

PREFACE

On December 6, 2002, a one-day Symposium was organized at the Department of Physiology and Biochemistry, University of Pisa, to honour Ottavio Pompeiano, Professor of Physiology at the University of Pisa Medical School, from 1957 to 2002. During this period Professor Pompeiano guided several generations of Italian and foreign students to whom he transmitted his fundamental enthusiasm about asking questions to nature and interpreting answers rigorously. On the occasion of this Symposium many of his former collaborators came to Pisa to celebrate the teacher who deeply influenced their thinking about science: this issue contains their contribution and is dedicated to him. We would like to express our gratitude to the University of Pisa for the generous sponsorship that made this conference possible.

We also take this opportunity to summarize the life, career, and scientific achievements of Professor Pompeiano.

Ottavio Pompeiano was born in Faenza on September 29, 1927 and completed his high school studies in Forlì in July 1944. Together with his father, he was subsequently taken and held as civil prisoner by the Third Reich occupation forces until January 1945. Later, that same year, he matriculated at the Medical School of the University of Florence, before moving to the University of Bologna, when this city was freed from occupation at the end of the Second World War. In July 1950 he obtained his Medical Degree, and his thesis received the Vittorio Emanuele II Prize, which the University of Bologna awarded to the student who had produced the best thesis during the previous academic year. In January 1953 he entered the Institute of Physiology at Bologna, headed by Prof. G.C. Pupilli, a former collaborator of Prof. M. Camis, the only Italian pupil of Prof. Charles Sherrington. Professor Pompeiano began his research career supported by a postdoctoral fellowship from the Italian National Research Council, CNR (from 1953 to 1956) at the Institute of Physiology of the University of Pisa, headed by Prof. G. Moruzzi, who had worked under Profs. F. Bremer, Lord Adrian, and H.W. Magoun. The stimulating scientific atmosphere in Pisa, and the opportunity to work closely with Professor Moruzzi played a great role in directing Pompeiano's interests toward neurophysiology. It was during this early period in Pisa that he first developed his interest in studying cerebellar and brainstem mechanisms involved in postural control and the regulation of sleep and wakefulness.

Supported by a Rockefeller Foundation Fellowship, that he was able to obtain, Professor Pompeiano moved to the Anatomical Institute of the University of Oslo to

work with Profs. A. Brodal and J. Jansen on neuroanatomy of the vestibular and cerebellar systems, from 1956 to 1958. Soon afterwards, he received a research grant to work at the Nobel Institute for Neurophysiology, a part of the Karolinska Institute in Stockholm, from 1958 to 1959. During this period he worked in close association with Prof. Ragnar Granit (Nobel Laureate in 1967) developing electrophysiological projects on muscle spindle physiology and motor control. These periods of diversified neuroanatomical and neurophysiological training provided a valuable basis for the research that he would have developed over the next several decades at the University of Pisa.

Back in Italy, Professor Pompeiano remained in Pisa, except for a brief appointment as Acting Professor of Physiology at the Medical School of the Catholic University in Rome, from 1962 to 1963. In 1967 he was appointed Full Professor of Physiology at the Medical School of the University of Pisa, where he taught physiology to undergraduate and graduate students taking specialized courses in Neurology, Psychiatry, Otolaryngology, and Sports Medicine. In 1968 he was also appointed Acting Professor of Neurophysiology at the Scuola Normale Superiore in Pisa, a position he relinquished in 1993. Professor Pompeiano also held visiting professorships at the Department of Physiology, University of Goteborg in 1964 (under the auspices of Prof. R. Lundberg), and at the Department of Veterinary and Comparative Anatomy, Pharmacology and Physiology at Washington State University, Pullman in 1985 (under the auspices of Prof. C.D. Barnes). Professor Pompeiano's research work from 1961 to 1997 was immensely aided by the continuous financial support he received from the National Institutes of Health (NIH), Bethesda, MD, USA for his projects on vestibular physiology, as well as on sleep mechanisms. He also coordinated a national research program on mechanisms of motor control (MURST) from 1981 until 2002.

