Each portion is made up of two kinds of nervous matter, one distinctly white, the other distinctly gray. In the brain the gray is all on the outside, the white matter being enclosed within it, while in the spinal cord the gray is in the centre, and the white outside. All are enclosed in three membranes—the dura mater, the pia mater, and the arachnoid.

In relation to the nerves, some go directly from the brain, the nerves of special sense, to the eye, the ear and the nose. Those which issue from the spinal cord pass off from it in pairs, on each side of the cord—thirty-one pairs, each having two origins, one from the back segment, the other from the front segment of the cord, and dividing into two roots at their start, but soon uniting into common or compound nerves, and with the others from the brain, not destined to go to the organs of sense, are distributed to the fleshy parts, accompanying, ramifying with, and controlling the vascular system.

The cerebro-spinal is one nervous system. There is a second one—the ganglienic —a double chain of nervous matter passing from the brain through the neck and along the front of the spinal column, the masses of which in each chain are twenty-eight in number, the largest the size of an almond. Springing from these central masses, a set of nerves pass off in four directions, many communicating with the nerves of the cerebro-spinal system. In addition to this chain of ganglia, there are other ganglia and plexuses of sympathetic nerves connected with the heart and all the vital organs; and one great ganglia, the "semilunar," receiving branches from the cerebro-spinal system, and which sends off radiating branches to the stomach, liver, diaphragm, kidneys and intestines.

Whenever an external vibrating impression is made on a part of the great terminal surface—as a picture to the eye, a sound to the ear or a friction to the skin—the vibration is conveyed directly away to the communicating centre, telling it, as it were, what has occurred. Or we shall see some indication of will made in a centre, and conveyed from thence to the nervous termination, bidding it to set in motion muscular fibre, and creating for a time motion of body and limb.

All kinds of motor connections from the centre pass through the front columns of the spinal cord, while all counter impressions from the extremities of the nerves to the commanding centres pass through the posterior columns of the spinal cord.

Thus in the cerebro-spinal system we notice the connections between will and the actions of will; the mode by which the special impressions of the outer world are impressed upon the inner man to inspire him while he lives with the life of the outer world, and the mode by which he responds to or reflects back those inspirations.

Should the great centres of the cerebro-spinal system be injured, they cannot receive external impressions, deliver commands in response, or reflect back what they have received, in due time or order.

By a sudden blow or mental impulse of surprise or emotion, the centres of this second nervous system, being for a moment overpowered, the blush of red blood on the cheeks and over the surface of the body will declare that the control over the vessels has been checked as far as the termination of the nervous fibre, while the glands that may be involved in the same shock, and for the same reason, left uncontrolled, will weep and pour out their secretions in copious streams. Should the shock be so extreme as to communicate a vibration from the centres, the nervous fibres will be irritated so decidedly as to close the arterial terminals, and shut off the blood stream in the vital arena. Then sudden and deathlike pallor will seize the surface of the