

Heinrich von Wild (1833–1902) and his Polaristrobometer

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ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Swiss Physical Society, Lausanne, June 16, 2011

ABSTRACT

Heinrich von Wild (1833-1902) and his Polaristrobometer

Born near Zurich, Heinrich Wild studied physics and became in 1858 professor at the University of Bern. In 1868, he was called to the direction of the Central Physical (Meteorological) Observatory in Saint Petersburg. During his 27 years in Russia, he was busy studying meteorology and terrestrial magnetism, enormously extending the network of observing stations in Russia, publishing results, working on the improvement and standardisation of meteorological instruments and actively participating in international conferences. He was also concerned with the standardisation of weights and measures.

Still at Bern in 1864, he used the very sensitive Savart polariscope to produce his “Polaristrobometer”, the first practical and commercially successful polarimeter/saccharimeter using monochromatic light. It remained one of the most sensitive instruments until the beginning of the 20th c. After his retirement to Zurich in 1895, Wild was again trying to improve it.

PRELIMINARY REMARK

No known relationship between

Heinrich WILD (1877-1951), the famous builder of surveying instruments and founder of “Wild Heerbrugg”,

and the (almost) forgotten Heinrich (von) WILD (1833-1902), meteorologist and inventor of the Polaristrobometer.

LIFE & WORK : AN OVERVIEW

- 1833 Birth near Zurich
- 1833 – 1858 Physics studies
- 1858 – 1868 Professor at Bern
- 1868 – 1895 Director of the Central Physical (meteorological) Observatory at Saint Petersburg (Russia)
- 1895 Retirement at Zurich
- 1902 Death

Mainly active in:

- Meteorology & earth magnetism
- Scientific instruments
- Metrology

I. YOUTH & BERN (1833 – 1868)

Life & Studies

- 17.12.1833: Birth in Uster (Zurich)
Son of Johannes W.,
Erziehungsanstalt Director in Zurich”
Gymnasium in Zurich
Studies in Zurich, Königsberg, Heidelberg
- 1857: PhD. In Zurich
- 1858: “Habilitation”
- 1863: Married with Rosa

Career

- 1858: P.D. at Uni-Z and ETH-Z
- 1858: Ext. Prof. of physics and astronomy at Uni-Bern
Director of the Observatory
(mainly meteorological)
“Eidgenössischer Eichmeister”
- 1862: “Ordinarius”
- 1867-1868: “Rektor” of Uni-Bern

I.1. WORK AT BERN (1858 – 1868)

Physics, metrology, earth magnetism, meteorology, scientific instruments, ...

- 1862 Supervises the Swiss “Weight & Measures inspectorate”
- 1865 Travels to Paris, to compare the Swiss mass units with the ones at CNAM
- 1867 First Director of the “Swiss Federal Verification Office”
(later “Swiss Federal Office of Weights And Measures”)
- 1869 Report about the standardisation of weights and measurements in Switzerland

- 1867 “Antrittsrede zum Rektorat : **Über dem ‘Föhn’** ”
Upholds a theory contradicting the one formulated by the much older H. W. Dove (1803-1879), the very influential director of the Meteorological Institute at Berlin

- 1856 “Novel photometer and Polarimeter” (while studying at Königsberg)
- 1865 First version of his “**Polaristrobometer**”

Well on the way to make a career as organizer,
administrator, editor, committee member
— and designer of instruments

But not a good speaker, does not like teaching

I.2. THE POLARISTROBOMETER (1865, IMPROVED 1869)

From 1850, **polarimetry** (i.e. the measurement of the rotation of the plane of polarisation of light by an optically active substance, for instance a sugar), becomes an important field of chemical research.

Existing instruments do not allow a precise enough determination of the angle of rotation with a liquid sample of reasonable length (about 20 cm).

Wild's **Polaristrobometer** answers a need.

