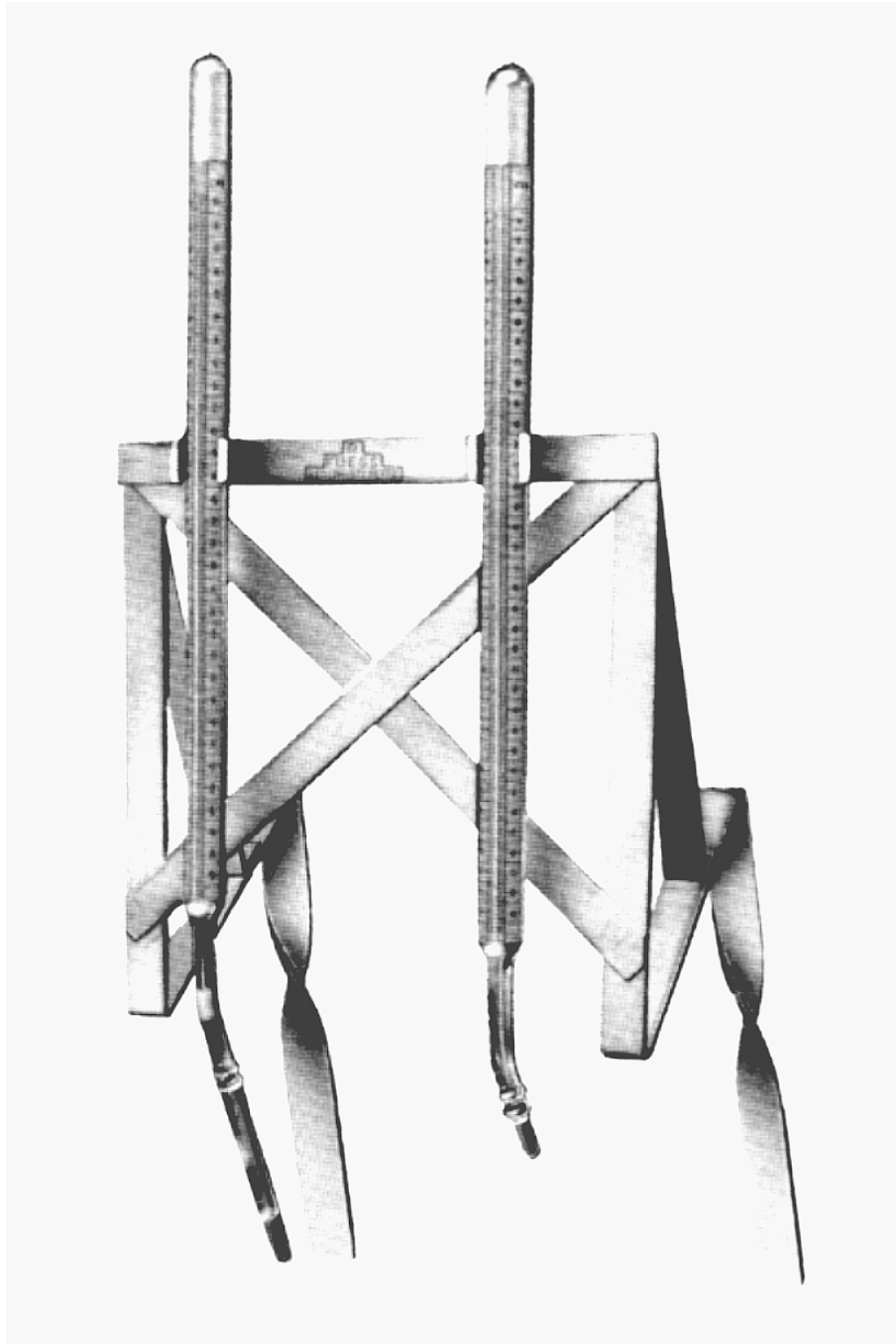


121,0 E

Meteorological Thermometers



1. Radiation-Intensity Meter, Robitzsch type

This instrument comprises a black and a white bulb thermometer, which are fused inside separate evacuated glass sheaths. On account of the different reflecting and absorption characteristics, the thermometers show a temperature difference dependent upon the radiation intensity; the corresponding amount of the radiated energy can be calculated in $\text{cal}\cdot\text{cm}^{-2}\cdot\text{min}^{-1}$ from the calibration sheet supplied. The instrument responds to a long-wave and visible, sun, sky and reflected radiations; the short wave part is largely absorbed by the glass sheath. By screening the direct sunlight, sun and sky radiations can also be separately measured, more conveniently by using two pairs of thermometers. For measurement the thermometers are so arranged that the screening of the thermometer bulb coincides with an etched mark on the sheathing bulb. The stand and bracket enables exact adjustment and setting the thermometers in the correct directions, so that the direct sunlight always falls on the self-same position of the sheathing bulb and always allows the same absorption.

