

(2) of the pons variolii; (3) the spinal cord, and (4) medulla oblongata. This division is based on the order in which the grand centres succumb, because, though the entire nervous sodality is simultaneously affected, the superficial portions of the encephalon yield before the deep, and the spinal cord before the medulla oblongata. Complete anæsthesia must necessarily destroy life by paralyzing the respiratory centre. Surgical anæsthesia corresponds with paresis of the pons variolii and consequently does extend beyond the centres of the "life of relation."

The immediate constitutional effect of chloroform in the circulation is general stimulation—psychical, nervous, muscular, and circulatory—the phenomena of which when taken collectively constitute the period of excitement. This period of inebriation is, however, much shorter than when ether is employed, the patient's struggles not being so violent, nor the volume of air drawn into the stomach so large. Stimulation is rapidly replaced by sedation until surgical anæsthesia is reached, at which time the vaso-motor, cardio-motor, and respiratory centres alone remain capable of performing reflex functions. Here let us add, parenthetically, that the essence of a reflex act consists in the transmutation by the irritable protoplasm of a nerve-cell of an afferent into an efferent impulse. If we now divide the reflex centres into sensori-motor, ideomotor, excito-motor, and inhibitory, we will be the better able to follow this rapid growth, and as rapid decline, of nervous irritability. The sensori-motor centres are chiefly situated in the medulla oblongata and spinal cord, and reflex action through these centres places the organs of special sense in a fit state to receive and transmit impressions. Those purely material centres are again connected with their respective ideomotors situated in the convolutions of the cerebrum, and this last connection is apparently the psycho-material telephone between matter and mind. Through it the individual becomes conscious of external impressions; and were this link destroyed, organic aptitude still remaining, we would have what might be called "ideo-coma." Bearing in mind that the primary action of chloroformic vapor is stimulant, we can readily understand how the circulating anæsthetic excites the conscious centres of special sense, and why those senses are, for a time, more acute than normal. The functions, then, of the cerebral con-

volution being eminently psychical, different areas being the seats of muscular consciousness for different muscular groups, these areas are called into action only when intelligent consciousness and volition are needed. The cerebellum, on the other hand, is the co-ordinating centre of muscular precision for voluntary movements, and the basal ganglia are the semi-conscious centres through which the different impressions are carried and returned from their various conscious and co-ordinating areas. What then might be expected but, that the primary chloroformic incitation of those encephalic centres should give rise to an unusual supply of muscular force, an exactness of muscular movement, and a rapid evolution of ideas, derived in part at least, from immediate external impressions. Should this quickened consciousness, this cerebral power to generate ideas manifest itself in the form of a powerfully depressing emotion, such, for instance, as "fear of instantaneous death," the special centre in which this originates may also generate a motor impulse which, if reflected on the pneumogastric, may inhibit the heart in diastole. In this way only can we account for many of the unexpected deaths which have occurred, without apparently sufficient cause, during the earlier stages of chloroformization.

The above leads us to another consideration. The more thoroughly educated are particular ideomotor centres, the more highly differentiated their constituent nerve-cells, and, as a consequence, the more irritable and rebellious to anæsthetic influence. Now, the cardinal principle in man is self-preservation; in woman, preservation of the species. Man is aggressive; woman emotional. As a result of this psychical difference, we generally find that the actions and incoherencies of male subjects during the period of chloroformic excitation are of the combative variety. Women, on the contrary, may display the emotional by singing, etc., but their thoughts and sensations usually run in procreative channels. From this peculiar action on the softer sex, we deduce the practical rule: Never anæsthetize a female excepting in the presence of a third person.

Let us next see what may be learned from the state of the pupil. In the iris we find two sets of muscular fibres, supplied by two sets of motor nerves originating in two different centres. The circular fibres (*sphincter pupillæ*) receive their efferent nerve supply through the motor oculi from the