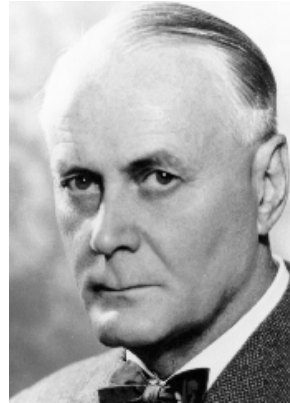




Ragnar Granit
Finnish Nobel Laureate
and Pioneer in
Bioelectromagnetism

Jaakko Malmivuo



1. Ragnar Granit
2. Ragnar Granit's family
3. Researcher in Helsinki, Oxford and Philadelphia
4. Scientific distinctions

1. RAGNAR GRANIT

Ragnar Arthur Granit was born on 30th October 1900 in the then Parish of Helsinki into the family of forestry officer Arthur Wilhelm Granit (born 1871) and his wife Bertie Granit (born 1878). The Granit family is originally from Korppoo, from the south-western archipelago of Finland. The family home for over 100 years was in Vikminne in Korpoström. Ragnar Granit's grandfather was a sea captain. During Ragnar's childhood his father looked after his silviculture firm in Helsinki and the family lived in Oulunkylä, now suburb of Helsinki..



Hjördis 1907, motheri Bertie, Bertil 1912, Ragnar 1900, Greta 1902, Gundel 1910, Ingrid 1905.

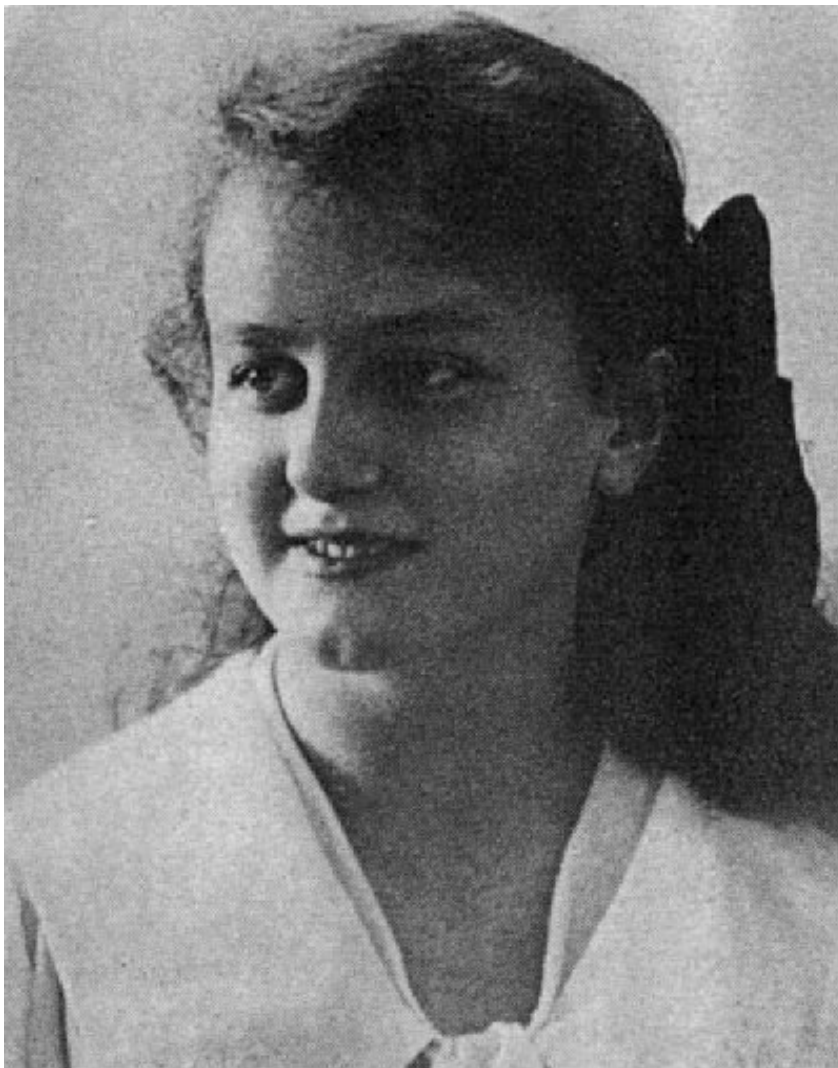
Ragnar Granit describes in detail his memories from his childhood and youth in Oulunkylä, Helsinki and Turku in his book published in 1984: "Hur det kom sig. Forskar minnen och motiveringar." (P.A. Norstedt & Söners förlag, Stockholm, 1983.) That shows, that the intellectual surrounding during his school years had very little to do with natural sciences, but instead much more with literature and painting.