One of Professor Pompeiano's major career priorities was to recognize and develop the scientific talents of young pupils. Working in his laboratory in Pisa was an effective training and experience for approximately 70 Italian and 70 foreign collaborators, who then became prominent researchers in their own field. Ragnar Granit expressed his appreciation to Professor Pompeiano in a supporting letter written to the President of the Committee for Medicine and Biology of the Italian CNR, urging them to develop a Center in Physiology and Motor control in Pisa:

"On the European continent no other school of motor physiology is at the same level of competence. This is why Pompeiano attracts so many workers from foreign countries to Pisa with the financial support of the NIH. It is a principle of this American foundation to only contribute in exceptional circumstances to the work of foreign scientists. Pompeiano's success in obtaining support from the NIH in the USA, at a time when grants to European biological science have been largely withdrawn, is a considerable compliment to himself. By his enthusiasm and experimental initiative Pompeiano has succeeded in creating an important centre of research on motor function. Behind it stands training in neurophysiology and histology second to none".

Together with his Italian and foreign collaborators, Professor Pompeiano published hundreds of experimental studies in peer-reviewed international journals. In addition, he co-edited numerous monographs, including *The Vestibular Nuclei and their Connections* (1962, with Brodal and Walberg, translated into Russian in 1966 by the USSR Academy of Sciences); *Basic Aspects of Central Vestibular Mechanisms* (1972, with Brodal); *Reflex control of Posture and Movement* (1979, with Granit); *Brain Mechanisms of Perceptual Awareness and Purposeful Behavior* (1981, with Ajmone-Marsan); *Vestibulospinal Control of Posture and Locomotion* (1988, with Allum); and *Neurobiology of the Locus Coeruleus* (1991, with Barnes).

Professor Pompeiano also served on the editorial boards of the "Italian Journal of Neurological Science", "Brain Research in Neurology and Psychiatry", "Journal of Vestibular Research", and "The Cerebellum", and served as member of the advisory board of "Progress in Brain Research". He succeeded G. Moruzzi as Chief Editor of "Archives Italiennes de Biologie" (now subtitled "Italian Journal of Neuroscience"), the oldest Italian journal of biology and physiology. For about 25 years, he was also Subject Editor of the Neurophysiology section of "Pflügers Archiv", the oldest German physiological journal (now "European Journal of Physiology").

Professor Pompeiano and his research group were competitively selected by the Committee of Molecular and Cellular Biology of the NIH to participate in the NASA Space Mission "Neurolab" (1995-1999), examining the effects of microgravity on gene expression in the brain. This project was supported by research grants given by the Italian Space Agency (ASI). Recent studies published between 2001 and 2003 (1-9) identified the important role of the central noradrenergic system in producing adaptation after exposure to microgravity in space, and readaptation to the terrestrial environment after landing.

After the retirement of G. Moruzzi in 1980, Professor Pompeiano became Head of the Institute of Physiology (now Department of Physiology and Biochemistry) at the University of Pisa for a three-year period, during which he founded in Italy the first Doctoral Program in Basic Neuroscience (now, Basic and Developmental Neuroscience), together with Profs. G. Moruzzi, R. Levi Montalcini, and L. Maffei. He directed this program from its origin (1982) until 1997 (his 70th year). He subsequently continued his research activities until October 31, 2002, when he took his formal retirement. At this time, he was nominated Professor Emeritus in Physiology on proposal of the Department of Physiology and Biochemistry and the Medical Faculty of the University of Pisa.

Professor Pompeiano has been a member of the Academia Europaea, Academia Rodinensis (Stockholm), New York Academy of Sciences, Italian Physiological Society, Bãrãny Society, Collegium ORLAS, European Neuroscience Association, American Neuroscience Society, International Brain Research Organization (Central Council 1976-1986). During his career he has been awarded with the A. Feltrinelli Prize for Medicine (Accademia Nazionale dei Lincei, Rome, 1974) for his discovery of spinal inhibition during paradoxical sleep (10-12) (Fig. 1). He studied the role that the noradrenergic and the cholinergic pontine systems exert in determining pos-