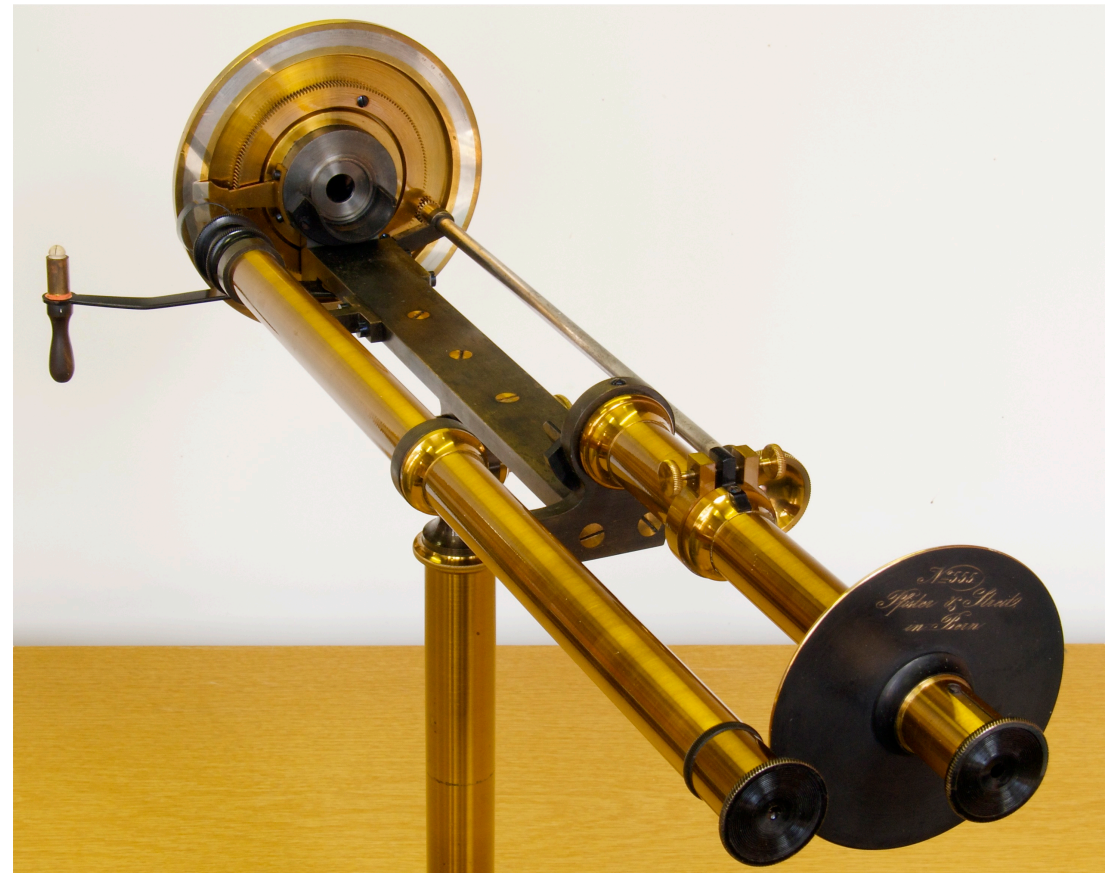
Original: shows **interference fringes** instead of changes of tints or luminosity in one or more adjacent fields.

“Best” polarimeter from 1870 to the end of the 19th c.

Successful, made in “large” numbers, mainly by Hermann & Pfister (later Pfister & Streit) at Bern.

