AN ELECTRIC THERMOESTHESIOMETER

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Studies of the receptor functions of the skin are of greate importance for medical research workers in various specialties. Although it is comparatively simple to determine tactile and pain thresholds, we have encountered considerable technical difficulties in determining temperature thresholds. At first we used a water thermoesthesiometer, but experience has shown that a good deal of time is required to determine warmth and cold thresholds, and that the conditions for using this instrument are cumbersome. What is more, the determination is not sufficiently accurate. But after trying a number of different models, we have been successful in building an electric thermoesthesiometer that is very simple to construct and use, and is also sufficiently accurate. It can be used both in the laboratory and also under any other conditions, with no restrictions and no additional instruments. With this device, we have examined about 350 persons, in the normal state and in various disease conditions. The device is suitable for extensive use in practical medical work.

The electric thermoesthesiometer (see figure) is in the shape of a pistol. The barrel contains a mercury thermometer with a range extending to 100° C. Movements of the mercury may be viewed through an opening in the barrel. The mercury reservoir protrudes from the barrel, and is encircled for three quarters of its length by a spiral of Nichrome wire. The tip of the mercury reservoir, which makes up one-fourth of its length, is exposed and serves as a thermal stimulator. Wires run through the barrel from the spiral to the handle, which contains a pocket-flashlight battery with a voltage of 3.7 v. When the circuit is closed the nichrome spiral heats up, warming the mercury reservoir. The temperature at the end of the reservoir is read from the scale of the thermometer, at the same time that it is giving rise to subjective sensations on the part of the individual being examined. To determine the cold threshold, we cool the end of the mercury reservoir with ethyl chloride, and it is then possible to obtain any desired low temperature at the end of the mercury reservoir by warming it. The flashlight battery is changed in accordance with the amount of use the instrument receives.

SUMMARY

The author offers an electric thermoesthesiometer of his own design. The device may be used in all conditions for the determination of thermal and cold thresholds. A

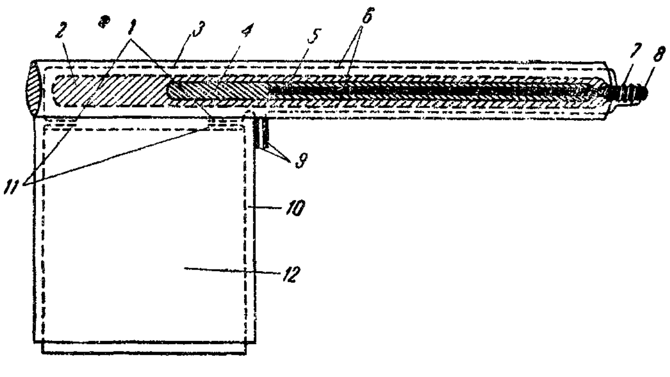

Fig. Electric thermoesthesiometer. 1) Contacts for battery; 2) mercury thermometer; 3) barrel of thermoesthesiometer, for thermometer and wires; 4) opening for determination of thermometer readings; 5) mercury column; 6) wires from spiral; 7) Nichrome spiral around mercury reservoir; 8) end of mercury reservoir, making contact with skin; 9) contacts for closing circuit; 10) combination handle and battery case; 11) battery terminals; 12) pocket flashlight battery, 3.7 v.

mercury thermometer graduated to 100°C is inserted into the barrel of the instrument. The movement of the mercury column may be seen through the slots in the barrel.

The mercury reservoir is surrounded by coils of nichrome wire. Its free end acts as a thermostimulus. The coil is heated by current from a pocket flashlight battery fitted into the handle of the instrument. When in contact with the instrument the heating of the mercury reservoir provokes a subjective feeling in the patient under observation. In determining the cold threshold, cooling of the end of the mercury reservoir by ethyl chloride is combined with its heating. The temperature of the thermostimulus is read off on the thermometer scale.