



J. Keränen — 70th Anniversary

by

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Professor JAAKKO KERÄNEN, son of a prosperous farmer, was born on June 1, 1883, at Paltamo. In 1910 he was granted his master's degree and in 1924 the degree of doctor of philosophy. He worked as chief of the geophysical observatory in Sodankylä from 1913 to 1917, as chief of section of the Finnish Meteorological Office from 1921 to 1933, and after 1933 as its director, from which position he retired in 1953.

These bald statements represent in outline a very long succession of laborious years within the field of geophysical science. And the work of this active septuagenarian still continues. The final evaluation of its results

will be made some time in the future, and we hope in the very distant future. But on this memorable occasion »*Geophysica*» wants to draw attention to some of the most important aspects of his work, in particular its geophysical side and to the results he has achieved.

In 1910, on the initiative of the director of that time, Professor G. MELANDER, the Finnish Meteorological Office started a major research project, the magnetic surveying of the whole territory of Finland. The following year the young Mr. KERÄNEN joined those engaged on this task. This incident came to be of great significance for his future development and work, which later concentrated upon two branches of science rather remote from each another, geomagnetism and meteorology.

From his acquaintance with the great forests of his native place, KERÄNEN developed into first-rate sportsman, and so the wildest regions and those hardest to reach, in North Finland, Lapland, Petsamo and some of the outer islands, fell to his lot in the geomagnetic field work. Besides this, in the summers of 1925 and 1926 he took part as Finnish delegate in the Finnish-Swedish magnetic surveying of the South Quarken. The lengthy survey was finished in 1928; in this work KERÄNEN took part during 15 summers, a considerably longer time than anybody else. The results of the survey are published as separate papers in the series published by the Finnish Meteorological Office, *Erdmagnetische Untersuchungen*. In 1933, in the same series, KERÄNEN published isomagnetic charts with tables, reduced to the epoch 1930. 5, comprising the whole territory of Finland. Since then, in the intervals between other investigations, KERÄNEN has made further magnetic measurements on the sea ice in some important passages in the archipelagos of the Gulf of Finland, of the Gulf of Bothnia, and on the Lake Laatokka, at magnetic repeat stations, etc.

At the time when magnetic field work began, an effort was made to establish a permanent magnetic observatory in this country as a base station for magnetic surveying and for general geophysical research work. For this purpose KERÄNEN spent the winter season of 1912—1913 in Potsdam, Germany, where he studied geomagnetism under the most eminent geomagnetician of that time, Professor ADOLF SCHMIDT. He also got acquainted with the instruments of the future observatory, which were being manufactured in the same place. The new observatory was built in Sodankylä in Finnish Lapland, and KERÄNEN was appointed as its first chief. He installed the magnetic recording system at the end of 1913, and so the observatory was able to start its regular work on January 1, 1914. The principal field of research was geomagnetism, but from the very beginning it also acted as a meteorological station of the first order.

Besides his magnetic work, during 1915—1917 KERÄNEN carried out investigations at Sodankylä concerning the temperature conditions in the snow cover and in the earth layers under the snow. He published the results of this work in 1920 in comprehensive paper »*Über die Temperatur des Bodens und der Schneedecke in Sodankylä nach Beobachtungen mit Thermoelementen*. This investigation, in which he deals thoroughly with the physical characteristics of the soil and of the snow, the temperature conditions in the surface layers of the soil and in the snow cover, and the formation and melting of the frost in the ground, has been of basic importance in many respects, being the first major investigation in this field. KERÄNEN also published the first magnetic year books of the observatory of Sodankylä for the years 1914—1917.

In 1918 KERÄNEN transferred for a short time to the service of the Geodetic Institute,

which had been opened shortly before, until in 1921 he was appointed chief of the synoptic and climatological section of the Finnish Meteorological Office. But even though his principal occupation was now with the meteorological side, he still took part in magnetic research work; and the observatory of Sodankylä and the scientific work performed there have always been near to his heart. This work he could also closely follow and effectively advance in the capacity of secretary of the Observatory Committee of the Finnish Academy of Sciences during 1919—1946, and later, since 1950, as president of the Committee. He has also made many trips to the observatories of neighbouring countries for comparison of magnetic instruments etc.

