

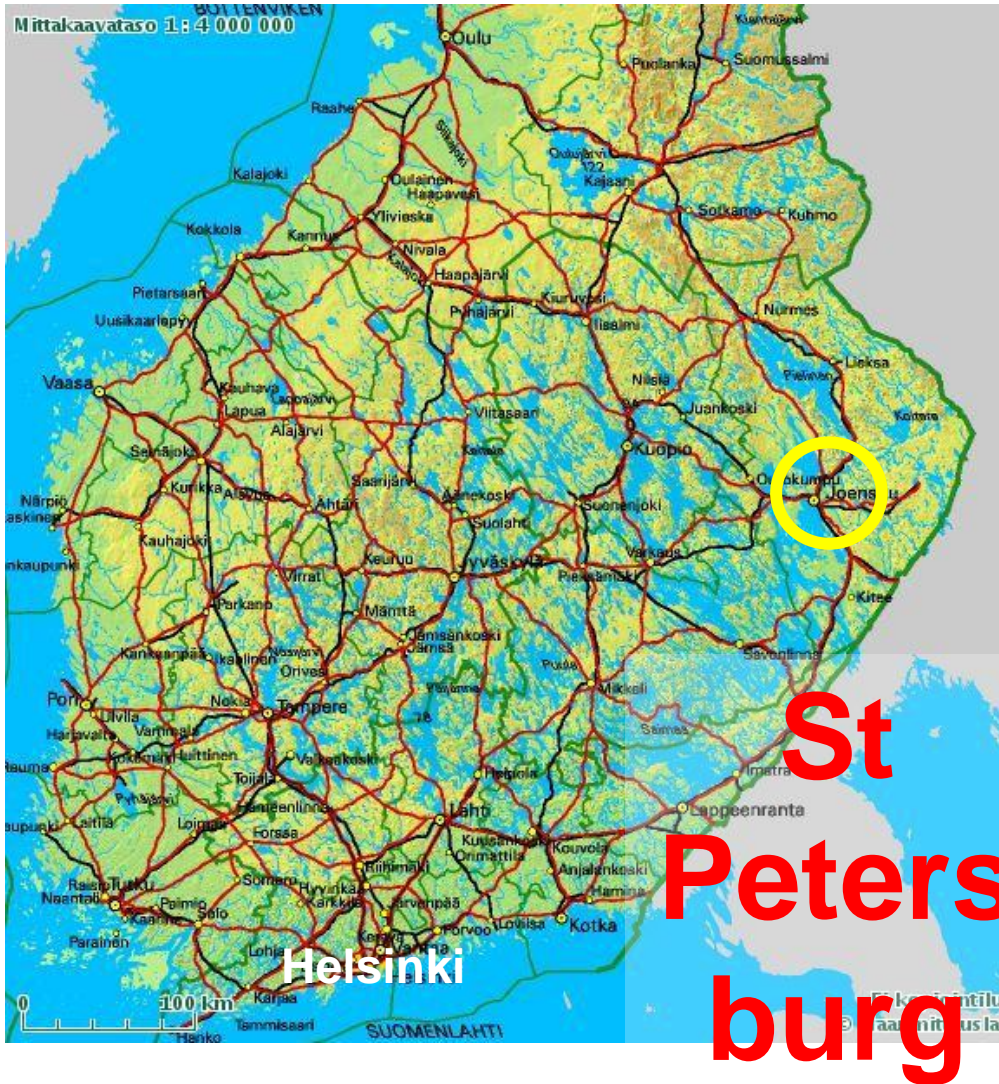
Vilho Väisälä and Erik Palmén

World renowned Finnish aerological scientists

In 2007 my wife and I moved from Sweden to eastern Finland, between Kontiolahti (Bay of the bear) and Joensuu (the mouth of the river)

Only then did I find out that the world's most well-known meteorologists had been born and raised there

Vilho Väisälä





Vilho Väisälä

1889-1969





VÄISÄLÄ



Vilho Väisälä's family background

His great grandfather Josua Väisänen (1782-1833) from Oulu in northern Finland had to change his name to Weisell because Väisänen sounded “so horrible” to the school teachers.

His son Claes Weisell (1817-76) rose to become priest in Lapinlax in northern Savolax.

His son Johannes, born in 1851, was at the age of two struck by polio which left his legs paralysed for the rest of his life. In 1876 he met Emma Birgitta Jääskelä. They married and had 7 children.

By then they had moved to Kontiolahti-Joensuu in Northern Karelia. In 1906 they changed the name to the Finnish sounding Väisälä. But Johannes had died two years earlier.



Arvi Nygren (toinen oikealta ensi rivissä), Kalle Pakarinen (vasemm. keskirivissä), M. Holm (ent. urheilukuningas, hän, jonka pää kuvassa on ylinnä muita), Vilho **Waisäl** (oik. keskirivissä), Akseli Lihr (tunnettu monipuolisena urheilijana Urh.-lehden ystäville; toinen vasemmalta ensi rivissä), Kusti Hirvonen (ensim. oik. ensi rivissä), Ate Hirvonen (poissa kuvasta), Yrjö **Waisäl** (Holmin oik. puolella), K. Hämäläinen (ensim. vas. ensi rivissä ja neiti Hilda Halonen (ks. erikoiskuvaa). Neiti Halonen on ensimmäinen ja tähän asti ainoa Pohjois-Karjalassa promoveerattu naisuima-
maisteri. Yrittelijöitä oli kyllä naispuolellakin useampia, mutta kokeet jäivät ensi juhliille. —
Kandidaatteja vihittiin 2: Otto Ahonen (ens. oik. takarivissä) ja T. Kemiläinen (poissa kuvasta). Takarivissä kädet ristissä rinnan yli seisoo Kalle-maisteri, joka opetti ympärillään olevan joukon ja sen ohella kävi senkin seitsemissä kisoissa Pohjois-Savon piiriä edustamassa. Toinen kuvassa seppeleetön, hän joka istuu sorkat sojossa, on Antti Varis, apuopettaja ja toinen Joensuun ainoa ensimmäisissä vesimaisterivihkiäisissä yksityisten aloitteesta seppelöity, paras paikallinen hyppääjä, vaikka onkin alettunut niin maa-tanaan kuvassa.

The Väisälä family in June 1911. Their father Johannes had died in 1904



Later
professor in
meteorology

Later
professor in
mathematics

Vilho Kalle
Yrjö

Later
professor in
astronomy

OLLI LEHTO

Oman tien kulkijat

Veljekset
Vilho, Yrjö ja Kalle
Väisälä

Otava

Johannes Weisell's book on the Volapük language

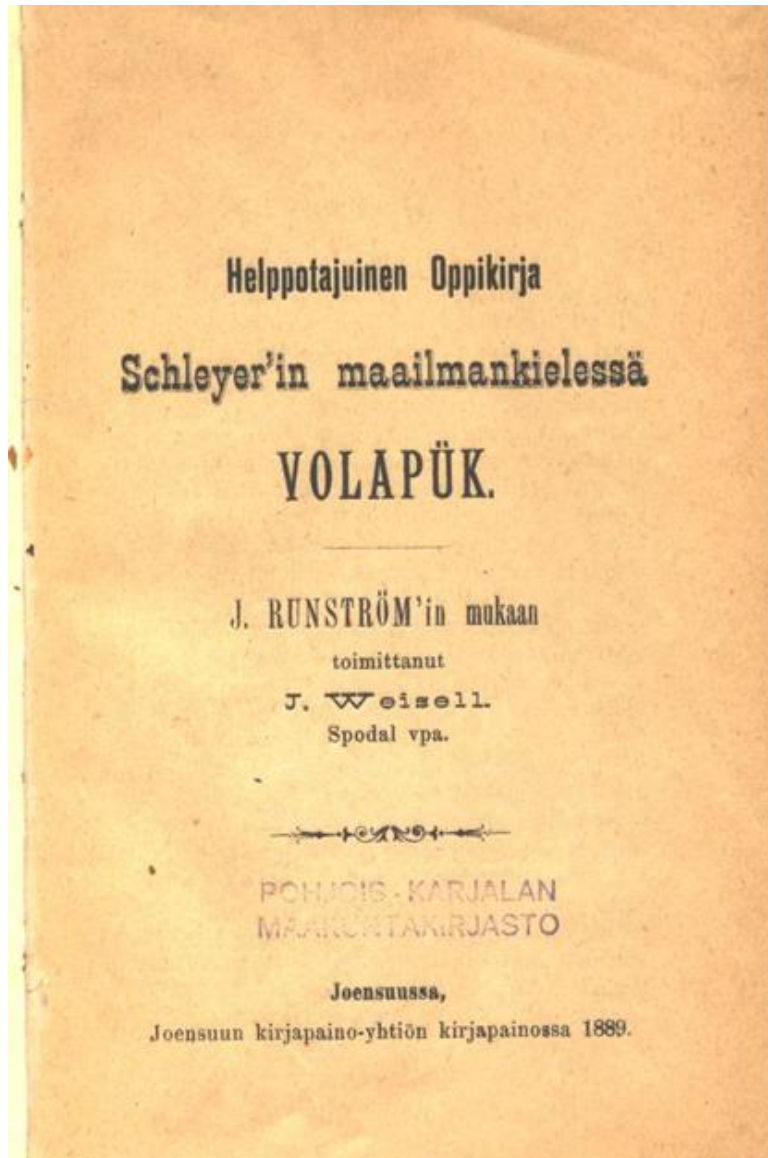
Vilho
Weisell/Väisälä
learnt at least
six languages:

Finnish
Swedish

German
Russian

English
French

Spanish?
Japanese?





Vilho Väisäläs teacher Ernst Lindelöf Finnish mathematician 1870-1946



6.2.7. THEOREM. *Every zero-dimensional Lindelöf space is strongly zero-dimensional.*

PROOF. It suffices to show that for every pair A, B of disjoint closed subset of a zero-dimensional Lindelöf space X there exists an open-and-closed set $U \subset X$ such that $A \subset U \subset X \setminus B$. For every $x \in X$ choose an open-and-closed set $W_x \subset X$ which contains x and satisfies

$$A \cap W_x = \emptyset \quad \text{or} \quad B \cap W_x = \emptyset.$$

Let $\{W_{x_i}\}_{i=1}^{\infty}$ be a countable subcover of the cover $\{W_x\}_{x \in X}$ of the space X . The sets

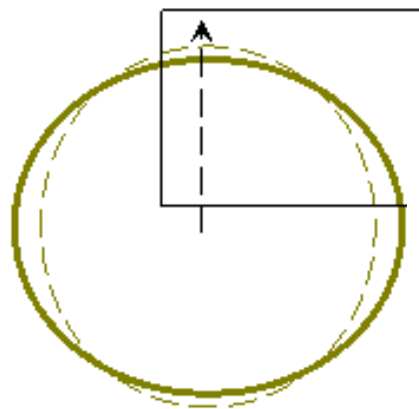
$$U_i := W_{x_i} \setminus \bigcup_{j < i} W_{x_j}, \quad \text{where } i = 1, 2, \dots$$

are open-and-closed and pairwise disjoint, and the family $\{U_i\}_{i=1}^{\infty}$ is a cover of the space X . The set $U = \bigcup \{U_i : A \cap U_i \neq \emptyset\}$ has the required properties.

