

The greatest accuracy normally obtained in relative determinations with pendulums appears to have been with an apparatus developed by the Gulf Oil Corporation in the United States for which an accuracy of 1 in 4,000,000 in routine field operations is claimed. In this routine, three to five stations were occupied in one day with two sets of apparatus and a crew of 25 men including surveyors to determine locations and elevations of stations.

The first relative determination of gravity in Canada was made with reference to Paris by Commandant Defforges of the Service Geographique of the French Army in the basement of the Macdonald Physics building of McGill University, Montreal, Que., in 1893. Other determinations were made by him the same year at Montreal, Que., and at Washington, Chicago, Denver, Salt Lake City, Mount Hamilton and San Francisco, U.S.A. A defect of gravity (now known to be due to isostatic compensation) according to the Bouguer theoretical method of computing gravity had already been observed over the Continents of Europe, Africa and Asia. Observations were made at the previously mentioned places to determine whether the same condition prevailed in North America. The results indicated a deficiency of gravity over the continent reaching a maximum of over 200 milligals at Salt Lake City, thus confirming what had been previously discovered on the other continents.

Gravity Work of the Dominion Observatory.—Observations of gravity were begun by the Dominion Observatory, in 1902, when a pendulum apparatus constructed by Saegmuller under the supervision of the United States Coast and Geodetic Survey was purchased in Washington. Dr. O. J. Klotz took observations with it that year at Washington, U.S.A., Ottawa, Ont., Toronto, Ont., and at Montreal, Que., and in connection with the determination of Trans-Pacific longitudes in 1903, also observed at Suva, Fiji, and Doubtless Bay, New Zealand. In connection with the observation of the total eclipse of the sun on Aug. 30, 1905, a determination of gravity was made at Northwest River, Labrador, by Professor Louis B. Stewart of the University of Toronto with the Dominion Observatory pendulum apparatus.

This apparatus consists of a set of three pendulums with the knife edge not on the pendulums but on a bracket which can be made fast in the pendulum case. The head of the pendulum has the form of an inverted stirrup with an agate plane in the head which rests upon the knife edge when the pendulum is in motion. Considerable trouble was experienced with the apparatus in the early days until the bobs were fastened securely to the stems by rivetting. A description of the instrument appears in Publication, Vol. II, No. 10, of the Dominion Observatory.

After Professor Stewart's observations in Labrador no further work was done until 1914 when F. A. McDiarmid made a comparison of gravity between Washington and Ottawa. He observed on the gravity pier in the Dominion Observatory which since that time has remained the base to which all gravity determinations by the Dominion Observatory are referred. With reference to the former base station of the United States Coast and Geodetic Survey at 205 New Jersey Avenue, S.E., Washington, and the value 980.118 cm., per sec., per sec., for it, McDiarmid obtained 980.621 cm. per sec., per sec., for Ottawa. For the same comparison, in 1921, A. H. Miller obtained 980.624 cm. per sec., per sec., and in 1929 the value 980.622 cm. per sec., per sec., for Ottawa. Until 1928, Washington was the only station in North America that had a trustworthy connection with Potsdam. By direct connection with Potsdam, in 1900, by Putnam, and following a world adjustment