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"Biofeedback," or voluntary control of internal states, already has been used in many laboratories to enable individuals to alter brain waves, blood pressure, blood flow, heart rate, and muscle tension. It is sometimes called autogenic training. The technique involves detecting the variable to be controlled, displaying information about it on a dial or with a light or sound, and then letting the subject practice controlling it. The procedure has been used experimentally in treating high blood pressure and migraine headaches.

While biofeedback may eventually have wide application in medicine, psychic researchers are concerned principally with its usefulness in investigating states of consciousness. Much work has been done with alpha waves, which are brain impulses that occur with a frequency of between 8 and 12 cycles per second. Most subjects are able to control their alpha waves fairly easily. About 90% of us can produce them just by closing our eyes. But with suitable training, subjects have learned to suppress them with their eyes closed, to produce them with their eyes open, or to alter the alpha frequency. The waves are detected with an electroencephalograph machine and then displayed to a subject as a sound or a light.

Alpha waves generally are associated with an alert yet passive mental state, lacking visual images. Their appearance is related to several ASCs. According to some studies, individuals who are highly susceptible to hypnosis produce alpha rhythms more often than those who are not so susceptible. Electroencephalographic studies of Zen monks have revealed that during meditation their brains produce alpha waves principally. Yogis have been shown to produce more of these waves while meditating, and individuals practicing transcendental meditation (the procedure taught the Beatles by Maharishi Mahesh Yogi) have more regular alpha waves, with increased amplitude.

► Experienced Eastern mystics who truly have mastered meditation techniques can do much more than manipulate their alpha waves, however. In 1970 researchers at the Menninger Foundation in Topeka, Kan., spent several weeks examining an Indian yogi, Swami Rama of Rishikesh and the Himalayas. The swami could voluntarily maintain his production of theta and delta brain waves. Theta waves (four to seven cycles per second) often appear when a person becomes drowsy and eases toward sleep; delta waves (about one per second, with very large amplitude) are usually associated only with deep sleep. During one five-minute test, Swami Rama demonstrated theta waves 75% of the time. The next day he deliberately produced delta waves for 25 minutes; he appeared asleep and even snored gently, but afterward he could repeat almost perfectly things said in the room at that time.

These are not just exercises but have the potential for teaching science some of the as yet unexplained workings of the human brain. When in the theta state (with alpha or beta also present 50% of the time), Swami Rama became aware of many unconscious thoughts he normally suppressed. The swami maintained that when in a state of deep reverie he could heal himself of certain ailments by giving the body suitable instructions in the form of images. Elmer E. Green, who directed the research at Menninger, also reported that Swami Rama "could diagnose physical ailments very much in the manner of Edgar Cayce [an American psychic who made thousands of medical diagnoses while in hypnotic trances], except that he appeared to be totally conscious."