

The Decade of Work & Research in Solid-Earth Geophysics, 1929 to 1939

Fieldwork in terrestrial magnetism -- Evaluation of gravity determination comparing high-precision steel and brass pendulums -- Invention and use of the horizontal double pendulum -- Recordings of tiltings of the earth's crust caused by: lunar and solar tidal forces, atmospheric pressure changes, & melting of seasonal snowpack.

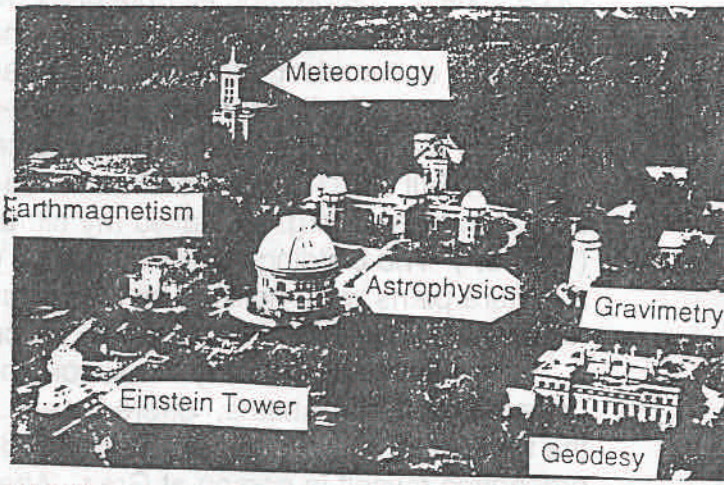


During my last Highschool year, a class field-trip was made to the University's Geophysical Station, located in a forest about 7 mi from the city. The director, Prof. Errulat explained the seismograph and why magnetic field-intensity was recorded in an "iron-free" hut. It impressed me to hear that the earth trembles when an atlantic cyclone with wind and surf batters Norway's coastline. I remarked to friend Geirg S., that being in charge of such a station would be to my liking. I hardly could dream that 10 years later I would be Prof. Errulat's successor.

After finishing highschool, I decided to see Prof. Errulat at his suburban home. He was delighted to hear that I wanted to study Geophysics. I spent 3 semesters at the Albertina, earned some money by magnetic surveying for Errulat. On my own, I measured air pollution above and downwind of the city. Also, I spent part of my time with the meteorologists at the airport, who were kind enough to let me replace on two occasions the observer in the daily weather-reconnaissance flight up to 500 mb (~15,000 ft) in an open-cockpit biplane.

Fall & Spring 1929/30, at Frankfurt University, I enjoyed a great diversity of courses offered there: Baur (statistical meteorology), Gutenberg (seismology) Linke (bioclimatology & upper atmosphere), Stüve (thermodynamics), & Mügge (synoptic meteorology). I learned so much that in Fall & Spring 1930/31 I decided change to Leipzig University for widening my knowlege in theoretical meteorology by Weickmann and Haurwitz. Friendship with Werner Schwerdtfeger developed. He, as well as I received the Ph.D. in summer of 1931 both with theses on hemispheric wave motions in the atmosphere but of different kind.

In 1931 Gernany's economy was at low tide. However, Weickmann found for W.S. a position in Berlin as forecaster and for H.L a stipend to do gravimetry work in Geodesy at Potsdam's unique "research campus". This place offered unexpected benefits. I found waterlevel-recordings from the two large Haffs of Eastprussia. I could improve gravimetric observations by correction for earth magnetic induction. I learned about earth tides. After a visit to Süring (director of the Met.Observatory) the best and immediate benefit turned out to be the: funding of Balloon Research.



The Research Inst.'s on Telegraph-Hill near Potsdam

My two years in Potsdam (1931/33) were not just work. The lakes formed by the River Havel were ideal for rowing. Karl Jung (of gravimetry) owned a boat and was happy to find a team mate. Our usual 20-mi round-trip led down Lake Templin and back via Werder on lakes of the main channel. On Lake Templin, we occasionally saw Einstein sailing in his yawl that he kept at his small house at one of the shore villages....

The Kings of Prussia had built in Potsdam several "chateaus", open to people after Wilhelm II was gone. In Spring 1933 I witnessed the "procession" lead by Hitler (dressed in a diplomat's frock!) walking to Garrison Church, where President Hindenburg (obviously displeased) appointed Hitler legally as Chancellor, since the NSDAP had won a majority in the Diet. 32 parties had been on the ballot. I had voted for SPD, as the lesser evil.

In Mid 1933, Weickmann called me back to Leipzig, for research and to assist the students working on Ph.D theses at the newly built Geophysical Observatory and dormitory located near a village and hill named Collm, about 30 mi east of Leipzig.

Collm Observatory

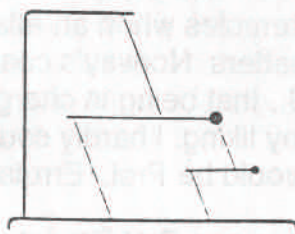


Fig. 12. Lettau tiltmeter (LETTAU).
CHEN TSHOI, I. Vertical Deformations

Horizontal Double Pendulum



H.L., traditionally dressed, at the entrance of the ancient salt mine, in Berchtesgaden, ready to go to his tiltmeter deep in the mountain March, 1938

Student advising involved research in micrometeorology. Geophysical work was partly routine, with occasional-magnetic surveys locally and in the Erz Mountains. I had to detect the location of power plant machinery causing seismic "noise". Experiments showed that air convection in our window-less double isolated instrument shelter was the cause of so-called "Frost-Unrest" on seismograms during cold spells.

Most rewarding was work with my horizontal double pendulum, a "coupled system" of ultra-high sensitivity for tilt (10^{-8}): Heisenberg came to Collm to see it and to "improve my theory of it". I recorded gravimetric tilt (0.01") with 2 to 4 cm amplitude. ... Occasionally, barometric tilt appeared when "solid ground" yields to high pressure centers and their movement.. Steinhauser (Vienna) had theorized that the Alps should yield to snowpack accumulation in Fall, and lift again when the snow melts. The German-Austrian alpine society supplied funds for me to verify "snow--pressure tilt" at the rim of the Alps. Two weeks of tilt recordings in the salt mine of Berchtesgaden confirmed the theory.

In Fall of 1938 the Albertina called me back as associate professor, succeeding Errulat in Königsberg. I installed my tiltmeter temporarily in the old unused dungeon ("Karzer") The building was on swampy ground and street traffic caused large erratic tilts. All future plans were nullified by the outbreak of war. A Russian geophysicist later wrote that he had copied my tiltmeter and recorded gravimetric tilt at a station in Siberia.

As last reward for my endeavors in dynamics of the "solid" earth, the faculty of the university in Graz, Austria, offered me in 1944 the chair of Alfred Wegener, the founder of the theory of continental drift.. I accepted gladly but as wartime draftee I had to postpone presenting myself in person at Graz. After war's end Austria was "liberated"; the faculty in Graz was forced to notify me that appointments of Non-Austrians had to be canceled..