FEPS

Federation of European Physiological Societies

FEPS NEWSLETTER

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Letter of the Secretary General of FEPS

On behalf of the Executive Board of the Federation of European Physiological Societies I wish you a prosperous 2008.
The Executive Board (ExCo) of FEPS has three new members : professor Bryndis Birnir (Malmö) is our new treasurer, professors Alexej Verkhratsky (Manchester) and Ginés Salido (Cáceres) are appointed as new members.
I like to thank the previous treasurer, professor Peter Bie, and two ExCo members, professors Carlo Di Benedetta and Eva Syková for all their efforts to make FEPS a strong Federation.

The first important FEPS supported event in 2008 is the FEPS Physiology Teaching Symposium, held in Cologne, Germany, on March 2, during the annual meeting of the German Physiological Society. Those of you who are involved in teaching Physiology in medical curricula are invited to participate in this FEPS supported symposium. More details about the teaching symposium can be found in this newsletter and on the website of FEPS (www.feps.org).

The Secretary General of FEPS
Ger van der Vusse

4th FEPS Workshop on Teaching Physiology

Implications of the Bologna Declaration for teaching Physiology in medical education

Cologne, Germany, March 2, 2008

Dear colleagues,

On behalf of the FEPS Task Force Group on Education in Physiology, we cordially invite you to participate actively in our 4rd workshop, which will be organized during the German Physiological Society meeting, held at the Albertus-Magnus-Platz Universität in Cologne on

Sunday March 2, 2008 between 13.00-17.30 hr

We warmheartedly recommend this workshop, and we like to invite you to participate vividly in the discussion with lecturers and colleague physiologists, both during and after the workshop.

In this workshop, the Task Force likes to identify the points of view regarding the desire to come to general national agreements for physiology curricula in various European countries, taking into account the directions of the Bologna declaration for a undergraduate and graduate structure of higher educations. For this, keynote speakers were invited that will highlight – during the first part of the workshop - the actual Physiology curricula in their country. Lecturers are:

1. **Luc Snoeckx** (Maastricht University, Netherlands): Introduction into the Bologna Declaration for higher education in Europa. Implication for Physiology curricula
2. **Tamás Ivanics** (Semmelweiss University, Hungary): Physiology curriculum in Hungary
3. **Liisa Peltonen** (Biomedicum Helsinki, Finland): Physiology curriculum in Finland
4. **Richard Rokyta** (Charles University Prague, Czech Republic): Physiology curriculum in the Cezch Republic
5. **Frits Prinzen** (Maastricht University, Netherlands)/Jan Hindrik Ravesloot (Amsterdam Medical Centre, Netherlands): Physiology curriculum in the Netherlands

In the second part of the workshop, the attendants will be invited to participate in a one hour discussion session in small groups. Reactions on challenging statements and conclusions will be discussed for the general audience afterwards. The results of this discussion could help the Task Force group of FEPS to construct more general advises for the national physiological societies in Europe.

Although the organizers of the German Physiological Society meeting have waved your fee if you attend this workshop only, they like you to register formally via their website. Please indicate that you will attend the Educational Workshop. More information regarding registration, location of the meeting, transport and lodging can be found on the official website of the German Physiological Society: **www.physiologische-gesellschaft.de**

I sincerely hope to welcome you all in this workshop. Please – if possible – bring your young colleague teachers and physiologists to this meeting, so that they can profit from contacts with all the experts.

Sincerely yours,

Luc Snoeckx
Chairman FEPS Task Force on Education in Physiology
Email: l.snoeckx@fys.unimaas.nl

Addendum

The role of the Educational Task Force in the FEPS organization

Physiology teaching in Europe is one of the important issues to be addressed by FEPS. Because of such important new developments as change from classical curricula to curricula integrated with other fields and to curricula based on Problem Based Learning (PBL), disappearance of departments of Physiology resulting in loss of visibility of Physiology as a discipline on its own right, and a general desire to make curricula more uniform and exchangeable, it was felt that a Task Force was needed.

