OUR PRIZE COMPETITION.

GIVE A BRIEF ACCOUNT OF THE SPINAL CORD. WHAT ARE ITS FUNCTIONS?

We have pleasure in awarding the prize this week to Miss J. G. Gilchrist, Gillespie Crescent, Edinburgh.

PRIZE PAPER.

The component parts of the nervous system consist of the brain, spinal cord, and the cerebro-spinal nerves, also known as the cerebro-spinal system, the sympathetic system, consisting of the sympathetic ganglia and nerves lying along each side of the vertebral column, forming a second division of the nervous system.

The spinal cord is a column of grey and white nerve substance, extending from the medulla oblongata to the lumbar region, where it terminates in a number of fine threads; it is about 18 inches in length, and is enclosed, like the brain, within the three membranes—dura mater, arachnoid, and pia mater. In the spinal cord the white matter is external, and consists of nerve fibres; the grey matter is internal, consisting of cells. In the brain the white and grey matters are reversed. From the grey substance proceed two ends pointing forwards and backwards, forming the posterior and anterior nerve roots, which are joined across by a band of grey matter (the commissura), having a tiny hole in its centre containing the cerebro-spinal fluid. Thirty-one pairs of spinal nerves are given off from the spinal cord, and pass out by means of small openings in the vertebræ. Those nerves are delicate, thread-like structures, consisting of nerve fibres enclosed in a protective sheath; they originate in nucleus or cell, and after leaving the nerve trunk break up into branches, which terminate in various parts of the body.

The nerve trunk is a cord-like structure, containing blood vessels, and holding the nerves together by a tough fibrous capsule, from which spring the different sensory and motor nerve fibres. An "afferent" nerve conveys sensation or feeling to posterior or sensory root of the spinal cord and to the brain. An "efferent" nerve proceeds from the anterior or motor root of the spinal cord, and conveys the impulse of movement to the muscles. Thus all the sensations, movements, and special functions of the body are regulated by the nervous system as a whole, the spinal cord forming the great centre for transmission and reception of sensation and movement to and from the brain. The spinal cord is wonderfully protected by the vertebral or spinal column, which consists of thirty-three "irregular" small bones, each having a body and projections or processes, to which the powerful muscles for supporting and bending the body are attached. The whole of the vertebræ are joined one above the other, each resting on a pad of cartilage to lessen vibration, so that they form a column through the centre of which passes the spinal cord. Seven of these bones form the cervical, of which the first of the neck vertebræ, the atlas, is more movable than the rest, and supports the skull in such a manner that the movement of nodding the head is possible; the atlas itself turns on a pivot-like projection from the next bone, the axis permitting a rotatory movement of the head. The twelve dorsal or back vertebræ are those to which the ribs are attached, then come the five lumbar vertebræ, below which are the sacrum and coccyx.

The functions of the spinal cord may be divided into three parts:—

1. The spinal cord *receives* impressions from various parts of the body by the sensory nerves, and conveys them to the brain, where they excite consciousness—*i.e.*, of pain, as from the prick of a needle on the skin.

2. The spinal cord *transmits*, by means of the motor nerves, the will power of the brain to the voluntary muscles, causing movements. One might also mention the inhibitory action, the power of the will to regulate and direct the actions, and also the power of self-control exercised to decide and guide the conduct, though the latter is rather beside the point in regard to the spinal cord.

3. The spinal cord has the independent power of "reflex action"—that is, reflecting a sensory as a motor impulse without the intervention or inhibitory power of the will. For instance, in paralysis, where there is loss of power of voluntary movement and sensation, a patient's leg will be moved or drawn up by reflex action following a stimulus, such as tickling the sole of the foot, though the patient is unconscious of any feeling at the time, and is not capable of moving the limb at will.

Inflammation, injury, or disease, such as paraplegia or spinal paralysis, causes loss of voluntary movement and of sensation below the diseased part, though reflex actions may be obtained.

HONOURABLE MENTION.

The following competitors receive honourable mention:—Miss Ethel E. Hall, Miss M. G. Bielby, Miss Ethel B. Hare, Miss M. Robinson.

QUESTION FOR NEXT WEEK.

What symptoms may be found in an infant who is suffering from congenital syphilis? What symptoms may develop in a newborn infant if the mother is suffering from gonorrhœa?

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