organs are incapable of taking over the complete pronephric function of the animal although an enlargement of the tubules after removal of the normal pronephros indicates a response to the increased functional demand.

The presence of the graft in the posterior position results in the formation of glomar capillaries by the host in the region of the transplanted nephrostomes.

When prospective pronephric tissue is placed just posterior to the normal pronephric region the tissues forming the common tubule of the transplant and the normal pronephros unite to form a single structure but the nephrostomal canals develop independently. In such grafts a continuous glomus is found extending from the region of the anterior nephrostome of the normal pronephros to the posterior funnel of the graft. The surface of this structure is markedly increased although the total volume appears little greater than normal, as the glomus is longer in the anterior-posterior axis but shorter in the lateral direction.

5789

Muscle Response to Foreign Innervation.

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Whether a muscle with foreign innervation will respond by contraction to any impulse reaching it or only to specific impulses which are characteristic for that muscle, has not yet been finally determined. To study the behavior of muscles with foreign innervation, anastomoses have been made between the individual nerve trunks of the brachial and lumbar plexuses in albino rats. The following anastomoses have been successfully obtained: sciatic to median and ulnar, sciatic to the radial, median and ulnar to the femoral, and the median with the ulnar to the sciatic.

The cut ends of the nerves were approximated and held in place by suturing with silk to the body wall. While so held the outgrowing fibers of the regenerating proximal nerve trunk grew along the distal trunk to the new muscle groups. A high percentage of the proximal nerve trunks showed evidence of regeneration and in about 50% of the 60 animals operated upon the nerves reached the muscle groups toward which they were directed.

By frequently reopening the incisions in the skin it was possible to locate the growing nerves and to follow the rate of regeneration of the outgrowing fibers. In young rats about 100 gm. in weight the daily outgrowth was about 3 mm. These nerves reached the muscle groups in about 40 to 45 days after the operation. The final length of the regenerated nerves was generally more than 3 times their original length. Observations made with and without ligature of the terminal stumps showed no cases which could be interpreted as a union by first intention, *i. e.*, Forsmann's suture.

The behavior of the muscle groups to which the foreign regenerating nerves were guided was studied by stimulating them electrically. Three or 4 days after the original nerve supply was cut off these muscles began to show the typical signs of atrophy. They decreased in size and gave the usual responses of degenerating muscle to galvanic and faradic stimulation. The arrival at these muscles of the outgrowing fibers of the regenerating nerve was followed by an increase in size, though they never completely recovered. The tone of the muscles also increased and when stimulated by galvanic and faradic currents they gave the responses of normal muscle. A stronger faradic shock, however, was required to cause contraction than was necessary for contraction of the normal control muscle.

Mechanical stimulation of the limb to which the outgrowing nerve fibers had been guided caused a reflex contraction in the original limb from which the nerve was drawn. This reflex was of the same type as might have been caused by the regenerated nerve in its original position. This type of observation was possible since the nerves of the brachial or the lumbar plexuses were divided in their distribution by the operation, some of the nerves being distributed to the fore limb and others to the hind limb. In the same way it has been possible to stimulate the limb in which the nerve was originally distributed and cause a contraction of the muscle groups with which it has established the new connection.

Thus it has been possible by means of simple mechanical stimulation applied to the peripheral sensory field of the original limb to cause impulses to pass over a nerve grafted to a new group of muscles. These impulses always cause contraction of the muscles which they reach. The muscles supplied, may be flexors or extensors, they respond as they would to impulses over their original nerve supply. So far there has been no indication of learning by these animals. The muscles are always contracted through reflex stimulation. These observations are interpreted as supporting the

experiments of Langley[1] which indicated that the result produced by impulses traveling in a nerve depends on where the fibers end and not upon any specific differences in the impulses themselves.

5790

Blood Pressure and Intestinal Motor Response to Splanchnic Stimulation after Nicotine.

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Small intravenous doses of nicotine (1 to 5 mg. per kilo) depress the activity of the intestine, and abolish the effect of electrical stimulation of the vagus on the gut of the dog and cat.[1, 2, 3] On the other hand, larger doses of nicotine (15 to 60 mg. per kilo) produce a stimulation of the intestine, and cause a return of the stimulatory effect of vagus faradization on the intestine.[2, 3] These latter effects of nicotine are not due to an action on the splanchnic ganglia, or on the adrenal glands, for these effects are retained after the extirpation of both the ganglia and the adrenal glands.[3]

In this report the effects of intravenous injections of nicotine are extended to the activity of the splanchnic nerve in the cat. The animal is pithed and prepared as in the previous communication.[3]

The motility of the intestine was studied by a technic different from that reported in a previous communication.[3] The abdominal wall is opened and the intestines are flooded with warm mineral oil. This minimizes distension due to loss of carbon dioxide.[4] Two superficial stitches are then taken into the muscularis of the intestine, about 1.5 cm. apart, and firmly tied. To each of the strings is now attached one of the levers of the Cushny myocardiograph. The free arm of the instrument is then connected with the writing lever. If the activity of the circular coat is to be recorded, the stitches are taken in the same transverse plane; if the longitudinal coat is being studied, the stitches are in the same longitudinal plane.

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