TECHNICAL NOTE :

DROP RECORDING DEVICE BASED ON PNEUMATIC AMPLIFICATION

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Summary : A device for drop recording based on the principle of pneumatic amplification has been described. This method is simple, involves minimal costs, and can be profitably employed for demonstrating venous blood flow changes in physiology class experiments.

Key words : drop recorder venous blood flow

In physiology class experiments a difficulty is always encountered in drop recording especially in the absence of electronic equipments. Simple mechanical methods would always be helpful in all studies requiring assessment of changes in blood flow. Principle of pneumatic amplification was utilised by one of us in recording jugular venous pulse. (Gogate,1961). Using this principle, a simple apparatus was assembled for drop recordings, which is being reported in this communication.

CONSTRUCTION

A continuous jet of air was allowed to pass through a tapering glass tube with a tip diameter between 1.0 *mm* and 1.5 *mm*. Constant airflow could be maintained from the outlet of an artificial respirator or a large toy-balloon. A toy-balloon cannot be used in experiments of long duration, as it requires repeated inflation. When a respirator was used a thick rubber bladder was interposed between the respirator and the air jet, to convert its intermittant output into a continuous flow.

Air-jet through the glass tube could be varied with the help of an adjustable screw and blood drops from the venous outflow were allowed to fall close to the tip of the glass tube meant for air-jet. Thus a continuous air-jet was interrupted momentarily by the falling drops of blood. These momentary interruptions of the air-flow resulted in the rise of air pressure in the side tube connected to a Marey's Tambour whose movements were recorded on a kymograph.

DEMONSTRATION

The femoral vein blood flow was recorded in six experiments performed on 5 dogs and one cat anaesthetised with intraperitoneal nembutal (35 *mg/kg*) and heparinised with 150 *i.u.*

per *kg i.v.* The blood from the distal cut end of the femoral vein was allowed to fall on air-jet from a height of approximately one cm, and was collected in a plastic funnel to be returned to the same vein through a polythene tube inserted into the proximal end of the vein (Fig. 1).

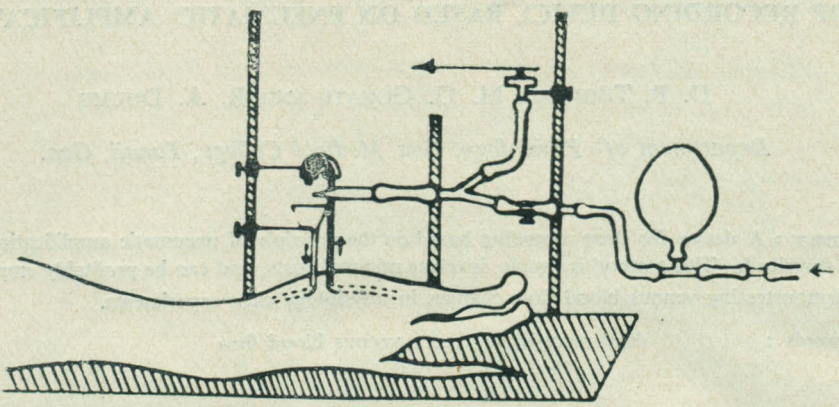

Fig. 1: Showing the assembly for drop recording device.

For every drop interrupting the jet, a movement of the tambour was recorded whose height could be adjusted by adjusting the volume of the air-jet.

Once a constant flow was established, change in the rate of flow could be faithfully recorded (Fig. 2). Demonstration about the increased venous flow was given by stimulation of intact femoral nerve, blood or saline infusion, and occlusion of the common carotid arteries (Fig. 2).

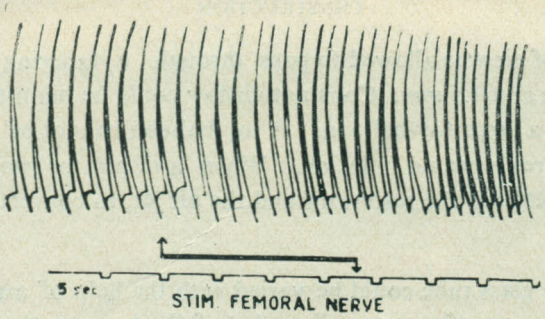

Fig. 2: Showing the effect of femoral nerve stimulation on blood flow. Each excursion of the pointer represents one drop of venous blood.

For demonstrating reduced venous flow, intravenous histamine and mechanical obstruction to femoral vein or artery were employed.

COMMENT

The method described above, working on the air-jet principle has been found to be simple and easy in animal experiments requiring the record of venous flow. Changes in the

rate of blood flow can be recorded simultaneously with other parameters. With the use of this device, the blood is returned to the body of the animal, preventing blood loss due to the recording device. The apparatus can be assembled in any laboratory with negligible cost. An aerating pump may be used in place of the artificial respirator and a bladder.

REFERENCE

Dogate, M.G. A modified simple pneumatic amplifier for recording the jugular venous pulse in class experiments. *Ind. J. Physiol. & Allied Sci.*, **15** : 36, 1961.