another way of thinking about certain problems and is easily considered separately. What I would like to do in the first few newsletters is to concentrate on this subject and expand it with illustrations I have collected from observations of myself and others since coming to Mexico. As an introduction I would like to quote a short section of the book, "Control of the Autonomic Nervous System," pages 188 to 197 of the manuscript. I will send you two other pieces as well -- one on vomiting as a key to the autonomic nervous system and its relationship to conscious experience, another on "turista" or "Montezuma's Revenge" and what I have found to be its proper control. In this way I hope to cover the gastro-intestinal tract from end to end.

I do not intend to go through the whole body this way. It just seems to me that these articles will be a good way of stating some of my interests to readers of Institute newsletters as well as drawing upon some of my present experiences in Mexico. I am very eager to move away from cities and towns to more remote parts of the country where Indian life goes on in purer form, and the things I want to see should be more accessible. Soon, I hope, there will be no lack of external things to write about.

Sincerely yours,

A handwritten signature in cursive script that reads "Andrew T. Weil". The signature is written in dark ink and is positioned below the typed name.

Andrew T. Weil

The passage below is excerpted courtesy of the Houghton Mifflin Company, Boston, from THE NATURAL MIND, by Andrew T. Weil, to be published later this year.

Control of the Autonomic Nervous System

The autonomic nervous system is a well-known division of the general nervous system. It innervates all of the smooth (or "involuntary") muscles, the heart muscles, and gland cells throughout the body. It exerts major regulatory influences on many important structures, including the intrinsic muscles of the eye, the glands of the skin, all of the cardiovascular, respiratory, digestive, endocrine, urinary, and reproductive systems. Neuro-anatomists and neurophysiologists have long studied its two components, the sympathetic and parasympathetic systems, and much is known about the connections of these systems to the organs they regulate. In some cases, the organs also receive fibers from the so-called voluntary motor pathway -- a large system of nerves originating in the motor cortex of the brain and making connections in the spinal cord. Since the cortex (or outer covering) of the brain seems to participate in many of our "higher" mental functions, such as intellection, it makes sense that we can consciously will responses in our bodies by sending impulses along our voluntary motor pathways to our voluntary muscles. Breathing is the best example of a function with dual innervation: our respiration can be totally conscious or totally unconscious. In one case, the voluntary nerves run things; in the other case, the autonomic system carries the impulses.

We can think of the autonomic system as a more instinctive regulatory mechanism -- one we share with many animals that lack our higher cortical centers. One of its qualities -- the one responsible for its reputation as an involuntary system -- is that it carries out its functions without our being aware of it. Moreover, if we try to will an autonomic response -- say a change in our blood pressure -- in the same way that we will a movement of our arm, we do not have much success. These facts have led many people to conclude that the autonomic nervous system has no direct connections to consciousness. But if we ask, "What kind of consciousness?"

the fallacy of this conclusion becomes clear. For the autonomic nervous system seems to have very direct connections to every kind of consciousness but the ordinary waking variety of the ego.

The most graphic illustration of this truth is a demonstration that has been made again and again in hypnotic subjects -- one whose significance has been badly missed for decades by medical scientists. If a subject in a good trance is touched by a finger represented to him as a piece of hot metal, an authentic blister will develop at the point of contact. The blister is real. It is produced by autonomic innervation of superficial blood vessels. And this channel between the mind and the body is wide open whenever we are in an altered state of consciousness with our awareness focused on something other than our ego and intellect.

That autonomic responses can be brought under voluntary control has long been known to practitioners of meditation, especially to students of yoga. Adepts at yoga can suspend respiration for long intervals of time, effect drastic changes in heart and circulatory function, and otherwise demonstrate that our internal functions are not beyond the reach of consciousness. In recent years, increasing numbers of Westerners, including physicians, have had a chance to observe these practices first-hand.

Texts on yoga are often vague about the techniques of achieving this kind of control (much of the information is transmitted orally from teacher to student), but from any survey of the Eastern literature three clues stand out. The first is that all of these accomplishments require relaxation, concentration, and practice. The second is that control of breathing is the key to the whole system. The third is that the first step to acquiring control of an autonomic response is to become aware of it. All of these suggestions are consistent with Western conceptions of neurophysiology.

Relaxation and concentration are means of detaching ourselves from ordinary consciousness, from that kind of consciousness where control of

autonomic functions is not possible. In neurophysiological terms, this may mean suspending certain cortical activities, since the connections between the cortex and the autonomic system are not direct. Practice is the means by which potential neuronal pathways are developed, since repeated use of a circuit in the nervous system makes future use of that circuit easier.

The importance of breath control is that respiration is the one function in which the two motor pathways are in perfect potential balance. The theory behind yogic and other systems of disciplined breathing is that regular rhythms produced by the voluntary pathway will eventually be picked up by the involuntary pathway, and that once this sort of correspondence is established across the function of breathing, it spreads naturally to the other involuntary functions of heart rate, circulation, and so forth. It is significant that all Eastern and many Western systems of spiritual practice place great stress on breath control, also that the words for "spirit" and "breath" are identical in many Indo-European languages (including Sanskrit [prana], Hebrew [ruach], Greek [pneuma], and Latin [spiritus]). Consider this excerpt from Foundations of Tibetan Mysticism by Lama Anagarika Govinda:

The most important result of the practice of 'anapana-sati' or 'mindfulness with regard to breathing,' is the realization that the process of breathing is the connecting link between conscious and subconscious . . . volitional and non-volitional functions, and therefore the most perfect expression of the nature of all life. Those exercises that lead to the deeper states of meditation . . . begin therefore with the observation and regulation of breath, which in this way is converted from an automatic or non-volitional function into a conscious one and, finally, into a medium of spiritual forces. . . .

