A SIMPLE AND ACCURATE FORM OF SPHYGMOMETER OR ARTERIAL PRESSURE GAUGE CONTRIVED FOR CLINICAL USE.

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THIS instrument consists of: (1) A broad armlet, which is strapped round the upper arm. The armlet is formed of a flexible steel band, on the inside of which there is fastened a bag of thin indiarubber. The rubber bag is connected by a Y-tube with (2) a small compressing air pump fitted with a valve and (3) a pressure gauge.

The pressure gauge is of special construction. Roughly, it consists of a metal tambour, the expansion of which is

exhibited in a highly magnified form by means of an index or pointer which travels round a dial. This dial is graduated in millimetres of mercury. The armlet, pump, and pressure gauge when not in use fit conveniently into a leather case. The instrument is used thus: (1) The armlet is strapped round the upper arm so that it fits closely to the skin. (2) By means of the pump the pressure is raised within the rubber bag until the pulsation indicated by the index of the pressure gauge becomes of maximal excursion. (3) At this point the pressure indicated by the gauge is read, and this pressure is the mean arterial pressure.

The armlet can be applied to the arm of any individual with the greatest ease, for the flexible steel band adapts itself to any shape or size. In children the armlet can be fitted equally well to the thigh, and the pressure is then taken in the femoral artery. The armlet is bound closely round the arm so that the rubber bag may be but slightly distended when the pressure is raised within up to the arterial tension. If the bag were greatly distended the elasticity of the bag would come into play, and from this an error in the readings would arise. To avoid this error the rubber bag is made thin and flaccid. By raising the pressure within the bag the venous outlets are blocked. This, if continued for long, produces great congestion of the arm and discomfort. For this reason the readings must be taken rapidly. The pressure is never to be maintained on the arm for more than a minute or so. The following is a convenient plan of work:

- (1) Force up the pressure rapidly till pulsation appears.
- (2) Continue to force up the pressure till pulsation disappears or obviously becomes lessened.
- (3) Slightly open the valve and allow slow leakage. As the pressure falls, note where the pulsation becomes maximal.
- (4) Let the air out entirely, and empty the arm of venous blood either by elevation of the limb or friction.
- (5) Repeat the operation and take another reading.

By following this plan no pain or discomfort will arise.

In studying the effect of exercise, posture, drugs, etc., successive readings must be taken in the above manner, first during the normal, and then during the experimental condition.

Owing to the effect of position on the circulation, the readings must be taken uniformly, with the arm placed by the

side and on the same level as the heart. The muscles of the arm must be relaxed during the observations. The arterial tension is constantly varying slightly, owing to changes in the force of the heart beat and the respiratory oscillations of pressure. Thus the maximal pulsation may be found now at one place and now at another, a few millimetres higher or lower. The mean of the different readings must be taken just as is done when the mercurial manometer is used in physiological experiments on animals. In conditions of quiet respiration these variations are often not great, and the pressure may be read at each observation within 2 or 3 millimetres. Variations of pressure by 5 to 10 mms. Hg. are of frequent occurrence, are physiological, and of no importance.

When the rubber bag presses upon the outside of the arterial wall, with a pressure equal to that mean pressure exerted from within, the wall is able to oscillate with the greatest freedom. In systole the artery is fully expanded, while in diastole it is collapsed by the pressure of the bag.

The accuracy of this index has been proved by repeated experiment. Thus the armlet was strapped round the neck of a dog (excluding the trachea). A cannula was inserted into the femoral artery, and connected with a mercurial manometer. Simultaneous readings were then taken of the pressure in the femoral artery, as indicated by the mercurial manometer, and the pressure in the carotid arteries as indicated by the sphygmometer. The maximal pulsation of the index of the sphygmometer was thus found to occur always at a pressure which exactly corresponded with the mean pressure in the femoral artery.

It is well known that the carotid and femoral mean pressures are practically the same in the dog when the animal is lying in the horizontal position. To show in yet another way the accuracy of this instrument the following experiment was performed. Whilst one arm was passively elevated above the head and the other remained dependent by the side, simultaneous readings were taken from either brachial artery by means of two sphygmometers. From the dependent arm the higher reading was obtained. The difference was equivalent in mercury to the height of the vertical column of blood which separated the two points of observation.

The facility with which the instrument can be used for clinical purposes is illustrated by a series of observations which we have made upon patients placed under the influence of anaesthetics. Before and during administration a series of readings were taken at intervals of time, and from the figures thus obtained curves were plotted out. In 8 cases of anaesthesia with gas and oxygen (sitting posture) the arterial pressure either rose a few millimetres of mercury or remained constant. In 4 cases of anaesthesia with ether the arterial pressure remained constant or fell a very few millimetres of mercury. In 6 cases of anaesthesia with chloroform the sphygmometer indicated an extensive and rapid fall of arterial pressure. This fall equalled 20 to 40 mm. of mercury. The normal arterial pressure in most healthy young men appears to be 110 to 130 mm. Hg. in the sitting posture.

We shall shortly be in a position to publish a series of preliminary observations on arterial pressure in different pathological states. By means of this instrument, which is made for us by Mr. J. Hicks, of 8, Hatton Garden, E.C., we believe that the arterial pressure can be taken in man as rapidly, simply, and accurately as the temperature can be taken with the clinical thermometer.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

THYROID GLAND SUBSTANCE IN OBESITY.

I HAVE been trying this treatment on stout Anglo-Indians (who were desirous of taking off a stone or two, and improving their figures) for some time back, but have only done so systematically and regularly since the beginning of this year. I first used tabloids of the whole gland substance