

# OSCILLOGRAPHIC RECORDING OF THE BLOOD PRESSURE IN ANIMALS DURING ACUTE EXPERIMENTS

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For the oscillographic recording of the blood pressure during acute experiments on animals we have developed a special pick-up, in the construction of which a bellows manometer reading up to 300 mm Hg was used. The pointer and scale were removed, and for them was substituted a steel plate to which were fixed two wire pick-ups with a resistance of 100 ohms. One end of the plate was fixed to the manometer case and the other to the diaphragm of the bellows (Fig. 1). The two tensiometric pick-ups were included in the bridge circuit of a type 8 ANCh-7M tensiometric amplifier.

The output current from the amplifier was transmitted to the loop of the oscillograph. The space inside the bellows was filled with a 4% solution of sodium citrate and connected to one of the animal's arteries. The change in the pressure in the arterial system was transmitted through the diaphragm of the bellows to the plate with the tensiometric pick-ups, thereby leading to a change in the resistance and a disturbance of the balance of the amplifier bridge. The output signal thus produced was proportional

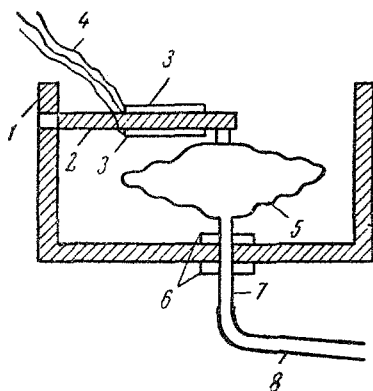


Fig. 1. Diagram of manometer with tensiometric pick-ups. 1) manometer case; 2) steel plate; 3) tensiometric pick-ups, fixed to the plate with BF glue; 4) leads to amplifier; 5) bellows; 6) nut securing bellows to manometer case; 7) metal tube; 8) rubber tube, leading to the animal's blood vessel.

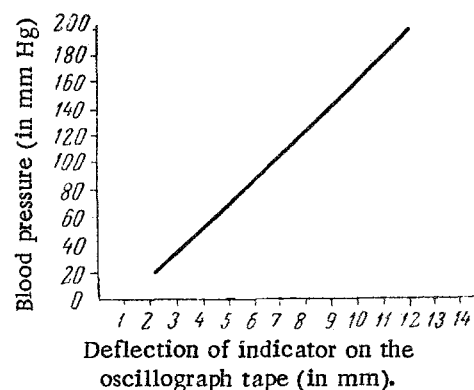


Fig. 2. Calibration chart of the manometer with the tensiometric pick-ups.

to the arterial pressure level (Fig. 2). A different calibration chart is necessary depending on the degree of amplification and on the resistance of the tensiometric pick-ups. Each pick-up that is made thus requires its own calibration data.

The tracings obtained on the oscillograph tape (Fig. 3a) give precise values of the maximum and minimum levels of the arterial pressure at any given moment. It is necessary only to measure the distance between the zero line and the curve of the arterial pressure, when the true value of the latter can be obtained from the graph.

Investigation showed the tensiometric pick-up to be a highly sensitive piece of apparatus for recording the arterial pressure. It has considerable advantages over the mercury manometer, for it completely eliminates the moment of inertia possessed by the mercury. Attention must also be directed to the fact that, when the arterial pressure is recorded at the same time as the electrocardiogram, it is possible to judge the relationship between the time of appearance of the electrical phenomena in the heart (the contraction of the cardiac muscle) and the appearance of the pulse wave in any particular vessel. It will be seen from the oscillogram (see Fig. 3) that the ventricular complex of the electrocardiogram precedes the systolic rise of pressure in the vessel.

The pick-up may be used with success for recording the pressure in the chambers of the heart. For this purpose

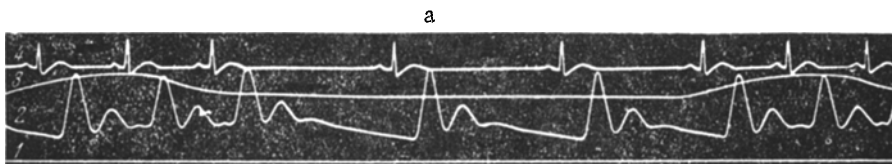
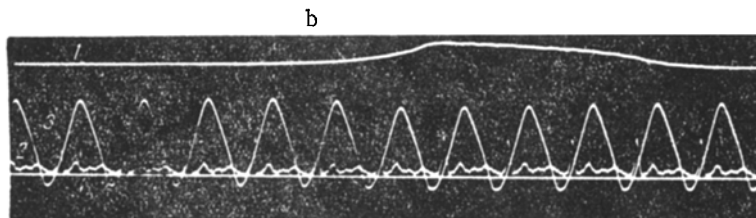


Fig. 3. Oscillogram of the blood pressure in the femoral artery of the dog (a). 1) zero line; 2) blood pressure; 3) respiration, recorded by means of a carbon pick-up; 4) electrocardiogram.



Oscillogram of the pressure in the left ventricle of the dog (b). 1) respiration; 2) electrocardiogram; 3) pressure in the left ventricle; 4) zero line.

the bellows of the manometer is connected, by means of a rubber tube introduced through a vessel, with one of the chambers of the heart. The oscillogram (Fig. 3b) shows the curve of the pressure inside the left ventricle of the dog. It may be seen that the pressure curve in the left ventricle (see Fig. 3) has the form of a sinusoid, fluctuating about the zero line, in which the peaks correspond to the value of the pressure arising at the moment of systole.

#### SUMMARY

A special pressure gauge with tensiometric pick-up was developed to register the blood pressure on the oscillographic tape in acute experiments on animals. The tensiometric pick-ups are included in the resistance bridge circuit of a tensiometric amplifier 8 ANCH-7M, from the outlet of which the signal is transmitted to the oscillograph. The above pick-up may be also used to register the pressure in the chambers of the heart.