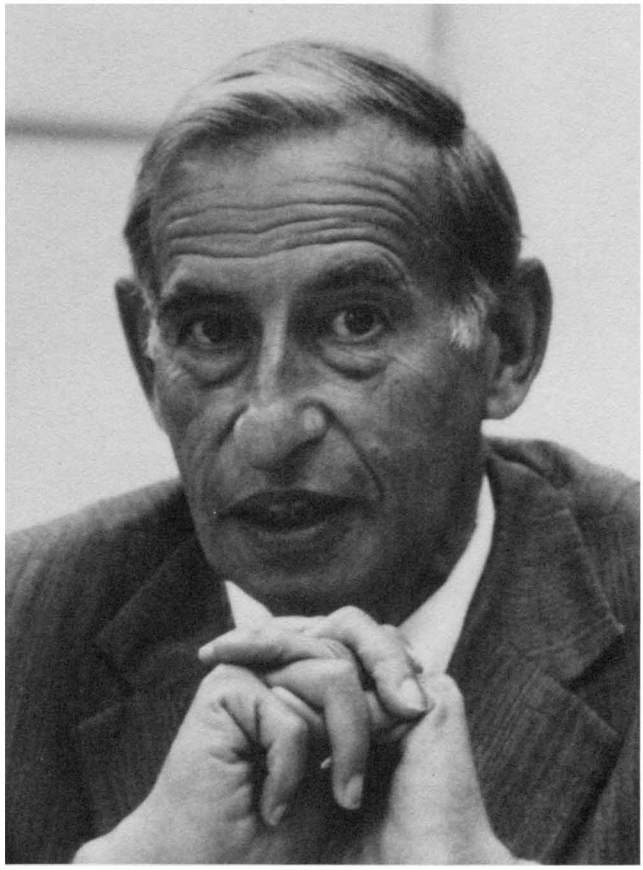
NATIONAL ACADEMY OF SCIENCES

HANS-LUKAS TEUBER

1916—1977

A Biographical Memoir by
LEO M HURVICH, DOROTHEA JAMESON,
AND WALTER A. ROSENBLITH

Biographical Memoir



HANS-LUKAS TEUBER

August 7, 1916–January 4, 1977

BY LEO M. HURVICH,
DOROTHEA JAMESON,
AND WALTER A. ROSENBLITH

ON WEDNESDAY, January 19, 1977, Hans-Lukas Teuber was scheduled to deliver a James R. Killian Faculty Award Lecture entitled "Mood, Motives, Memory and Values."[1] Instead there assembled in the Kresge Auditorium of MIT a memorial gathering of family, colleagues, students, and friends to remember and share recollections of this extraordinary person. They were there to express their affection, admiration, and love for him, and to assuage the grief prompted by his untimely and unexpected death at the age of sixty. Professor Teuber—or Luke, as he was known to his many friends—lost his life on January 4 while swimming off Virgin Gorda in the British Virgin Islands where he was vacationing with his wife Marianne. He had been at MIT since 1961 and in 1964 had founded the Department of Psychology and was appointed its first head. Within a few years the department had grown into a center of psychology and the brain sciences that came to be known and admired the world over.

Only a man of his brilliance, scholarly acumen, and warm personal qualities could have accomplished such a feat in one

[1] The first lecture, which was to have been delivered January 12, 1977, was entitled "From Perception to Action."

decade. A magnetic human being—summarized once in the phrase of a ten-year-old child of a colleague: "He twinkles"[2]—Luke was a gifted experimenter, teacher, and administrator. Above all, throughout his busy professional life, he expressed a warmth for people: gentleness, consideration, and concern for others. His colleague Professor Nauta said of him: "Luke was that rare person, described by Camus, as the true poet who would have no choice at all but to make poetry—even in the desert."[3] Whence came this magical, "highly improbable and very lovable man," as he was described by a brilliant young colleague, Ann Graybiel.[4]

