in good health, and is seen at or before the onset of labour, but other means should be tried if she has been in labour for some time. Even when the *conjugata vera* is less than 4 ins. and more than $3\frac{1}{2}$ ins. Dr. Dickert would regard Caesarean section as the operation of election if the patient is in good health, is seen at term, or before the onset of labour. Two hours of second stage pains may be allowed before operative interference, but it must ever be remembered that every hour of delay lessens the chances of recovery in Caesarean section.

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**PHYSIOLOGY.**

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**The Effect of Exercise upon the Venous Blood-Pressure.**

The experiments recorded by D. R. Hooker (*Amer. Journ. of Phys.*, vol. xxviii. p. 235) were mainly carried out on the human being. The experimental procedure was as follows:—The subject was seated on a stationary bicycle such as is used in gymnasia for exercise. Both hands rested on the handle-bars, one being employed to maintain balance and position, the other being relaxed as much as possible, and on it the determinations of venous pressure were made. The instrument which was employed was a modification of that devised by Recklinghausen. The pressure was taken before and at varying intervals during exercise. In all cases the pressure rose during exercise, the rise varying from twice to about four times the normal. The exercise was in most cases prolonged until some degree of fatigue set in. Experiments were carried out on animals for the same purpose. In these cases a group of muscles was kept in action by electrical stimulation of the motor nerve, while a record was taken of the venous pressure in the external jugular or femoral vein. A sharp rise of about 4.5 cm. (10 per cent. sodium citrate solution in manometer) was observed at the onset of muscular exercise, accompanied by an increase in the respiratory movements. With the cessation of the excessive respiratory activity the venous pressure fell to a point 2 cm. above the control, remaining at this level throughout the period of muscular exertion. The arterial pressure remained unchanged.

This rise in venous pressure appears to be too sudden to be accounted for on Henderson's hypothesis, namely, an increase in venous tone due to an accumulation of carbonic acid in the blood. The rise might be due to a vaso-constriction in the splanchnic area, giving rise to a general venous plethora. From Bayliss and Starling's experiments on the effects produced by splanchnic excitation the rise in venous pressure which occurs is apparently independent of the heart-rate and arterial
pressure. An important factor, other than the splanchnic vaso-constriction, is the change in the heart beat during muscular exercise. There is not only a marked increase in the rate of the heart, but also a remarkable decrease in its volume, as observed in skiagrams. The decrease affects the ventricles, while there is seemingly an increase in the auricular volume, the latter being probably due to a damming back of the blood into the auricles, causing their dilatation and subsequently a rise in the venous pressure.

Hooker attempted to test the validity of this explanation by taking the venous and arterial pressures before and after acceleration of the heart produced by cutting the vagi. In both cases which were investigated there was a small rise in venous pressure, and as the arterial pressure remained above the control before vagal section, the possibility of the rise in venous pressure being due to a loss of arterial tone was excluded. It therefore seems probable that acceleration of the heart-rate with a resultant decreased unit output is one factor in the rise of venous pressure which accompanies muscular exercise. If this be accompanied by an actual decrease in the capacity of the total arterial stream bed, we might expect a still greater rise of venous pressure.

The persons who exhibited the greatest rise of venous pressure were those in poor physical condition from an athletic point of view. The heart must suffer strain both from the increased arterial resistance and also from the venous congestion.

The probable sequence of events leading to a rise of venous blood-pressure during muscular exercise may be briefly stated as follows:

At the outset there is a local vascular dilatation in the active muscles coincident with an expression of blood from the veins. This results in a prompt rise of venous pressure. The consequent transitory fall of arterial pressure is followed by an accelerated heart-rate, which may, under certain circumstances, interfere with the effectiveness of the heart, and help to produce a stasis of blood in the great veins. Finally, a compensatory vaso-constriction occurs in the great splanchnic area, including the portal vein, which shunts the blood to the active muscles. There is, as a consequence, a venous plethora, which expresses itself as a rise of venous pressure which continues throughout the period of activity.

**Acapnia and Glycosuria.**

One of the most important factors involved in the maintenance of the normal metabolism of the cell is the internal respiration. It has often been noticed that there are disturbances of breathing in various forms of experimental diabetes. It has been pointed out by many investigators that an insufficient supply of oxygen to the cells (as in CO poisoning) results in a well-marked glycosuria. According to Edie, Moore, and Roaf (*Biochem. Journ.*, 1911, p. 325) an excess of CO₂
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in the air breathed apart from oxygen deficiency may result in glycosuria.

