Geheimrat Professor Dr. Adolf Schmidt

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Adolf Schmidt

Adolf Schmidt was the director of the Potsdam Magnetic Observatory from 1902 until 1928. The present geomagnetic observatory was built following his plans at a site which he selected near the small town of Niemegk. On his 70th birthday, 23 July 1930, the observatory was officially inaugurated and has borne his name since then.

Biographical notes

ADOLF SCHMIDT was born on July 23rd 1860 in Breslau (today Wrozlaw/Poland). The family had four children.
ADOLF SCHMIDT attended a high school in Breslau which he left with his leaving certificate to take up studies in mathematics, physics, English and French at the university of Breslau. He graduated at the age of 22 summa cum laude, with a dissertation in pure mathematics, entitled ''On the Theory of the **CREMONA** Transformations, Especially Those of Fourth Order''.
He passed the government examination for a teaching qualification at Breslau University not only in mathematics and physics, but also following a special interest in languages, in English and French. After probationary years in Breslau and Gotha he took up a permanent position as gymnasium teacher at the Ernestinum gymnasium in Gotha in 1885, where he was later also nominated as a professor.
In 1902 he was appointed successor to **MAX ESCHENHAGEN** as director of the Potsdam Magnetic Observatory. He led this observatory very successfully during the following 27 years and developed it to one of the best known magnetic observatories in the world.
In 1928 he retired and returned to Gotha, were he continued his scientific work, where he died on 17 October 1944.

Scientific progress until 1902

In Breslau **ADOLF SCHMIDT** already had come into contact with geophysics, which later on was to become the subject of his scientific work. He took part in the analysis of observations made during

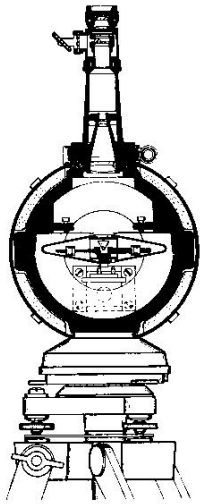
the International Polar Year, especially in the field of geomagnetism.
In Gotha the **JUSTUS PERTHES** Publishing House helped to develop his interest in geomagnetism and led him to important scientific research. There he wrote some of his most important works, dealing with the calculation of the potential of the geomagnetic field. The results attained in the works were of such far-reaching importance that he received an invitation to take part in the International Conference on Terrestrial Magnetism and Atmospheric Electricity of the British Association for the Advancement of Science, held in Bristol in 1898. At that conference the International Earth Magnetic Commission was founded. **ADOLF SCHMIDT's** participation led to his early nomination as a professor. **ADOLF SCHMIDT** also became known through other scientific publications during his years in Gotha, so that he was appointed successor of the late Prof. **MAX ESCHENHAGEN** as director of the Potsdam Magnetic Observatory in 1902.
It must be mentioned that **ADOLF SCHMIDT** not only worked in his very own branch of research, but also published some work dealing with other geophysical problems. His meteorological research was particularly noteworthy, first of all his contribution to the competition of the Königsberg Physical and Economical Society. In 1891 **ADOLF SCHMIDT** succeeded in solving the given problem, namely to work up the Königsberg ground-temperatures, and so won the prize.