Hans-Lukas Teuber was born August 7, 1916, in Berlin, the son of Dr. Eugen Teuber and Rose Knopf Teuber. His parents were exceedingly musical—both were excellent pianists—and his younger brother became an organist and music historian. His father, who was his greatest single influence during Luke's early years, had studied under Wilhelm Wundt and Carl Stumpf; under the sponsorship of the Prussian Academy of Sciences, he set up a primate station on Tenerife (Canary Islands) for the study of anthropoid apes. (While there, Eugen Teuber also collected folk melodies for Stumpf's "Tonarchiv.") In early 1914 he returned to Germany to serve as a communications officer during World War I. After a brief period during which they overlapped at Tenerife, Wolfgang Köhler took over the direction of the station from Luke's father and went on to conduct the famous chimpanzee experiments that he described in *The Mentality of Apes.* After the war, Luke's father became interested in calculating devices and joined a business machine firm called Adrema, first as director of research and later as director of exports.

[2] Transcript of a gathering to remember Hans-Lukas Teuber, Kresge Auditorium, Massachusetts Institute of Technology, Cambridge, January 19, 1977, p. 16.

[3] Ibid., p. 4.

[4] Ibid., p. 13.

In 1938 Lukas's parents and brother moved to Denmark; he continued his studies at the University of Basle in Switzerland, where he was a student from 1935 to 1939.

Lukas spent his youth with the family partly on the Baltic and partly in Berlin. His first schooling was in a private preparatory school in Berlin, and he subsequently attended the Collège Français (a Huguenot school) in Berlin for eight years, graduating in 1934 with a *baccalauréat.* His classical education emphasized the humanities—Latin, Greek, and ancient history—and all subjects, including the natural sciences, were taught in French. Lukas shared his father's disparate interests in Greek and Roman literature, the comparative study of animal behavior, and the application of mathematics to problems of communication. They took long hikes together, first into the Harz Mountains and later in the Alps. Lukas's older son Andreas documented the influence of his father's classical education when he told us at the memorial convocation: "I remember . . . when I was four years old, he thought it would be splendid if I heard *Antigone* by Sophocles—hard enough for a four-year-old—except that my father thought I would not truly appreciate it unless he read it to me in Greek. And so there I was, four years old—I had this teddy bear—and I sat there and listened to Sophocles in Greek."[5] (The going was not always that rough for Andreas and his younger brother Christopher. Although the English translations of the Greek myths and the recounting of the entire *Odyssey* were part of their bedtime fare, so were Dr. Doolittle and Winnie the Pooh.)

Lukas wrote poetry and plays in his youth and had contemplated a career as a poet. In later years, he continued to write occasional verse (he often quoted relevant poetry in his lectures), but while he was at the University of Basle, philos-

[5] Transcript of a gathering to remember Hans-Lukas Teuber, p. 10.

ophy became his primary interest—particularly, philosophy of science. His early interest in the comparative study of behavior continued, and he took courses and received laboratory training in biology and zoology, comparative anatomy, and embryology. His teacher in physical chemistry was Professor Bernoulli, and he worked with Professor Portman in the Zoological Institute. Hans Spemann, who came from nearby Freiburg to lecture on embryology, was still another influence. And it was here that Lukas's interest in problems of central nervous system physiology was first engaged.

An important aspect of Lukas's Basle years was the small interdisciplinary workshop in which he participated with several young instructors and fellow students. One of the latter was Marianne Liepe. Discussions at the workshop focused on the methodologies of the diverse sciences and ways to bridge the gap between the biological and social sciences. But the intellectual interests of the group ranged wide. At one time the group read Dante's *Divina Commedia* and works such as Bachofen's *Mutterrecht und Urreligion*—the sort of book that later led Robert Graves to extol matriarchal societies.

