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AN INSTRUMENT USED IN BAROMETRIC LEVELLING EQUIPMENT RESEARCH

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Abstract: Most of the population lives in the foothills and mountain areas. Based on this, it is required to develop industry, construction works, infrastructure, communication, roads in this area. It is advisable to use the barometric method in the search for mineral resources, in geophysical and geological exploration, in the mapping of regions with difficult terrain by geographers and archaeologists, in determining the topographical plan or absolute heights of regions with difficult terrain and difficult access.

Keywords: Determining the possibilities of using barometric leveling, barometric altimeters, temperature measuring instruments.

Introduction

In the territory of Uzbekistan, the population lives mainly in foothills and mountain areas. Based on this, it is required to develop industry, construction works, infrastructure, communication, roads in this area. It is advisable to use the barometric method in the search for mineral resources, in geophysical and geological exploration, in the mapping of regions with difficult terrain by geographers and archaeologists, in determining the topographical plan or absolute heights of regions with difficult terrain and difficult access. Therefore, it is necessary to implement barometric leveling methods in mountainous and sub-mountainous areas, and scientific research and improvement of barometric leveling accuracy is becoming the demand of the time today. The barometric method is based on the principle that air pressure decreases with increasing altitude. As a result of barometric leveling, the height of the points is determined with an accuracy of 1-2 meters. Therefore, this type of leveling is used in the works that do not require accurate leveling, for example, in various expeditions, geophysical, geological, geomorphological, geographical and other investigations, in the preliminary study of the relief of a place.

In barometric leveling, thermometers and resistance thermometers with various devices are the main instruments for measuring temperature.

Thermometer-TM8 consists of a thick-walled capillary. The side of the capillary where the mercury is located is in the form of a cylinder, and the other side ends with a glass ball or a metal tip for connecting the thread (Fig. 1, a).

The length of the tool is 170-200 mm, and the outer diameter is 8 mm. Scale unit value is 0.5 or 10, measurement range is from +50 to -360S.

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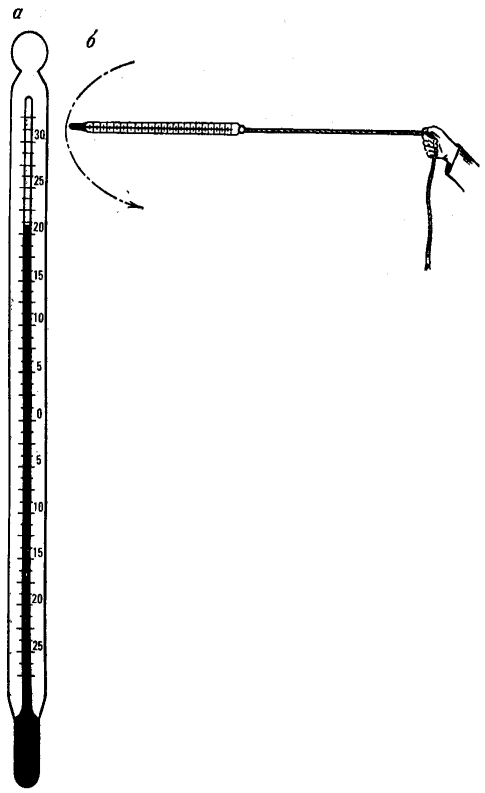
The speed of passively taking the temperature with a thermometer is about 100 s. It depends on the intensity of heat exchange and the parameters of the thermometer.

In moving air, this process happens very quickly. Therefore, a thread is tied to the thermometer and the thermometer is counted by turning it 100 times over the head (Fig. 1b).

The temperature is measured several times, the difference between the readings of the thermometer should not exceed 0.3-0.40.

Aspiration psychrometer.One of the best tools for measuring temperature is a psychrometric thermometer. They are widely used in barometric leveling.



The smallest unit value of the thermometer is equal to 0.20, the coefficient of inertia in still air is 100 s. The temperature can be measured from +50 to - 350 C with the device.

Resistance thermometer.This tool is availableDo not measure the air temperaturesionally, that is, a thermos hanging on a special mach or a treewith a meter, the air temperature can be measured at a distance of 10-15 m from the surface of the earth. This is the effect of the bearing surfaces on the results of temperature measurement

allows to reduce.

(Figure 1).

Barometer-aneroid BAMM (springless meteorological aneroid of the Moscow plant). In this tool (8-p), the linear displacements of the aneroid block membranes are replaced by the angular turns of the tool arrow by means of an extension-lever mechanism.