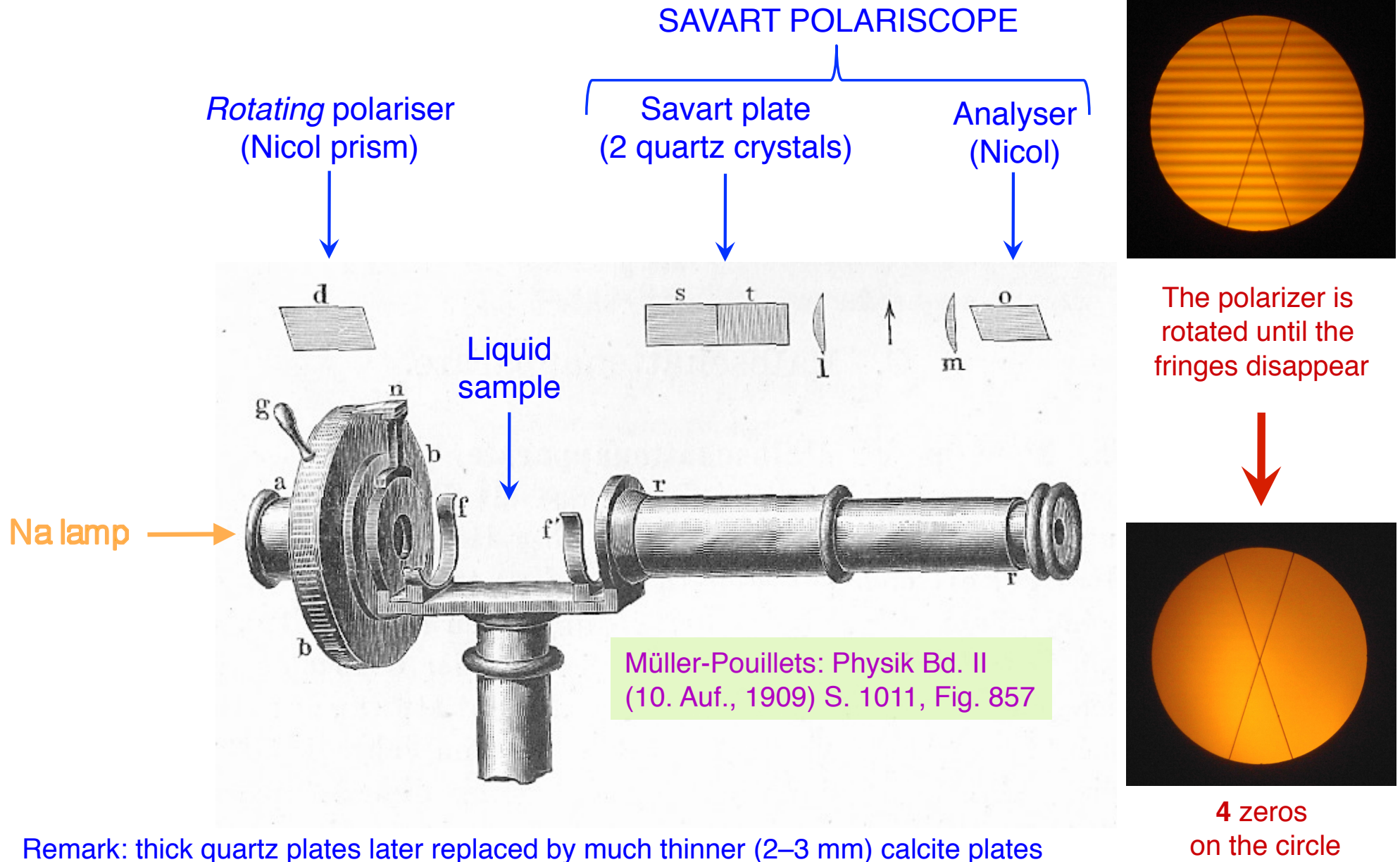
*2011 proclaimed by UNESCO and IUPAP
“ International Year of Chemistry ”*

The large Polaristrobometer (for laboratory and research work):



- Polarimeter/saccharimeter with *rotating polarizer*
- To be used with monochromatic light (Na lamp)
- 2 sizes: for tubes up to 220 mm length (as shown) and for 100 mm tubes)
 - Dr. H. Wild: Ueber ein neues Polaristrobometer (Saccharimeter, Diabetometer) ... (66 S. + 1 Taf.) (Bern: Haller'sche Verlagbuchhandlung, 1865)
 - H. Wild: Über die neueste Gestalt meines Polaristrobometers (Saccharimeter, Diabetometer) Bull. Acad. impériale des Sciences de Saint-Pétersbourg Vol. 14 (1870) 149-163 +1 Taf.

Optical system of the small Polaristrobometer (100 mm tubes)



II. SAINT PETERSBURG (1868 – 1895)

August 1868: appointed

Director of the “Central Physical Observatory”
and

Extraordinary (ordinary in 1870) member of the
Imperial Academy of Sciences

Lives with his wife (and servants) in the building of the
Observatory, just across the Neva from the old town.

In winter, leads an active social life (likes the theater).