On receiving the Holtzer Fellowship at Harvard in 1939, Lukas prepared to come to the United States, but the outbreak of World War II delayed his arrival here until 1941. Marianne Liepe had come to the United States two years earlier to study at Vassar College, and she and Lukas were married in 1941. Marianne's background was similar to Lukas's in many ways. Her parents were Wolfgang and Gertrud (Neustadt) Liepe. Her father had been chairman of the Department of German Literature at the University of Kiel in Germany and later became a professor at the University of Chicago. The Teubers's two sons, Andreas Wolfgang and Christopher Lawrence, were born in 1942 and 1946. Andreas is now an associate professor of philosophy at Brandeis University and Christopher is a structural designer in Venice,

California. The Teubers became naturalized American citizens in 1944. In recent years Marianne has devoted more of her intellectual energies to her contributions to art history, particularly the Bauhaus period; but throughout Lukas's career, she was an integral part of the international intellectual life that moved freely and hospitably from his laboratory or seminar room to their home.

Teuber received his Ph.D. in psychology from Harvard University in 1947. His graduate training at Harvard and research at the Cabot Foundation in Cambridge were interrupted by two years of service in the U. S. Naval Reserve from 1944 to 1946. According to a perhaps apocryphal story, Lukas at first failed the mandatory German language examination at Harvard because, as a recent arrival to the United States, he did not know enough English into which to translate the German text. His Navy stint, however, and a part-time position as assistant boys secretary at the Cambridge YMCA while he was a Harvard graduate student accelerated his Americanization. He eventually acquired a superb command of the English language, and throughout his academic career his rapt audiences enjoyed his eloquence and gentle humor.

During his stay at Harvard, Lukas's interests were divided between the physiology of sensation and the application of experimental methods to the study of small social groups. His appointment to the research staff of the Cabot Foundation turned him temporarily in the direction of experimental sociology and led to his doctoral dissertation—"Dyadic Groups—A Study in Counseling Relationships"—under Gordon Allport's sponsorship. This study was part of a ten-year experiment in the "prevention of delinquency" by providing guidance, counseling, and psychotherapy to 325 underprivileged boys. Treatment consisted of intensive, face-to-face interactions between the boys and some thirty coun-

sellors; these counsellors saw the boys at weekly to monthly intervals for periods ranging from two-and-a-half to eight years. A control group of 325 similarly underprivileged boys—matched in pairs with the members of the treatment group but left entirely untreated—was also set up at the beginning of the experiment.

The importance of control groups to evaluate such social intervention programs was borne out by the outcome. Ten years after the start of the experiment and after all treatment had been terminated, the research staff compared the incidence of delinquency between the treated and control groups. Even though all but one of the counsellors thought their treatment efforts highly successful, the frequency of offenses turned out to be slightly higher in the treatment group. The use of large matched control groups was to be a dominant feature of Teuber's later research on brain-damaged patients.

After his death, an autobiographical sketch that Lukas had prepared in either 1952 or 1953 was found among his papers. In summarizing his career to that point, he wrote:

> My original biological interests had been fostered at Harvard through contacts with Lashley, and through avid reading of the work of J. W. Gibbs, L. J. Henderson, and W. B. Cannon. The possibility that the logic of Gibbsian systems (set up for physical chemistry) might be equally applicable to biological and social systems, was considered more and more seriously.
>
> A more direct influence was that of Kurt Goldstein, who at that time (1941) was Visiting Professor and William James lecturer at Harvard. Frequent personal contacts made me aware of the strategic role of experimental neurology within the framework of general biological science, and suggested a reconsideration of the earlier German work (Bethe, Uexkull, Weiss) in comparative physiology of nervous systems and problems of sensorimotor integration.
>
> The final and decisive push in the direction of my chosen field was provided almost fortuitously by a two-year period in the U.S. Navy. In 1944, I arrived at the San Diego Naval Hospital where Dr. M. B. Bender

was in charge of the neurology wards. He was interested in studying peripheral nerve injuries, causalgia, and sensory disturbances after cerebral injury. Hearing of my acquaintance with Goldstein's work, he suggested that I stay with him at the Naval Hospital. An improvised laboratory was set up early in 1945, and men with acute battle injuries of the nervous system were studied by us for nearly two years. The unique opportunity of observing effects of acute brain injuries resulted in a number of joint papers . . . In these papers, we tried to continue the tradition of Goldstein and Gelb, of Poppelreuter, of Head and Holmes, considering the injuries as experiments of nature and studying the disturbances of brain function as a clue to normal modes of central nervous functioning.

