

New Standard Magnetometers

Encouraged by Dr. K. Wadati, Director of the Japan Meteorological Agency, Tokyo, Dr. S. Imamiti, who retired in December, 1952 from his post of the director of the Kakioka Magnetic Observatory, began to construct in 1950 new electromagnetic Standard Magnetometers, A-56 and H-56, with higher absolute accuracy than those hitherto used at Kakioka. He has devoted himself to this difficult and pioneering project in close cooperations with the Special Committee on Standard Magnetometer, chairmaned by Dr. M. Hasegawa, of the Science Council of Japan, and more than thirty of the most famous manufacturing agencies in Japan in various special branches of engineering. He and his successor, Dr. T. Yoshimatsu, have been faithfully assisted by the skilful magnetician, Mr. M. Hirayama, chief of geomagnetic section, and others of the observatory throughout the total course of progress, during which all participating members of the project were confronted with several difficult problems on both technique and expenditure, and even unexpected accidents happend as time went on; otherwise the construction would not make such a good progress that preliminary observations could be begun in March, 1957.

The Standard Magnetometer H-56 is a sine galvanometer, while A-56 is a type suggested by E. A. Johnson in 1939, the latter being specially designed to be able to observe independently any element of H, D, Z, F and I with the absolute accuracy of about 0.5γ in intensity and $3''$ in angle.

The standard coil used for A-56 or H-56 consists of a single layered Helmholtz coil of nonoxygenous hard copper wire of high purity, 0.4972 mm in diameter, and a pyrex glass bobbin with low temperature-coefficient and high specific resistance, on which the wire is wound under constant tension. The dimensions of the coil were measured by comparing with the standard block gauge at the Tsugami Manufactory, Niigata, Japan, of which length is accurately determined with the accuracy of less than 0.2μ by using the wave length of monochromatic light. They are given in the following table.

	H-56	A-56
Diameter	$2997095 \pm 0.06 \mu$	$2999003 \pm 0.06 \mu$
Length	$1500120 \pm 0.19 \mu$	$1499996 \pm 0.22 \mu$
Number of turn	24	22

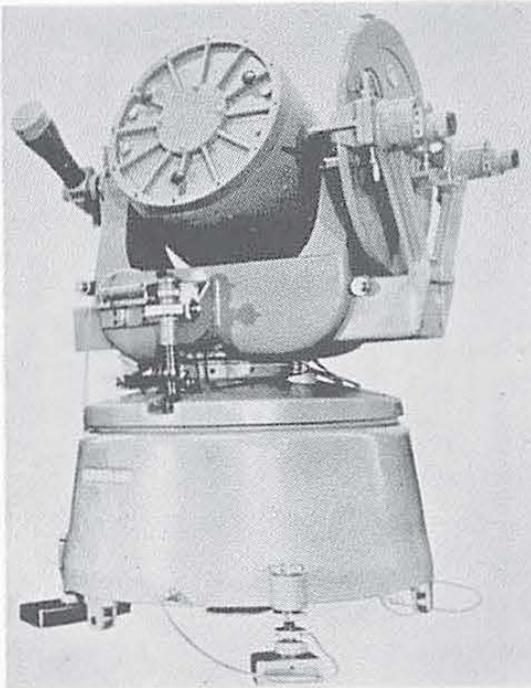
The magnetic theodolites of A-56 and H-56 were made of nonmagnetic materials of high purity specially prepared, of which magnetic testing was carried

out by using an astatic magnetometer with sensitivity of $0.01 \gamma/\text{mm}$ at three stages during the course of construction from material preparing to assembling.

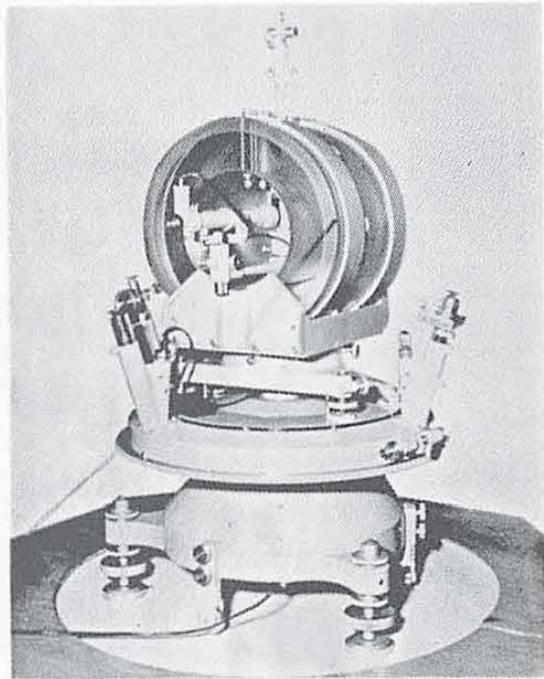
The Standard Magnetometers are operated in the Standard Magnetometer House built of granite blocks, which is controlled throughout the year at the temperature of 20°C and at the relative humidity of 55 % by the automatically controlled ventilating device.

The detailed account of the process of construction and functions of the magnetometers will be reported in this journal in near future by Mr. M. Hirayama.

I wish to express our sincere thanks to all members of the project and all other officials and individuals in cooperation, specially the president of the Tsugami Manufactory, for their many valuable helps and advices.



Standard Magnetometer A-56



Standard Magnetometer H-56

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