lowing the inoculation of massive doses of *Bacillus prodigiosus.* Our findings confirm Bertarelli's observations, and are of interest from two points of view, (1) that extensive hemorrhagic lesions and death of small laboratory animals follows the introduction of massive doses of an organism which in the ordinary sense is non-pathogenic. (2) When *Bacillus prodigiosus* is used as a test organism in filtration experiments, its presence in the inoculum after filtering through a leaky candle, might result in obscuring or even altering the experimental findings, since the organism itself has certain toxic properties.

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Structural Changes in Anterior Horn Cells Following Central Lesions.

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The rôle of the impulses which impinge upon the cells of the "final common pathway" in maintaining their normal functional and structural character has not been fully appreciated. Warrington[1] demonstrated that after section of the dorsal roots of the post-thoracic cord segments, anterior horn cells on the same side became structurally altered, some of them ultimately degenerating. Cells on the contralateral side were also observed to be effected in certain cord segments, apparently those concerned with crossed reflexes. These observations did not include studies of the anterior horn cells after their dissociation from impulses descending to them from higher centers. The evidence so far accumulated has not shown whether or not motor horn cells in the spinal cord are effected directly after decortication or section of the pyramidal tracts, or trans-section of the spinal cord. The following experiments were performed with this question in mind.

In the first series of 17 rats, unilateral section of the cortico-spinal tract on the base of the medulla was performed. The observations on the functional disorganization of these rats will be reported later. In a second series (10 rats) the dorsal roots of the fifth, sixth, seventh, eighth cervical and the first thoracic segments

[1] Warrington, W. B., *J. Physiol.*, 1898, **23**, 112.

were sectioned; one complete root was cut in each animal. In a third series of 4 rats, double trans-sections of the spinal cord were made, one at the level of the twelfth thoracic and the second at the level of the fourth lumbar vertebra. The dorsal root fibers of both sides entering this isolated segment of the cord were also cut. The vascular system was injured as little as possible. The animals of all 3 series were killed with ether between 15 and 20 days post-operatively.

Structural changes were observed in ventral horn cells only of the lower cervical segments of the animals in which one of the pyramids had been sectioned. This alteration was manifest by a swelling of the nucleus, and the collection of the chromatic material of the cytoplasm about it. In some instances, the nucleus had become definitely degenerate; in others, the nucleus had entirely disappeared and the cell was represented only by a hyaline mass. The altered cells in this first series were always few in number and confined solely to the side opposite the lesion.

Structurally altered and degenerate ventral horn cells were also found in the cords of those animals upon which rhizotomy had been performed. The degenerate cells were not confined to the segment supplied by the resected root but extended cranially and caudally into the adjoining segments. Cells on the contralateral side were also effected. They were located for the most part in the same segment.

The isolated segments of the cord, from which all of the segmental as well as descending impulses had been removed from the motor cells, showed complete degeneration. Both the motor horn and the internuncial cells were effected. Below the level of the second trans-section, the effected and degenerate cells were confined almost solely to the upper sacral segments. The mass of degenerating material represented by the ascending and descending fiber tracts may have been a mechanical factor which contributed to the extensive degeneration in this series.

These results demonstrate that following the section of dorsal roots or descending pathways of the spinal cord, anterior horn cells become structurally altered; some of them degenerate. In the rat, rhizotomy produces a much more extended degeneration than does a complete trans-section of the spinal cord in the lumbar region. The number of degenerate cells which appear following pyramidal section is not as large as that produced by cord trans-section. This fact may be associated with the limited function of the cortico-spinal tract in the rat.

These observations are quite in agreement with those of Warrington and are supported by the observations of Fulton and Keller[2] on the degeneration of peripheral nerves following trans-section of the spinal cord in monkeys.

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Observations on Effect of Repeated Administration of Nembutal in Guinea Pigs.

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The nembutal, sodium-ethyl (1-methyl-butyl) barbiturate, was dissolved in water and injected intraperitoneally into guinea pigs to see whether they had a tolerance for the drug. The animals were divided into 2 groups: (1) those receiving the drug twice weekly and (2) those receiving it daily.

The doses varied from 7.5 to 20 mg. per kilo body weight, but the dose for each pig remained constant. The minimum fatal dose (M.F.D.) was found to be 60 mg. per kilo. This amount killed 90% of the pigs.

To study the effects of the drug, the periods of time required for the development of 3 phases in the hypnotic state were selected: (1) the time from the injection until the animal could not move forward after painful stimulation (pinching); (2) the time from the injection until the animal could move forward after painful stimulation, and (3) the time from the injection until the animal could walk with a steady gait. The onset of sleep followed the first of these phases.

The weight of the animal greatly influenced the length of the hypnotic state, the heavier pig having the longer period of hypnosis, when the same size dose was given. There was, however, often considerable difference in the susceptibility of the individual animals which had approximately the same weight.

Injections of 25% of the M.F.D. of the drug induced sleep in about 65% of the animals. If this amount is given semi-weekly, the hypnotic effect, as judged by the failure of the onset of sleep,

[2] Fulton, J. F., and Keller, A. D., The Sign of Babinski, Springfield, 1932, 165.