the fatigue holds for that spot, but does not implicate the reflex as obtained from the surrounding skin. The reflex is, when tired out to stimuli at that spot, easily obtainable by stimulation two or more centimetres away. This is seen with either mechanical or electrical stimuli. When the spot stimulated second is close to the one tired out, the reflex shows some degree of fatigue, but not that degree obtaining for the original spot. This fatigue may be a local fatigue of the nerve-endings in the spot of skin stimulated, to which in experiments making use of electric stimuli some polarization may be added. Yet its local character docs not at all necessarily imply its reference to the skin. It may be the expression of a spatial arrangement in the central organ by which reflex arcs arising in adjacent receptors are partially confluent in their approach toward the final common path, and are the more confluent the closer together lie their points of origin in the receptive field. The resemblance between the distribution of the incidence of this fatigue and that of the spatial summation previously described argues that the seat of the fatigue is intraspinal and central more than peripheral and cutaneous; and that it affects the afferent part of the arc inside the spinal cord, probably at the first synapse. Thus, its inci­dence at the synapse R*a—*P*a* and at R—P would explain its restrictions, as far as we know them, in the scratch-reflex.

The local fatigue of a spinal reflex seems to be recovered from with remarkable speed, to judge by observations on the reflexes of the limbs of the “ spinal” *dog. A few* seconds’ remission of the stimulus suffices for marked though incomplete restoration of the reaction. In a few instances there may be seen return of a reflex even during the stimulation under which the waning and disappearance of the reflex occurred. The exciting stimulus has usually in such cases been of rather weak intensity. In the writer’s experience these spinal reflexes fade out sooner under a weak stimulus than under a strong one. This seeming paradox indicates that under even feeble intensities of stimulation the threshold of the reaction gradually rises, and that it rises above the threshold value of the weaker stimulus before it reaches that of a stronger stimulus. The scratch-reflex which has ceased to be elicited by a weak stimulus is immediately evoked—often without any sign of fatigue in its motor response—by increasing the intensity of the stimulus applied at the same electrode. The occurrence of fatigue earlier under the weaker stimulus than under the stronger also shows that the fatigue consequent under the weaker stimulus may often be, relatively to the *production of the natural discharge,* greater than when a stronger stimulus is employed. This, which has been of frequent occur­rence in the writer’s observations on the leg of the “spinal” dog, if obtaining widely in reflex actions, has evident practical importance.

It is easy to avoid in some degree the local fatigue associated with excitation of the scratch-reflex from one single spot in the skin by taking advantage of the spatial summation of stimuli applied at different points in the receptive field. When this was done, a curious result met the writer. The provocation of the reflex has been made through ten separate points in the receptive field, the distance between each member of the series of points and the point next to it being about four centimetres. Each point is stimulated by a double-induction shock delivered twice a second. When this is done a series of scratch movements is elicited, and continues longer than when the stimuli are applied at the same interval, not to succeeding series of skin points but to one point. Thus three or four hundred beats can be elicited in unbroken series. But the series tends somewhat abruptly to cease. If, then, in spite of the cessation of the response, the stimulation be *continued* without alteration during three or four minutes or more, the scratching movement breaks out again from time to time and gives another scries of beats, perhaps longer than the first. These experiments indicate that physical polarization at the stigmatic electrode is not answerable for the fading out of the scratch-reflex. It shows also the complexity of the central mechanisms involved in the reflex. The phenome­non recalls Lombard’s phases of briskness and fatigue in series of records obtained with the ergograph.

It is interesting to note certain differences between the cessa­tion of a reflex under fatigue and under inhibition. the reflex ceasing under inhibition is seen to fade off without obvious change in the frequency of repetition of the beats, or in the duration of the individual beats. The reflex ceasing under fatigue is seen to show a slower rhythm and a sluggish course for the latter beats, especially for the terminal ones.

Among the signs of fatigue of a reflex action are several sug­gesting that in it the command over the final common path exercised for the time being by the receptors and afferent path in action becomes less strong, less steady and less accurately adjusted. Under prolonged excitation their hold upon the final common path becomes loosened. This view is supported by the fact that its connexion with the final common path is then more easily cut short and ruptured by other rival arcs competing with it for the final common path in question. The scratch­reflex interrupts the flexion-reflex more readily when the latter is tired out than when it is fresh.

In the hind limb of the “ spinal ” dog the extensor-thrust is inelicitable during the flexion-reflex. That is to say, when the flexion-reflex is evoked with fair or high intensity the writer has never succeeded in evoking the extensor-thrust, though the flexed posture of the limb is itself a favouring circumstance for the production of the thrust if the flexion be a passive one. But when the flexion-reflex is kept up by appropriate stimulation of a single point over a prolonged time, so that it shows fatigue, the extensor-thrust becomes again elicitable. Its elicitability is, then, not regular nor facile, but it does become obtainable, usually in quite feeble degree at first, later more powerfully. In other words, it can dispossess the rival reflex from a common path when that rival is fatigued, though it cannot do so when the rival action is fresh and powerful.

Again, the crossed extension-reflex cannot inhibit the reflexion of the flexor-reflex under ordinary circumstances if the intensity of the stimulation of the competing arcs be approximately equal; but it can do so when the flexion-reflex is tired.

The waning of a reflex under long-maintained excitation is one of the many phenomena that pass in physiology under the name of fatigue. It may be that in this case the so-called fatigue is really nothing but a negative induction. Its place of incidence may lie at the synapse. It seems a process elabo­rated and preserved in the selective evolution of the neural machinery. One obvious use attaching to it is the prevention of the too prolonged continuous use of a common path by any one receptor. It precludes one receptor from occupying for long periods an effector organ to the exclusion of all other receptors. It prevents long continuous possession of a common path by any one reflex of considerable intensity. It favours the receptors taking turn about. It helps to ensure serial variety of reaction. The organism, to be successful in a million-sided environment, must in its reaction be many sided. Were it not for such so-called fatigue, an organism might, in regard to its receptivity, develop an eye, or an ear, or a mouth, or a hand or leg, but it would hardly develop the marvellous congeries of all those various sense-organs which it is actually found to possess.

The loosening of the hold upon the common path by so-called fatigue occurs also in paths other than those leading to muscle and effector organs. If instead of motor effects sensual are examined, analogous phenomena are observed. A visual image is more readily inhibited by a competing imagé in the same visual field when it has acted for some time than when it is first perceived (W. Macdougall).

One point, on a priori grounds, is a natural corollary from the “ principle of the common path,” as indicated by the experimental findings relative to the incidence of fatigue. The reflex arcs, each a chain of neurones, converge in their course so as to impinge upon and conjoin in links (neurones) common to whole varied groups—in other words, they conjoin to *common poths.* This arrangement culminates in the convergence of many separately arising arcs in the final efferent-root neurone. This neurone thus forms the instrument for many different reflex arcs and acts. It is responsive to them in various rhythm and in