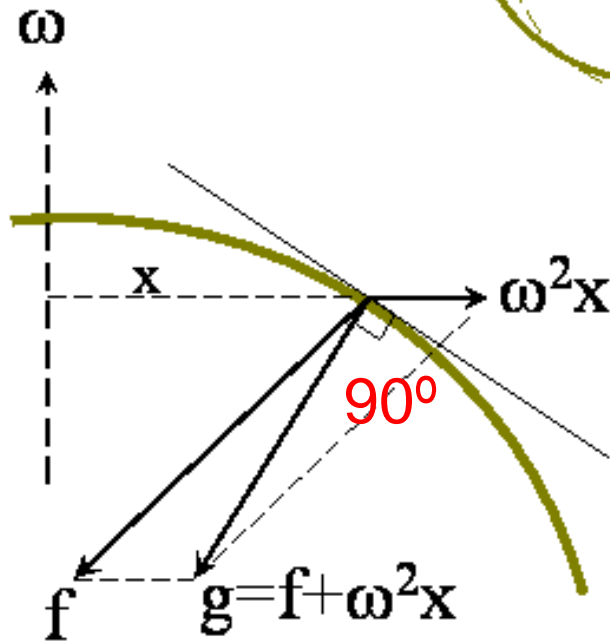
Lorenz Lindelöf Finnish mathematician 1827-1908



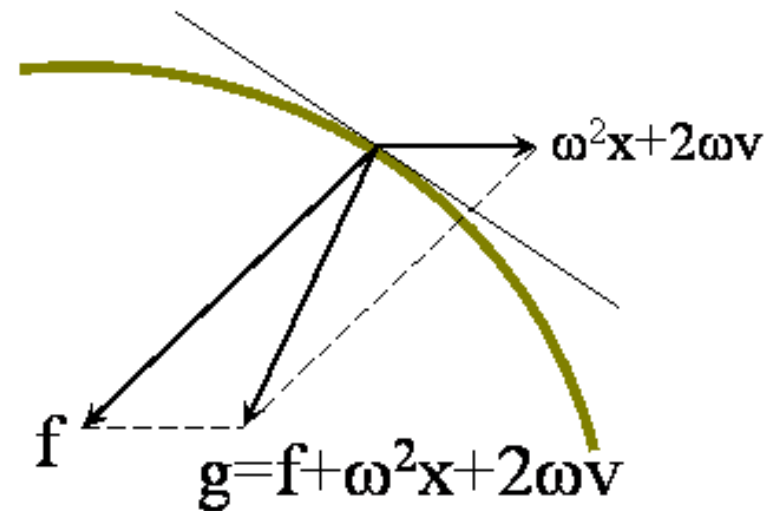
Från L.L. Lindelöf: Trajectoire d'un corps assujetti à se mouvoir sur la surface de la terre sous l'influence de la rotation terrestre." Acta Soc. Scient. Fenn., No. 16, 1888.



Lindelöf's reasoning
with his own notations
of how a body moves
over an rotating non-
spherical planet



Vetovoima	Painovoima
Dragningskraft	Tyngdkraft
Gravitation	Gravity/gravité
Anziehungskraft	Schwerkraft



Gravity g is no longer perpendicular to the earth's surface. This results in accelerations in the vertical and sideways (Eötvös effects and Coriolis effect)

Vilho Väisälä's boss



Gustaf Melander 1861-1938

Born in Kuopio, Savo in C Finland but began at Helsinki University 1879

BSc in 1885 in physics and Docent in 1890

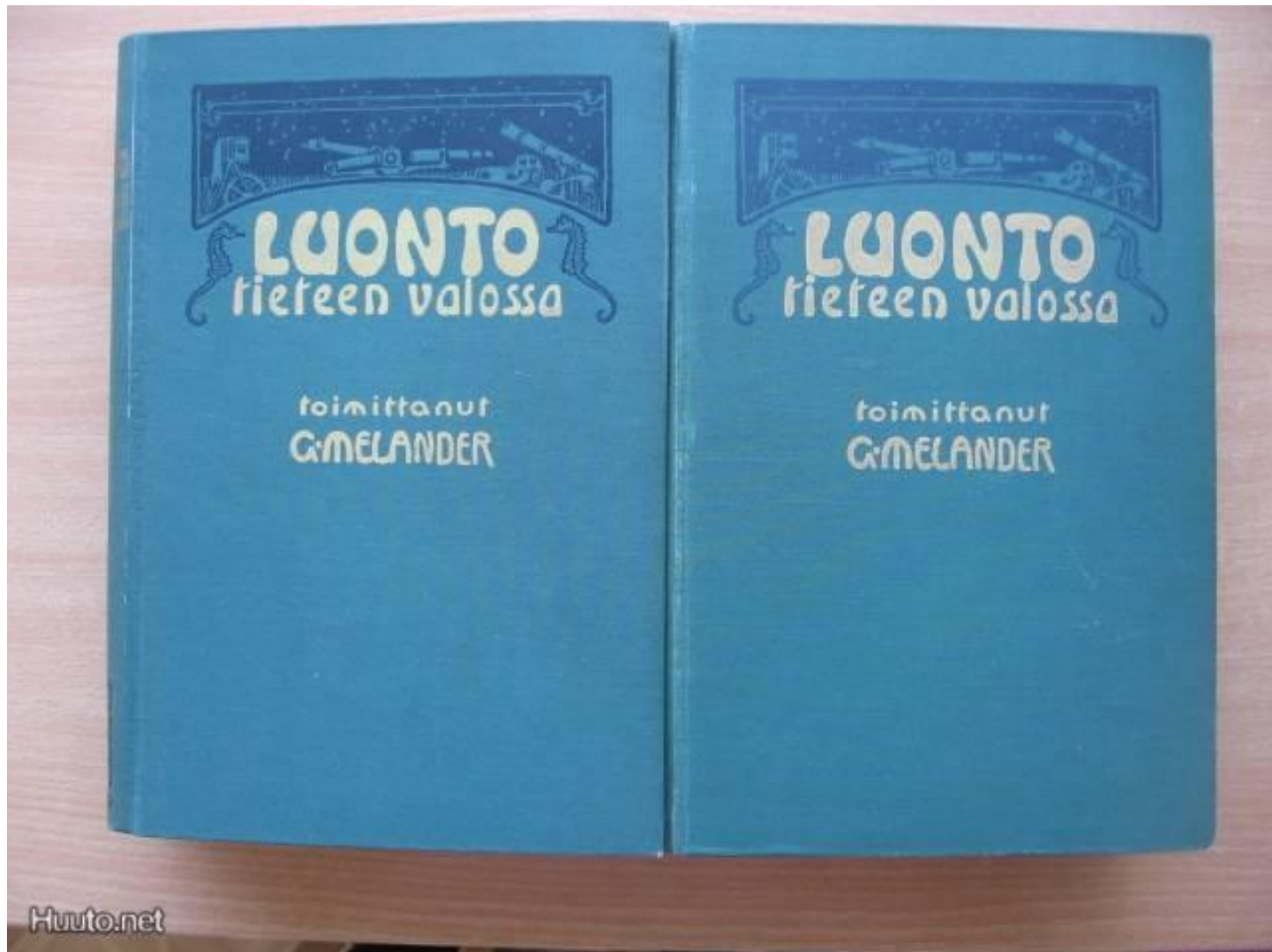
The first physicist in Finland to lecture in Finnish

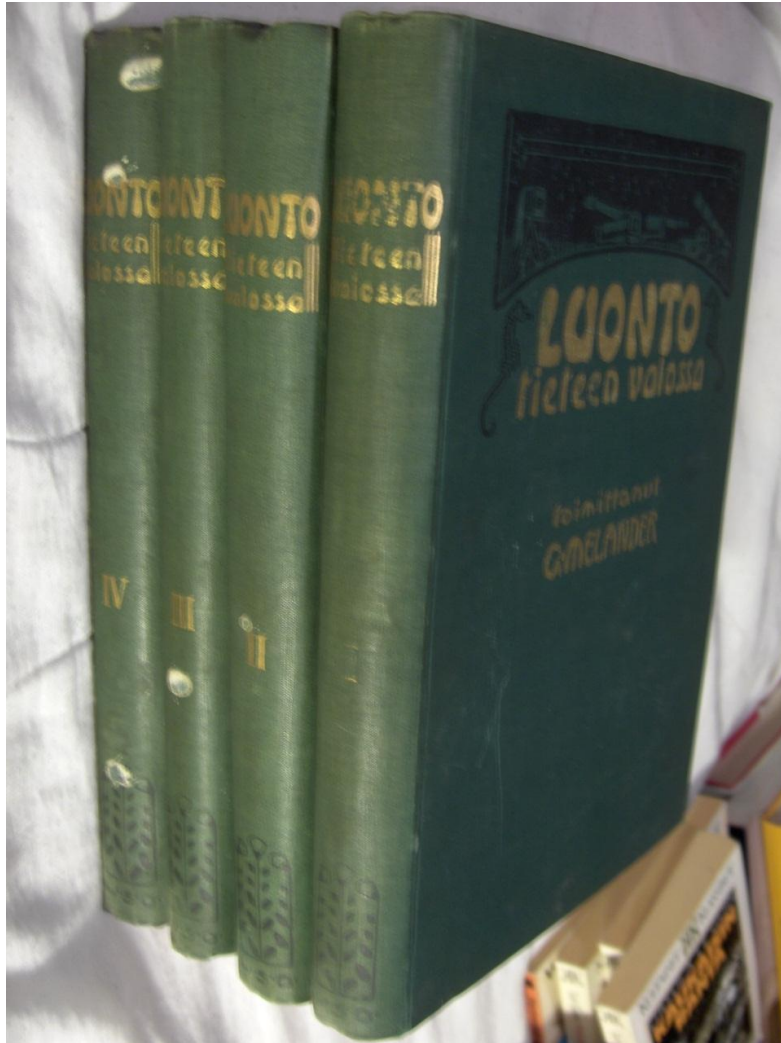
1893 started the “Vipuset Society” to promote the use of the Finnish language in physics.

1899 issued the first dictionary of physical terms in Finnish

1909 contributed to a Finnish encyclopaedia with articles on physics

“Nature in the light of science”, 1908-11





Gustaf Melander was a great intellectual

He travelled abroad 1896-1907

His books contained many articles on meteorology and was read by “everybody” in Finland interested in meteorology, perhaps also Vilho Väisälä

1908 Melander was appointed Director of the Finnish Meteorological Institute

*METEOROLOGISEN LAITOKSEN PIIRUSTUS
HELSINKI TUORIKATU N:3*

Finland's meteorological Institute founded in 1838!



V. c. 1515.

2850.

L. 158.5.

Talon-pojan

Sää- eli Ilma- Kirja,

Toikka

KIRJALLISUUSSEURAN

KOKOUS

HELSINKI

Tarpeellisia tietoja maanvilje-
liöille Ilman-muutteisista.

Uusi, parattu ja lisätty, paino.

Turussa, 1848.

Painettu J. C. Grenckellin ja Pojan Kirja-painosssa.

As part of Russia the Finns could benefit from the advanced state of geophysical research

The Aurora or Polar Light (**Полярное сияние**) was at that time and for long thought to be an atmospheric phenomenon.



Observations were moved from Helsinki to Sodankylä 1913-44

Nordic Congress of Physicians and Natural Scientists in Helsinki 17-21 July 1902



Mikhail Aleksandrovich Rykatchef (1841-1919) graduated from the Russian Naval Academy in 1865. In 1867 Heinrich Wild was appointed as Director of the Main Geophysical Observatory in St. Petersburg. Rykatchef became Assistant Director and worked with Wild to re-organize the local network of weather observing stations. In 1876 a new weather telegraphy and marine meteorology branch was established in the Observatory. With Rykatchef at its head, it was responsible for storm warnings. Then in 1885 a full meteorological branch finally was created. Its director, I. B. Schpindler, had previously done meteorological research under Rykatchef. Rykatchef was the Director of the Main Geophysical Observatory from 1896 to 1913. In addition to his meteorological work, he was interested in hydrological problems, and in 1897 implemented the first public warning system for high water levels on the Neva River.