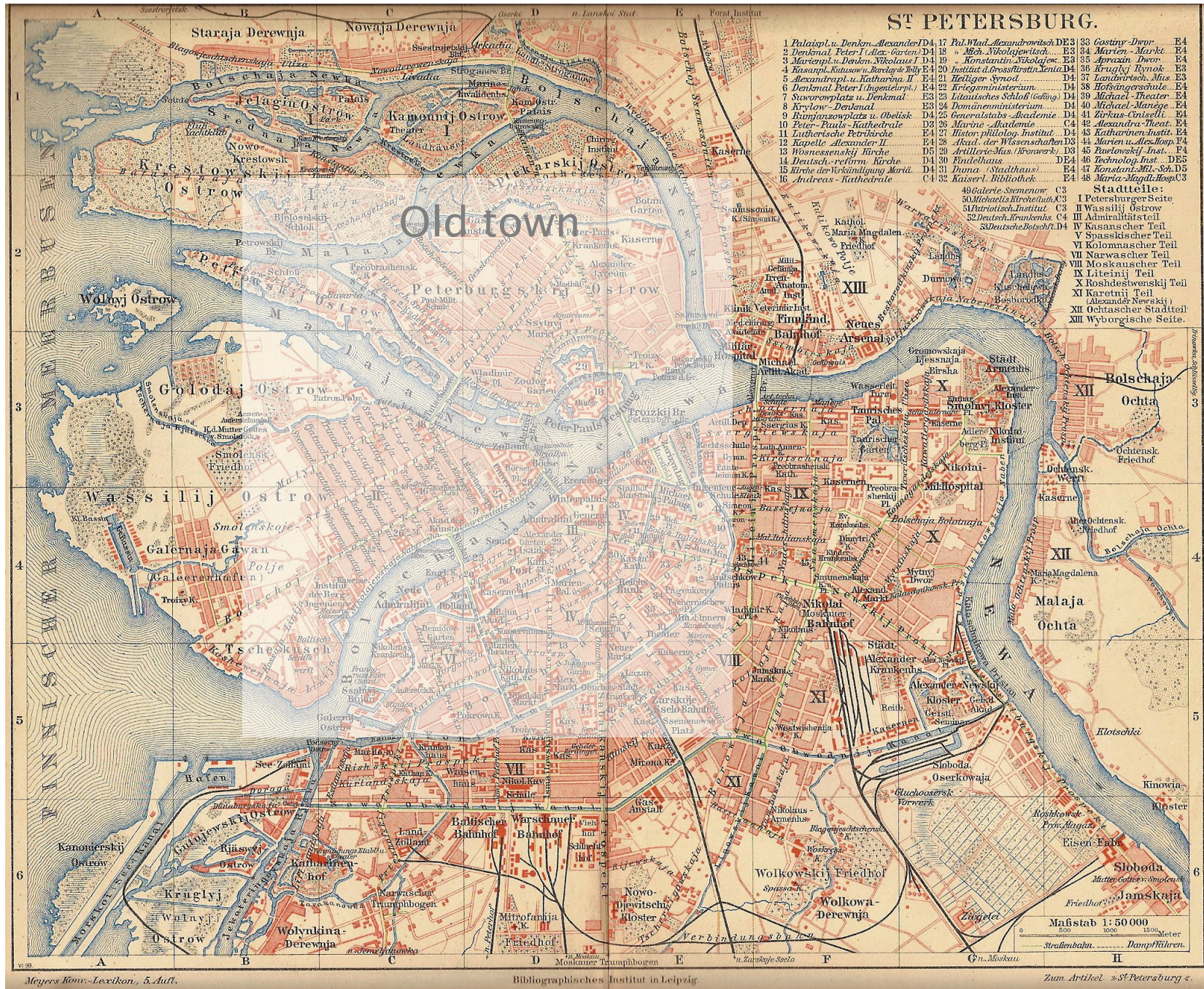
“Friday Evening” receptions at the Observatory.

From 1881, more invited people, literary or scientific
(Chwolson,) conferences, music.

See Karl Spitteler (Swiss citizen, later Nobel Prize of literature):
“Die Freitag Abende im Petersburger Observatorium”, (1902).

Saint Petersburg at the end of the XIXth c. (population 930'000 in 1888)

Meyers Konv.-Lexikon, 5. Aufl. (ca. 1899)



