conflicts by traditional arguments, not by group techniques. During encounter sessions, strong emotions participants feel toward each other arise primarily because they treat each other as anonymous objects that facilitate and support acting out; thus participants are interchangeable rather than unique, and strong ties that develop between them actually originate in mutual exploitation. The movement typically uses science to overcome the scientific view of man, that is, it validates its claims to elevate man above the limits of rationality by invoking scientific methods and language, and interprets easy excitement as experimental research. It is common for trainers to criticize the morality of the marketplace because industrial firms take no responsibility for consequences of their actions; yet trainers take responsibility only for themselves, and trainees are left with the responsibility for whatever happens to them, be it boredom, joy, or suicide. The movement is criticized by laymen for leading people away from old traditions to new values and by scientists for the fact that no real change has been demonstrated for anyone. Finally, the movement portrays itself as a problem-solving technique that relies on everything but the cortex. With internal contradictions like this, it is not surprising that observers find sensitivity training an elusive activity to size up.

Aside from paradoxes, Back detects some serious questions that have been produced by the movement. The first has to do with the valuing of change for change's sake and the absence of any specification as to its desired direction or goal. Could a movement that espouses change be harnessed to any political ideology, whether benevolent or malevolent? Another question concerns sensitivity training in organizations. Stated globally the question is, how far ought an employer involve his employees for the good of the company? Exposure to organization-sponsored sensitivity training could do more to an individual than is warranted by his working relationship, which is only part of his life. It could affect everything an employee does and in that sense multiply rather than reduce the parts of his life that the employer controls. A related point is that sensitivity training may appear effective largely because it deals with a population that is self-selected by social background, personality, and cultural ideas. As people outside this population, with different philosophies and ways of life, are pressured to participate in the movement, there is a chance that they will be harmed rather than entertained, will find themselves with neither their original defenses nor effective substitutes. This issue is not trivial, since people in higher positions are being trained who influence increasingly large numbers of people below them. Finally, more traditional therapists such as psychiatrists are put in a considerable bind by the movement. If they present their basically negative evaluation of the movement, they run the risk of undermining their own position. Laymen have difficulty distinguishing between encounter groups and the conventional psychotherapy, hence discrediting the former may sink the latter.

There are at least two interesting lessons for social science in general implicit in Back's analysis. There is growing concern that science may shudder to a halt under the weight of proliferating information. If anyone should have buckled under this weight it is Back; even though the sensitivity movement espouses the nonverbal, it is decidedly verbal in its espousing. This book is a testimonial that Back did not buckle, and the reason seems to lie in his style of work, which encompasses personal experience in groups, interviewing both trainers and trainees, digesting both popular and technical articles, uncovering correspondence that highlights dilemmas, browsing in bookstores at "growth centers" (such as Esalen), examining transcripts of public hearings, and most of all keeping his eyes and ears open. This multi-method, quasi-ethnographic, backstage exploration has netted far more insight than is to be found in the conventional state-of-the-art literature review. The sociology-of-science thread he has followed lends a coherence to the subject that is impossible to find if one pays attention solely to items in the public domain. At a time of confused groping to decide how science can evaluate its own contributions and shortcomings, Back provides a compelling model of one way to do it well.

The second lesson has to do with the hazards to science of an offshoot that shares its status in the eyes of the public but has escaped its venerable controls. Laymen may bristle at supporting science, not because it uses esoteric practices with sporadic payoffs, but because its prestige and trappings are invoked to legitimate nonscientific activities from which the consumer is not protected.

Considering all that Back has described, what is likely to be the denouement? It may consist of this. While at the margins of the academy sensitivity proponents continue to build an emotional elite and to savor intense group experiences sans attention to intermediate problems, skeptics will continue to hold the establishment together and influence its course. And as the movement reaches its peak and begins the descent, the members of the elite, true to the title of a book of science fiction that is a bible of the movement, may find themselves more than ever "strangers in a strange land."

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Silent Articulation

Inner Speech and Thought. A. N. SOKOLOV. Translated from the Russian edition (Moscow, 1968) by George T. Onischenko. Translation edited by Donald B. Lindsley. Plenum, New York, 1972. x, 284 pp., illus. $22.50. Monographs in Psychology.

Many older American psychologists will remember the sterile discussion of whether all thought is or is not implicit speech, differing in kind from normal articulation only in the extent to which it is audible. A number of workers demonstrated early in the 20th century that silent recitation, reading, problem solving, and the like may be accompanied by manifestations of activity in various parts of the speech musculature, although that demonstration failed to settle the controversy. This book represents a basic advance on such simple demonstrations, in that it attempts to describe and explain the circumstances under which activity will be present in the motor speech system. Two methods are used: first, electromyographic measures are made of articulatory activity; second, subjects are made to articulate aloud while simultaneously executing some other task, and the deterioration of the task is measured.

The electromyographic studies reviewed (both the author's own and those of other workers) represent a technological advance over earlier work. Sokolov clearly recognizes the difference between demonstrating a generalized heightened state of tension in the ar-

ticulatory musculature and showing reduced articulation of specific word patterns. He produces evidence to demonstrate that patterned electromyographic activity, as well as generalized heightened tension, occurs in such activities as problem solving. However, more sophisticated techniques would be necessary, and are indeed only now becoming available, for detailed reading of the pattern of individual words.