This type of research was to remain a consuming interest of Luke's until the end. Dr. Weiskrantz, an Oxford colleague and friend, has written: "He contributed a unique and distinctive personal approach to a tradition that had its roots in 19th century neurology."[6]

Following his discharge from the Navy and completion of his graduate work at Harvard, Lukas went to the New York University College of Medicine. Under the sponsorship of Bender and S. B. Wortis, he built up a small laboratory to continue studying the effects of penetrating brain injuries. Successively he was appointed research associate in the College of Medicine and in the Department of Psychology in the Graduate School of Arts and Science, associate professor, and professor. Throughout this period he headed the Psychophysiological Laboratory at the NYU Bellevue Medical Center and with his colleagues and students established that laboratory as a vital and creative research center that attracted international attention. Teuber's research collaborators during these years included Josephine Semmes, Lila Ghent, Rita Rudel, Sidney Weinstein, William Battersby, Joseph Altman, Mortimer Mishkin, Stephan Chorover, Florry Proctor, and others.

[6] L. Weiskrantz, "Hans-Lukas Teuber," *Nature*, 2(1977):485–86.

Although his teaching at NYU was primarily in specialized courses such as neuroanatomy and physiological psychology, Teuber's interdisciplinary interests persisted. He also taught a course on the social psychology of small groups and became a member of the Macy Foundation multidisciplinary group. This group held a series of conferences in an area that became known—after the title of Norbert Wiener's book—as cybernetics; the discussions dealt with feedback theory and communication theory and their possible relevance to the study of central nervous function.

In 1961 Teuber left New York University for MIT—but with certain misgivings: he had had a long association with his group of brain-injured patients, and he was strongly attached to his attractive home in Dobbs Ferry just outside New York City. The early transition to MIT was, in his own words, "somewhat turbulent." But even after the move to the Boston area, Luke was able to maintain his contacts with the New York patient group, and in fact the association lasted some thirty years. He had a clear and uncompromising conception of the type of psychology department he wanted to develop at MIT, and he saw to it that his plan became reality.

In 1961, psychology at MIT was a section in the Department of Economics and Social Science. But Luke moved rapidly to reorganize psychology staffing, to plan a research building, and to develop a doctoral program. In contrast to a proposed interdepartmental arrangement that would have overseen all scientists and engineers at MIT involved or interested in psychology, Teuber and his colleagues stressed the need for psychology as a core concept. Their aim was a strong and cohesive program with both educational and research components. Luke's view was supported by the visiting committee of the "parent" department and the MIT administration; by the end of the 1964 academic year, the MIT corporation conferred departmental status on psychology.

From its very beginning the department focused its efforts on what is now commonly called brain sciences. Three related parallel lines of interest were vigorously pursued: (1) brain and behavior (neuropsychology, neuroanatomy, and neurophysiology); (2) experimental psychology (perception and learning); and (3) social and developmental psychology, with an emphasis on comparative aspects (sensorimotor development, cognition and language acquisition, and psycholinguistics).

