

lated at the same time the result is closure of the glottis, the muscles that open the glottis being overpowered.

The result of stimulating all the muscles of respiration, and all the muscles of the larynx simultaneously, would be the closure of the glottis, the muscles at the same time straining to perform inspiration. This is the condition present during the spasm in croup. The same condition may be produced by stimulating both parts of the respiratory centre.

The respiratory centre is situated in the medulla, close to the roots of origin of the glosso-pharyngeal, pneumogastric and spinal accessory nerves. It has a complex function over two groups of muscles: the muscles opening the glottis and of inspiration, on the one hand: on the other hand, the muscles closing the glottis and of expiration.

Now the centre is automatic, but partly controlled by higher centres in the brain. It is also reflexly affected by any nerves of the body (all having some remote connection with it), but more especially by the glosso-pharyngeal, pneumogastric and medullary part of the spinal accessory.

Thus we have to consider the centre itself, the higher centres controlling it, and the nerves affecting it; and any disease of either of these may unbalance the respiration and produce croup among a great number of other symptoms.

Of the respiratory centre we may have hemorrhage or degenerations producing croup. These must be exceedingly rare, except in the miliary hemorrhages of hydrophobia. In locomotor ataxia the laryngeal crisis may be attributed possibly to derangement of this part of respiratory centre.

Diseases of higher respiratory centres may produce croup. Thus we have the epileptic cry produced by spasm of the glottis, or the croup of hysteria, or the barking cough of boys at puberty, generally brought on by masturbation, or the neurosis of the larynx, equivalent to writer's cramp, and brought on by talking; a common form is that associated with malnutrition of rickets. This is seen in children up to two years of age and is so common that it has been given a special name, laryngismus stridulus. In this disease there is associated contraction of many other muscles and may end in general convulsions. If a person be strangled from any cause, he suffers at the last from general convulsions and it is doubtful if the convulsions of laryngismus stridulus differ from those of strangulation. Laryngismus stridulus is primarily a neurosis, and is classified with hysteria and epilepsy.

Nerves directly affecting the respiratory centre are the glosso-pharyngeal, pneumogastric and medullary portion of the spinal accessory.

Irritation of these nerves in any part of their course, or distribution, may produce croup. They may be irritated close to the