Elementary Anatomy,

AS APPLIED TO NURSING.

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LECTURE II.

(Continued from page 124.)

THE nerve centres are composed of nerve cells or ganglionic corpuscles, which are oblong bodies consisting of a soft, semi-solid substance, in the midst of which is a large, clear, and transparent area, which is known as the nucleus, and within which is generally a smaller body, which is termed the nucleolus. Each corpuscle sends off prolongations, which may divide and sub-divide, finally being continued into the ordinary nerve fibres. The brain and spinal cord, which occupy the cavity of the skull and spinal column, are invested by a very vascular, fibrous tissue, which is called the *pia mater*, over which, again, is a very tough, fibrous membrane, the *dura mater*, which coats the bony walls of the cavities; between these is the *arachnoid membrane*, which forms a sort of closed sac between the two, and which secretes the *arachnoid fluid*. The spinal cord is a column of greyish-white substance extending from the top of the spinal canal, where it is continuous with the brain to about the second lumbar vertebra, where it tapers off into a fine filament. Throughout its length, back and front, are deep fissures. The anterior fissure divides it in the middle line in front nearly down to the centre, and a smaller cleft, the posterior fissure, nearly extends to the centre of the middle line behind; consequently, there is only a narrow bridge of the cord connecting its two halves throughout its length, and this bridge is traversed through its whole course by a minute canal, which is termed the central canal of the cord. Each half of the cord is divided longitudinally into three equal parts —the anterior, lateral, and posterior columns—by the lines of attachment of two parallel series of delicate bundles of nerve filaments, which are the roots of the spinal nerves. Those that arise nearer the back surface of the cord are called the posterior roots; those which arise along the front line are the anterior roots. The trunks of these nerves pass out of the spinal cord by apertures between the vertebræ, and then divide and subdivide as they pass away to supply the different organs to which they are distributed. There are thirty-one pairs of these spinal nerves, and consequently there are twice as many sets of roots of spinal nerves, which are given off in two lateral series from each half of the cord.

Now experiments have proved that the action of these nerves is very different, inasmuch as those which pass off from the anterior part of the cord act as *motor* nerves, and those which pass off from the *posterior* part subserve the function of sensation, and so are termed the *sensory* nerves. For example, it has been shown that if, in a living animal, the anterior roots of a spinal nerve be cut, the animal loses all control over the muscles to which that nerve is distributed, although the sensibility of the region of the skin supplied by the nerve remains quite perfect. If the posterior roots, on the other hand, be cut, all sensation is lost, but the power of voluntary movement remains unaffected. If both roots be cut, movement and sensation are completely lost, the muscles are paralysed, and the skin may be cut or torn without any sensation being caused. Students have a "tip" for remembering this very important fact which you will also find useful. It consists of the word MAPS :— M, motor—A, anterior—P, posterior—S, sensory. The importance of this knowledge in the diagnosis and comprehension of disease of the nervous system, is, as you will readily perceive, very great indeed, because by means of the symptoms it is possible to localise the disease of the nerve. You will, therefore, understand that—to go back to our original analogy—just as, when the telegraphic wires are cut, no message can be passed through them, and so the offices they supply are rendered useless, so the destruction or impairment of any part of a nerve results in the impairment or loss of power of the muscles or organs which that nerve supplies.

We, therefore, find that there are two distinct effects which are caused by disease or injury to the nerves. The muscle supplied by such an affected nerve will cease to act in response to the commands of the central nervous system, and will speedily suffer from the effects of the disuse, that is to say, it will shrivel and become, what is termed, atrophied. Or, if the commands of the brain are sent by irregular messages, the muscle instead of ceasing to contract at all, will contract spasmodically, and too often; its movements will become irregular and purposeless. For an example of the first effect, we turn to a typical case of paralysis, and take for example the muscles of the forearm of a man, the nerves supplying which have been cut across by a severe accident; the muscles become atrophied and wasted, shrunken and contracted, and the hand and arm is, what is termed, paralysed or palsied. The same result is caused by disease of the nerves, as, for example, in a case of old people who have suffered from an attack of apoplexy, or what is popularly termed a "stroke." Or again, we see the same appearance in the arms or legs of children who have been affected with the form of paralysis which occurs during infancy or early childhood. With regard to the second class of cases, we see its effects in the shaking of the head in old age, or better still

previous page next page