Weiskrantz has succinctly summarized the department's further development under Teuber's leadership:

> To it he attracted scientists of great distinction from a variety of disciplines, as well as younger persons whose promise later was fulfilled; the contributions of his colleagues were as important in neurophysiology as in experimental psychology. He worked unceasingly to attract funds for their endeavors and to promote a genuinely interdisciplinary atmosphere, warm and paternalistic, in which he and his colleagues could flourish. The MIT department became an almost compulsory stopping-off point in the U.S.A. for scientists from throughout the world with interests in brain function and psychology; they were invariably greeted with great hospitality and kindness, their seminars almost always continuing at the Teubers' home late into the evening, surrounded by a formidable but enthusiastic circle of graduate students.[7]

To this day the full-time faculty of the department includes Walle J. H. Nauta (Institute Professor), who came from the Walter Reed Institute of Research; Emilio Bizzi, whom Lukas brought from the National Institutes of Health; Richard Held and Alan Hein from Brandeis University; Stephan L. Chorover, who came with Teuber from NYU; and Ann M. Graybiel, Whitman Richards, Peter H. Schiller, and Gerald E. Schneider, all of whom received their doctoral degrees at MIT.

Teuber's scientific interests are succinctly summarized in

[7] L. Weiskrantz, "Hans-Lukas Teuber," p. 486.

the title of one of his many invited addresses, "The Brain and Human Behavior": "What we want to know," he said, "is nothing less than what goes on within ourselves (and by that we mean within our central nervous system) when we perceive, when we move, when we feel (or express emotions), and when we learn or remember."[8] In pursuit of this ambitious goal, his research, which was usually a collaborative effort, can be divided into roughly three periods.[9]

The first phase—with Bender in San Diego—has already been mentioned. It dealt mainly with visual and perceptual changes related to occipital injuries in a small number of brain-damaged individuals. This work was characterized by three qualities: (1) an emphasis on how different examination procedures provide different answers regarding the nature of the deficits; (2) a de-emphasis on the localization aspect of the effects; and (3) the necessity of complementing clinical studies with precise, detailed laboratory investigations. The French neuropsychologist Hecaen has underscored the impact Teuber's approach has had on contemporary neurological procedures.

The work carried out in New York University's Psychophysiological Laboratory constitutes the second phase. When Teuber went to New York in the spring of 1947, he persuaded the Veterans Administration to allow him to draw up lists of World War II veterans who had relatively stable and chronic lesions after receiving penetrating head wounds. After preliminary interviews at VA hospitals, selected patients were invited to participate in the research project at the New York University Medical School. The traumatized

[8] H.-L. Teuber, "The Brain and Human Behavior," in *Handbook of Sensory Physiology*, ed. R. Held, H. W. Leibowitz, and H.-L. Teuber, vol. 8, *Perception* (Heidelberg: Springer-Verlag, 1978), p. 880.

[9] H. Hécaen, "H.-L. Teuber et la Fondation de la Neuropsychologie Experimentale," *Neuropsychologia*, vol. 17, no. 2(1979):119–24.

veterans were not chosen on the basis of clinical needs or complaints but simply because they had suffered a head injury. Prior to the head injury they had been healthy young men with no signs of brain pathology.

Working with a large brain-injured population, Teuber and his colleagues developed a battery of precise tests encompassing the tactile, auditory, and visual domains. The resulting data led them to an increased recognition of the importance of problems of functional localization and functional hemispheric lateralization. It became possible to specify the unilateral or bilateral nature of the difficulties; and, as Hécaen points out, by demonstrating the significant associations among the symptoms, it became possible to reveal the functional deficit responsible for the various behavioral manifestations.

A unique feature of this research, and one strongly influenced by Teuber's early work, was the introduction of a large, matched control group. This group was made up of veterans with peripheral nerve wounds; their performance on the battery of tests was used to establish norms. Matched control groups today are de rigueur in scientific studies, and Lashley had used control groups in his animal studies on the effects of brain lesions, but their use was not standard procedure in human neurological testing and diagnosis. Another instance of Teuber's awareness of the importance of control groups came later when he served as a member of the Biosciences Subcommittee of the National Aeronautics and Space Administration. He insisted that matched controls be identified on earth in experiments that involved sending single monkeys—who belong to a naturally gregarious group—off into space. The single, isolated space-borne monkey did die (as Teuber had predicted), but so did several similarly isolated monkeys in the control group on earth.

