I have seen many cases of neuritis and lumbago cured by the use of ultra-violet light. I believe such cases are due to a specific anaphylaxis excited by proteins absorbed from the bowel while it is in a state of catarrhal inflammation. The sudden incidence is probably due to exercise creating a local acidosis from the lactic acid produced in the muscles, which tends to make the cells more sensitive to the proteins.

At least one of the three cases I have cited was a pure example of anaphylaxis, and, in her, peptone failed completely, whilst ultra-violet irradiation was a complete success, as it was in the other cases. Now it has been demonstrated that exposure to the sun's rays causes a general hyperleucocytosis with a relative neutropenia and a strong relative lymphocytosis. I frankly admit that this is comparable with the leucocytosis produced by the injection of peptone, and it is quite possible that this helps to account for the anti-anaphylactic action of ultra-violet light rays. But it is only one of the remedial results of ultra-violet light, and probably the least effective; this doubtless accounts for the frequent failure of peptone, and in any case for the short period of protection it affords. Another valuable therapeutic effect of ultra-violet rays is their directly germicidal action on the body, increasing the bactericidal powers of the blood, thus reducing the formation of bacterial toxins.

Probably the most useful function of ultra-violet rays is their power to increase the absorption of calcium and phosphorus, which, with the formation of vitamin D from the cholesterol in the skin, is doubtless the main factor in the cure of rickets. This also leads not only to the better nutrition of the bones and nervous system, but also to the alleviation of spasm and the induction of a calmative effect on the nervous system. Nor must it be forgotten that there is an increase of iron in the blood and a decided rise of haemoglobin in the erythrocytes, diminishing the risk of dyspnoea and asphyxia, so potent a factor in asthmatic conditions.

Finally, the internal secretions of the thyroid and adrenal glands are increased, and they are both valuable in the treatment of asthma and allied conditions.

It will be observed that the ultra-violet light treatment of asthma counters the varied factors in its causation, and is valuable, not only for cure, but also for prophylaxis.

A METHOD OF ESTIMATING CARDIAC OUTPUT.

BY

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THE problem of the correct treatment of heart disease reduces itself largely to cardiac output. The common type of heart failure means diminished cardiac output, and we shall never be able to tackle the problem of heart failure properly unless we have a reliable method for determining the output of the heart.

The following is a description of a method for estimating cardiac output. The underlying principle is simple. The venous pressure is measured by inserting a needle, preferably in the cephalic vein of the arm. A given number of heart beats are admitted. Then the pressure is taken again, and from the increased venous pressure we calculate the output per beat, or, if desired, per minute. It will be seen that the principle underlying this method is the determination of the single output by variation of the venous pressure. Particulars are as follows.

The pneumatic tourniquet of a sphygmomanometer is placed on the arm; a needle with as wide a bore as possible is inserted in the cephalic vein and connected with a manometer containing a solution of 0.7 per cent. sodium chloride and 0.5 per cent. citric acid. The venous pressure is now taken. Then the artery is compressed very rapidly by means of the airbag so as to obliterate completely the brachial artery. The venous pressure is taken again, after which the arterial blood is allowed to enter the limb for the

space of 5, 10, or 15 beats by relaxing the airbag. At the same time the pressure must remain high enough to prevent the venous circulation from being re-established.

A record of the number of beats which were allowed to pass into the lower part of the upper extremity. It will be seen from this chart that one is able to recognize those beats which do not completely pass through and to account for them in calculation.

The pressure in the veins is now taken again. It will be seen that it is necessary to take the venous pressure three times: first, when the circulation in the veins as well as in the arteries is free; secondly, when the circulation is cut off in the veins as well as in the arteries; thirdly, after a known number of beats have been admitted, the venous circulation still being cut off. The first and the third measurements are essential for our purpose, the second serving as control only.

The following readings are typical:

Venous Pressure Experiment.

V.P.=4 inches.

After compression=9 inches.

After eight beats (see chart)=23 inches.

∴ Rise=14 inches.

=1.75 inches per beat rise.

Case of specific carditis. Wassermann reaction ++; blood pressure 145/105; pulse rate at time of experiment=120 per minute.

It remains to say a word in regard to the counting of the beats, which is not so simple as might be imagined. The only satisfactory method of getting a reliable count is to place the pad of a Mackenzie's polygraph on the radial artery and record the beat by means of the needle on a photographic slide, such as is available in the electrocardiograph.

I am indebted to Dr. Crawford, assistant physician, Liverpool Heart Hospital, for valuable assistance in carrying out the experiment.

THE PROGNOSIS IN FRACTURES OF THE OS CALCIS.

BY

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IN any case of fracture two questions must be answered: How long will the patient be incapacitated for work and require compensation? and To what extent will he be permanently crippled?

The investigation here reported was undertaken to determine the duration of the disability, and the degree of final impairment of function in cases of fracture of the os calcis. Twenty-five such cases were treated at the Northern Hospital, Liverpool, in the period 1921 to 1924. Of these, only fourteen reported for re-examination after completion of treatment; they were all men, and their average age was 45 years. In every case the fracture was caused by a direct fall on the heel.

For comparative purposes the period of disability was taken as the time between the date of the accident and of the man's resumption of a permanent occupation; in most cases this was determined by proceedings under the Workmen's Compensation Act. The average was eleven months. In seven cases the period was between eight months and a year; the shortest period was three months, and the longest twenty months.

The final results were difficult to assess. All the patients were ultimately able to resume moderately heavy work. None became industrial cripples. All complained of pain in the heel when running, or walking fast on uneven surfaces, such as cobble-stones, or in damp weather. In