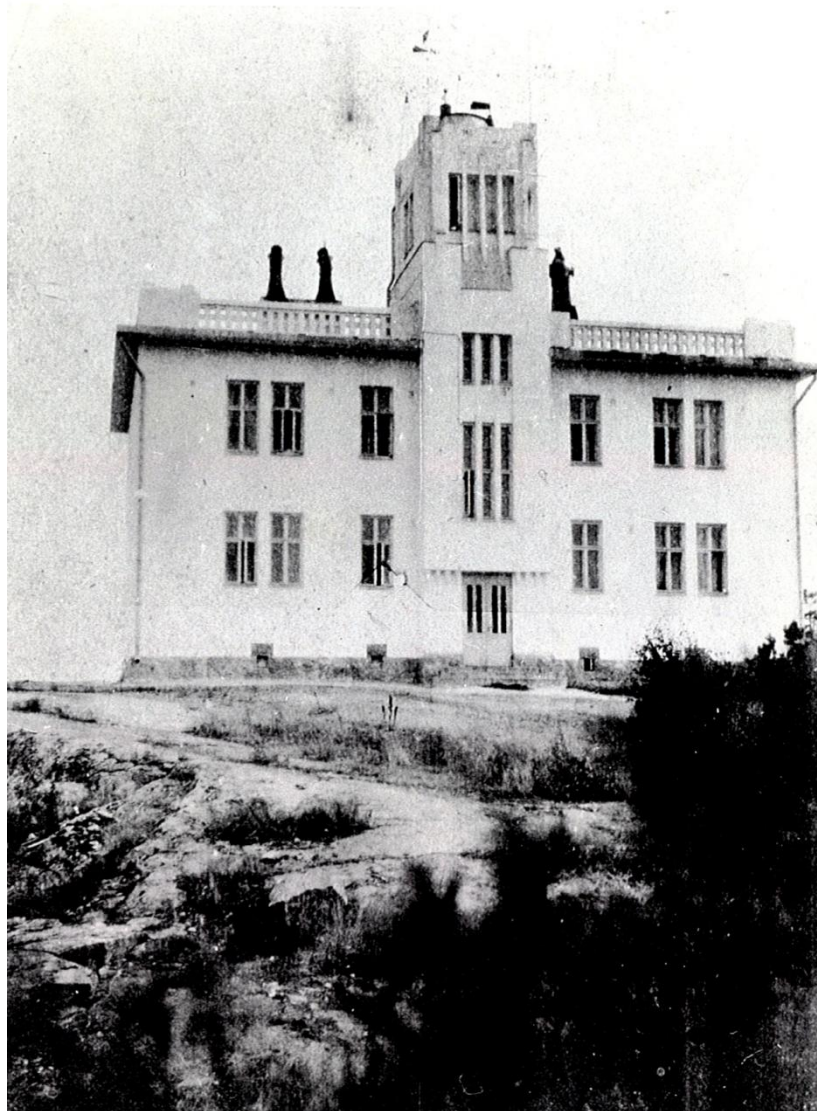
Pavlovsk observatory

served as a
model for a
similar
observatory in
Helsinki





Ilmala observatory in northern Helsinki



Vilho Väisäläs workplace:

Ilmala aerological observatory 1910-67

Founded by Gustaf Melander, Director of the Finnish Met Service 1909-31



Melander was like many other intellectuals from the Swedish speaking minority sincerely concerned about the common people



Melander's engagement for the sake of the Finnish speaking people was no coincidence. His father had taught at the very same school in Kuopio where the Father of Finnish nationalism, Wilhelm Snellman (1806-81) had been headmaster.

Melander had probably, as a child, sat in the lap of the great man!



So Gustaf Melander should have gone down in history as a great man of Finland, one of their national heroes

Instead he is at best frowned upon, at worst completely forgotten. **Why?**

1. He didn't seem to have had a "winning personality"



Sw:Mårran

Ru: Moppa
(Myppa)

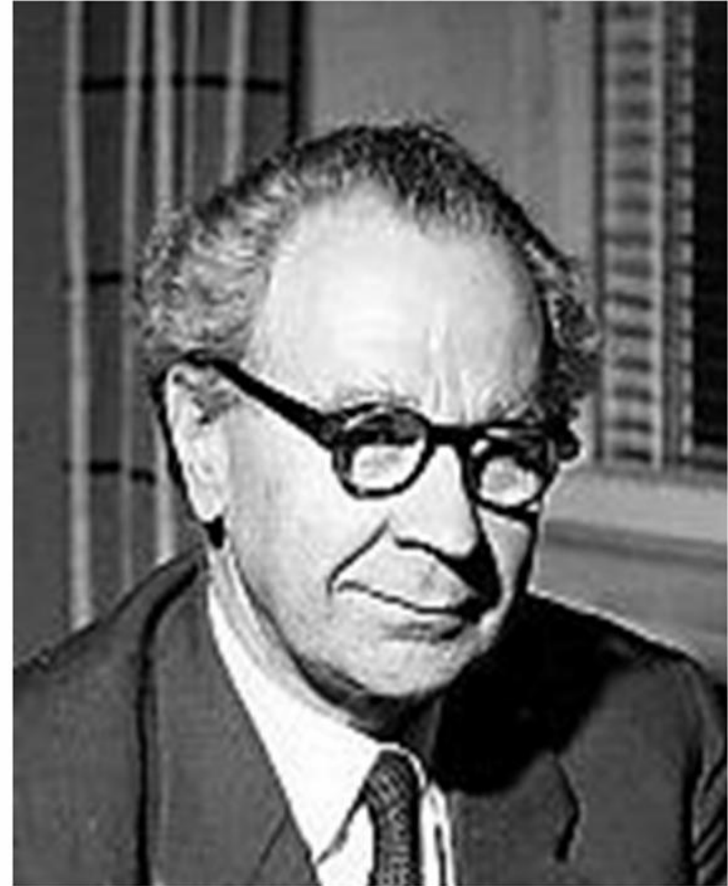


Hitchcock movie "The lodger"

The Lodger (1926)



2. Later Melander and Väisälä became enemies – and Väisälä survived longer to write the history



3. But the main reason seems to have been a misunderstanding of this photo



From a Finnish-Swedish expedition at Sea of Åland in 1925

Did the Scandinavian directors really call Melander “Finland’s Napoleon”?



From Seppinen's history of the FMI 1838-1988. On the back it is written "Finland's Napoleon closely guarded"

Tate Gallery in London:

Napoleon aboard HMS *Bellerophon*,
by Sir William Quiller Orchardson exhibited 1880



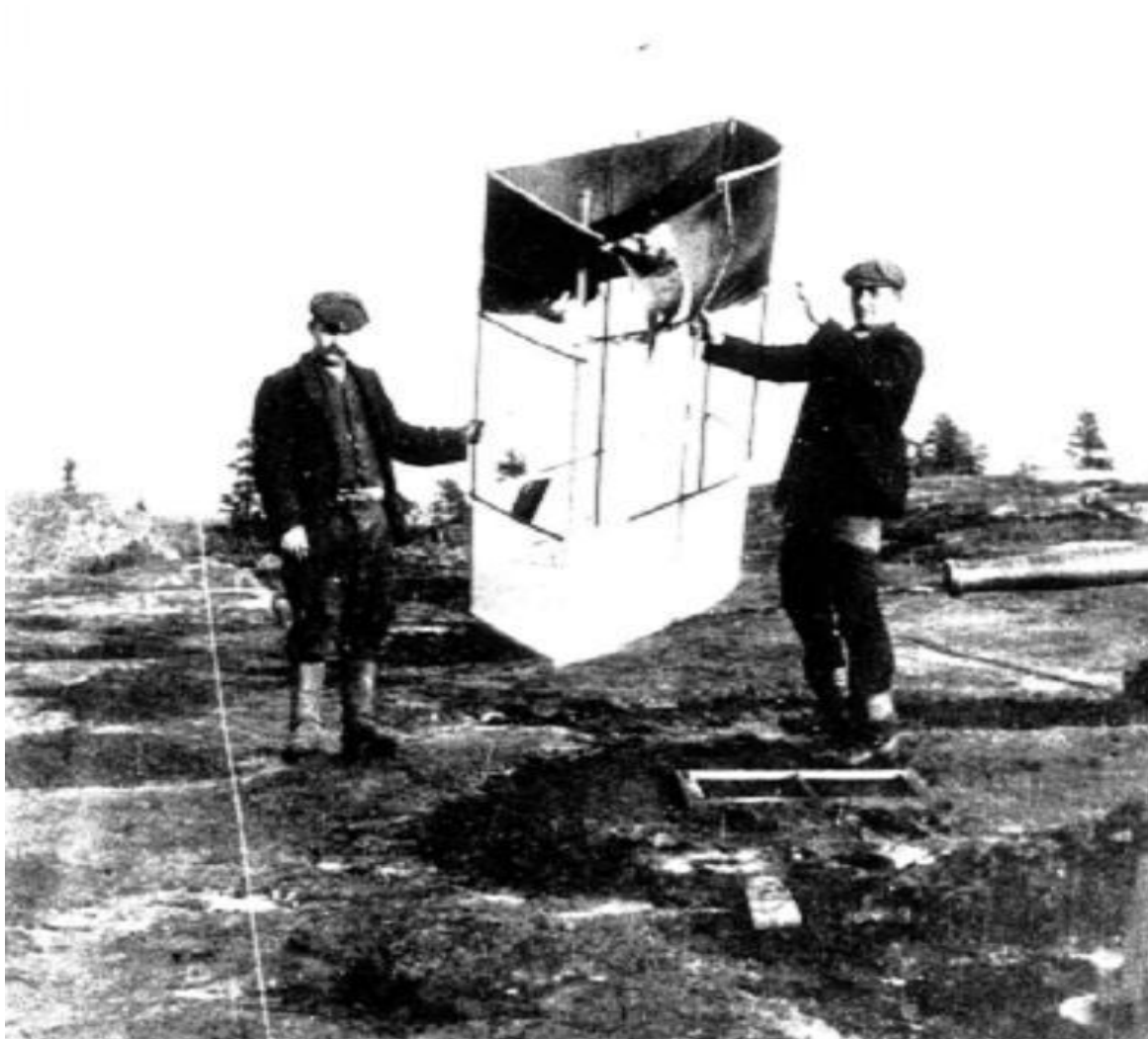
**“Finland’s Napoleon” was
just a humorous reference to
this famous painting**



Vilho Väisälä at Ilmala 1914



Launching kites to measure the winds in lowest layers



The war 1918 passes by Ilmala



Vilho Väisälä in the 1920's

- Head of Research at the Finnish Met Service
- Lecturing at Helsinki University
- Founded the Finnish Geophysical Society
- Discovered the Brunt-Väisälä frequency 1925

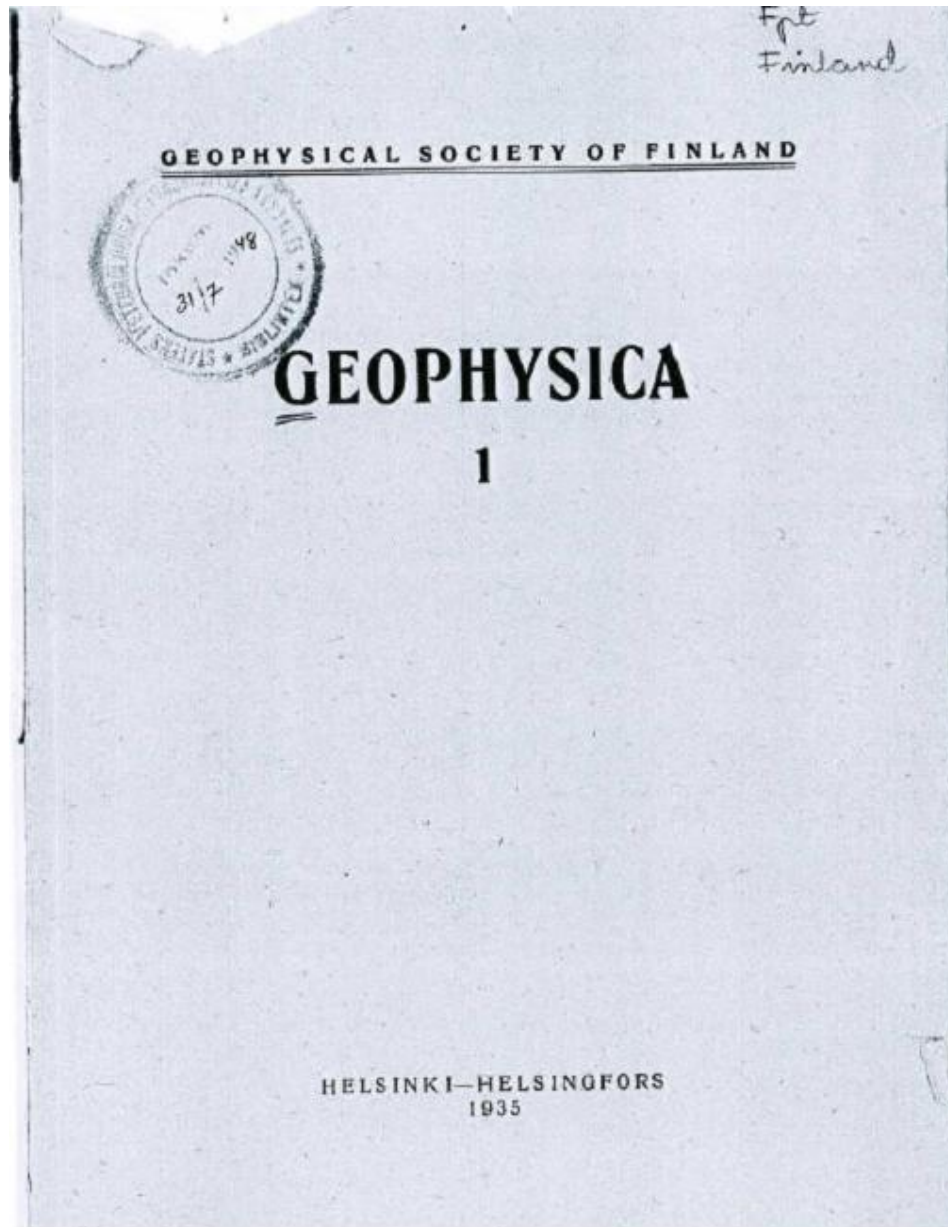
$$N_{BV} = \sqrt{\frac{|g|}{T_v} \left(\frac{\Delta T_v}{\Delta z} + \Gamma_d \right)},$$

where: gravity, $g = 9.8 \text{ m/s}^2$,
dry adiabatic lapse rate, $\Gamma_d = 9.8 \text{ K/km}$