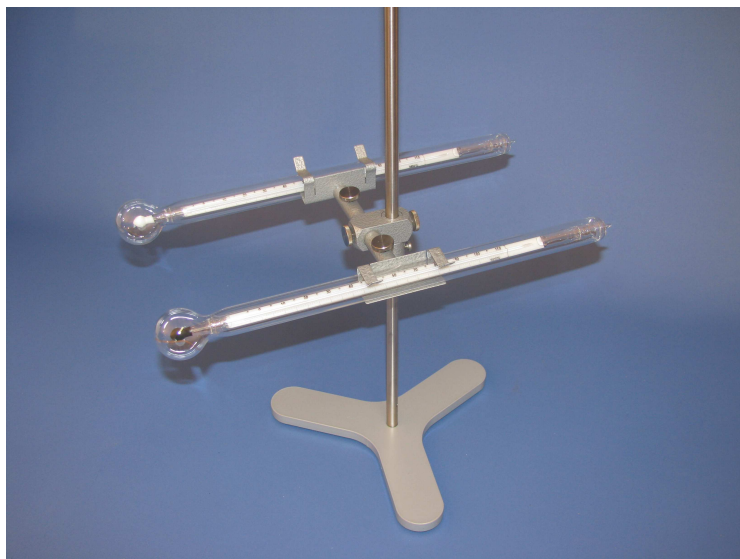


Fig. 1 Radiation-Intensity Meter 58a on Stand 58b

58a **Radiation-Intensity Meter, Robitzsch type***
consisting of a black and a white bulb thermometer,
with calibration sheet
range: -5 ... +100 °C
division: 1/2 °C
weight: 0.6 kg

58b **Stand with bracket for No. 58a**

* Literatur:

M. Robitzsch: "Meteorologische Zeitschrift", No. 6/1928, p. 234 - 235

M. Robitzsch: "Gerlands Beiträge zur Geophysik", No. 27-2/1930, p. 244 - 252

2. Extreme Thermometers

These are designed for measuring the highest and lowest temperatures over a particular time, generally a day.

The **maximum thermometers** (fig. 2, 3) are mercury thermometers with cut-off threads. In the bulb a glass rod is fused. Its free end projects into the capillary leaving a small free space, which allows the mercury to expand through, but with contraction causes a breaking of the thread, which thus remains in the maximum position. After reading the value the mercury can be easily shaken down once more into the bulb.

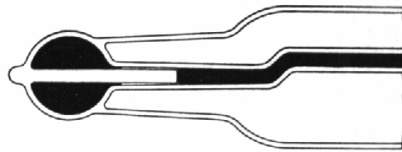


Fig. 2
Maximum Thermometer
(cut-off arrangement)

The **minimum thermometer** (fig. 3) is filled with alcohol. In the capillary there is a glass rod in the alcohol, which with a falling column is drawn down through the surface tension, but with rising column remains where it was. The glass rod indicates with its end nearest to the thermometer bulb the lowest temperature obtained during a particular time interval. It can be reset by tilting the thermometer.

Type	Divisions	1/2 °C	1/5 °C
	Length	29 cm	37 cm
	Weight	0.075 kg	0.080 kg
	Range	No.	No.
Maximum Thermometer	- 30 ... + 50 °C	42/50	43c/50
	- 10 ... + 60 °C	42/60	43c/60
Minimum Thermometer	- 40 ... + 40 °C	43/40	43d/40
	- 10 ... + 60 °C	43/60	43d/60
	- 30 ... + 50 °C	43/50	43d/50

(other ranges possible on request)

T23 UG14 Combined holder (support) for Maximum and Minimum Thermometer (= No. 44e)

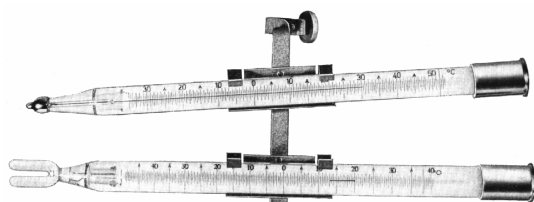


Fig. 3 Maximum and Minimum Thermometers
with Support T23 UG14

T23 UG01 Tripod with rod (= No. 44f) for carrying Psycho- and Extreme Thermometers Weight: 1.25 kg

TH48 UG03 Holder for one maximum- or minimum-thermometer (= No. 52h)