Ragnar went to school in Helsinki in the Swedish Normallyceum and passed the matriculation examination in 1919. After matriculation Ragnar first considered starting

law studies and in fact took summer courses in 1919 at Åbo Akademi University in philosophy and Finnish legal language. The summer course in philosophy had a strong orientation towards psychology and this latter subject completely captivated him

Ragnar Granit describes in detail his memories from his childhood and youth in Oulunkylä, Helsinki and Turku in his book published in 1984: "Hur det kom sig. Forskar minnen och motiveringar." (P.A. Norstedt & Söners förlag, Stockholm, 1983.) That shows, that the intellectual surrounding during his school years had very little to do with natural sciences, but instead much more with literature and painting.

Ragnar went to school in Helsinki in the Swedish Normallyceum and passed the matriculation examination in 1919. After matriculation Ragnar first considered starting law studies and in fact took summer courses in 1919 at Åbo Akademi University in philosophy and Finnish legal language. The summer course in philosophy had a strong orientation towards psychology and this latter subject completely captivated him



Marguerite (Daisy) Bruun

2. RAGNAR GRANIT'S FAMILY

Ragnar Granit's spouse, Baroness Marguerite (Daisy) Emma Bruun was born in 1902 in St Petersburg. Her parents were Councillor of State Baron Theodor Bruun and Mary Edith Henley. The originally French family had become russianized. Daisy's father was Head of the Finnish Passport Office. Her mother was English by birth and always spoke English with the children.

Ragnar met Daisy the first time in 1918. Daisy wove the crown of laurels used at the conferring of his master's degree in 1923. Ragnar and Daisy married in 1929 and spent their honeymoon in Philadelphia, where Ragnar had gone to pursue research. Their son Michael was born in 1930. He is an architect by training and in 1990 was appointed Professor of Architecture at the Royal Institute of Technology in Stockholm.

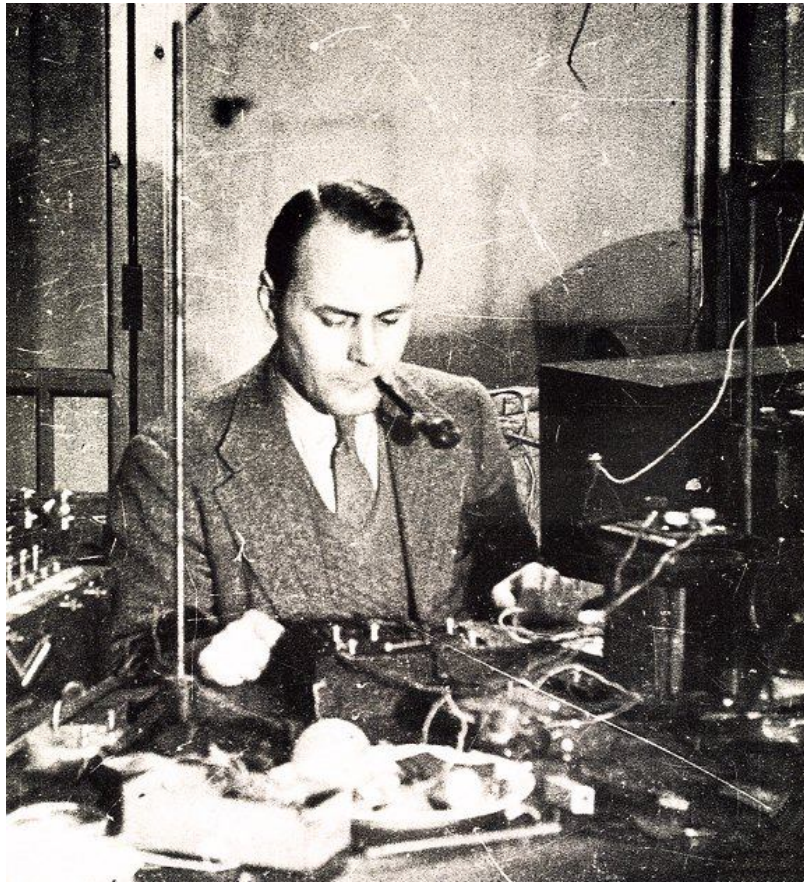


Ragnar, Daisy and Michael Granit

3. RESEARCHER IN HELSINKI, OXFORD AND PHILADELPHIA

In 1928 Ragnar Granit travelled to Oxford University, just two years after Professor Edgar D. Adrian had been the first to measure the electric impulse of a single nerve. The most notable nerve physiologist of the time, Sir Charles Scott Sherrington, was then working at Oxford. Granit wanted to understand vision and realized that the underlying fact was that the retina itself functions as a nerve centre which processes visual information and transmits already processed information to the brain's visual centre.