David Brunt (1886-1965)
Professor at Imperial
College London, discovered
the equation in 1923 but
published in 1926



Lewis F Richardson
1881-1953 Physicist, meteorologist, mathematician
who “discovered” Väisälä

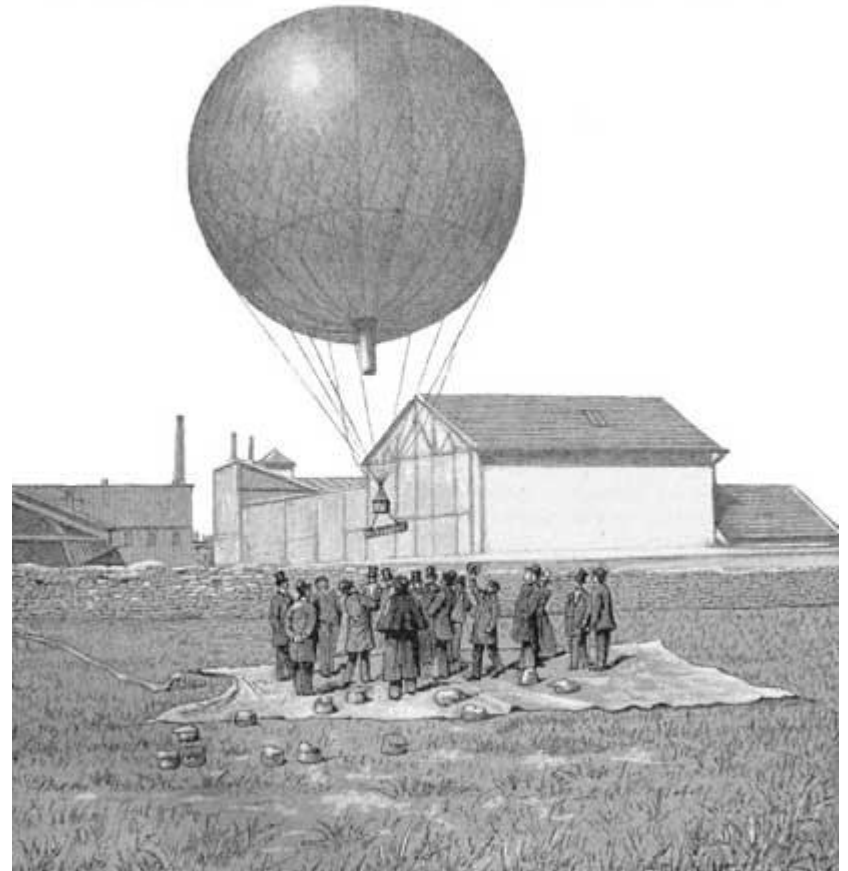


1926: Vilho Väisälä is instrumental in founding of the Finnish Geophysical Society

Early aerology with balloons



Couldn't reach high enough



Instruments and recordings
were lost

Again: influences from Russia

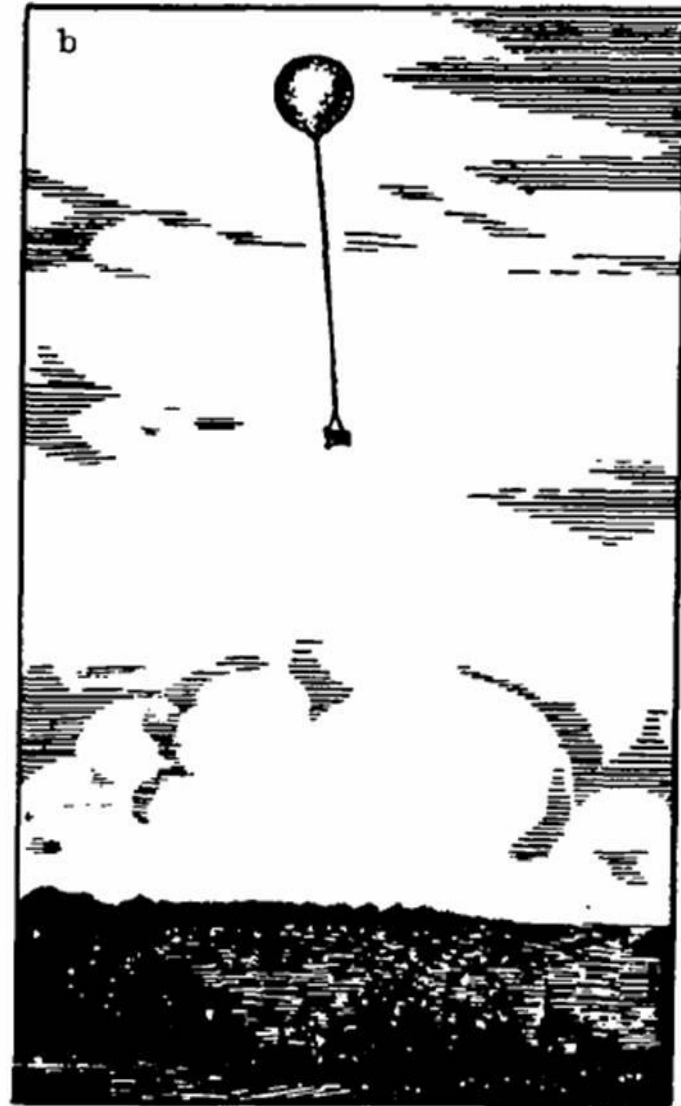
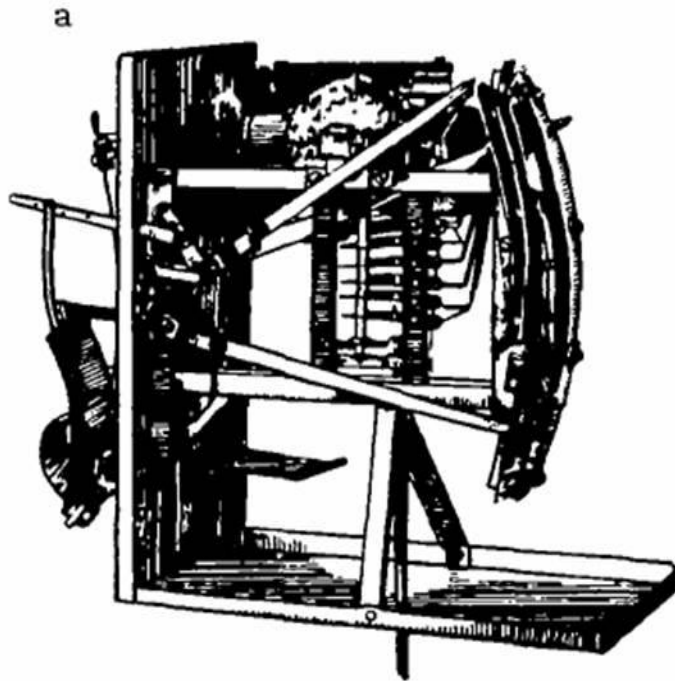


FIGURE 4. Radiosonde (a) and radiosonde in flight (b)

Pavel Alexandrovich Molchanov was born in 1893 and graduated in 1914 at St. Petersburg University. In 1917 he was employed at the Geophysical Observatory in Pavlovsk.

His self-produced radiosonde had its premiere flight January 30 1930 and reached an altitude of 7.8 km where the measured temperature is -40.7°C .

Molchanov's design became a popular standard because of its simplicity and the converted instrument readings to Morse code. This made it very easy to use without special equipment or training .



1928

Zur Technik der Erforschung der Atmosphäre.

Von P. Moltchanoff, Pavlovsk.

Mit 9 Figuren.

Übersicht.

1. Ballon-Sondes mit begrenzter Höhe.
2. Hergesells Methode zur Bestimmung der Pilotballonhöhe.
3. Ein neues Instrument zur Registrierung der Böigkeit des Windes in der freien Atmosphäre.
4. **Anordnung zur Fernübertragung** der Angaben von meteorologischen Instrumenten.
5. Die Aussichten der Aerologie im Zusammenhang mit den Fortschritten der Luftfahrt.

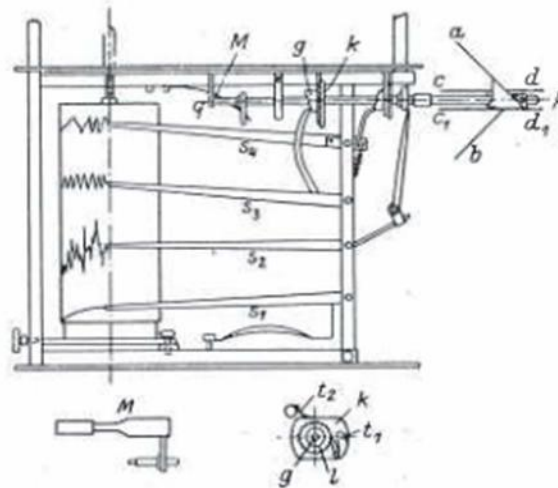
1. Ballon-sondes mit begrenzter Höhe.

Die Erforschung der freien Atmosphäre hat leider die Besonderheit im Vergleich mit den gewöhnlichen meteorologischen Beobachtungen, daß sie nicht bei allen Wetterlagen möglich ist. Deswegen leiden die aerologischen Beobachtungen an **gewisser** Einseitigkeit oder jedenfalls Ungleichartigkeit. Aus diesem Grunde ist die Aufmerksamkeit aller, die sich für die aerologische Technik interessieren, **darauf** gerichtet, sich von dieser Abhängigkeit zu befreien.

Die am wenigsten vom Wetter abhängige Methode der Registrierballone hat doch immerhin den Mangel, daß bei starkem Wind die Ballone, besonders bei **sumpfiger** oder waldiger Umgebung, schwer zu finden sind. Um diesem abzuhelpen, hat man Versuche gemacht, die vom Ballon zu erreichende Höhe und damit auch die **Weite seines Fluges zu beschränken**. So haben z. B. auch Dines in England und V. Kuznetzow in Rußland zu diesem Zwecke kleine Vorrichtungen konstruiert, die durch Vermittlung von Barometerdosen in einer im voraus bestimmten Höhe den oberen, das Instrument tragenden Ballon loslösen und damit **seinen Aufstieg abbrechen**. Die Kompliziertheit und geringe Zuverlässigkeit dieser Vorrichtungen hatten zur Folge, daß sie keine Verbreitung erlangten. Eine andere von uns früher versuchte Vorrichtung setzte die Benutzung der Ausdehnung des Ballons bei **seinem Aufstieg voraus**. Zu diesem Zweck bekam der obere Ballon **einen Schnurgürtel, der in einer** der Länge der Schnur entsprechenden Höhe die Ballone voneinander löst. Diese Vor-