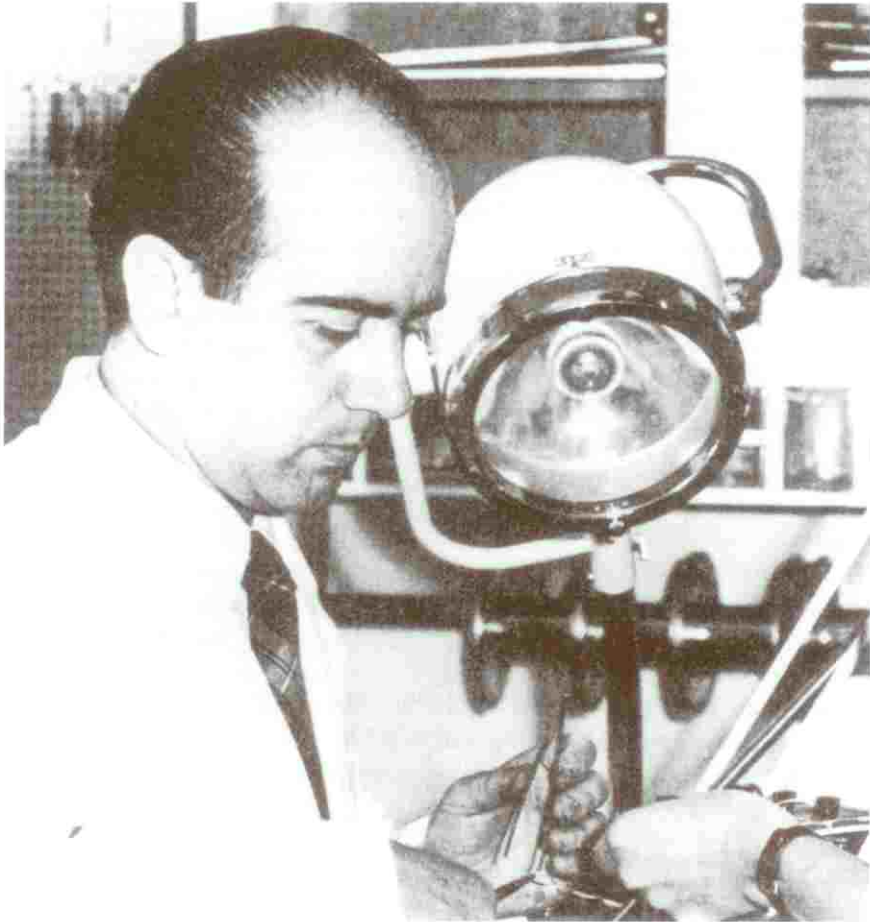


Fig. 1 - How the brain suppresses the muscle tone during paradoxical sleep so that commanded movements are not enacted was revealed by the experiments of Ottavio Pompeiano (10-12). Working in the Pisa Institute, Pompeiano applied the classical techniques of spinal reflex analysis introduced by Charles Sherrington to demonstrate that the motor cells leading directly to the muscles are actively inhibited throughout each REM period. Furthermore, stimuli coming directly from the skin and muscles are also blocked by the second inhibitory process associated with the clusters of rapid eye movements. Both kinds of inhibition were shown to come from the brain stem. Source: Courtesy of J. Allan Hobson, *The Dreaming Brain*, Basic Books, Inc. Publ., New York, 1988.

tural atonia during this phase of sleep (13, 14). He identified several mechanisms of sensorimotor integration during paradoxical sleep (15). He also discovered that vestibular nuclei neurons increase their rhythmic discharge in absence of head movements during REM sleep (16) and play an important role in developing mechanisms of sensorimotor integration during sleep (17). These findings led Professor Pompeiano to investigate the role that noradrenergic and cholinergic systems exert in the gain regulation of the vestibulo-ocular and the vestibulospinal reflexes, as well

as in the adaptive processes which affect these vestibular reflexes during combined visuo-vestibular and neck-vestibular stimulation (18, 19). Professor Pompeiano received the Educational Department Gold Medal (Italian Government, Rome, 1979); he also received the Robert Bårany Gold Medal of the Medical Faculty of Uppsala University (1983) "for the most valuable work on the vestibular system in the widest sense, made in the last five years" and the International Prize and Prof. P. Caliceti Gold Medal of the University of Bologna (1984) for the best work on the vestibular system from 1980 to 1984. He was named a member of the Decorated Order Cherubin of the University of Pisa in 1978.

In June 1999, Professor Pompeiano received the Distinguished Scientist Award from the American Sleep Research Society, honoring his scientific advances in the field of sleep research, particularly for his work on inhibition of motoneurons during sleep, and his pioneering descriptions of mechanisms of sensorimotor integration during REM sleep. The award cited his "significant, original and sustained contributions to the understanding of sleep mechanisms". In March 2003, Professor Pompeiano was designated one of the original "Founders" of the field of modern sleep research by the Board of Directors of the Sleep Research Society for his contributions made between 1953 and 1962. This award was presented at the Meeting of the Sleep Research Society in conjunction with the World Federation of Sleep Societies, Chicago, June 2003, on the occasion of the 50th anniversary of the discovery of REM sleep.

Paola d'Ascanio and Diego Manzoni

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