replaces spinal substance and sclerosis is established. Specific treatment is only available in the earliest stage. No hope for cure follows softening. Softening is not followed by marked loss of substance as in the brain for the reason that extensive softening of the cord produces death. The circulation in the cord differs from that in the brain, in that the cord has no terminal arteries. The softened parts do, after a time, seem to regain their circulation, but this is due to the newly formed and dilated capillaries around the obliterated vessels. (Sottas was the first to describe this compensation). Other diseases than syphilis, notably tuberculosis, may produce similar spinal lesions. Many cases described as acute diffuse central myelitis, are undoubtedly cases of spinal softening. The symptoms are those of persistent chronic spastic paraplegia. F. P. N.

The Cerebellar Cortex of the Dog.—Henry J. Berkley (John Hopkins' Hospital Reports, Nos. 4, 5, 6, 1893).

The object of the investigation was to determine if the careful use of the ordinary methods of hardening and staining would not give a clearer insight into the structure of this most complex organ, than has been previously obtained, and though just published, the work antedates most of the results obtained by the silver method of Golgi.

The agents used for fixation purposes were chiefly Flemming's solution, Müller's fluid, and absolute alcohol; with safranin, carbolic fuchsin, Nissl's magenta, and various modifications of the Weigert hematoxylin methods for staining agents. Medullated fibres—in the central core of the leaflets, three varieties of medullated fibres are distinguished: (1) a series of apparently unbranched, non-varicose, straight medullated tubes, passing directly from the sides and apex of the core into the innermost pole of the Purkinje cell bodies; (2) a series of fibres passing from the core to the nighborhood of the eosin-cells of Dennissenko, which branch indefinitely between the groups of granule cells of the middle layer, forming an open network of anastomosing fibres with a complicated arrangement; (3) a class of fibres that after passing from the core through the entire granule zone, terminate upon the nerve cells situated in the inner third of the barren zone.

Around the capsule of the Purkinje cells is wrapt a network of fine medullated fibres, that are partly derived

from the association bundle which runs just without the "limitans interna," and as high as the middle third of the molecular layer, and partly from fibres that descend from that layer. Circular fibres are also found at the outer limit of the molecular layer, but in inconsiderable numbers. Scattered nerve cells, some equally large as the Purkinje, are found among the white fibres of the central core.

Granule zone. Within the limits of this zone six varieties of cellular bodies, exclusive of those appertaining to the blood vessels, are to be distinguished. The round or granule cells are most numerous, and occupy one-half of the layer. Then come four varieties of neuroglia cells, differentiated by their forms and reaction to staining agents. Neuroglia elements are comparatively infrequent, except along the outer margin of the layer, where they assume the importance of a double or triple row of pear-shaped cells, with their apices directed toward the barren layer.

An elaborate study is given to the so-called eosin-cells of Dennessenko which are described accurately for the first time. They consist of angular cells, very difficult to stain, and with peculiar relations of the plexus of anastomosing nerve fibres. These fibres always runs in close approximation to the granular body, but do not directly enter it, and thus a cell may be surrounded on all three sides by the medullated tubes so as to present the appearance of a blue-black triangle inclosing a brown centre (copper precipitate preparation). The fibres after passing beyond the body again join the network and proceed to branch indefinitely. Nowhere can any connection between the axis-cylinder and the granular cell be demonstrated, nor does the medullated sheath lose its contour (contra Beevor). Very fine grained processes extend from the poles of these cells in sharp contrast by their brown color with the medullated fibres. Considerable numbers of multipolar, bipolar and pyramidal shaped cells, as well as some much larger than the Purkinje, are found within the limits of the zone. Purkinje cells and molecular layer.—The Purkinje cells are found to be surrounded by numerous glia cells whose fibrils form an enveloping capsule of the finest feltwork. This capsule extends beyond the extreme limit of the inferior pole, and high up upon the protoplasmic arms of the cells. The encapsuling of the Purkinje bodies forms a lymph space which, for the barren layer taken as a whole, is of

stupenduous extent. Other description of the great cells does not differ materially from that already given by other writers (Obersteiner).

Beyond the Purkinje cell layer, extending as high as the limit of the inferior third of the molecular layer, lie considerable numbers of small, rounded and angular multipolar cells, with distinct protoplasm, large nuclei containing coarse grains, and well developed prolongations. The largest of these are 18x12 and are undoubtedly nerve cells. In their neighborhood, but peripherally, are numbers of still smaller cells with a relatively large nucleus, and ill-defined though present protoplasm. These do not belong to any of the glia types, and are almost certainly, like their larger neighbors, nerve cells. The fibres of the third variety of medullated tubes of the central core pass to these nerve cells, and are lost upon reaching them.

Neuroglia nuclei are sparingly distributed through the barren layer, the place of their supporting extensions being taken by the fibrillæ that extend from the "limitans externa" and its pial connections. A distinct arrangement of glia cells with fine tentacles is found along the outer margin of the barren zone, that are only to be seen in Nissl sections. Beyond this margin lies a sub-pial lymph space of considerable extent, and from the inner layers of the vascular pia, connective tissue threads extend into and through the molecular layer to the "limitans interna."

The article concludes with the statement, that the nerve elements of the cerebellum viewed as a unit bespeak a sensory and not a motor organ, and elaborates the likeness of the cellular bodies to certain other already ascertained sensory elements. Seven drawings accompany the paper. J. C.

An Investigation of the Structure of Spinal Ganglia.—Erik Müller (*Nordisk Medicinsk Archiv*, 1891, No. 26). The author has, by means of the isolation method and serial cuts, investigated the structure of the spinal ganglia in newly born and growing rabbits. He considers first the form and arrangement of the cells and shows in opposition to most authors that the cells, in young animals are not always isolated. Very often there were to be seen accumulation of cells, cell colonies which stood in close communication one with another, but which varied very much in their form and gross relationship. These colonies are in part regular, made up