3. Ein neues Instrument zur Registrierung der Böigkeit des Windes in der freien Atmosphäre.

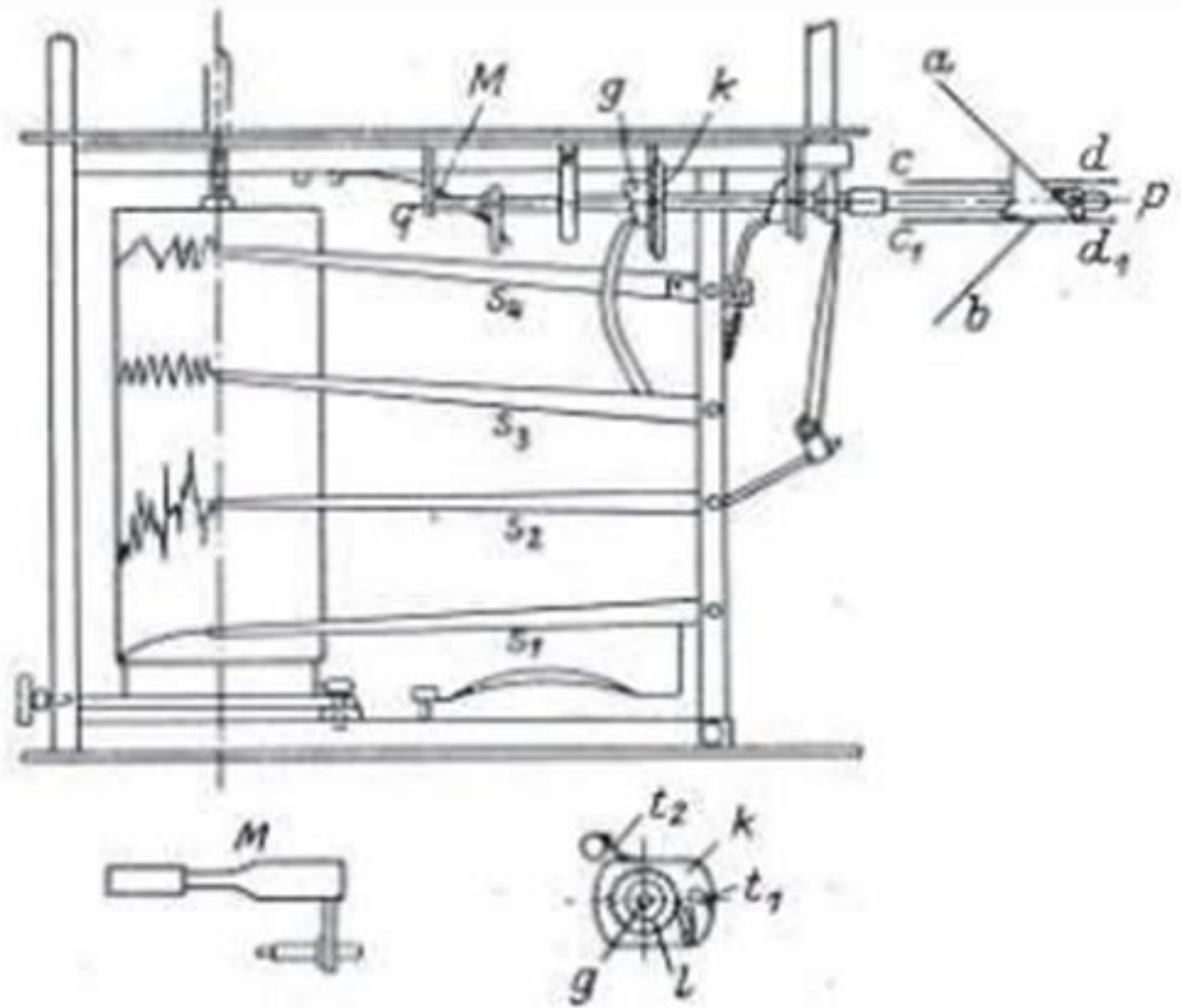
Die Registrierung der Struktur einer Luftströmung erfordert ein Instrument, welches einerseits empfindlich genug sein soll, um auf die kleinste Änderung der Windgeschwindigkeit zu reagieren, andererseits eine klare und deutliche Registrierung ergeben muß. In dem von uns vorgeschlagenen Apparat (Fig. 4) dient ein Propeller mit seinen Platten a und b als Empfänger. Außer diesen Flächen besitzt der



Figur 4.

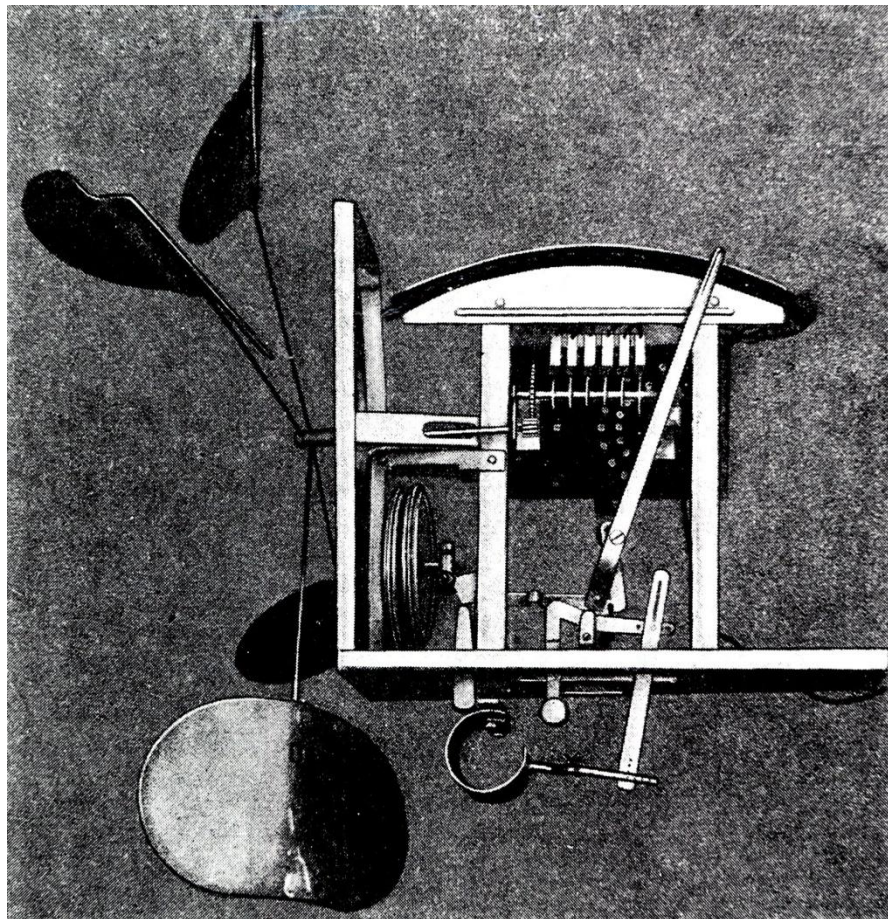
Propeller noch zwei Platten cd und c_1d_1 , nach der Achse pq gerichtet, welche zur Dämpfung seiner eigenen Bewegung unter dem Einfluß der Trägheit dienen.

Die Drehungsphase der Propellerachse wird mittels eines Exzentriks durch einen Hebel auf die Schreibfeder S_2 übertragen, so daß die Ordinate der Registrierung unmittelbar die Windgeschwindigkeit gibt.



Figur 4.

Thanks to strong geophysical traditions before the revolution one of the leading developer of radio sondes was the Soviet Union



This one was found on the Finnish of the border in 1931

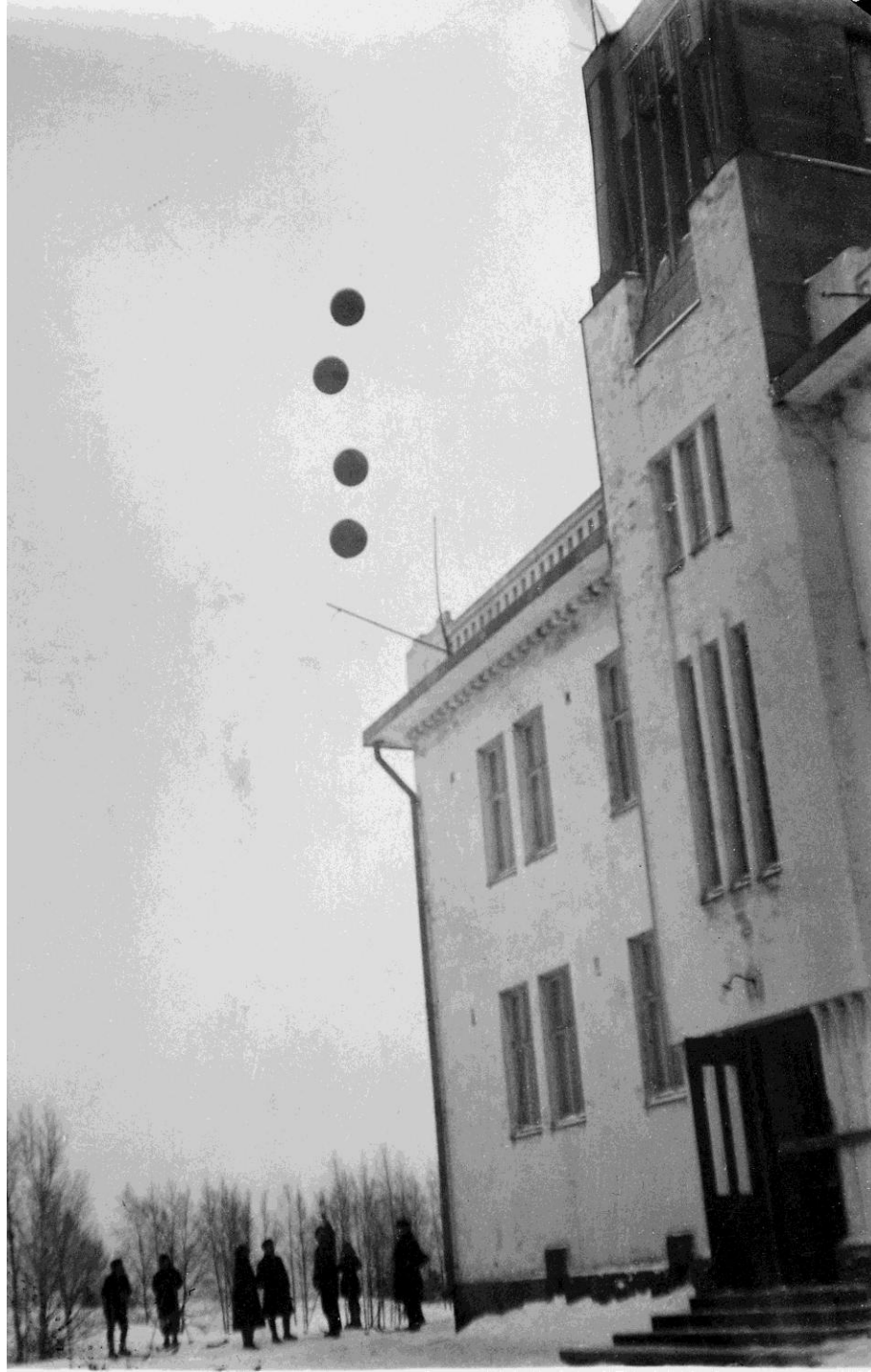
Vilho Väisälä:
- I can do better!



