

cord. Thus for a motor impulse only two principal neurones are required from its beginning till it reaches the muscle concerned.

Neurologists frequently speak of neurones of the upper level and neurones of the lower level, which can be understood from Figure 14. It is also easy to see from the same illustration why lesion of upper neurones does not give rise to degenerative paralysis, for, according to the neurone doctrine, the two essential neurones of a motor tract are independent of each other. It can also be understood from this figure how sensory and motor neurones may come into close relationship in the cortex cerebri, so that on purely anatomical grounds a *sensory-motor* cortical region is comprehensible.

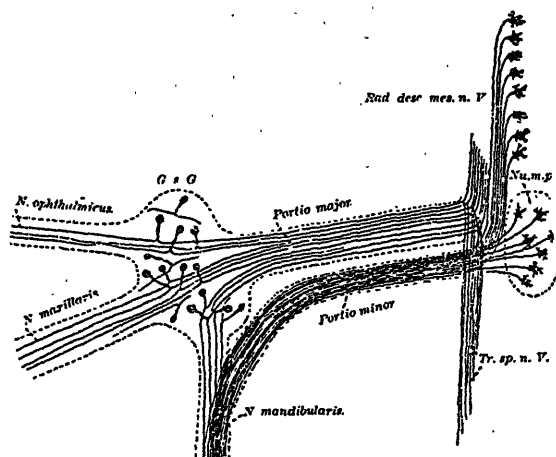


FIG. 13. Diagram showing the motor and sensory neurones, the axones of which enter into the formation of the trigeminal nerve (after Van Gehuchten). *g. s. g.*, semilunar ganglion of Gasserius; *Nu. m. m. n. V.*, Nuclei motorii minores nervi trigemini; *Nu. m. pr. n. V.*, nucleus motorius princeps nervi trigemini; *Rad. desc. mes. n. V.*, radix descendens nervi trigemini; *Tr. sp. n. V.*, tractus spinalis nervi trigemini.

By the help of this most modern technique we have been the better enabled to realize what a wonderful sensory organ or combination of organs is the skin. Fig. 15, for example, illustrates the application of the Golgi method to sections of skin, from which it can be learned how extremely numerous are the nerve branches distributed to even a small area of the cutaneous surface. Further it will be observed that

nerves are abundantly supplied to the hair bulbs, enabling us to understand why touching hairs gives rise so readily to cutaneous sensations, and why the "whiskers" of the carnivora can serve such a good purpose, especially in the dark. In revealing the extent of the exact structure of the various modifications of the axone known as sensory *end-organs*, the methylene blue method has probably served a better purpose than any other.

In figure 16 we have a representation of the nerves ending in heart muscle. It was formerly considered probable that every skeletal muscle fibre was supplied with a small branch of nerve, and actual observation by the methylene blue method and also with the Golgi method would seem to lend the support of actual observation to an old suggestion; and from very prolonged observations on the nerve supply to the hearts of various