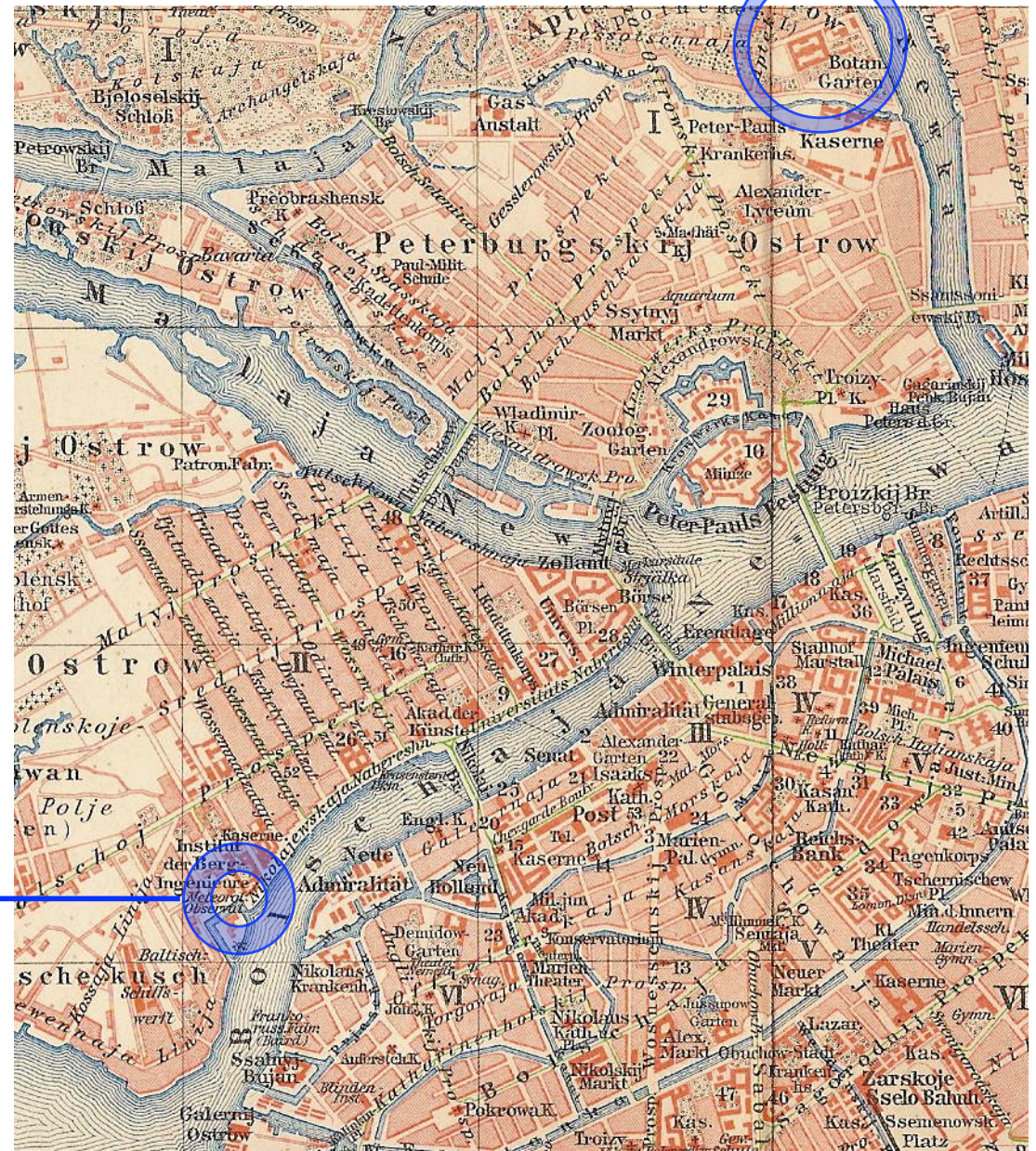
His Excellency Regel, another Swiss, was Director of the Botanical Garden.
Living so far away from the old town, he had not so many guests as Wild.

