

frequently used for observing deep-water temperatures ; but a maximum and minimum thermometer can only be used where it is known that there is a continuous rise or fall in temperature from the top to the bottom, for the thermometer only gives the maximum and minimum temperatures to which it has been subjected while being lowered and raised, and this is not necessarily the temperature at the depth to which it has been lowered. The reversing thermometer is, however, not open to this objection, as it registers the temperature at the time it is made to turn upside down, irrespective of the temperature of the water through which it passes while being raised or lowered.

During the Loch Ness observations use was made of platinum resistance thermometers in conjunction with a Callendar recorder. Some observations with resistance thermometers had previously been made in America by Mr Warren, who used a telephone to measure the changes in resistance of a platinum thermometer, and one of his instruments was used by the Survey. Dr F. M. Exner¹ also used ingenious electrical resistance thermometers in the Wolfgangsee with considerable success, but no observations on a large scale had previously been attempted by electrical means.² The object of the electrical installation was to obtain a continuous record of temperatures at any depth. The arrangement used was designed for the Lake Survey by the Cambridge Scientific Instrument Co., Ltd., and is referred to in my paper on lake temperatures.³ It was not altogether satisfactory, but the experience gained in working with it would probably enable the observers to design an apparatus which would work well ; and this method of observation, giving, as it does, continuous records of the temperature, has great advantages over observations made with mercury thermometers.

EFFECT OF CONFIGURATION AND GEOGRAPHICAL POSITION ON THE TEMPERATURE OF A LAKE

It is difficult to enumerate all the factors which play a part in determining what shall be the temperature of the waters of a lake, but these factors may be discussed under the following heads:— (1) the depth of the lake and the area of its surface, (2) its altitude,

¹ "Messungen der täglichen Temperaturschwankungen in verschiedenen Tiefen des Wolfgangsees," *Sitzungsber. Akad. Wiss. Wien*, Bd. cix., Abt. ii.a, 1900.

"Über eigentümliche Temperaturschwankungen von eintägiger Periode im Wolfgangsee," *ibid.*, Bd. cxvii., Abt. ii.a, 1908.

² A thermo-electric junction was used to measure temperatures in the Lake of Geneva in 1836 by MM. Bequerel and Breschet (*Bibl. Univ. Genève*, t. vii, p. 173, 1837). This is probably the first attempt to measure lake temperatures by electrical means.

³ See *Trans. Roy. Soc. Edin.*, vol. xlv. p. 410.