*Reflex Postures.—*But there are certain reflexes which do persist for long periods at a stretch. These are reflex postures. The hind limbs of the “ spinal ” frog assume an attitude which is reflex, for it ceases on severance of the afferent spinal roots. This attitude is one of flexion at hip, knee and ankle, resembling the well-known natural posture of the frog as it squats when quiet in the tank. Similarly in the “ spinal ” dog or cat certain muscles exhibit a slight but persistent contraction. This is seen well in the extensor muscles of the knee. These tonic reflexes are related to attitudes. In the dog and cat they are exhibited by those muscles whose action antagonizes gravity in postures which are usual in the animal, thus the extensors of the knee and hip and shoulder and elbow are in tonic contraction during standing. The reflex arcs concerned in reflex maintenance of this tonic contraction of muscles have been shown in several cases to arise within those muscles, and in those very muscles which themselves exhibit the tonic contraction. It is not, however, certain that all muscles exhibit a reflex tonus: for instance, it is not certain that in the dog the tail muscles exhibit such a tonus. And in those muscles which do exhibit the spinal reflex tonus attempts to obtain a similar untiring slight steady reflex contraction by artificial stimuli applied to receptive organs or nerves have failed.

*The Spinal Reflex Arcs of the Hind Limb.—*When the skin of the limb is stimulated the flexion-reflex already described is evoked. The reflex is excited by nocuous stimuli such as a prick or squeeze applied to the skin anywhere in the limb, but most easily when applied to the foot. Electrical stimuli wherever applied evoke the same reflex. Similarly electrical stimuli applied to any afferent nerve of the limb evoke this reflex, whether the afferent nerve be from skin or from the muscles. Since the reflex always provokes excitation of the flexor muscles and inhibition of the extensor muscles, the result is that central stimulation of the afferent nerve of a flexor muscle excites its own muscle and inhibits its antagonist (reciprocal innerv- ation), while similar stimulation of the afferent nerve of an extensor muscle inhibits its own muscle and excites its anta- gonist (reciprocal innervation). The reflex flexion of the ipse- lateral hind limb is commonly accompanied by reflex extension of the opposite hind limb. If the reflex spreads to the fore limb, it produces extension of the same side fore limb with flexion of the crossed fore limb sometimes, but sometimes extension of both fore limbs.

In the dog and cat extension of the ipselateral hind limb can, however, be excited by stimulation of the skin in three limited regions. One of these is the sole of the foot; smooth pressure between the pads excites a strong brief extension. This is called the extensor thrust. It is accompanied by a similar sudden brief extension of all three other limbs. This reflex may be related to the action of galloping, and the pres- sure which excites resembles that which the weight of the body bears on the pads against the ground.

The two other regions are the skin of the front of the groin supplied by the crural branch of the genito-crural nerve, and the skin just below and mesial to the buttock. These always excite the extensor muscles, not the flexors. They may be concerned with sexual acts.

*Reflexes of the Fore Limb.—*These resemble those obtainable from the hind limb. The ipselateral reflex is flexion at shoulder, elbow and wrist. The contra lateral fore limb at the same time is extended at shoulder, elbow and wrist. When the reflex spreads to the hind limbs the hind limb of the same side is extended at hip, knee and ankle, that of the crossed side is sometimes flexed at hip, knee and ankle, but sometimes is instead extended at hip, knee and ankle. The reflex sometimes spreads to the neck, causing the head to be turned toward the fore limb, which is the seat of the stimulation.

*The Scratch Reflex.—*This has already been partly described above. The area from which it can be excited by appropriate stimulation is a large one, namely, a field of skin which is some­what saddle-shaped having its greatest width transversely across the shoulders. It extends from close behind the pinna back to the loin. The stimuli which are effective are rubbing the skin or lightly pricking it, or lightly pulling on the hairs: also faradisation by a needle electrode whose point is only just inserted among the hairs but not deeper than their roots. If the stimulus be applied to the right hand of the mid-line the right hind limb is flexed at hip and performs the rapid scratching movement described above, and the left hind limb is thrown into steady extension. And conversely, when the stimulus is to the left side of the mid-line.

Each of these reflexes is a co-ordinate reaction. It is seen, therefore, that through the medium of the spinal cord the body behind the head has at command a certain number of reflexes and that each of these manages the skeletal musculature in a co-ordinate way. It will also be clear from the facts mentioned above about these separate reflexes that the fields of muscles worked by these several reflexes is to a large extent common to them all. Thus the reflex excited from the skin of the right hind limb acts on the muscles of that limb and also on those of the three other limbs. So similarly the reflex excited from the left hind limb, and from each fore limb. Study of the inter-relationship between these reflexes shows that by means of the spinal cord not only is co-ordinate action of the muscles ensured for each reflex, but that also the separate reflexes are co-ordinated one with another.

When we examine the relationship holding between individual reflexes we find that some resemble one another in regard to their action upon a particular muscle or group of muscles. On the other hand, some act in opposite ways upon a particular muscle or muscle group. In order to follow the co-ordination effected by the spinal cord in corresponding reflexes together we have to turn to a certain feature in the scheme of construction of the nervous system. This feature is embodied in what is termed the principle of the common path.

*Interaction between Reflexes.—*At the commencement of every reflex-arc is a receptive neurone extending from the receptive surface to the central nervous organ. This neurone forms the sole avenue which impulses generated at its receptive point can use whithersoever be their destination. This neurone is therefore a path exclusive to the impulses generated at its own receptive point, and other receptive points than its own cannot employ it. A single receptive point may play reflexly upon quite a number of different effector organs. It may be connected through its reflex path with many muscles and glands in many different regions. Yet all its reflex arcs spring from the one single shank or stem, *i.e.* from the one afferent neurone which conducts from the receptive point at the periphery into the central nervous organ.

But at the termination of every reflex arc we find a final neurone, the ultimate conductive link to an effector organ, (muscle or gland). This last link in the chain, *e.g.* the motor neurone, differs obviously in one important respect from the first link of the chain. It does not subserve exclusively impulses generated at one single receptive source, but receives impulses from many receptive sources situate in many and various regions of the body. It is the *sole* path which all impulses, no matter whence they come, must travel if they are to act on the muscle fibres to which it leads.

Therefore, while the receptive neurone forms a private path exclusively serving impulses of one source only, the final or efferent neurone is, so to say, a public path, *common* to impulses arising at any of many sources of reception. A receptive field, *e.g.* an area of skin, is analysable into receptive points. One and the same effector organ stands in reflex connexion not only with many individual points, but even with many various receptive *fields.* Reflexes generated in manifold sense-organs can pour their influence into one and the same muscle. Thus a limb muscle is the *terminus ad quern* of many reflex arcs arising in many various parts of the body. Its motor nerve is a path common to all the reflex arcs which reach that muscle.

Reflex arcs show, therefore, the general features that the initial neurone of each is a *private* path exclusively belonging to a single receptive point (or small group of points); and that