Saint Petersburg: old town



Central Physical Observatory

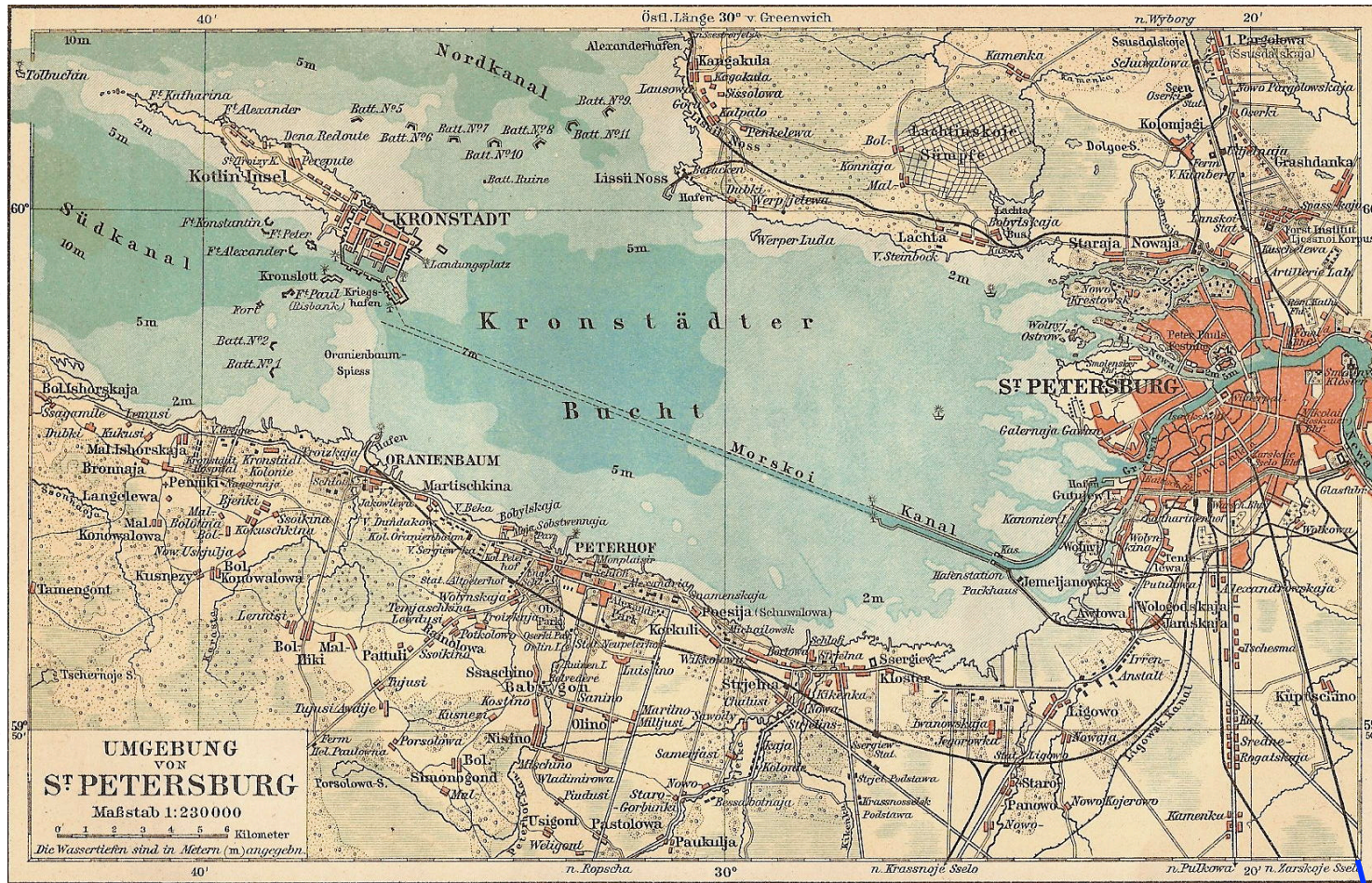
(with accommodation for the Director.
In winter, the guests of the 'Friday Evenings' had only to cross on foot the frozen Neva. The building was enlarged after Wild retirement in 1895).



Meyers Konv.-Lexikon, 5. Aufl. (ca. 1899)

- 1877-1878 Wild in charge of the construction of the **Magnetic Observatory** in the park of the palace at **Pavlovsk**, south of Petersburg, on a plot of land given by the Grand Duke Konstantin Nikolayevich.

Meyers Konv.-Lexikon, 5. Aufl. (ca. 1899)



Surroundings
of
St Petersburg



↓
To Pulkovo Astronomical Observatory (~ 20 km)

↓
To Pavlovsk Magnetic Observatory (~ 30 km)
where Wild lives in his “**dacha**” during the summer months

- 1878 Made “**Wirklicher Staatsraad**”, becomes “**His Excellency Heinrich von Wild**”, along with the rank of **General**
- ~~1880 Would like to go to Berlin, as head of the Meteorological Observatory at Potsdam – the old controversy with Dove is not forgotten~~

1881

- 1881 The last assassination attempt against the Emperor Alexander II is successful !



... but the life and the work of His Excellency Heinrich von Wild are not affected.

14 years more of prodigious activity !



For 27 years, Wild was the most eminent member of the numerous Swiss colony living at Petersburg, at the top of the middle class, but with only infrequent contact with the high society gravitating around the imperial court.

