

## Heino Eelsalu (1930-1998)

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Heino Eelsalu, scientist of Tartu Observatory for a number of years, died of heart attack on 26 July 1998.

Heino Eelsalu was born on 8 May 1930 in Tallinn in the family of Taavet Eelsalu (until 1936 Ehrenpreis), a veterinary surgeon's assistant. In 1949 he graduated from the Tallinn 2<sup>nd</sup> Secondary School and entered the department of mathematics of the Faculty of Mathematics and Natural Sciences of Tartu University from which he graduated *cum laude* in mechanics in 1954. Mechanics, though, was not his real interest.



Already in his schooldays his interest in the starry sky was aroused due to popular writings by Roopi Hallimäe and others, and later at the university he became an active member of the astronomy group of the Students' Scientific Society. On his second year he started research into stellar astronomy under Prof. G. Kuzmin's guidance. Later this research developed into a very successful diploma work. From then on H. Eelsalu's activities were connected with Tartu Observatory (until 1973 the Institute of Physics and Astronomy, in 1973 - 1995 the Institute of Astrophysics and Atmospheric Physics) - first as a post-graduate student, later as a Junior Research Associate and since 1960 as a Senior Research Associate.

During those years he was working basically on two astronomical themes. Most of his time was occupied by studying the structure of the Galaxy. His dissertation paper was "The gradient of the gravitational acceleration of the galaxy perpendicular to the galactic plane in the vicinity of the Sun" (1958). The obtained gradient of gravitational acceleration and the resulting density of the gravitating substance (dynamic density) was within error in accordance with the density of directly visible matter in the vicinity of the Sun. In some years time H. Eelsalu had to take a position of defence to protect his theory against the well-known Dutch astronomer J. Oort and several others after him, who found that the density of the gravitating matter exceeds

that of the visible matter 1.5 - 2 fold. The discussion about the existence of the unknown additional matter (hidden or dark matter) in the vicinity of the Sun continued with more or less success for decades. Several new approaches were invented to solve the problem, e.g. H. Eelsalu succeeded in applying statistical databases on the age of meteorite craters, seemingly a far cry from the topic dealt with. By now this controversy has been solved in favour of H. Eelsalu's theory as more recent determinations of dynamic and visible matter are in accordance once again. If there is some dark matter in the vicinity of the Sun in our Galaxy, then no more than 10 % of the total, and visible matter is certainly dominating. In his thesis H. Eelsalu had to process huge data masses by stellar-statistical methods. The experience obtained by him led him to the studies of data processing methodology in Galaxy observations as well as to dealing with general methodological questions. In the course of this work he produced several monographs: "Statistical Principles of Galactic Astronomy", in six parts (1973 - 1975, in Russian), "Theoretical Foundations of Stellar Statistics" (1982), and "Theory of Basic Galactic Research Systems" (1990), as well as several research papers on individual methodological problems and their application.

Another favourite topic belonged to the field of stellar photometry. He observed variable stars, determined brightness curves and studied the basic problems of astrophotometry. It is in this sphere where his first research is to be found in - "IX Cassiopeiae" (1953), compiled on the basis of the materials of the Moscow Observatory photographic plate archives. In several papers he investigated the possibilities of using photographic plates with weak darkening.

However, research into astronomy is only a part of H. Eelsalu's creative heritage. In the early 1970s he became intensely interested in links between the history of astronomy, cultural lore and astronomy. To introduce the field, he compiled a longer review "The development of astronomy as a problem of Estonian cultural lore" (1976), pointing out also further tasks facing researchers. In what followed he managed to deeply deal with the spread of Copernicus' teaching in Estonia, the development of astronomical research and teaching at Tartu University, associations between our poetry and folklore and celestial phenomena, ancient calendars, the origin and development of celestial bodies, interpretations of cave paintings, astral mythology, etc. His original ideas appeared in several articles in the magazines "Eesti Loodus" (Estonian Nature), "Horisont" (Horizon), "Keel ja Kirjandus" (Language and Literature), "Looming" (Creative Work), Tähetorni kalender (Observatory's Calendar), etc. (see, e.g. "Kalevipoeg and Heaven" in the 1996 calendar) and other Estonian, Latvian, German, Scandinavian, Finnish, etc. publications. "Johann Heinrich Mädler - Eine dokumentarische Biographie" (Berlin, 1985), written in cooperation with the German astronomer D. B. Hermann and "From Age to Age" (Tallinn, 1985), providing an overview of Ice Age man's understanding of the sky as well as the interpretation of the theme of the epic in the "Kalevala" from an astronomical point of view deserve special attention.

H. Eelsalu shared his knowledge not only in print but he was also an active participant in various social events. He took an active part in organising numerous conferences and workshops. He started conferences, dedicated to paleoastronomy that brought together scientists from different fields. Looking for the roots of the place of astronomy in Estonian national culture contributed to the preservation of national identity during difficult times.

H. Eelsalu was active in the leadership of the Estonian Naturalists' Society, the council of the Museum of History of Tartu University, the meteorite commission of

the Estonian Academy of Sciences, the Academic Society of German-Baltic Culture in Tartu, the Estonian Society of Prehistoric Art, etc. He was also a member of the International Astronomical Union (IAU) and the European Astronomical Society.

H. Eelsalu was an excellent popularizer of science. His contribution to compiling the subject index in astronomy for the Estonian Encyclopedia (EE) was remarkable. As a foreman of the EE's public council, he organized ordering and editing of articles, writing a great deal of them himself. This work later developed into a reference book "Lexicon of Astronomy" (Tallinn, 1996).

Being a person of many talents, H. Eelsalu knew many languages. Besides his mother tongue - Estonian, he was fluent in English, French, German, Russian, Swedish and Finnish, he communicated in Latvian with Latvians and coped also in Italian, Polish and Spanish. With the help of the dictionary he was doubtless able to read in all European languages. Such an excellent command of so many foreign languages was no doubt of great help in studying the history of science and culture and promoted to creating contacts with foreign researchers. His colleagues from Tartu Observatory also benefited from his knowledge of languages as he was always helpful in editing manuscripts written in a foreign language.

Among his hobbies yachting was the most important. Being younger, he was a contestant himself, later he acted as a referee, also at international Baltic regattas, he is the author of a seven-language yachting dictionary which unfortunately has not been published.

Heino Eelsalu was not destined to finish everything he had planned but we can be sure that his heritage is of permanent value for Estonian science and culture.

From: Tähetorni kalender [Observatory's Calendar] 1999, Tõravere 1998, p. 127-130 (in Estonian). Translated by Krista Kallis.