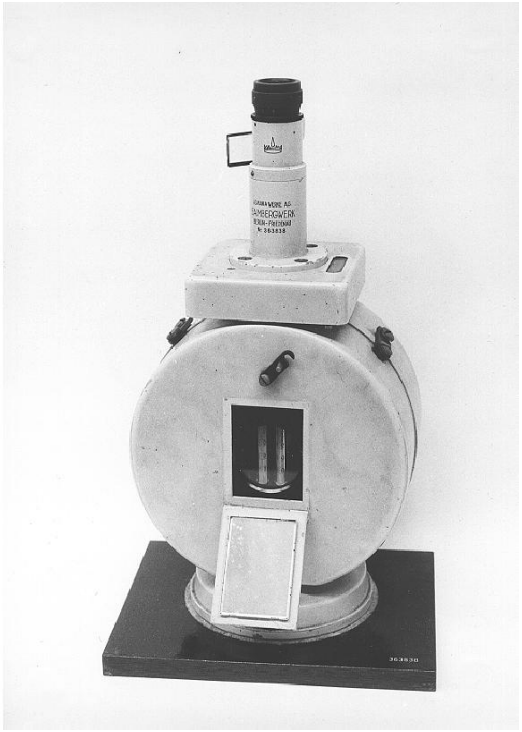
Adolf Schmidt's time in Potsdam

Prior to coming to Potsdam, **SCHMIDT** had made his name with theoretical work. However, he soon demonstrated his abilities in experimental magnetism.
As director of the Magnetic Observatory **ADOLF SCHMIDT** was able to pursue his various research interests on a large scale. He was highly skilled in all fields of geomagnetic research, experimental methods, statistics and mathematical methods. Some of his experimental results were only possible due to his theoretical and mathematical research.
The first deals with the modification of the deflection experiments, used to measure the absolute magnetic horizontal intensity. These experiments were hampered by difficulties arising from the inhomogeneity of the artificial magnetic field. With some pioneering research **ADOLF SCHMIDT** succeeded in solving these problems in a definitive manner. At first this was a purely mathematical and theoretical solution. But he was not satisfied with that and proceeded to put it into practice. The theodolite, named after him, provided the experimental possibility of utilising the theoretical knowledge.

ADOLF SCHMIDT theodolite in use

A further result of practical research was the construction of the magnetic field balance. During the early years of the 20th century magnetic measurements in the field became of more interest, making it relatively easy to achieve knowledge about the distribution of the magnetic properties of matter of the upper strata of the earth's crust. **ADOLF SCHMIDT** adapted to adjust the well-known **LLOYD's** balance for use in the field. This was an especially difficult task, as this balance was the most delicate instrument for magnetic variation-recordings, particularly because the magnet is put on a knife-edge. It is characteristic of his extraordinary technical and engineering abilities that **ADOLF SCHMIDT** succeeded in designing an useful instrument. He developed the first balance in 1907 in collaboration with the precision-mechanics workshop **O. TOEPFER** in Potsdam.





Sketch and view of a SCHMIDT magnetic field balance

The statistical work of **ADOLF SCHMIDT** dealt initially with a problem already considered by **MAX ESCHENHAGEN**. It was the question of summing up numerically the strength of the magnetic variation during the day, caused by ionisation processes and the state of the upper atmosphere. In order to define this so-called geomagnetic activity **ESCHENHAGEN** had introduced five categories (1, 2, 3, 4, 5). **ADOLF SCHMIDT** took up this idea, which he recognised to be the correct approach, and refined it, at the same time reducing the categories to three (0, 1, 2). They were accepted at the international congress in Innsbruck in 1905. These international character figures are still used today. The idea of measures for the activity led finally to the Potsdam geomagnetic activity indices K, introduced by **JULIUS BARTELS** and internationally accepted in Washington in 1939.
ADOLF SCHMIDT investigated the geomagnetic effects of the tides on the ionosphere. The so-called lunar diurnal variation in the geomagnetic field indeed was known, but its treatment required numerical calculations that were almost impossible for a single scientist with the computers then available.
ADOLF SCHMIDT's mathematical investigations with regard to the transformation of the spherical harmonics into different co-ordinate systems were especially well known. He determined a general solution to this problem, and this formula gave him the theoretical basis for the improvements in the deflection experiments for the definition of the horizontal intensity, mentioned above.
One of his important theoretical investigations was in the field of the so called ring current. Indeed, the discovery, that such a ring current must be surrounding the equator, was not his alone; for