Another important Teuber contribution—the principle

of the "double dissociation of symptoms"—was designed to offset the uncertainty of verifying a lesion site. In order for a particular deficit to be considered attributable to a particular lesion, the lesion has to "determine" the deficit to the exclusion of another type of deficit, caused by a lesion at a different site that does not involve the first deficit. This principle quickly became a fundamental tenet in animal and human neuropsychological methodology by serving as a check on the validity of experimental results.

As his work progressed, Teuber came to see the principles of cerebral localization in a broader perspective. As evidence accumulated, he drew the conclusion that bilateral hemispheric lesions could produce consequences that were not the equivalent of simply adding two unilateral lesions. On the other hand, disorders of hemispheric interaction could result from unilateral lesions. Ultimately, the brain-injured population that Teuber worked with totaled 520 cases; the original World War II group of veterans had been augmented by cases from both the Korean and the Vietnam wars.

The third phase of Teuber's research contributions began with his recognition of the importance of the concept of corollary discharge. This hypothesis derived from formulations by von Holst and Mittelstaedt[10] and, independently, by Sperry,[11] and it led Teuber to begin rethinking the relationships between perceptual and motor behavior and their cerebral correlates. He advanced the hypothesis that mechanisms of internal stimulation, as distinct from external sensory stimulation, could provide the necessary stability for human perceptions and the spatial and temporal framework

[10] E. von Holst and H. Mittelstaedt, "Das Reafferenzprinzip (Wechselswirkungen zwischen Zentralnervensystem und Peripherie)," *Naturwissenschaften*, 37(1950):464–76.

[11] R. W. Sperry, "Neural Basis of the Spontaneous Optokinetic Response Produced by Visual Inversion," *Journal of Comparative and Physiological Psychology*, 43 (1950):482–89.

for action, a notion that helped to throw light on a variety of frontal lobe disorders.

Teuber described corollary discharge as follows:

> Specifically, we postulate that when we make deliberate voluntary movements (e.g., shift our eyes across the room), *two* streams of signals are initiated within our nervous system, and not only one. One of these two is of course the classical motor outflow to the effector organs. The other set of signals is sent, directly and centrally, to the sensory systems, so that the consequences of the intended action can be taken into account.
>
> We call these discharges "corollary" when they are essentially derivations of momentary motor commands, and "anticipatory" when more remote consequences of the impending action are being computed. In either case, these signals . . . involve an information flow that is the reverse of the classical Sherrington one: not from sensory to motor, from back to front, so to speak, but in the opposite direction, from motor and premotor to sensory and therefore from front to back.[12]

The concept was used to interpret results related to visual searching behavior, curious abnormalities in the reversal of certain types of reversible figures, and breakdowns in sorting and categorizing behavior. As was his wont, Teuber sought to give the notion a solid base in neurophysiology by relating the concept to single cell studies of his own colleagues and related research in other laboratories.

Teuber's move to MIT coincided with rapid advances in electrophysiology and neuroanatomy in laboratories throughout the world. He and his colleagues, however, who were at the forefront of this specialized research, went beyond relating new data from anatomy, physiology, and studies of single neurons to perceptual-motor behavior. They attempted to relate these findings to simple and complex perceptual events (e.g., facial recognition), to problems of language (e.g., acquisition and impairments of production or reception of speech), and to problems of mood and memory (e.g., am-

[12] H.-L. Teuber, "The Brain and Human Behavior," p. 900.

nesias). The relative innateness and limits of modifiability of the postulated neurophysiological mechanisms were major concerns of Teuber's in each of the problem areas he touched on.

Teuber recognized that "the key questions about perception and movement, memory and mood remain unanswered"; but he was confident that the "converging evolution of experimental psychology, physiology and microanatomy together with comparative and developmental studies are bound to take us ever closer to our common goal: that of gaining a rational understanding of ourselves."[13] In moving toward this goal he was untiring in his efforts as researcher, administrator, teacher, and promoter of neuropsychology—both at home and abroad.