Using the electric measuring technique developed by Edgar Adrian, Granit continued bioelectric research at the University of Pennsylvania as researcher in medical physics from 1929 to 1932. After that he was back again at Sherrington's laboratory during the years 1932-1933. He continued his electroretinogram (ERG) bioelectric research on the visual nerve and the retina at the University of Helsinki from 1935 to 1940. Granit's book *Sensory Mechanisms of the Retina* published in 1947 is one of the classics in the field of the electrophysiology of the eye.



Ragnar Granit in his laboratory in 1930's.

One of Sherrington's central thoughts was that the effect of nerve signals on the next nerve cell, via a synapse, can be either activating or inhibiting. Granit became interested in the idea of being able to demonstrate experimentally that the retina also contained inhibiting synapses. After leaving Sherrington and returning home to Helsinki, he succeeded in this experiment. In this work he used a self-made electron valve amplifier. He published his research results in 1935.

However, this work was not yet applied to a single nerve cell. In his further work, also carried out in Helsinki, Granit performed an experiment on a single nerve cell. The preparation involved an insulated frog's eye which had just been opened. For this he required an extremely small electrode. In his measurements he used an especially sharp silver needle insulated with a glass capillary tube. The glass capillary had been melted round the whole silver needle except for the head of the needle. This type of electrode was the first of its kind and was to be used later as an instrument in countless other electro-physiological research experiments.

Granit further pursued the physiological basis of colour perception. According to his research results, some nerve fibres of the eye are not particularly selective in the case of colour. On the contrary, they react in the same way over the whole spectrum. In contrast, other fibres clearly distinguish between colours. In 1937 Granit published these research results, thus confirming the theory of colour perception put forward in his own day by Hermann von Helmholtz (1821-1894).

Together with another physiologist from Helsinki, Gunnar Svaetichin, Granit observed that the electric impulses generated in the retina, the so-called electroretinogram, showed that sensitivity to colour is concentrated mainly in three different groups in the area of blue, green and red. This provided the first biological demonstration in support of the Young-Helmholtz three-colour theory.

In 1929 Ragnar Granit was appointed Docent in Physiology, and in 1937 Swedish-language Professor of Physiology at the University of Helsinki. In 1940, when the Winter War between Finland and Russia had ended, he was appointed Research Professor at Harvard University in the United States. It is known that he had already bought the travel tickets to the United States when he received the offer to become Professor of Neurophysiology at Karolinska Institutet of Stockholm. He decided in favour of the latter. In 1945 the Neurophysiology Laboratory of the Nobel Institute of Medicine in Stockholm was founded. He was invited to become its director and worked in this position until his retirement in 1967.

Ragnar Granit was also Visiting Professor at the Rockefeller Institute in New York during the years 1956-1966, at St. Catherine's College, Oxford in 1967, at the University of the Pacific, San Francisco in 1969, at the University of Düsseldorf in 1975, at the Max-Planck Institute (Bad Nauheim) in 1976 and at the National Institute of Health (Bethesda, Maryland, USA) in 1971-1972 and 1974.

4. SCIENTIFIC DISTINCTIONS

In 1928 Ragnar Granit travelled to Oxford University, just two years after Professor Edgar D. Adrian had been the first to measure the electric impulse of a single nerve. The most notable nerve physiologist of the time, Sir Charles Scott Sherrington, was then working at Oxford. Granit wanted to understand vision and realized that the underlying fact was that the retina itself functions as a nerve centre which processes visual information and transmits already processed information to the brain's visual centre.



St Vincent Prize, Turin, 1961.

Ragnar Granit also received numerous distinctions and awards from different universities and research institutes in Finland and around the world. He was nominated Member of the Finnish Society of Sciences and Letters in 1937 and was later Honorary Member. He was Member of the Royal Swedish Academy of Sciences from 1944 and its President during the years 1963-65. He was Member of the Royal Society since 1960, Member of the National Academy of Science since 1968, Honorary Member of the Accademia di Medicina, Turin, since 1961, Member of the Indian Academy of Science since 1963, Member of the American Academy of Arts and Sciences since 1971, Member of the Accademia Nazionale dei Lincei, Rome, since 1978 and member of numerous other academies of science.

