cord on some system destined to end in the lumbar region. Naturally one thinks of the pyramidal tract in this connection, but it does not represent the only decussating connection with area 4. Thalamocortical fibers also end in the region inoculated, so that a relay from the thalamus to the cord via the spino-thalamic tracts or medial lemniscus must also be regarded as a possibility. Further experimental work now in progress is designed to elucidate the separate rôles which these long systems may have in the production of the crossed paralyses. It is thus possible, within certain limits, to alter at will the pattern of paralysis by varying the point at which the virus is introduced into the central nervous system. With this evidence for the propagation of the virus along the lines followed by definite fiber systems it seems possible to analyze the olfactory system for pathways which might be involved after intranasal inoculation.

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Experimental Poliomyelitis Without Paralysis.*

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Preliminary studies on a series of 13 Rhesus monkeys *(Macaca mulatta)* indicate that by section of the olfactory tracts it is possible to confine the activity of poliomyelitis virus after intranasal inoculation to the olfactory bulbs. Previous experiments (Brodie and Elvidge,[1] Schultz and Gebhardt[2]) have shown that monkeys in which both olfactory tracts and bulbs were destroyed did not develop paralysis after introduction of the virus into the nose. These findings, however, give no information regarding the ultimate fate of the virus after such a method of inoculation. The question remains as to whether the virus dies out immediately or may survive in the body—whether it can enter into any reactions with nonnervous tissue, or is capable of conferring any immunity upon its host although the typical picture of clinical poliomyelitis does not appear.

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1 Brodie, M., and Elvidge, A. R., *Science*, 1934, **79**, 235.

2 Schultz, E. W., and Gebhardt, L. P., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 728.

Eight animals were prepared with very careful sections of both olfactory tracts. This was done by an approach through the medial wall of the orbit, well proximal to the olfactory bulbs. The olfactory tracts were delivered through a small slit in the dura and were cut, in most cases without blood loss or damage to the underlying frontal cortex. Most important of all, there was no disturbance to the nervous tissue or blood vessels of the olfactory bulbs, so that the fibrils of the olfactory nerves presumably maintained their normal relations within the nasal mucous membrane. The operated animals and normal controls were inoculated intranasally on 2 successive days with one cc. of a 10-20% suspension of monkey cord containing MV virus. The controls showed a febrile reaction in 3-7 days with paralysis in 7-12 days from the date of inoculation. On the other hand the operated animals remained unparalyzed, although 6 of them developed a marked fever at the same time as the controls. This reaction subsided in 3-6 days' time and the animals were again apparently normal. A second inoculation in 3 animals produced another febrile attack, while the remainder were unaffected by the virus. In all, the third inoculation was unaccompanied by febrile manifestations.

In contrast was another group of 5 monkeys in which both olfactory bulbs had been removed. The operation was accomplished by cutting away the bridge of the nose and exposing the bulbs without directly entering or disturbing the nasal cavity. Thus visualized the bulbs were cleanly removed by suction with minimal damage to the adjacent frontal poles of the brain. All the animals so prepared showed neither paralysis nor temperature rise after the introduction of virus suspension into the nose, although the controls again pursued the course typical of poliomyelitis.

The experimental evidence thus points to the olfactory bulbs as the seat of a virus reaction which duplicates the early stages of clinical poliomyelitis. Sections of the olfactory bulbs from animals showing a febrile reaction show definite traces of virus invasion-leucocytic infiltrations, particularly around blood vessels, and destruction of mitral cells. It thus seems possible to produce poliomyelitis in the isolated olfactory bulbs without resulting paralysis. A minute histological study of the noses and nervous systems of the animals which have survived inoculation is now in progress. Also under investigation is the possibility that an immunity may be produced by this means.