More than anyone else he helped bring together scientists—both young and old—with diverse backgrounds but mutual interests, hosting their discussions at his departmental colloquia, seminars, scientific meetings, and symposia. He lectured fluently with wit, humor, and brilliance in three languages: German, French, and English. As an "insightful, popular, and expansive reviewer at international meetings—even as a helpful translator for foreigners, the duration of his commentaries was apt to exceed, by a considerable amount, that occupied by the original speaker."[14] As Ann Graybiel reminds us, Lukas was often teased about this trait, but as she says, "He was by nature impish"; "he was a tease, and he loved to be teased."[15] His summations were usually brilliant, his introductions always entertaining and informative, and his classroom lectures—he was among MIT's most popular lecturers—drew standing-room-only audiences. In presentations as well as in conversation, he made no effort to

[13] H.-L. Teuber, "The Brain and Human Behavior," p. 912.
[14] L. Weiskrantz, "Hans-Lukas Teuber," p. 486.
[15] Transcript of a gathering to remember Hans-Lukas Teuber, p. 13.

suppress his contagious delight, but his listeners always needed to keep a close watch on his expressive eyebrows, which often punctuated—or punctured—a point.

His gentleness, his warmth and consideration for others, are epitomized by his advocating and helping to institute at MIT the first committee to protect human subjects from untoward effects of psychological and other forms of experimentation. The MIT Review Committee on Human Subjects antedates by several years the university review committees set up under the supervision of the National Institutes of Health.

His concern for the unethical use of scientific knowledge led him to resign as chairman of the Advisory Committee to the Surgeon General of the U.S. Army when his committee was asked to develop a policy for the use of LSD and other mind-altering drugs. Moral decisions must always be primary, he claimed. And when it comes to the application of science, scientists must be citizens first and, together with others, protect all human beings from the abuses of science and from ignorance.

Professor Hécaen paid Teuber the highest tribute when he wrote that Teuber's works made him "the founder and guiding spirit of contemporary neuropsychology."[16] Teuber's posthumously published address, "The Brain and Human Behavior," which was delivered on July 20, 1976, at the 21st International Psychology Congress in Paris, concludes:

> For millennia, we have tried to comprehend the universe around us; the time has come, during this last century, and is now here, to attempt to comprehend ourselves. To this end, all the sciences have to be put to the service of man's understanding of man. Psychology finds its identity, I propose, by its subject matter, not by its methods.
>
> It is clear that our particular science is as central as physics, and ulti-

[16] H. Hécaen, "H.-L. Teuber et la Fondation de la Neuropsychologie Experimentale," p. 122.

mately more so. But it is also capable of as much abuse as physics. As Lord Adrian once said, "He who can first explain and control paranoia will have found the means of producing it." Yet just for that reason, all of us here who are concerned with furthering man's understanding of man will have to abide by a new kind of hippocratic oath, never to do harm, always to heal rather than hinder, to make human life richer, and to make it free.[17]

It seems appropriate to conclude this memoir with two brief excerpts from the citation prepared by his MIT colleagues for the James M. Killian Faculty Achievement Award (1976–77):

Hans-Lukas Teuber, Professor of Psychology, founder and head of the Department of Psychology at the Massachusetts Institute of Technology, is a man who joins the instincts of a penetrating experimenter and the experience of a brain scientist with the consummate style of a gifted teacher. In that many-sided image, he has created the Department where he never ceases to support, by precept and example, his three-fold ends: informed observation, keen experiment, and the generosity and wit to make the fruits of science available to all. . . . Even that is not all. Many of us do not forget his long hours of talking and sharing with troubled and angry students during the terrible years of the war in Southeast Asia. He displays two high gifts, that of a scientist's perpetual wonder at the mysteries of brain and behavior, and that of an artist's compassion for the springs of thought and action in his fellow human beings.

THE AUTHORS would like to thank Marianne Teuber for her generous assistance in the preparation of this memoir.

[17] H.-L. Teuber, "The Brain and Human Behavior," p. 913.