3. Katathermometer

The Katathermometer measures the cooling down value, which is dependent upon air circulation, air temperature, radiation influence, and also air humidity. The instrument is heated in a water bath of 50 to 80 °C to the extent that the thermometer liquid rises until the upper widened part of the capillary is 1/3 full. Then the time is measured that is taken by the column, under the effect of cooling, to reach the position between two etched marks on the capillary, that correspond to the temperature points of 38 and 35 °C, which cover the average temperature of the human body of 36,5 °C. One divides the instrument constant (mg cal/cm²), established by calibration, by the time measured (s) and so obtains the "cooling force" or the "Kata Value", the amount of heat in mg cal which is released by 1 cm² of the thermometer bulb surface within 1 sec. If the bulb is surrounded with moist muslin, an additional quantity of heat is removed by evaporation according to the humidity of the air; the Kata value of the wet instrument is noticeably higher than that of the dry instrument. The instrument is designed for climatic research in coal mines, workshops and assembly halls etc., and can under certain conditions also be used as sensitive anemometer for weak air flow.

- 59** **Katathermometer**
with 2 moistening wicks and test certificate of the Clausthal
Mining Academy
Length: 22 cm
Weight: 0.025 kg

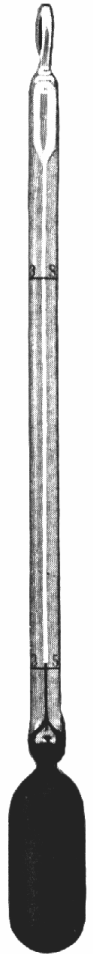


Fig. 4 No. 59
Katathermometer

4. Thermometers for Measuring Air Temperature

For measuring air temperature, in addition to the following types for special cases, the **Aspiration Psychrometer** may be preferred, which, on account of its radiation screen and the effective artificial ventilation of the thermometer, gives a representative cross-sectional value with the best accuracy. These instruments are described in Leaflet 131,0 E.

Thermometer (for Psychrometer type August)

- 28/45** range -35 °C to +45 °C, division in 1/5 °C, length 370 mm
28/60 range -10 °C to +60 °C, division in 1/5 °C, length 370 mm
29/45 range -35 °C to +45 °C, division in 1/2 °C, length 340 mm
29/60 range -10 °C to +60 °C, division in 1/2 °C, length 340 mm

other ranges possible on request, but total measuring range 80 K

further typical ranges

- 28/50** range -30 °C to +50 °C, division in 1/5 °C, length 370 mm

52gk Holder for Maximum or Minimum Thermometer for measuring the maximum or minimum air temperature close to the earth's surface
with support rod, thermometer holder T23 UG14 and radiation screen
measuring height adjustable from 2 to 12 cm
Weight: 1.1 kg

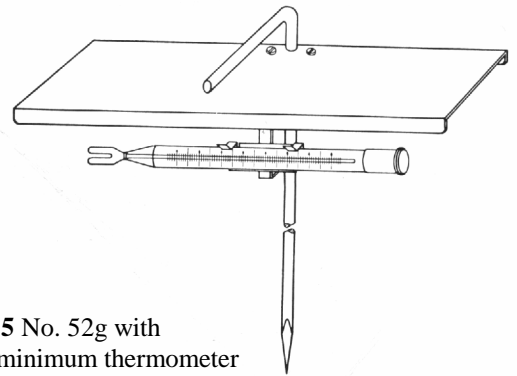


Fig. 5 No. 52g with one minimum thermometer

52g as No. 52gk but with holder for only one thermometer (TH48 UG03)

62a Window Thermometer Hellmann type (fig. 6),
with radiation and rain shield and support
Range: $-38\text{ }^{\circ}\text{C}$... $+60\text{ }^{\circ}\text{C}$
Divisions: $1/1\text{ }^{\circ}\text{C}$
Length: 42 cm
Weight: 0.45 kg

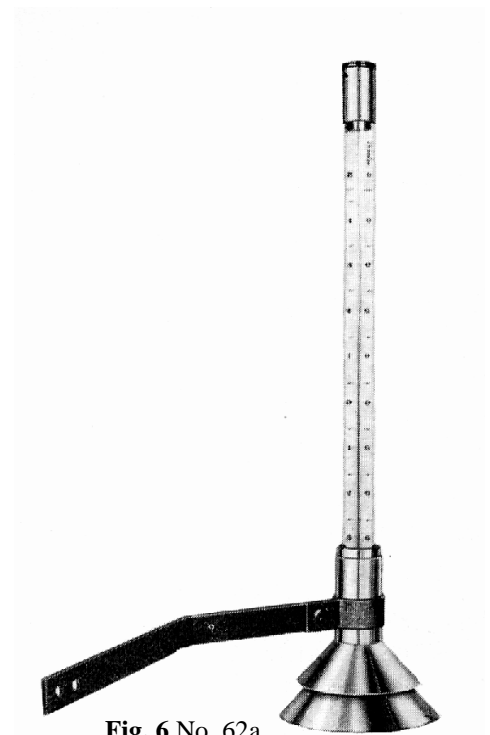


Fig. 6 No. 62a

62h Spare Thermometer for No. 62a



Fig. 7 No. 52

52 Thermometer for measuring the air temperature close to earth's surface

with iron tripod (fig. 7)
Height of middle of bulb from feet: 65 mm
Range: $-20\text{ }^{\circ}\text{C}$... $+60\text{ }^{\circ}\text{C}$
Divisions: $1/5\text{ }^{\circ}\text{C}$
Weight: 0.7 kg