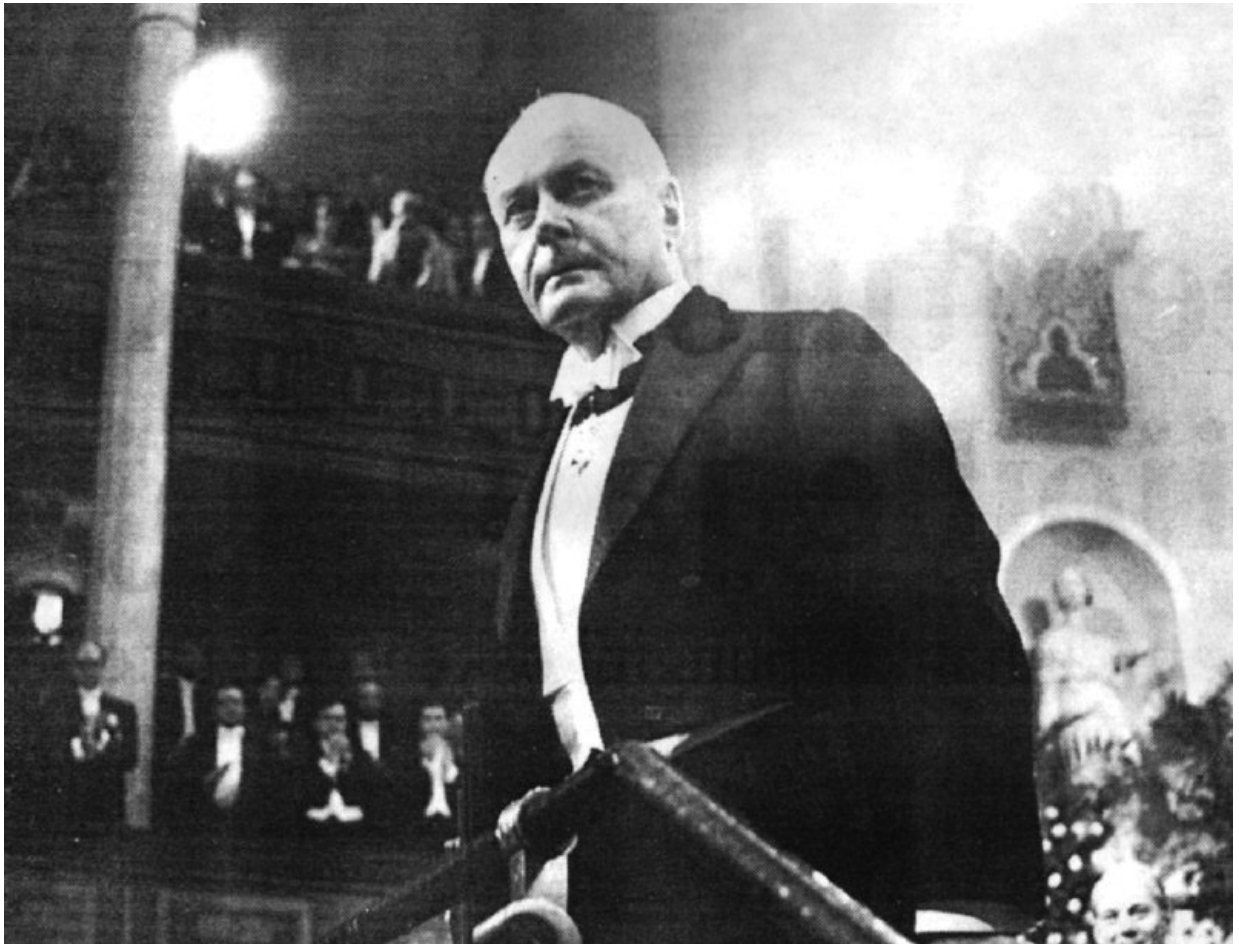
His scientific awards include, amongst others, the Anders Jahren Prize for medicine in the Nordic Countries in 1961, the Accademia di Medicina (Turin) St. Vincent Prize in 1961.

Ragnar Granit has also been awarded numerous honorary doctorates, e.g. in Oslo 1951, Oxford 1956, Lima, Bogotá and Santiago 1958, Hongkong 1961, Chicago 1969, Pisa 1970, Helsinki 1982 and Göttingen 1987. The Academy of Finland awarded Professor Granit the title of Academician in 1985.



President Mauno Koivisto, Academicians Ragnar Granit and Matti Kuusi, 1985.

Ragnar Granit was born a Finn, received his education in Finland and worked as professor in Finland. He did the scientific work which led to the Nobel Prize in Finland before moving to Sweden. It was not possible, however, for him to receive the Nobel Prize earlier, because he was a member of the Nobel Committee by virtue of his professional post. After his retirement in 1967 the Nobel Committee awarded him the prize for "his work during his youth", to quote Granit himself.



Nobel Prize, 1967.

Ragnar Granit faithfully spent his summers until the end of his life in Vikminne in Korppoo. Until the last years of his life he received the Swedish-language newspaper "Hufvudstadsbladet" in the morning post and the accent of the Swedish-speaking Finn in his speech was genuine. Until his death he continued to be a member of the Finnish Society of Physicians.



Vikminne