HONORS AND DISTINCTIONS

HONORARY DEGREES

Université Claude Bernard, Lyon, France, Doctor of Medicine, 1975
Université de Genève, Switzerland, Doctor of Psychology, 1975

VISITING LECTURESHIPS AND PROFESSORSHIPS

Eastman Professor, University of Oxford, England, 1971–1972
Christmas Lecturer, Illinois Science Lecture Series, Chicago, 1974
Philips Lecturer, Haverford College, Pennsylvania, 1975

AWARDS

Karl Spencer Lashley Award for Research in Neurobiology, American Philosophical Society, 1966
Apollo Achievement Award, NASA, 1969
Kenneth Craik Award in Experimental Psychology, St. Johns College, Cambridge, England, 1971
James R. Killian Faculty Achievement Award, Massachusetts Institute of Technology, 1976–1977

HONORARY AND ELECTED MEMBERSHIPS

National Academy of Sciences, 1972
American Academy of Arts and Sciences, 1962
Society of Experimental Psychologists, 1960
National Institute of Neurology Faculty, Mexico, 1967
French Neurological Society, 1968
Institute of Medicine, 1975–1977
Sigma Xi

SCIENTIFIC AND PROFESSIONAL SOCIETIES

American Academy of Neurology
American Association for the Advancement of Science
American Neurological Association
American Psychological Association
Association for Research in Nervous and Mental Diseases
Eastern Psychological Association
European Brain and Behavior Society
French Psychological Society (associé étranger)

International Brain Research Organization
Psychonomic Society
Society for Neuroscience

EDITORIAL POSITIONS

Coeditor, *Experimental Brain Research,* 1965–1977
Berlin Editorial Board, Springer-Verlag, *Handbook of Sensory Physiology,* 1967
Consulting editor, *Journal of Comparative and Physiological Psychology,* 1956–1968
Consulting editor, *Journal of Nervous and Mental Disease,* 1961–1964
Editorial Board, *Journal of Psychiatric Research,* 1961–1964
Neuropsychologia, 1962–1977

PROFESSIONAL AND ADVISORY AFFILIATIONS

Professional Advisory Committee, Boston University Aphasia Center, 1975
Board of Directors, Foundations Fund for Research in Psychiatry, 1966–1969
International Brain Research Organization: Central Council Representative, 1968–1970; Chairman, 1970–1973; Chairman, Committee on Symposia, 1968–1974
Scientific Advisory Board, Massachusetts General Hospital, 1971–1974
Task Force in Behavioral Biology, National Academy of Sciences, 1965–1968
Biosciences Subcommittee, National Aeronautics and Space Administration, 1963–1970
National Institutes of Health:
Mental Health Study Section, National Institute of Mental Health, 1955–1958 and 1960–1961; Experimental Psychology Study Section, National Institute of Mental Health, 1961–1964; Neurology A Study Section, NINDB, 1964–1968
Behavioral Sciences Training Committee, National Institute of General Medical Sciences, 1969–1973
Head Injury Section, National Institute of Neurological Diseases and Blindness, 1967–1969
Scientific Advisory Committee, New England Regional Primate Center, 1971–1977

Biological and Behavioral Sciences Panels, Office of Scientific Research, U.S. Air Force, 1962–1965

Advisory Committee on Psychophysiology, Office of the Surgeon General: Member, 1958–1960; Chairman, 1960–1963

Research Advisory Committee, United Cerebral Palsy Association, 1959–1969

Area Consultant in Psychology, U.S. Veterans Administration, 1947–1960

Research Group on Head Injuries, World Federation of Neurology and the World Federation of Neurological Sciences, 1967–1969

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1948

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1949

With M. B. Bender. Alterations in pattern vision following trauma of occipital lobes in man. J. Gen. Psychol., 40:37–57.

With M. B. Bender and L. T. Furlow. Alterations in behavior after massive cerebral trauma (intraventricular foreign body). Confin. Neurol., 9:140–57.

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