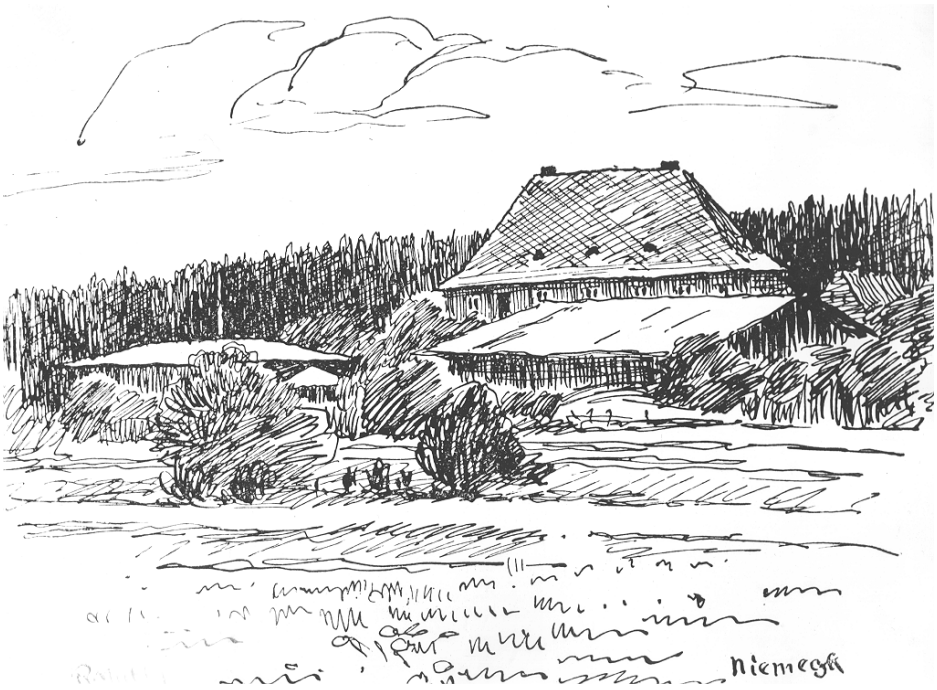
BIRKELAND and **STOERMER** had already pointed out this phenomenon, but SCHMIDT, relying on the existing material of several observatories, was probably the first to show the real existence of the ring current, and to give data on its intensity.

Managing the Magnetic Observatory

In addition to his excellent scientific work **ADOLF SCHMIDT** managed the magnetic observatory very efficiently and raised it to its world wide reputation.
He was always anxious to secure and improve the accuracy and reliability of both the absolute geomagnetic measurements and the continuous recording. Many technical and mathematical innovations were initiated, which are described in more detail in the observatory yearbooks.
In particular, he took care that the highly sensitive magnetic recordings in Potsdam were not influenced by industrial disturbances. In all, he was forced to intervene three times. The first time was when electrical towing was started on the Teltow-Canal in 1903 and 1904; the second time was when the Potsdam horse tramway was electrified in 1907. **ADOLF SCHMIDT** thought it to be the right moment to transfer the geomagnetic recordings from Potsdam to Seddin. On his initiative a small observatory was built on the Seddiner See, where continuous geomagnetic recordings took place. When in 1928 the Berlin suburban railway was electrified, it was clear that absolute measurements could no longer be made in Potsdam. However, **SCHMIDT** realised that disturbances were also affecting the recordings in Seddin, and that this situation would only get worse.

View of the measurement buildings of the Adolf Schmidt Observatory at Niemegk in 1932

Consequently, he made the farsighted decision to relocate the observatory completely to a new site, which would allow operation undisturbed from technical and urban influences for the foreseeable future. He selected the site of the new observatory himself. He decided for the small Brandenburg town of Niemegk, 50 km from Potsdam. There, near the woods, the Observatory for Geomagnetism, named after him and now internationally known, was built according to his plans.
The observatory was officially inaugurated on 23 July 1930, at the occasion of **ADOLF SCHMIDT's** 70th birthday.



Niemegk observatory in 1930, view from south-east, after a drawing by R. Muth

Awards

For his outstanding achievements **ADOLF SCHMIDT** was awarded various well-deserved honours and distinctions. He was made Honorarprofessor at Berlin University in 1907. The Academies of Berlin, Göttingen and Christiania elected him member, and the German Geophysical Society made him honorary member. The Technische Hochschule (today Technical University) of Berlin-Charlottenburg made him Dr.-Ing. h. c. He was also awarded many decorations.