The first main goal of this Task Force should be to identify the common grounds of an academic European Physiology program, including the description of end-terms and competencies. This information could be very useful for the various national societies since they could help in establishing the generally accepted disciplinary end-terms. Aside from that, a survey is needed of the various approaches of educational methodologies, as well as of the Physiology-related educational research which is performed in each country. Furthermore, experts in various domains of educational methodologies have to be identified. Results of these inquiries will be published on the FEPS website, as well as published in international journals. Specific topics will be selected by the Task Force group to be presented on the annual workshop on Teaching in Physiology.

Famous European Physiologists. Part 2.

Giuseppe Moruzzi

Giuseppe Moruzzi was born in Campagnola in the province of Reggio Emilia the 30th 0f July, 1910.
He grows up in Parma were he gets the High School diploma at the age of 17 and the Medical Degree at the age of 23, like his father Giovanni. Prof. Moruzzi died the 11th of March, 1986.

MORUZZI'S OUTSTANDING CONTRIBUTIONS TO NEUROSCIENCE
Moruzzi was an exceptional scientist, an exceptional scholar, and an exceptional man. These three aspects of his personality are inseparable because he succeeded in integrating them into an exemplarily coherent life, marked by a consistent harmony between his great intellectual, cultural and moral qualities. That he was an exceptional scientist is revealed by those criteria for scientific excellence whose validity he himself always upheld: the seminal discovery; the ever-lasting acquisition of facts and concepts; the experiment which is as valid today, and will be as valid tomorrow, as when it was first published; the observation which not only solves a specific scientific problem, but also teaches how to reason and make predictions in front of every natural phenomenon.

At least three of Moruzzi's papers fully meet these criteria. The first paper, published with Adrian in 1939 (Adrian and Moruzzi 1939), provided the first proof that the cortical neurons giving rise to the pyramidal tract, and by inference all corticofugal neurons, participate in the spontaneous activity of the brain by a continuous emission of action potentials, even in the absence of movement. This discovery, to which the then 28-year-old Moruzzi contributed no less than did the 1932 Nobel laureate Adrian, is still a starting point for models of the organization of the intrinsic activity of the central nervous system.

The second paper, coauthored by Moruzzi and Magoun (1949), demonstrated the activating influence of the brainstem reticular formation on the EEG, and is rightly considered Moruzzi's best work. In 1981 the journal Current Contents selected it as a "citation classic" on the basis of the more than 840 quotations received during the 1961-1981 period (Moruzzi and Magoun 1981). A perhaps less arid index of its impact on the development of the neurosciences is the almost universally accepted division of the history of these sciences into the pre- and post-Moruzzi-Magoun eras.

The third paper of major importance was published by Moruzzi in collaboration with Batini, Palestini, Rossi, and Zanchetti (Batini et al. 1959). By describing the prolonged EEG and behavioral arousing effects of pretrigeminal midpontine sections, it offered a compelling argument for the active genesis of sleep and its partial dependence on caudal brainstem structures. It also prompted a series of experimental investigations and theoretical constructions which bear out the paramount role of Moruzzi in clarifying the functional mechanisms of the sleep-wake cycle.

Moruzzi's interest in the Problem of the Neurophysiology of Emotions

Moruzzi was a very productive scientist, and in addition to the above three famous papers he published very many studies which helped the advancement of the neurosciences in various ways and fields, particularly with respect to cerebellar physiology and pathophysiology. For space limitations, I shall consider only his contributions to the neurophysiology of emotions. As a physiologist he was chiefly interested in the basic mechanisms of animal life, and he rightly maintained that in order to begin to understand such mechanisms one ought to address issues that are simple, unitary, and possibly amenable to common biological principles.
Emotional phenomena, whether introspective or behavioral, are neither simple, nor unitary, nor easily liable to biological generalization, and perhaps as a result of this, Moruzzi's experimental work never tackled the problem of the neural bases of emotions directly. Yet it is a fact that his discovery with Magoun of the activating functions of the ascending reticular formation changed the course of the neurophysiological approaches to the analysis of the

relations between cerebral organization and emotional life.

