

Professor Juraj Antal  
A Premier Slovak Physiologist

by Hájek J

from  
The Institute of Physiology, Faculty of Medicine, Comenius University, Bratislava,  
Slovakia,

The first Institute of Physiology, in Slovakia, was founded in 1924 at the Comenius University, Bratislava. The first two Principals, both from the Charles University of Prague, were Antonín Hanák (1924-1930) and Vilém Hons (1930-1939). With the break-up of Czechoslovakia prior to World War II, and the departure of Dr. Hons, the Institute was under the temporary leadership of Josef Babor (1939-1940) who was also the Head of the Institute of Biology. By then Babor was almost seventy years old, and the task of managing and teaching two faculties was no easy task. At that time Juraj Antal was doing postgraduate study at the Georg August University in Hermann Rein's Institute (Göttingen; 1939-1940). He was persuaded by the dean of the Medical Faculty to return to Bratislava to become the Interim Head of the Institute of Physiology.

Juraj Antal was born at Slovany (in the district of Martin) on June 14th 1912, in a farming and business community. He finished grammar school in 1931 and went on to study Medicine at the Comenius University, graduating in 1938. As a student he worked initially in the Institute of Anatomy and later in the Institute of Experimental Pathology. In 1939 he transferred to the Institute of Physiology before going to Göttingen. On his return from Germany, Juraj married Katarína Kubincová, an ophthalmologist. They had three children, two sons and a daughter. In 1941 he was appointed Lecturer in Physiology, and in 1945 Professor. In 1953 he was elected member of the Slovak Academy of Sciences and in 1968 member of Czechoslovak Academy of Sciences.



Throughout the war and for a number of years afterwards Prof. Antal was the leading light of physiology in Slovakia. His teaching load was heroic. Apart from within Physiology he lectured to three other faculties at Comenius University, the students of Psychology within the Faculty of Philosophy and those in the Faculties of Science and Physical Education & Sports. The total number of students he trained, and examined over his academic life amounted to over ten thousand. He was appointed as Visiting Professor in Physiology at the Medical College of the Thomas Jefferson University (Philadelphia) 1969-1970. He was the author and co-author of several textbooks on Physiology and Practical Physiology, which ran to several editions. Importantly he initiated many translations of works from German into Slovak, particularly, in 1968, W.D. Keidel's *Kurzgefasstes Lehrbuch der Physiologie*. This enabled Slovak students to study trends in cybernetics, gain information on research and computational medicine in their own language. By writing -and translating- textbooks

he decidedly contributed to fixation and codification of Slovak physiologic terminology.

The task of restoring the damaged and plundered Institute after World War II, and to recruit staff was immense. However, so successful, that several of his pupils were appointed to the new Departments of Physiology in the Medical Faculties in Kosice and Martin, and Divisions of Physiology in Research Institutes. Prof. Antal helped to supply such institutes with the necessary equipment as well as personnel. The foundation of the Slovak Academy of Sciences (SAS) gave new momentum to the initiation of new research centres. The aim of the SAS was that physiological and medical research was to be given top priority. Prof. Antal was the choice of the SAS to become the Head of the institute of Experimental Medicine, and Head of the Institute of Normal and Pathological Physiology (INPP). However, with the expansion, Prof. Antal's students were in high demand again.

With the establishment of the new posts in Universities and Academy there was an upsurge in physiological research in Slovakia for the next three decades. The number of members of the Slovak Physiological Society rose from 10 in 1940 to more than 300 by 1970. Personally Prof. Antal saw himself as a teacher and experimenter rather than as an organizer or founder of Institutions. His great love was to work in his own laboratory, or make equipment in his mechanical and electrical workshops. He was inspired by Rein's Institute and remained an inspired original researcher. He enthusiastically recorded as many variables as possible, and realized the importance of making such measurements in not only anaesthetized but also fully conscious subjects (animal or human).

In Prof. Antal's research work, there are three distinct periods (see reference list at the end of this article). The first, in Rein's Institute (Göttingen), was on respiratory gases and the respiratory quotient. He worked with the original Gaswechselschreiber apparatus, and with R. Schleinzer studied the effects of several anaesthetics, and adrenaline, on respiratory metabolism in small animals. The results were published in *Pflügers Archiv*, in 1942, the first articles by a Slovak physiologist in this journal.

In the second period 1952-1972, Prof. Antal directed his interest towards haemodynamics, reflexes and the interaction of higher nervous influences upon these. Courageously he made the measurements under dynamic conditions, in a Pavlovian chamber. The studies covered such fundamental activities as locomotion, food ingestion, simultaneous group facilitation, thermoregulatory activity and reaction to noxious stimuli. The project was aimed to elucidate if these activities affected this type of experimental learning. Sadly, some regarded this as a questioning Pavlovian conditioning. With time, however, this research was seen to conform to current thinking, and also elucidate the role of reticular effects in these processes and the activation of the cortex. High recognition was given to this work with the award of the I.P. Pavlov Medal of the Physiological Society of the USSR in 1970 and the Pavlovian Award of America in 1973.

The above studies lead Prof. Antal into his next phase of research, that of Activity Physiology, soon to be covered by the term 'Actophysiology'. A review of this work was published in 1993.

After the Soviet invasion of Czechoslovakia in 1968, Prof. Antal was in serious trouble, owing to what was regarded as his negative attitude. In August of that year he took part, together with nearly fifty Czechoslovak physiologists, in the IUPS Congress in Washington, USA. At the Embassy, as President of the Czechoslovak Physiological Society, he was first in signing a protest resolution against the invasion and occupation of his country by the Soviets, and indicated his support of the Prague Spring. The result of this was that by 1970 Prof Antal had been relieved of all of his academic and university posts. He was made several offers of work by overseas universities and scientific institutions, but he did not want to leave Slovakia. From 1972 until 1994 he was allowed to continue his work with the SAS, but not at the Comenius University.

In addition to the awards made by the Pavlovian Societies in Europe and America, J. Antal was very proud to be given the Golden Medal of Jan Evangelista Purkinje from the Czechoslovak Medical Society in 1992. This was in honour of him being the last professor and academician before the division of Czechoslovakia in 1992. He was also deeply impressed when he found his name in the table of Carl Ludwig's disciples, named as a "son" of Hermann Rein.

Juraj Antal died on November 30<sup>th</sup> 1996, at the age of 84. He is buried in Martin, in the National Cemetery amongst many other notable Slovaks. Vilém Laufberger, himself a renowned 20<sup>th</sup> century Czech physiologist, has predicted that in the history of Slovak science, Juraj Antal would be remembered as "The Father of Slovak Physiology".

### **Bibliography**

Juraj Antal published more than 200 papers in Czech, Slovak, German and English. Below is given a selection of those pertinent to this article, (*in chronological order*).

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