The first test launch in 1934 in Tampere

...met with some
scepticism from
the Finnish Met
Service

3/26/2016



Geophysical conference in Warsaw in 1935



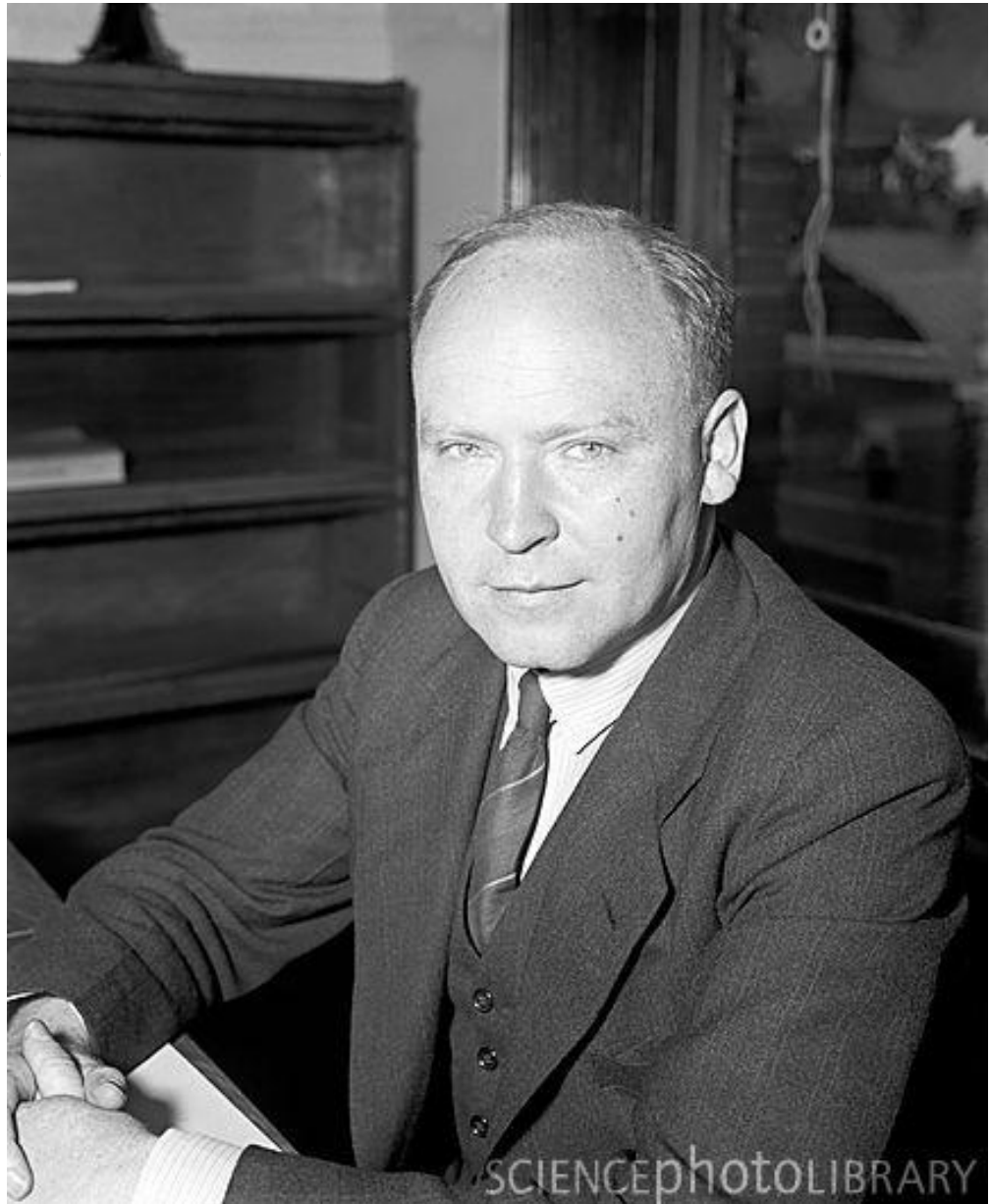
Carl Gustaf Rossby

Swedish-American meteorologist
1898-1957

One of Vilhelm Bjerknes's closest collaborators in the Bergen school 1919-22. Made the warm fronts red and the cold fronts blue. Met Vilho Väisälä on a course in 1922.

At SMHI 1923-26 when he emigrated to the US. Discovered the “planetary (Rossby) waves” and paved the ground for NWP.

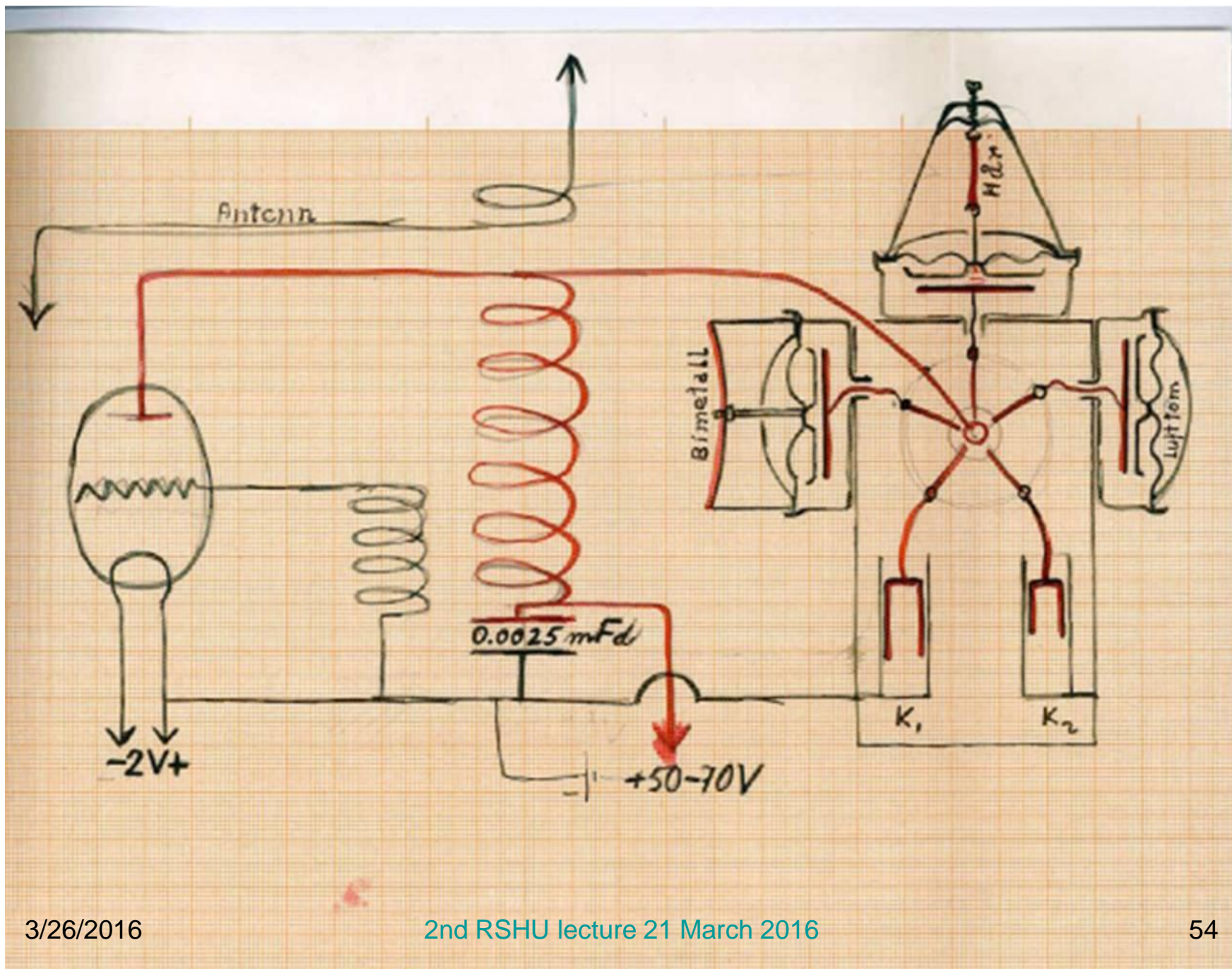
Returned to Sweden in 1947 and ended his life with work on environmental issues