In 1951 - two years after Moruzzi and Magoun (1949) had obtained EEG activation by reticular stimulation, and Lindsley et al. (1949) had produced coma with lesions of the rostral pole of the reticular formation – Donald Lindsley utilized these results for proposing a theory of emotion which has exerted a strong influence on neuroscience to this day (Lindsley 1951). The theory, called the activation theory because of the key role it attributes to EEG activation, views the hypothalamus-reticular formation complex as the central substrate which gives rise to the descending impulses controlling the somatic manifestations of emotion, as well as to the ascending corticopetal impulses mediating the related subjective experiences. According to the theory, the activity of the central substrate, which is amply open to facilitating and inhibiting influences arriving from both sensory periphery and other central nervous structures, varies in a continuous fashion between two extreme states, maximal undifferentiated emotional excitement, on the one hand, and sleep, on the other. The differentiation between discrete emotional states and the modulation of their intensity are attributed by the theory to intermediate degrees of activity of the central substrate.

The last assumption has always constituted a weak point of the theory because it is not easy to see how a mere quantitative change in the activity of the same neural system could bring about a shift, for example, from a positive to a negative emotion or vice versa. It is to Moruzzi's credit that he was one of the first to identify this weak point of the theory and to indicate a possible correction. In a scarcely known paper published in 1958 under the title “The Functional Significance of the Ascending Reticular System" (Moruzzi 1958), he suggested the possibility that the ascending reticular system is by no means homogeneous and unspecific, such that the various emotional states may result from its fractionated and differentiated activation rather than from quantitative variations of its overall diffuse energizing influence on the cortex. There is a hint in that paper at the existence of multiple and different ascending brainstem system - a concept which modern neurochemistry has shown to correspond to the reality of the various chemically differentiated ascending pathways, with substantial consequences for the understanding of the neurology of emotions.

Giuseppe Moruzzi and the Istituto dell'Enciclopedia Italiana

During the last years of his life I had the opportunity and pleasure to see him work on many entries of the Enciclopedia del Novecento, the monumental publication of the Istituto which aims at presenting a comprehensive picture of the flow of contemporary scientific thought. I can testify that he made an enormous contribution to the success of this publication by applying, with characteristic total dedication, his wisdom and capacity for work to all stages of the production, from choice of authors to correction of galley-proofs. I also have a vivid memory of the proud satisfaction with which he secured for the Enciclopedia the collaboration of lord Adrian (Adrian 1977) and Frederic Bremer (Bremer 1982), two great neurophysiologists who had been his influential teachers during his formative years. He felt that their writings could bring into the Enciclopedia the essence of one of his most valuable and profound spiritual roots.

Moruzzi as a Scholar and Educator

Moruzzi was an authentic intellectual who added to his scientific success the great merit of being a teacher in the true sense of the word that is one who can transmit a tradition of civilization. He played a fundamental role in the scientific and cultural revival of Italy after the tragedies of the fascist dictatorship and the Second World War, but his influence extended far beyond the boundaries of his country. In 1949, when he returned from Chicago to Pisa to take up the headship of the Institute of Physiology of the local university, he began to put into practice a program whose optimism and goodwill are made clear by a commentary he published in that year (Moruzzi 1949). In addressing a scientific American society which had invited him to describe the state of scientific research in Italy after the destructions of the war, Moruzzi gave a dispassionate picture of the moral and material poverty of his fellow citizens, but at the same time he openly revealed his hopes for the future and the task he had set for himself:

I hope that future European research work will contribute enough to justify the belief of many of us, that the old continent is still alive. Europe experienced worse times after the fall of Rome and then she alone was responsible for

Western civilization. I have often wondered about the feelings of the scholars in those miserable centuries and I think that they could only be ones of despair. And yet at the beginning of the twelfth century, something happened which very few had hoped for, and men began to build cathedrals, to found universities, and to irrigate their lands. It was the dawn of the Renaissance and of our modern culture. We do not know where we are standing in the tide of civilization, but we have faith that European contributions to the humanities and sciences are not near the end.

Innumerable colleagues, collaborators, pupils, and students not only from Italy but also from many other countries, can testify that Moruzzi was always faithful to this spirit, which allowed him to create in his Institute in Pisa a spiritual atmosphere outstanding for its almost religious concept of the significance of research work, for the breadth of its cultural scope, and for its logic and methodological rigor. Whoever was lucky enough to work and learn in that atmosphere, whoever could appreciate its direct or induced effects, whoever had a chance to meet Moruzzi and interact with him on a personal basis, cannot but be fully aware of the exceptionality of the man and his active life, and deeply feel and mourn the void left upon his death?