Breath is the key to the mystery of life, to that of the body as well as to that of the spirit.*

Becoming aware of internal functions means paying attention to sensations we ignore in our ordinary waking state. As defined by neuro-anatomists, the autonomic nervous system is purely motor or "efferent" —

*Lama Anagarika Govinda, Foundations of Tibetan Mysticism (Rider and Co., London, 1960; U.S. ed., Samuel Weiser, Inc., New York, 1969), p. 152.

(that is, it carries impulses away from the brain to peripheral smooth muscles and glands). But it is well known that sensory nerves travel with this system, carrying information from the internal organs to the brain. These "visceral afferent nerves" as they are called are among the least-well-understood components of the nervous system. We do not know what information they carry or how the brain integrates their messages into its infinitely complicated system of data processing. The experiential correlate of this lack of understanding is our own inability to feel what goes on inside our bodies except in the vaguest ways. We are all aware of occasional sensations from our viscera, particularly if they are distended, but few of us can pinpoint the miscellaneous pains, twinges, and feelings that arise from inside our chests and abdomens. These visceral sensations are diffuse (that is, poorly localized), unclear as to quality, and of uncertain significance. Yet yogis say that with practiced concentration one can greatly sharpen one's perception of these signals and that success in this practice leads automatically to greater autonomic control.

Working on this suggestion, a number of American researchers have begun to develop simple methods of teaching people to regulate internal functions. Known as "autonomic feedback control," these methods are all based on the principle of using external devices to augment internal signals so that they become perceptible without special practice. For example, blood pressure can be made continuously visible on an oscilloscope screen or blood flow through an extremity on a moving graph. It turns out that if people in laboratories are provided with this sort of continuous feedback from an autonomic function to their external senses, they can quickly learn to modify the function. In this way, researchers in many parts of the country are demonstrating that heart rate, blood pressure, peripheral blood flow, and a variety of other functions thought to be beyond the reach of consciousness can be brought under voluntary control quite easily. These results have appeared in respectable journals* and are stimulating

*See, for example, "Effects of Feedback and Reinforcement on the Control of Human Systolic Blood Pressure," by D. Shapiro, B. Tursky, E. Gershon, and M. Stern, Science 163, p. 588 (7 February 1969). Also, "Mind Over Body, Mind Over Mind," by Gay Luce and Erik Peper, N.Y. Times Magazine, 12 Sept. 1971, p. 34.

considerable interest among physicians and patients alike, even in orthodox medical circles.

The reason for this interest is obvious. Orthodox practitioners now have no methods for regulating autonomic functions with any specificity. For example, they have no effective drug for high blood pressure. The commonest variety of high blood pressure is called "essential hypertension," ("essential" being one of several words doctors use to conceal their ignorance of causes). It is a widely prevalent disease associated with serious complications over the course of years. Essential hypertension seems to be correlated with a general increase in the tone of the sympathetic division of the autonomic nervous system, and orthodox medical treatment of the condition is therefore aimed at sabotaging this system, even to the point of surgical cutting of sympathetic nerves. Unfortunately, these methods either do not alleviate the course of the disease much, or, if they are drastic enough, cause so many derangements of general sympathetic functioning that any decrease in blood pressure is offset by the appearance of other problems.* The finding that patients can be taught to lower blood pressure directly and specifically by the technique of autonomic feedback control opens a new and exciting frontier of treatment.

It is not necessary for people to know what they are doing when they learn to modify a function like heart rate or blood pressure; all they have to do is have feedback from the process to their senses. Furthermore, once they get a feel for the successful technique, they can dispense with the external amplification and continue to practice anytime, anywhere. The success of these methods has led some researchers to conclude that Western technology is about to usher in an era of instant yoga and that yogis have been wasting their time.

I do not subscribe to these sentiments because it seems to me that yogis learn to do far more important things by their methods than gain con-

*Many "antihypertensive" drugs are marketed, and doctors administer them to patients very frequently, but the ones that work do so many other things that I consider them dangerous. The other things are conveniently described as "side effects" in pharmaceutical advertising, although in practice the decrease in blood pressure is often the side effect.

trol of particular autonomic processes. Autonomic feedback control is certainly important: if nothing else it shows us that common conceptions of the limits of conscious control are mistaken. But does it change our relationship to our unconscious minds? I am convinced that the unconscious mind stands in the same relationship to the autonomic nervous system as the conscious mind does to the voluntary motor pathway. The problem, then, is not to learn to control the autonomic nervous system (since all of us are already doing that all the time); the problem is simply to open the channels between the conscious and the unconscious minds.

These channels are blocked in our ordinary waking state, opened in altered states of consciousness like trances and highs. Autonomic feedback training bypasses these channels by routing an unconscious sensation through an external amplifying device. Doubtless this method has a very important place in specific clinical applications, but I do not think it will help us solve the general problem of establishing free interchange between our conscious and unconscious experience. In fact, by putting us in touch with certain possibilities of extended consciousness without teaching the general method of achieving and maintaining such control, it is open to the same criticisms that can be applied to drugs as means of reaching desired states of consciousness, including the inherent risk of dependence on something external and material to achieve something internal and non-material. In short, although autonomic feedback training may help us treat our symptoms by ourselves and with natural methods (clearly steps in the right direction), it will not put us in touch with the true causes of health and illness.

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