- 1895 In ill health, Wild goes into **retirement**.

A SAMPLE OF HIS WORK AT SAINT PETERSBURG (1)

Meteorology, earth magnetism, metrology...

- ≥ 1868 As organizer and administrator of the Russian meteorological service, **extends the network of observing stations** from 31 to **650** and directs the construction of the Magnetic Observatory at Pavlovsk
- 1869 **3 months journey through Russia*** (to visit existant observatories); Report to the Academy.
- 1869-1894 **Edits** the “Annalen des physikalischen Centralobservatorium” and the “Repertorium für Meteorologie (17 vols., 6 suppl.)
- 1870-1885 Each year, one or more **trips abroad** with his wife, either to
 - Meteorological committees and congresses
 - “Commission”, then “Conférence diplomatique”, then “Comité international du mètre” (Weights & Measurements)
 - International Polar Conferences (organizing the **Polar Year 1882-1883**)
- > 1885 Wild tired, less trips abroad
 - Chairman of the 5th “International Polar Conference” (1891)
 - “Comité international du mètre” (1894)

* By train, boat, land transportation to Moscow, Nijni-Novgorod, Kazan, Samara, Saratov, Tsaritsyn (Volgograd), Rostov-on-Don, through the Caucasus to Tiflis (Tbilisi), Poti, Kerch, Sevastopol, Odessa, Kiev, Moscow, and back to Petersburg.

A SAMPLE OF HIS WORK AT SAINT PETERSBURG (2)

Meteorological and magnetic instruments

- Standardisation of meteorological instruments, to make measurements comparable
- Improvement of instruments (for instance a mercury barometer with a precision of 0,01 (!) mmHg)
- Magnetic theodolite
- Etc.