52a Thermometer only
Length: 47 cm, Weight: 0.05 kg

5. Water Thermometer

53c Water Thermometer
 in nickel holder with scoop
 Range: -5 °C ... +40 °C, Divisions 1/5°C
 Length: 30 cm, Weight: 0.3 kg

53f Spare Thermometer
 for No. 53c
 Length: 27 cm



Fig. 8 No. 53c
 Water Thermometer

6. Soil Thermometer

These instruments are intended for shallow depths. To the mercury bulb is fused a vertical shaft, of a length corresponding to the measuring depth. For easy reading the tube bearing the scale above the surface of the soil is angled at 60° from the horizontal. This improved form minimises breakage movement of the soil. The insertion depth is calculated from the middle of the bulb.

Soil Thermometer,
 Divisions: 1/5°C
 Weight: 0.1 kg

No.	Depth cm	Range °C
49a/0	0	-30 ... +55
49a/2	2	-30 ... +55
49a/5	5	-25 ... +55
49a/10	10	-25 ... +55
49a/20	20	-20 ... +55
49a/30	30	-15 ... +55
49a/50	50	-10 ... +40

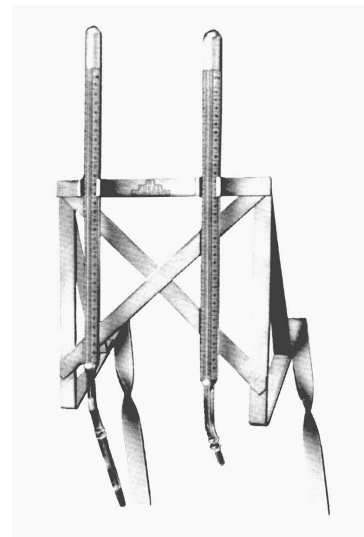


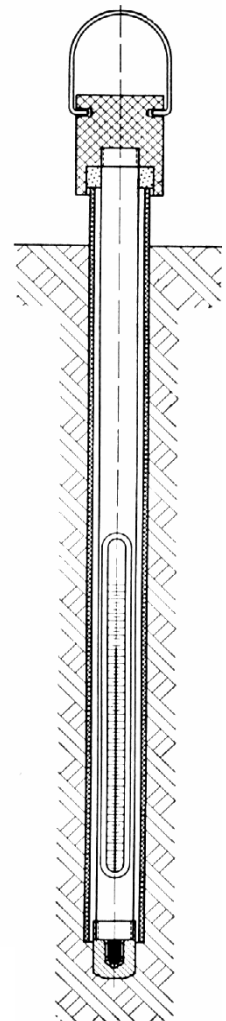
Fig. 9 No.51a with two soil thermometers

Iron Stand for Soil Thermometer

51a for 2 Thermometers Weight: 0.72 kg
51b for 3 Thermometers Weight: 0.76 kg
51a/51b for 5 Thermometers

Deep-Soil Thermometer

For larger depths soil thermometer 61 shown in fig. 10 is suitable. Equipped with a large mercury bulb, the thermometer is fitted in the lower end of a plastic sheath, and the whole unit is withdrawn from the soil for reading. The protruding thermometer bulb is protected by a cap of corrosion-resisting material. For protection and for inserting the thermometer into the soil a plastic tube is used. The upper protective cap with its gasket prevents the ingress of water and foreign bodies, as well as the formation of air currents inside the thermometer. Furthermore the low thermal conductivity of the plastic parts will prevent a variation of measurement values when withdrawing and reading the thermometer. By the use of corrosion and humidity resisting materials, a long life is guaranteed. To accommodate the natural structure and heat conductivity of the soil, a soil borer of the same size is used for inserting the thermometer tube.



Deep-Soil Thermometer in Plastic Sheath

with protective cap and insertion tube
Range: -10 °C ... +30 °C
Divisions 1/10 °C

61/50k	for 50 cm depth	Weight: 0.9 kg
61/100k	for 100 cm depth	Weight: 1.4 kg
48	Spare Thermometer	Weight: 0.12 kg

Fig. 10 Deep-Soil Thermometer Mo. 61.. in plastic sheath

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