Sokolov describes an interesting series of experiments which show that the amount of articulatory activity in problem solving will depend on the nature of the problem (with more activity for problems with obvious verbal content) and its difficulty. He believes also that there are substantial individual differences in the use of articulatory processing. His experiments with "interference" show the same pattern of the effects of task difficulty. In addition he is able to show interesting interactions between the target and the interfering task. Simple repetition of a single syllable presumably keeps the motor side of the articulatory mechanisms as busy as more complex performance. The effects are not as destructive, however, as recitation of more complex memorized material. Sokolov discusses the meaning of this in connection with his hypotheses about the function of inner speech.

Two general points of view are possible about the function of inner speech. One is that the electromyographic indicators simply represent some kind of overflow phenomenon—they are interesting and useful simply as manifestations of activity at some higher level, and give hints of the possible content. A second possibility, which Sokolov supports, is that the presence of activity in the articulators stimulates sensory activity from the articulators and that this serves a function per se in problem-solving activity. It might conceivably be possible to differentiate these points of view by experimental interference with sensory feedback.

This book is interesting more for the inspiration it offers for future research than for the work is describes. The electromyography of speech is now a rapidly developing field. Sokolov's book is rich in suggestions as to how it might be used as a probe in studying the more elusive areas of problem solving, reading, and short-term memory.

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Psychoneuroendocrinology

Influence of Hormones on the Nervous System. Proceedings of a meeting, Brooklyn, N.Y., June 1970. D. H. FORD, Ed. Karger, Basel, 1971 (U.S. distributor, Phiebig, White Plains, N.Y.). xx, 504 pp., illus. $31.45.

Endocrine secretions play an important role in modulating various aspects of neural function underlying behavior and mood. In turn, psychological factors, such as anxiety, affect pituitary hormone secretion. In recognition of this interplay, a group of scientists representing various basic and clinical disciplines have organized an International Society of Psychoneuroendocrinology. The papers in this book were compiled from the first meeting of this society.

Because of the breadth of the growing field of neuroendocrinology, it is not surprising that this single volume is not truly representative of the various topics which comprise the field. Nevertheless, the 40 chapters give important and interesting insights into several of the more active areas of investigation. A large number of the chapters deal with the role of thyroid hormone in the development and function of the brain. These papers describe a multitude of effects on brain chemistry, physiology, and behavior which result, either directly or indirectly, from thyroid hormone excess or insufficiency. However, very little is known about the basic cellular mechanism of thyroid hormone action, except from the work described by Sokoloff and Roberts concerning a thyroxine-induced mitochondrial factor which stimulates amino acid incorporation in immature brain and immature and adult liver. Other papers provide support for the direct action of thyroxine and certain steroid hormones on the brain by showing that systemically administered radioactive hormones are taken up into nervous tissue. At the cellular level, Chader and Villee examine the binding of estradiol to brain cell nuclei, deVellis and co-workers show that glial cells are targets of adrenal steroid action, and Pfaff and co-workers examine the neurophysiological consequences of testosterone and corticosterone action on the brain.

Neural regulation of endocrine secretion receives limited coverage. Krieger and Krieger examine the effect of putative neurotransmitters, intracerebrally administered, on ACTH secretion, and Kawakami and co-workers examine the role of various limbic structures in modulating ACTH secretion. Papers by Donovan and by Clemens and Shaar examine the neural regulation of gonadotrophin secretion. Steroid hormone effects on behavior and mental performance in mature animals are described by Klaiber and co-workers, by Michael, by Ciaccio and Lisk, and by Dupont and co-workers.

One of the most intriguing topics in this volume is the role of steroid hormones in the ontogeny of sexual behavior and neuroendocrine regulation. Nadler describes the masculinizing effects of intrahypothalamic testosterone implants in baby rats, and Swanson describes the consequences of systemic administration of androgen in newborn hamsters on subsequent reproductive physiology and sexual behavior. Peretz and co-workers extend this type of work on rodents to the rhesus monkey, showing effects of perinatal androgen in determining the gender of threat and play behavior.

The relationships of such psychoneuroendocrine studies to clinical observations on man are dealt with in papers by Abrams, Brambilla and Penati, and the late Max Reiss. The book is dedicated to Reiss.

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Odontology

Dental Morphology and Evolution. A symposium, Englefield Green, England, Sept. 1968. ALBERT A. DAHLBERG, Ed. University of Chicago Press, Chicago, 1971. x, 350 pp., illus. $18.50.

The results of the first international symposium on dental morphology were published in 1967 as Vol. 46, No. 5, pp. 769–992, of the *Journal of Dental Research*. The organization of the second symposium, held in 1968, was largely the work of Percy Butler. The papers given, now available in book form, are divided into three basic but somewhat arbitrary and overlapping groups: Ontogeny, five papers; Phylogeny, six papers; and Morphology, another six papers. Most of these contributions deal with the teeth of primates (notably man) and primitive therians, with only occasional forays into other mammalian orders. I found the book to be rather uneven but instructive reading; I recommend it as a valuable reference work.

The section on ontogeny leads off