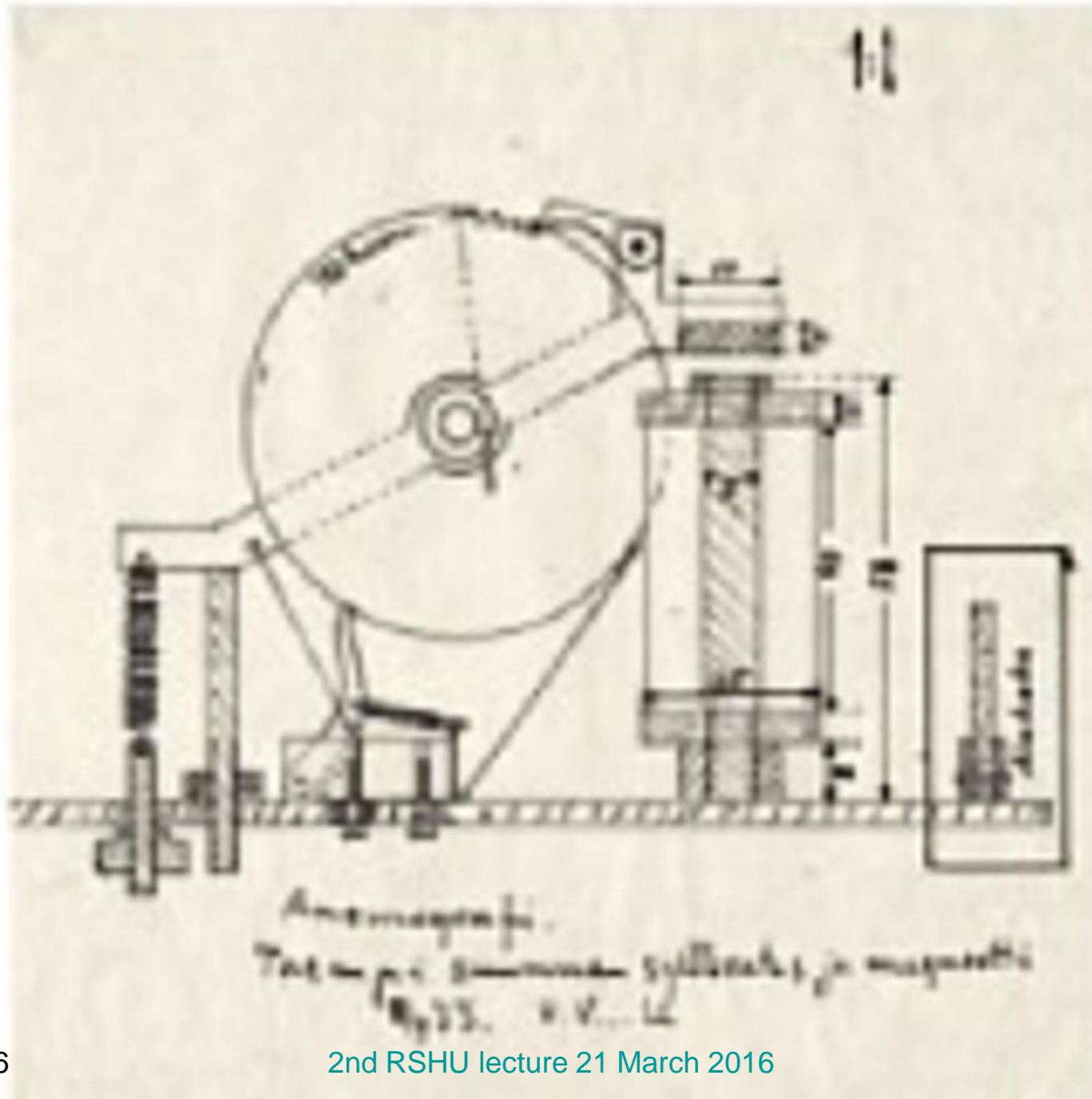


Great international interest



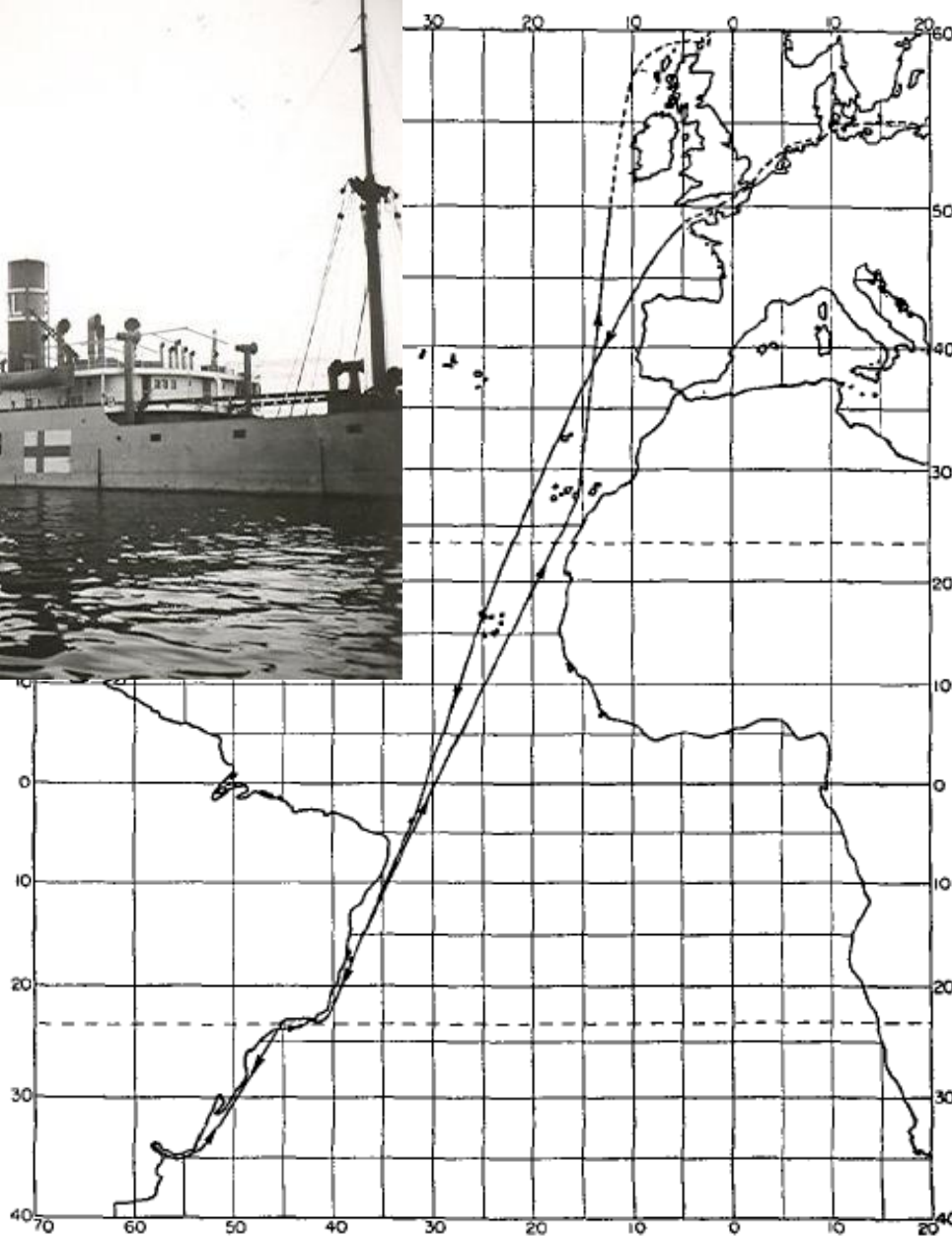
Carl Gustaf
Rossby at M.I.T.
was the first to ask
for radio sondes –
25 of them





The journey to the Southern Hemisphere in summer 1939 (!)

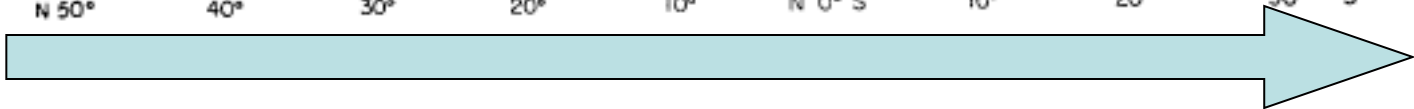




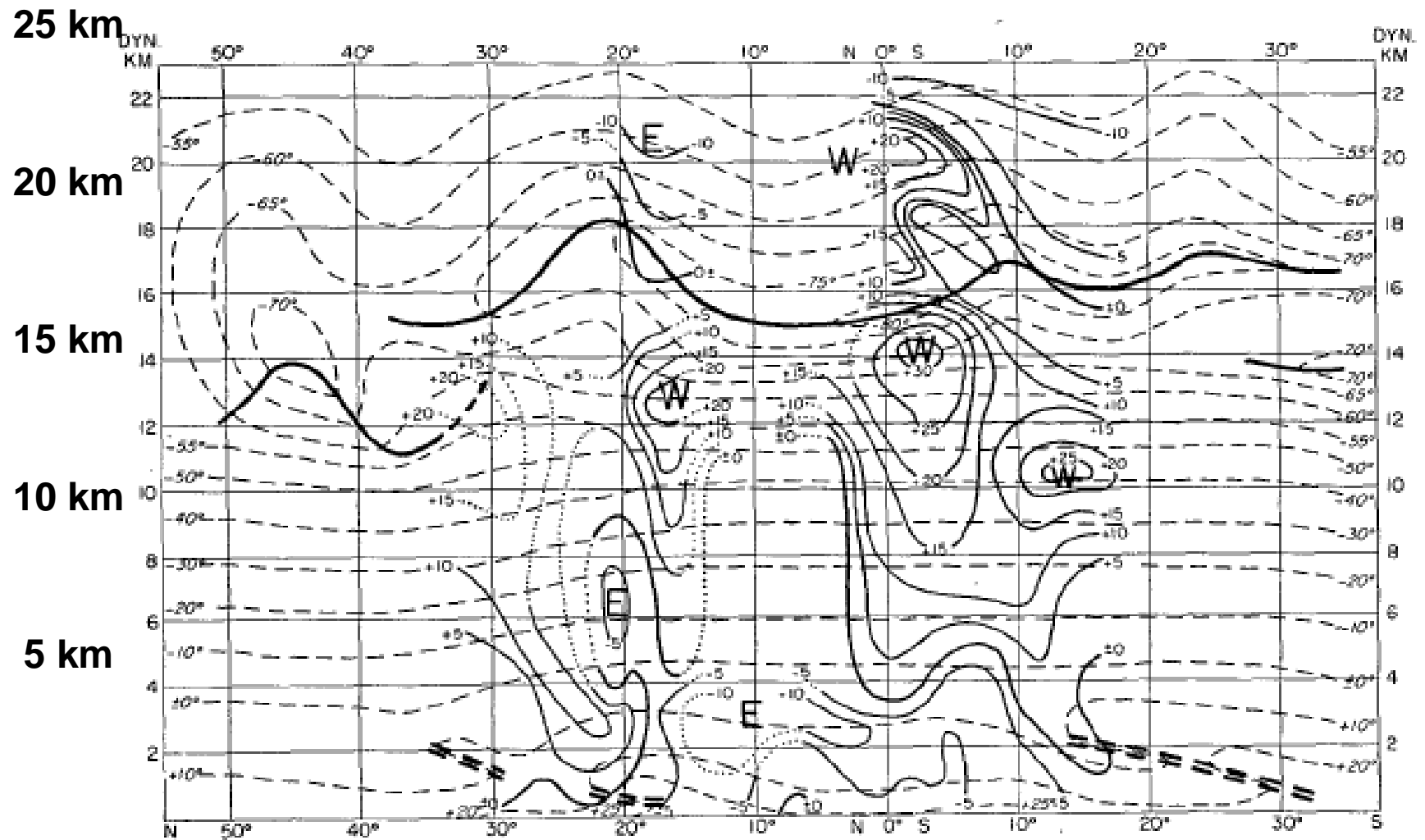
In summer 1939 Vilho Väisälä and two young meteorologists Lauri Vuorela and Mauri Tommila set out on a promotional expedition to South America



5 km



Coming back home: Oct-Nov 1939



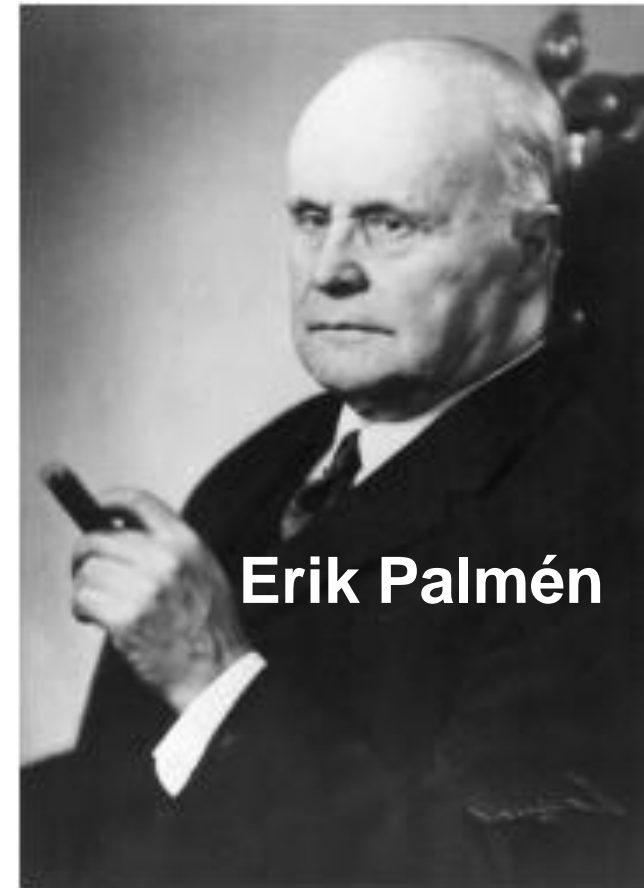
In 1944 Vilho Väisälä hoped to succeed Oscar Johansson as professor in meteorology at Helsinki University

...but there was
another one



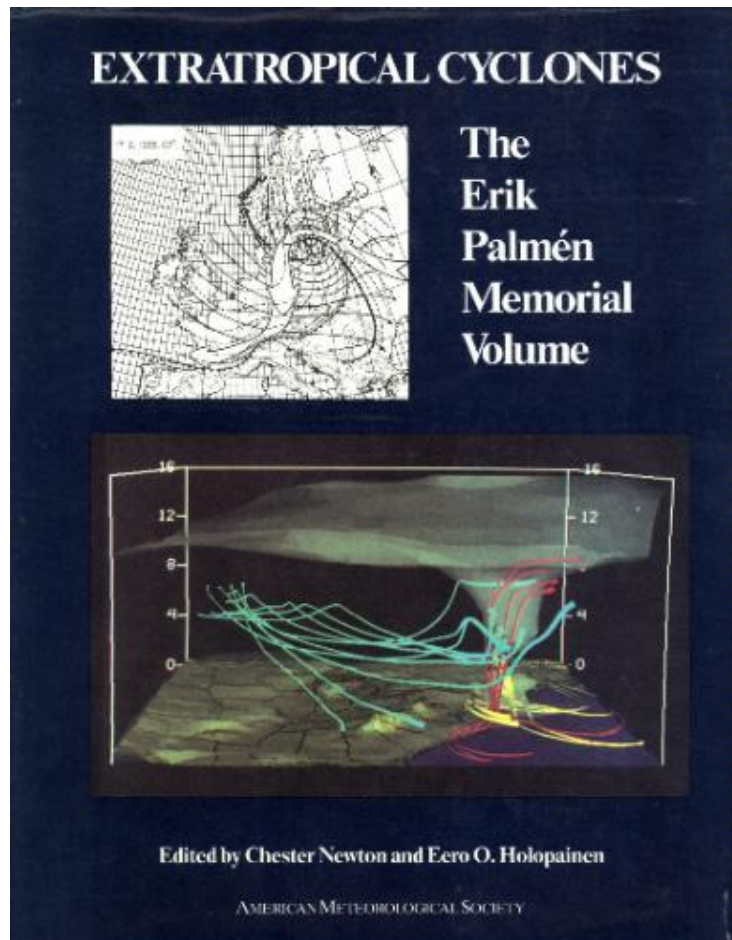
Oscar Johansson

Engineer but
also scientist
(the **Brunt-
Väisälä
frequency**)



Erik Palmén

Among the world's meteorologists Eric Palmén is more recognized meteorologist than Vilho Väisälä