His literary output on geomagnetism comprises about 30 publications, of which the most important deal with the geomagnetic main field and its secular variation, principally in Finland.

After entering the service of the Finnish Meteorological Office KERÄNEN continued his investigations on the temperature conditions of the surface layers of the soil, with particular reference to the physics of the ground frost phenomenon and the occurrence of ground frost in Finland. How great is the value set on these investigations is evident from the fact that KERÄNEN was commissioned to write the section concerning the temperature conditions of the surface layers of the soil in the collected work *Einführung in die Geophysik*, issued in 1929.

These investigations on the temperature of the soil inspired KERÄNEN to extend the range of his investigations into the field of agricultural meteorology. In the middle of the nineteen-twenties he began to make investigations on the dependence of the harvest upon meteorological elements. In his publication *On the Dependence of the Harvest upon the Temperature in the Foregoing Winter and May* KERÄNEN made clear the influence of the temperature of the foregoing winter upon the harvest of the next summer, showing that an early spring and a good harvest usually follow a mild winter, while on the other hand a cold winter is followed by a late spring and by a poor harvest. Later he elucidated thoroughly, with correlation calculations, the dependence of the harvest of various cultivated plants upon the temperature and humidity during the growing season.

KERÄNEN has also been interested in forest meteorology. Among other things, he has made investigations on the role of lightning in causing forest fires in North Finland. He has also written the section concerning forest climate in the *Forest Manual of Finland*, published in 1950.

In addition to his scientific work KERÄNEN has promoted research in agricultural meteorology as a teacher. After his appointment in 1930 as lecturer in Geophysics at the University of Helsinki, he lectured chiefly on agricultural meteorology in the University Department of Agriculture and Forestry.

KERÄNEN'S interest in the agricultural applications of meteorology led him, as early as the nineteen-twenties, into the climatological field, as was very natural, since a knowledge of the climate forms the necessary basis for solving the problems of agricultural meteorology.

As a climatologist, KERÄNEN has investigated the temperature conditions of Finland and of Northern Europe. The most remarkable of these investigations is *Über die Eigenschaften der Lufttemperatur in Helsinki* which can be held up as an example for investigations of this kind. Among other investigations in this field may be mentioned a presentation in charts of the temperature conditions of Finland, an investigation on the temperature

conditions on the northern boundaries of some trees and bushes and a paper concerning the variations of the climate in Northern Europe during the last century.

When the *Geographical Handbook of Finland* was being compiled, KERÄNEN was commissioned to write the chapter concerning geomagnetism and, in collaboration with Professor V. V. KORHONEN, the chapter concerning the climate of Finland.

His interest in agricultural meteorology led KERÄNEN also to attach attention to the necessity for measurements of radiation. As early as 1926, when the radiation conditions of Finland were still very incompletely known, KERÄNEN began to make light measurements in Helsinki with grey-wedge photometers, and later he organized corresponding measurements at the observatory of Sodankylä. Together with Professor H. LUNELUND he published the solar and sky radiation recorded in Sodankylä during the International Polar Year 1932—1933.

KERÄNEN'S literary work comprises about 50 publications from the meteorological field.

Not only as a research worker, but also as director of the Finnish Meteorological Office KERÄNEN has indirectly advanced the development of meteorology in this country. During his 20-years' term of office as director, the Meteorological Office has developed greatly. This advancement is manifested, among other things, by the foundation of the aerological station of Sodankylä, the geomagnetic observatory of Nurmijärvi and also by the fact that the personnel of the institute has increased fivefold.

As meteorologist and as magnetician KERÄNEN has taken an intensive part of international collaboration. He has represented this country in many scientific committees, conferences and congresses, thus making our geophysical science known abroad.

On Professor KERÄNEN'S anniversary, the Finnish Geophysical Society joins in the congratulations presented both to the esteemed scientist and to the modest, humorous individual.