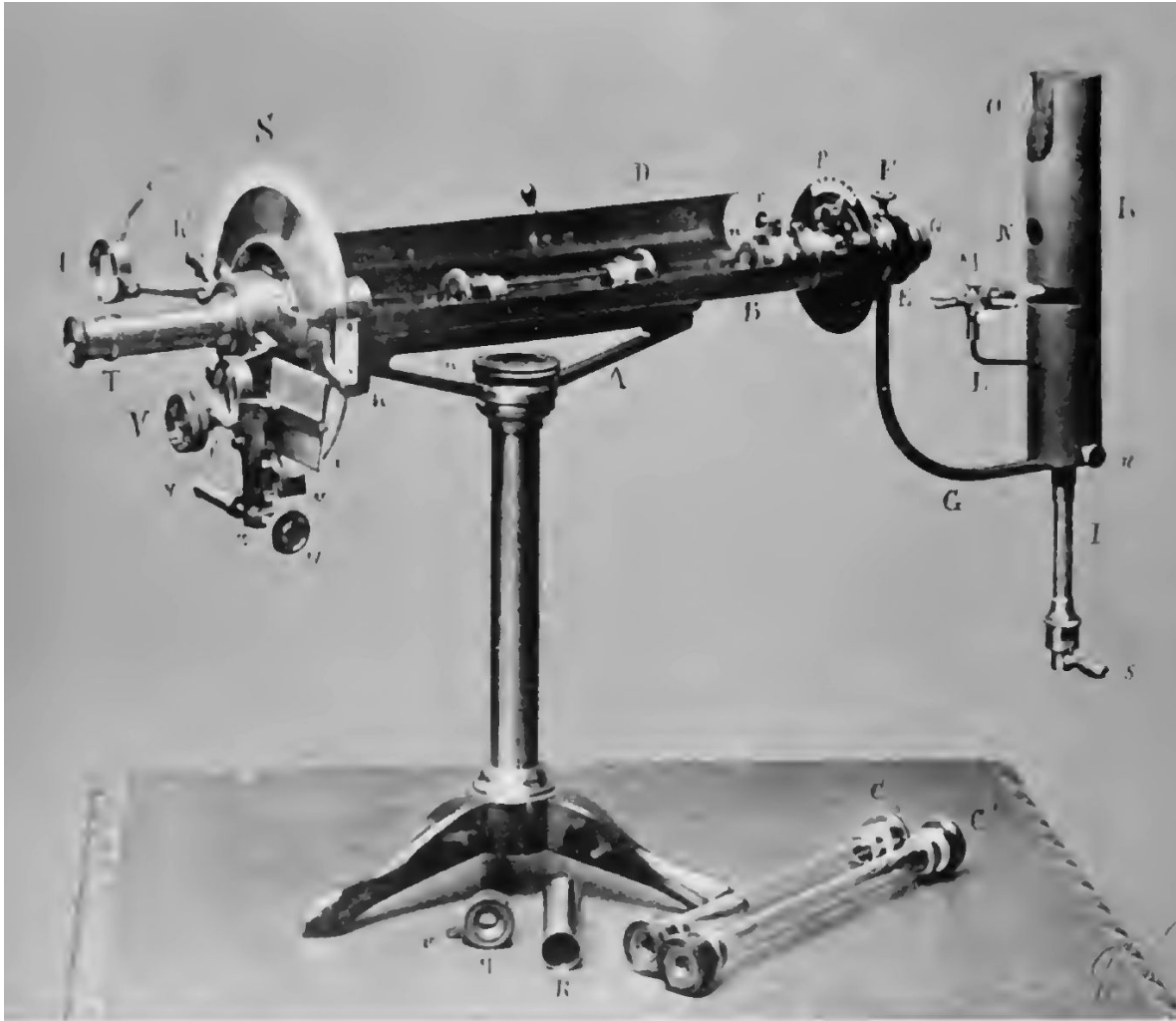
Publications

- “Die Temperaturverhältnisse des russischen Reiches” (1881)
- “Das Konstantinowsche meteorologische und magnetische Observatorium zu Pawlowsk” (1895)
- More than **100** publications in scientific journals

III. ZURICH (1895 – 1902)

- In ill health, His Excellency Heinrich von Wild retires in July 1895
- Returns to Switzerland (Zurich) with his wife Rosa – no children
- Publishes a few more papers about the measurement of terrestrial magnetism (instruments and methods)
- Last attempt to improve his now obsolescent Polaristrobometer

Back to the Polaristrobometer (1898)



- Wild recognises that his Polaristrobometer has been replaced by better instruments
- Convertible to half-shade (“Halbschatten”) polarimeter
- Several other improvements such as a rotating *analyser*
- At least one prototype made by Pfister & Streit at Bern
- Commercially not successful

H. Wild: Verbesserung des Polaristrobometers
Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich,
43. Jahrgang, 1898, S. 37-80 + 1Taf.

Heinrich von Wild dies on May 5, 1902

- 1902: Obituaries in
 - Neue Zürcher Zeitung
 - Verhandlungen der Schweizerischen Naturforschenden Gesellschaft
 - Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich
- 1902: Karl Spitteler: “Die Freitag-Abende am Petersburger Observatorium. Zum Andenken an Staatsrat von Wild (NZZ)



1913: Rosa v. Wild: Erinnerungen –
Gewidmet dem Andenken meines Gatten Heinrich v. Wild,
Mitglied der K. R. Akademie der Wissenschaften zu St. Petersburg und Direktor
des physikalischen Zentral-Observatoriums daselbst von 1868–1895

2011:

The pioneer of meteorology is remembered by a few meteorologists
Polaristrobometers, still to be seen, are the sole material mementos of his work

Acknowledgements

Without *Dr. R. Saba*, who gave me a Polaristrobometer he had salvaged many years ago, I would never have been incited to study the life of Heinrich Wild and explore the mysteries (for a physicist) of chemical polarimetry.

I am also thankful to *Dr. I. Orlov*, who identified the location of Wild's residence on the Saint Petersburg map and located on the Web photographs of the building.

Last but not least, I am grateful to the *EPFL*, through my laboratory, the *LPHE*, for its continued support.

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- **Ferdinand RUDIO** und **Carl SCHRÖTER** : Heinrich Wild (1833–1902); Nekrolog in Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 47. Jahrgang (1902) 443-451 [partial reproductions of the obituary written by **MAURER**, of another one by **RYKATSCHEW** published in NZZ Nr. 354 (1902), followed by the article written by **Karl SPITTELER** “Die Freitag-Abende im Petersburger Observatorium. Zum Andenken an Staatsrat von Wild“, published in NZZ Nr. 250 (1902) Morgenblatt S.1.]
- Meteorology in Russia; Monthly Weather Review March 1899, pp. 103-107 [mainly about the meteorological work done by Wild in Russia]
- Heinrich Wild; Monthly Weather Review September, 1902, p. 451; [Short obituary]
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