

PROPOSED ATMOSPHERIC ELECTRICITY WORK ON THE  
MAGNETIC SURVEY YACHT "GALILEE" IN 1907.

In accordance with instructions from the Director of the Department Terrestrial Magnetism of the Carnegie Institution of Washington, the undersigned will join the magnetic survey yacht *Galilee* at Sitka about Aug. 1st and attempt, in connection with the ship's regular magnetic work, the following atmospheric electricity observations during a cruise in the Pacific Ocean. The main purpose at present is to acquire the necessary experience. Hence the work must necessarily be largely experimental.

1. *Potential.* An attempt will be made to study the fair weather potential gradient at sea during calm weather, or with fairly smooth sea. A plan proposed by Mr. J. E. Burbank will be tried, viz., to place the collectors on a boat or raft towed at some distance behind the vessel. The collectors would be two amalgamated zinc plates (found to work well in fair weather) placed about one meter apart, one above the other and connected with the electroscope by two waterproof insulated cables, one to the case and the other to the leaves of the electroscope. If the zincs do not prove satisfactory, simple water droppers may be devised.

2. *Dispersion.* The Elster and Geitel dispersion apparatus will be used to obtain relative values of conductivity of the air to compare with the large mass of data which have been collected on land with similar apparatus by numerous observers. These observations can be carried out precisely as on land.

3. *Ionic velocities and specific number of ions.* Ebert's apparatus will be used, making the observations according to the usual method, and protecting the instrument from wind and spray.

4. *Specific conductivity.* Gerdien's conductivity apparatus with hand driven fan will be employed, the length of the exposure being suited to the conductivity found, and the conductivity computed according to the usual method.

5. *Radioactivity.* The method and apparatus of Elster and Geitel will be used for the present at least, the wire being charged to about 2000 volts by means of the dry pile provided for the purpose as long as the dry pile proves efficient. If the dampness destroys the usefulness of the dry pile an attempt will be made to charge the wire by means of an induction coil. For this purpose a good primary battery will be needed, and also an arrangement for maintaining a suitable spark gap (point and plate) so as to have a unipolar charge on the wire.

The radioactivity of the sea water may be determined by evaporation and examination of the residue, or by testing air shaken up with the sea water. Rain water will also be collected and evaporated, the residue being examined for radioactivity. In these tests the apparatus for the investigation of the radioactivity of air and soils of Elster and Geitel will be employed.

6. *Calibration of electroscopes.* Electroscopes will be calibrated about once a month or as often as the leaves are injured and have to be replaced. A set of 200 cells using copper-zinc electrodes and a weak solution of magnesium sulphate as solution has been constructed. Along with these a number of small dry cells (small size "Ever Ready" cells will do) giving a potential of about 50 volts will be needed. These are for use with the voltmeter to give a standard potential to which to refer the magnesium sulphate cells as the latter polarize too rapidly to give a correct reading on the voltmeter. Some form of support for the electroscopes will be devised to keep them approximately level during observations, e. g., a gimbal stand with a flat table on top and a rather heavy counterpoise below.

*Department Terrestrial Magnetism.*  
*Washington, D. C., June 1, 1907.*

P. H. DIKE.

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## NOTES

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4. *Magnetic Observations at Various Levels.* The *Editor* of the *Meteorologische Zeitschrift* in referring to an abstract of *Schmidt's* article on magnetic variation observations in mines (*Cf. T. M.*, vol. XI, p. 181), contained in the March issue of the *Zeitschrift*, calls attention (p. 131), to the fact that magnetic declination observations were undertaken in the year 1884 in the "Adalbert shaft," of the silver mine at Pribram, Austria, 1000 m. below the surface of the Earth. A report of this work by *Liznar* will be found in the *Zeitschrift d. österr. Ges. f. Met.* 20, 184, 1885. Unfortunately, however, the difficulties of operation proved too great to keep up the observations.

Also in the same volume, p. 180, appears an article by *Maurer* of Zürich on the magnetic observations made on the top of Mt. Säntis, 2500 m. above the level of the sea.

The installation of magnetic variation instruments on the top of Mt. Sonnblick at a height of 3100 m. is in contemplation.

In the fall of 1903, *L. A. Bauer* investigated the possibility of operating self-registering magnetic instruments at various levels in the copper mines at Houghton, Michigan. It was found that at that time, in the absence of electrical installations, the conditions were exceptionally good for installing instruments at nearly a mile below the surface. Some preliminary arrangements were accordingly made, with the assistance of *Professor F. W. McNair*, President of the Houghton College of Mines, but unfortunately, owing to the greatly delayed arrival of the instruments ordered of German mechanicians and the necessity of returning some received, on account of their defective character, it has not been possible to carry out the contemplated work. Owing to electric installations the conditions are not so good now.