G. Berlucchi

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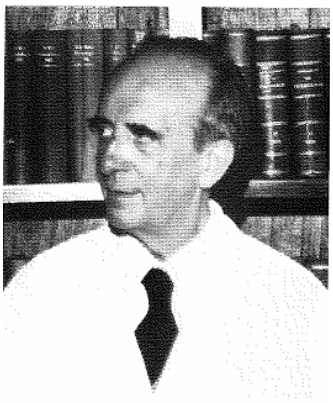

Fig. – 1 *Giuseppe Moruzzi in his office at second floor of the Istituto at Via San Zeno (picture by Robert **W**. Doty) in the springtime of 1977.*

This Week's Citation Classic

CC/NUMBER 40
OCTOBER 5,1981

Moruzzi G & Magoun H W. Brain stem reticular formation and activation of the EEG. *Electroencephalogr. Clin. Neuro.* **1**:455-73, 1949. [Dept. Anatomy, Northwestern University Medical School, Evanston, IL)

Stimulation of the brain stem reticular formation evokes generalized desynchronization of the EEG, simulating the arousal reaction of sensory stimuli. The electrocortical arousal is mediated by an ascending system, which is still active after mid-brain interruption of the classical sensory paths. [The SCI* indicates that this paper has been cited over 840 times since 1961.]

Giuseppe Moruzzi
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and
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July 15, 1981

"In 1948, a visiting professorship supported by the Rockefeller Foundation brought one of us (G.M.) to Chicago and prompted our collaboration. The scientific background of the original project[1,3] may be found in works started during World War II: 1) demonstration of an inhibitory reticulospinal system,[4] involved in the paleocerebellar control of posture and movements;[l,2] 2) prolonged abolition by paleocerebellar stimulation of the clonic twitches elicited in the chloralosed cat by local strychninization of the motor cortex, an observation suggesting the existence of an ascending inhibitory influence.[5] We started from the working hypothesis that ascending reticular pathways might explain the paleocerebellar effects on the motor cortex. Our approach was a study on the effects of fastigial and bulboreticular stimulations on the electrical activity of the motor cortex of the chloralosed cat, before and after local strychnine. Both conceptually and technically we were concerned with a simple problem, and our hope to reach a conclusion within a short time appeared justified. But the results were unexpected[1-3], and only at the end of the academic year was our work completed.

"The first experiment was made in December 1948. The EEC of the motor cortex became completely flat during stimulation of the inhibitory bulboreticular formation. By recording from other cortical areas we realized in the same day that the hasty statement written at the beginning of our protocol book ('activity of the motor cortex completely inhibited') gave a distorted picture of the reality. However, a few other experiments on unanesthetized *encéphale isolé* preparations were necessary in order to realize that the well-known phenomenon of the EEG arousal could be reproduced by reticular stimulation. In the next months the physiological significance of the *ascending reticular system* became clear. Our work was mainly concerned with parallel investigations on the phasic aspect of the arousal phenomenon, but it was realized that 'a steady background of less intense activity within this cephalically directed brain stem system' might contribute to the maintenance of the waking state. The first results of reticular lesions were reported by Lindsley, Bowden, and Magoun[6] in the same issue of the journal.

"The concept of structures responsible for the control of the general *level* of cerebral activities led to new approaches and views in several fields of the neurosciences: *neurophysiology* (mechanisms of EEC arousal and of the orienting reaction; levels of central activity during attentive and relaxed wakefulness, drowsiness, and sleep;

and sleep-waking cycle); *neuropharmacology* (barbital narcosis); and *clinical neurology* (coma following midbrain lesions). The predicted ascending reticular pathways were found in neuroanatomical investigations. This convergence of scientific interests and several interdisciplinary symposia on the ascending reticular system may explain why the original paper was highly cited. A more recent review has been prepared by Hobson and Brazier."[7]

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Fig. 2 – *The page of "This Week's Citation Classic" devoted by Current Contents (5 october 1981) to the paper concerning the reticular formation by Moruzzi & Magoun as discussed by the Authors.*

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