1 Block consists of aneroid boxes connected in series to each other, which are pressure receivers. One end of the block is fixedly connected to the pump, and the movable end is connected to a rigid 3-rod; the 2nd end of the stern is connected with 4 regulator levers and 6 axles are reinforced.

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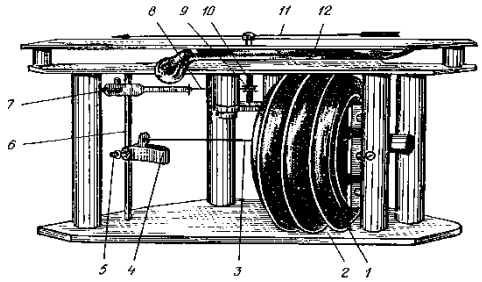

Figure 2

The sensitivity of the instrument can be changed by changing the length of the regulator using 5 screws. At the upper end of 6 axles, 7 levers are reinforced, with which 8 tali chains are connected at one end. The 2nd end of the chain is reinforced with 8 rollers fixedly attached to 10 arrows with 11 arrows. As atmospheric pressure changes, the block of aneroid boxes changes its dimensions, turning 6 arrows, which rotates 8 rollers through the Tall chain, which means that 2 arrows are also u mm. sim. above moves on a scale divided into units by . 12 thermometers are attached to the scale of the instrument, the limits of temperature change are from 15 to +400 C.

With this instrument, atmospheric pressure can be measured from 600 to 800 mm above sea level. The smallest division unit of the scale is 0.5 mm.sim.ust, measurement is made up to 0.1 mm.sim.ust.

The best barometric aneroids of this system help to find the pressure with an accuracy of 1.2-0.3 mm.sim.ust.

Barometric aneroid MD-49-2; MD-49-A. These instruments are a modification of the BAMM barometer. The scheme of mechanical installation of linear displacements of the aneroid block to the tool arrow as in BAMM MD-49-The internal displacement of 2 is shown in Fig. 9. MD-49-2 barometer aneroid pressure measurement limit is 790+600 mm above sea level, accuracy of atmospheric pressure measurement with an accuracy of 1 mm above sea level is 0.15-0.2 mm above sea level, pressure change limits in mountainous areas are 820-300 mm above sea level MD-49-A is an aneroid barometer.

These are corrections to calculations on barometer aneroids. The following corrections are made to R instrument calculations to determine atmospheric pressure R: Scaled ΔPshk, temperature ΔRt, and additional pressure ΔR0

$$P = P' + \Delta P_{шк} + \Delta P_t + \Delta P_0.$$

is calculated by the formula.

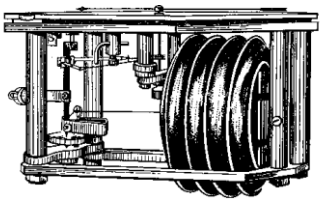

Figure 3

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Δ*Pshk*The need for scale correction is explained by the fact that when making barometer aneroids, the scales are linear for the entire pressure range and the given system is made the same way for all instruments. A ΔPshk correction is made to account for the linearity of the oscillation produced by the transmitter. Scale correction amounts for intervals of 100 mm. wire are given in the inspection report of each instrument. Taking into account that these corrections change, it is necessary to determine this correction twice before starting work and at the end of it.

Temperature correction ΔPt

$$\Delta P_{t_i} = bt_i,$$

It is determined by the formula, where b is the proportionality coefficient, t1 is the instrument temperature.

In areas where the height difference is more than 200 mΔ*Rt*size

$$\Delta P_t = [\delta P_{t_{эт}} + R\,(P_{эт} - P_i)]\,t_i,$$

is determined by the formula, where dPt is determined at a certain pressure Ret is the temperature correction of the aneroid at 0 C;

$R_{e1}R(Ret—Pi.)$temperature correction of the aneroid to 10S associated with the change of the modulus of elasticity of the aneroid boxes R, with the change of the aneroid box elasticity and the parameters of the mechanical parts of the instrument, which affects the indicators. To eliminate the effect of temperature, barometric aneroid readings are brought to a single temperature (usually to 00C) using appropriate corrections.

Taking into account both temperature and temperature corrections, the presence of mechanical errors of the instrument, a slight shift of the zero requires additional correction.

Barometric altimeters


The additional correction is defined as the difference between the pressure obtained in the mercury barometer and the pressure measured on the aneroid scale of the barometer, taking into account the previous temperature and scale corrections.

Δ*R0*is determined at the working pressure and at its end.

Radiotechnical altimeters **GPS altimeter**

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