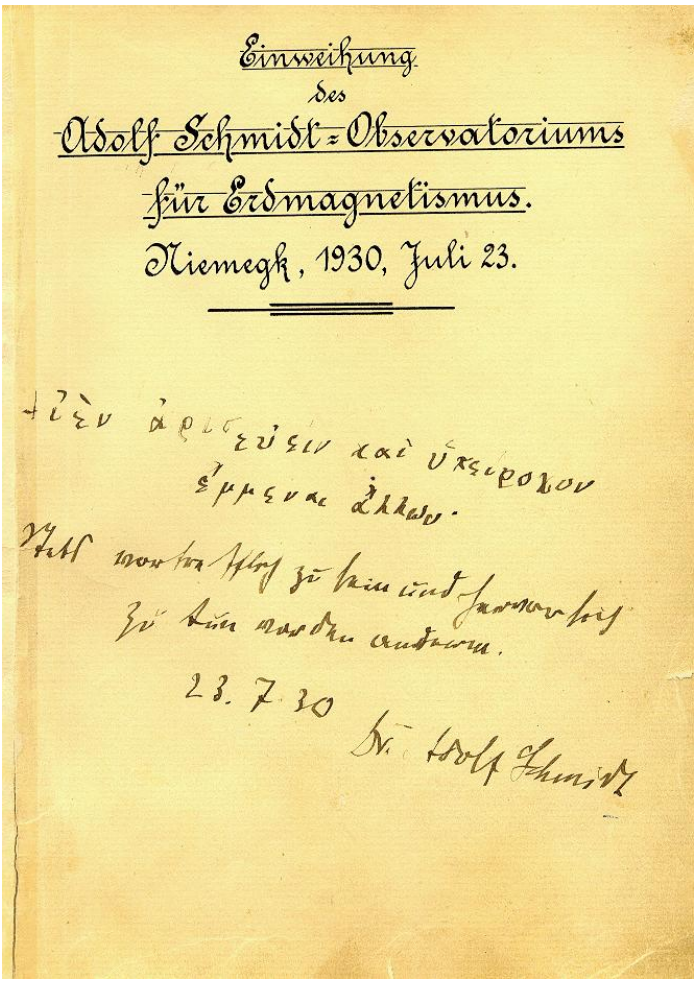
ADOLF SCHMIDT bust at the Niemegk observatory

Interests and political Attitude

ADOLF SCHMIDT was fluent in English and French, as well as classical Greek and Latin. He was also sufficiently strong in Russian to be able to read works in the original. He was a vocal supporter of the development and use of Esperanto for international communication.
His scientific interests also extended to an interest in the arts. He published two works on the numerical demonstration of musical intervals, in the "Zeitschrift für Physik" in 1920 and 1921, developing some new aspects of theoretical harmony.
ADOLF SCHMIDT developed at a young age a strong social consciousness and sense of justice. Unsurprisingly, both affected his political attitude. He joined the League of Human Rights, in order to demonstrate his attitude, and as a result was "persona non grata" for the National-Socialist government.
ADOLF SCHMIDT wrote down into the visitors' book at the inauguration of the Observatory for Geomagnetism in Niemegk on his 70th birthday:

Aien aristeuein kai upeirocon emmenai allwn.

in English, "Always to be excellent, and to distinguish oneself before others".


Einweihung
des
Adolf Schmidt-Observatoriums
für Erdmagnetismus.
Niemegk, 1930, Juli 23.

First page of the Adolf Schmidt Observatory guest book with ADOLF SCHMIDT's inscription

References

G. Fanselau — In Memory of Adolf Schmidt
IAGA Bulletin No. 10, Transactions of the Helsinki and Berkeley Meetings (1960/1963), published in 1969

A. Best — Zum 50. Todestag von Geheimrat Professor Dr. Adolf Schmidt
Adolf Schmidt 1860-1944, Zum 50. Todestag des Geophysikers und Esperantisten am 17.10.1994, herausgegeben vom GeoForschungs-Zentrum Potsdam unter Mitwirkung der Esperanto-Liga Berlin, 1994