

# AN ELECTRIC THERMOMETER FOR MEASUREMENT OF THE SKIN TEMPERATURE

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Many methods have been suggested for measurement of the skin temperature, based on the use of special mercury thermometers, thermocouples, resistance thermometers and semiconducting resistance thermometers (thermistors) [1, 2]. Defects in these apparatuses and the difficulty of obtaining them have compelled us to seek methods of producing an apparatus which can be made in hospital workshops.

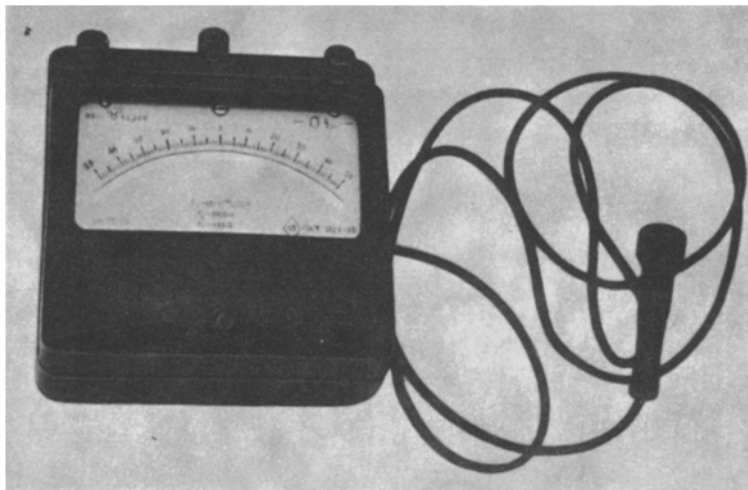


Fig. 1. General view of the apparatus for measurement of the skin temperature.

The greatest difficulty is experienced in the construction of a sensitive pick-up for the thermometer. In this apparatus we therefore used a semiconductor point-contact diode type D1B, of Soviet manufacture.

Investigation of semiconductor diodes showed that the strength of the current flowing through the diode changes with a change in its temperature, and also that these changes are greatest in the region of positive temperatures of 30-40°, i.e., within the range of measurements required in medical practice. Sudden and frequent changes in the temperature of the D1B diode do not lead to appreciable changes in the accuracy of the readings given by the apparatus which we have constructed.

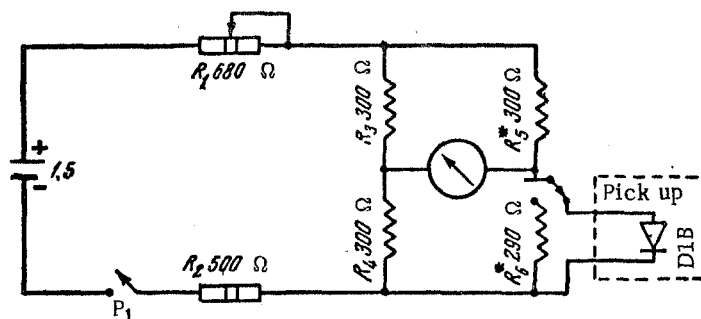


Fig. 2. Scheme of the apparatus for measurement of the skin temperature.

A general view of the apparatus and the scheme of its construction are shown in Figs. 1 and 2.

Our suggested thermometer is assembled according to the principle of a bridge scheme with a type M 117-2 measuring apparatus graduated between 30 and 40°. One arm of the bridge consists of the D1B crystal diode. The thermal inertia of the apparatus with this type of pick-up is 10-15 seconds. The bridge is supplied from a 1.45 v dry cell. The circuit includes a device for ensuring consistent readings of the thermometer irrespective of the voltage of the cell. Our investigations have shown that the accuracy of measurement of the temperature lies within limits of  $\pm 0.1^\circ$ .

The thermometer which we recommend may be assembled from readily available radio components.

#### SUMMARY

The author describes an electric skin thermometer furnished with a bridge circuit and a semiconductor diode D1B as a transducer. The precision of the instrument lies within the range of  $\pm 0.1^\circ\text{C}$ .

#### LITERATURE CITED

1. Investigations of Semiconductor Devices in Electronic Apparatus Circuits. Collected Scientific Papers of the Moscow Engineering and Physical Institute [in Russian] (1958).
2. G. A. Shminke, Electrical Measurements in Physiology and Medicine [in Russian] (1956).