Henderson and Underhill (Amer. Journ. of Phys., vol. xxviii. p. 275), continuing the former's work on the nature of acapnia, that is a diminution of the CO₂ content of the blood, have investigated the CO₂ content of the blood in various forms of experimental diabetes. They thought that the glycosuria which seems occasionally to follow violent emotions in man or in lower animals may be due to the excessive respiratory activity, with a consequent lowering of the CO₂ content of the blood from excessive pulmonary ventilation.

In diabetic coma an acute acapnia occurs which is due to a hyperpnea and not merely to an expulsion of CO₂ from the bicarbonates of the blood by acids. The authors hold that the hyperpnea of diabetic coma is induced by the ethereal, not the acid, bodies present (e.g. acetone) in diabetic coma.

Reversal of the Reflex Effect of an Afferent Nerve by Altering the Character of the Electrical Stimulus Applied.

Sherrington and Sowton (Zeitschr. f. allg. Phys., Bd. xii. S. 485), continuing the investigations of the former on the reflex effects produced by stimulation of an afferent limb nerve, obtained some interesting results by varying the character of the afferent stimuli. In the decerebrate mammal the reflex effect produced on the isolated vastocrureus muscle on stimulation of an afferent limb nerve is, under ordinary conditions of stimulation, a rapid relaxation. If the stimulus be strong, the muscle relaxes rapidly and greatly; if weak, the relaxation is slower and less marked. It was found that with certain forms of stimulation or using the same preparation reflex contraction could be produced. Thus if galvanic stimulation were employed, relaxation occurred if the stimuli were strong; while if quite weak, contraction occurred. The same occurs with weak faradic stimulation, although the contraction is shorter in duration.

If the galvanic stimulation be not only weak, but its onset and fall less abrupt than normal, as may be obtained by the use of a rheonome, the contraction is still more prolonged, and a weak tonic contraction may be kept up during the whole time that the current is waxing and waning.

In order to obtain this contraction reflex the symptoms of shock must as far as possible be absent, otherwise it is not elicited. As the symptoms of shock are more marked in the decapitate than in the decerebrate animal, the contraction reflex cannot be obtained in the former, although the relaxation can be readily produced. The effects may not only be produced on the same side but also on the opposite
one, the reflex in each case being of the same character. It is evidently, therefore, not a part of the limb’s stepping reflex, because in stepping the two limbs are always conversely, not symmetrically, moved. The great interest of the investigation lies in the fact that stimulation of the same afferent nerve may give rise to two different reflex effects, according as the stimuli be strong or weak. It recalls the different effects which are produced in the blood-vessels of the limb when the distal end of the sciatic nerve is stimulated by infrequent or frequent stimuli.

It is still doubtful as to the way in which these double effects are brought about. One might assume the co-existence in the nerve of two different kinds of afferent nerve fibres, one which calls forth contraction and the other relaxation, the former more excitable under the influence of weak, long-continued stimuli, the other by stronger and sharper stimuli.

THERAPEUTICS.

By F. D. BOYD, C.M.G., F.R.C.P., and J. EASON, F.R.C.P.

TREATMENT OF TETANY.

ALTHOUGH tetany is more interesting to those who are specially engaged in the treatment of children, it is nevertheless a condition of much importance to the surgeon performing thyroidectomy, to the physician in gastric and intestinal cases, and to the obstetrician as one of the diseases prone to occur during pregnancy.

During the past ten years more or less fruitful efforts have been made to elucidate its pathology and to place the treatment on a scientific basis. The researches on this subject are the sequel to the observation made in 1896 by Vassale and Generali, that the symptoms of tetany following experimental and therapeutic thyroidectomy were due to accidental damage or removal of the parathyroid glands.

Although parathyroidal damage is held by many to be the cause of surgical tetany, it is not yet proved that spontaneous tetany is invariably associated with changes in the parathyroids.

Erdheim, Yanase, Haberfeld, Escherich, Biedl, Pineles, Pépere, Silvestrini and Mondors and others have found parathyroidal lesions in the spontaneous tetany of children. Again, Erdheim, Adler, Thaler, and von Frommer have experimentally shown that the tetany of pregnancy is due to hypoparathyroidism, and Fischer has recorded clinical evidence in support of this view.

In some cases of spontaneous tetany, however, the parathyroids have appeared to be normal. Schaffer and Rheindorf examined 400 serial sections of the glands in a fatal case of tetany and found no evidence of hæmorrhages. In a case of infantile tetany Ravenna