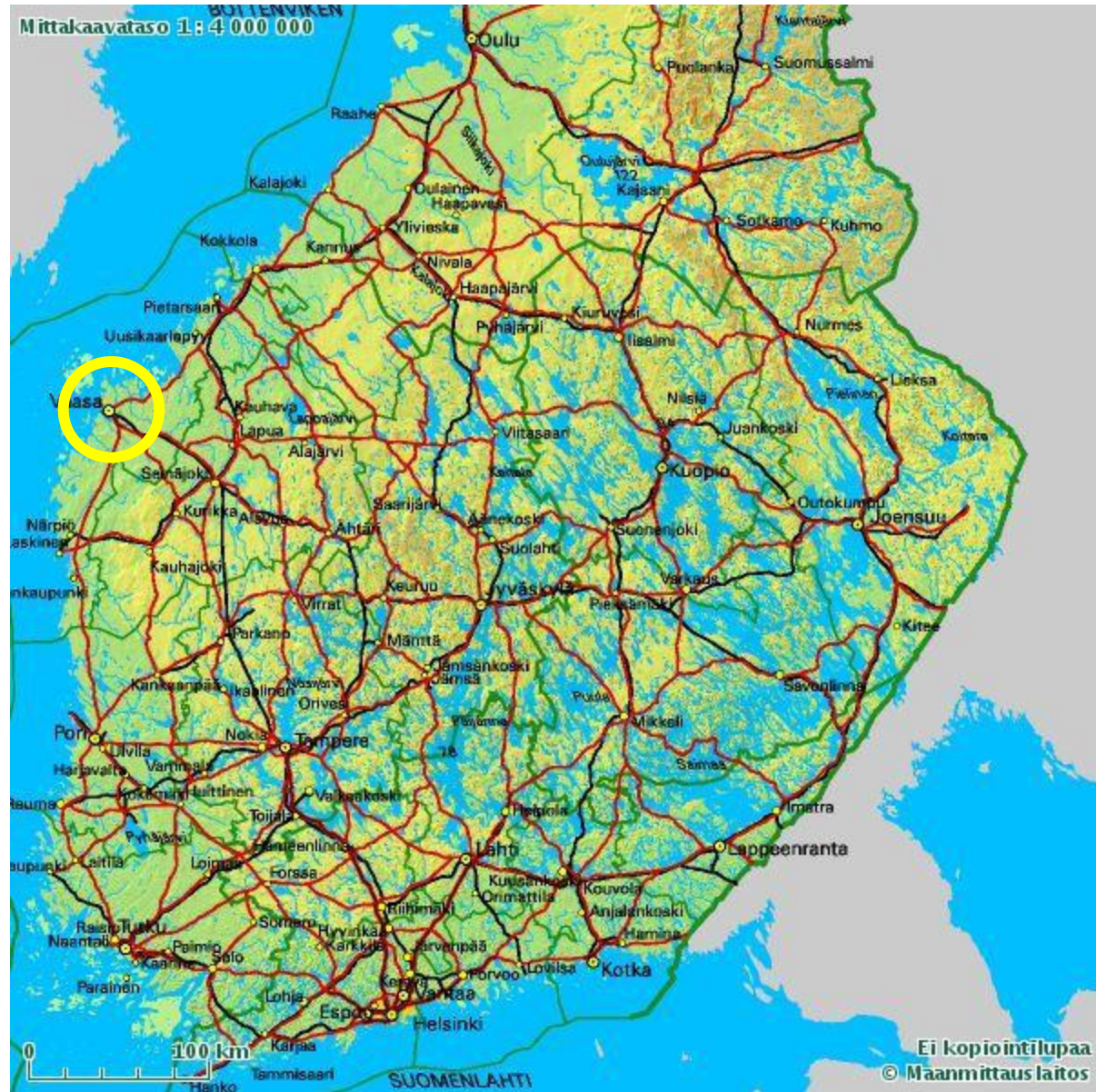


Opening of the Erik Palmén Memorial Symposium on Extratropical Cyclones in Helsinki, August 1988.
(Courtesy of the Department of Meteorology, University of Helsinki.)

To his honour the American Meteorological Society and the Finnish Geophysical Society arranged an Erik Palmén Symposium in 1988

Erik Palmén

1898-1985

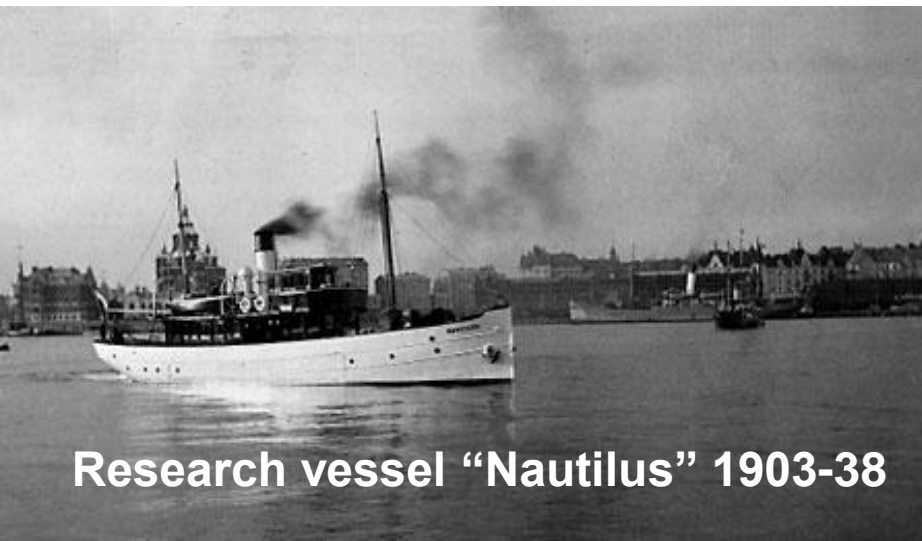




The two Erik Palméns

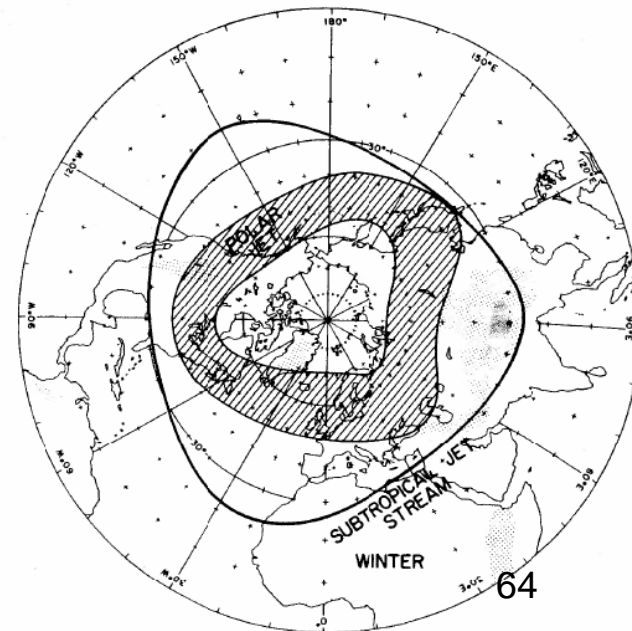


Officially: The oceanographer



Research vessel "Nautilus" 1903-38

Hobby: The meteorologist



When the Finnish authorities couldn't make up their mind about whom to chose as new professor in meteorology, Palmén lost patience and in 1946 left Finland to go to the US, invited by C-G Rossby.

There he took part in ground breaking research on the atmospheric global circulation, tropical cyclones and jet streams in particular

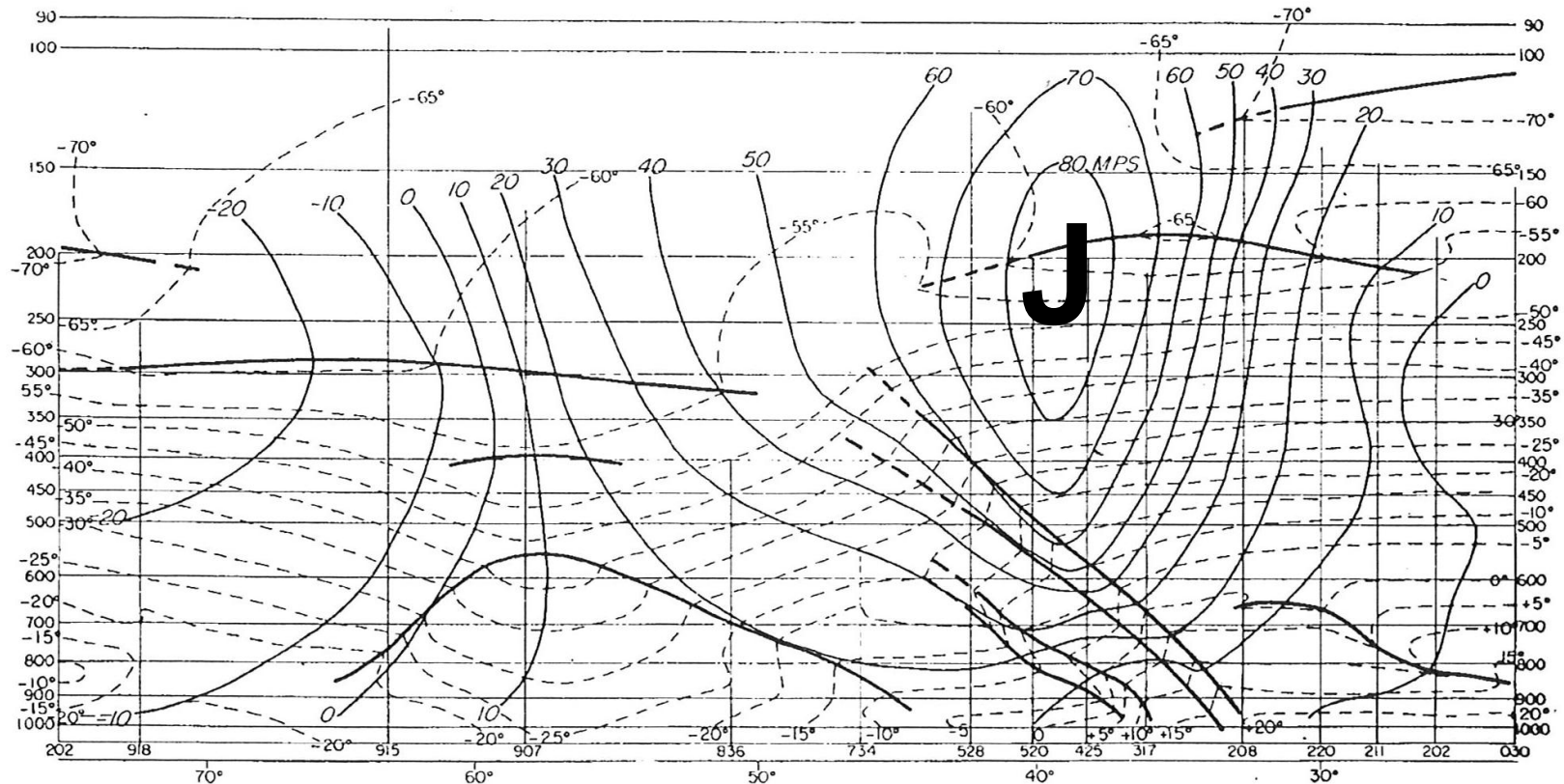


FIG. 4. Vertical section from Havana to Thule (Greenland), approximately along meridian 80°W, 03 GMT 17 January 1947. Thick lines represent boundaries of fronts and tropopause; solid thin lines, isotachs of geostrophic zonal wind ($\text{m} \cdot \text{s}^{-1}$); thin dashes, isotherms ($^{\circ}\text{C}$). (After Palmén, 1948a).

Carl Gustaf
Rossby and Erik
Palmén
remained very
good friends
until Rossby's
sudden death in
1957



In the meantime (1948) the Finnish authorities made up their minds
... and the
winner was



But did Palmén
fade away?



To solve the problem the government created
The Academy of Finland



Finland's three top meteorologists at Niagara Falls in 1949



Jaakko
Keränen
FMI

Vilho
Väisälä
VAISALA

Erik
Palmén
**Finland's
Academy**

Streets
named
after the
Väisälä
family

Two
Vaisala
Awards,
by
WMO
and
Roy
Met
Soc



Erik Palmén's square, Helsinki



3/26/2016

2nd RSHU lecture 21 March 2016



Geophysical society's
Palmén Medal in silver

NMM 6

1968

Hässelby Slott



Sjätte Nordiska Meteorologmötet
11-14 juni 1968, Stockholm

Föredragssammandrag

9.4.1968

Vilho Väisälä:

Om temperaturmätningen i stratosfären ovanför 20 mb.

Sjätte Nordiska Meteorologmötet
11-14 juni 1968, Stockholm

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Föredragssammandrag

Vilho Väisälä:

Om temperaturmätningen i stratosfären ovanför 20 mb.

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Undersökningen av den finska radiosondens strålningsfelet, tillhjälp av en radiosond, där man - utom bimetalltermometern hade en trådtermometer med 0.15 mm tjockhet i frågasattas nuruvida bimetalltermometern duger till temperaturmätningen på så stor höjd i stratosfären. Vid 35 mb är den motsvarande osäkerheten $\pm 1^{\circ}\text{C}$. För temperaturmätningen i den högre stratosfären duger trådtermometern i fråga, men även dess angivelse skall ännu korrigeras för strålningsfelets ballongkomponent.

NMM 9
1974
Bergen



3/26/2016

March 2016

Erik Palmén took
part in all Nordic
Meetings up to
1980 (except 1976
in Iceland)

1974 in Bergen also
saw **Jack Bjerknes**

72

END