IV.—Some General Considerations on the Structure of the Nerve Cells.

It may seem strange to revert to this subject, but owing to the fact that the Nissl granules were thought to be cytoplasmic structures, several views concerning the structure of nerve cells have been advanced that would not have been if the true nature of the granules had been known.

The first question is, whether the Nissl granules are formed elements of the cell body, or are precipitated while the cell is dying or when it is affected by the fixing agent. Held[82] accepts the latter explanation, as he claims to have seen fresh cells in which there were no granules but a homogeneous cell body. On standing for a few minutes the cells become granular, thus showing the granules were precipitated while the cells were dying. On adding water to the cells they become vacuolated, but the vacuoles would collapse on adding a fixing agent, thus leaving the granules around a vacuole. Held also believes that the granules are soluble in alkalies, and that the normal reaction of the nervous system is alkaline, but it becomes acid shortly after death, and that this is the reason the cells contain vacuoles in tissue hardened in alkaline alcohol.

v. Lenhossek and Flemming say the granules are visible in the fresh condition shortly after death. Each animal has a typical form of granule in the spinal ganglion cell, whatever fixing fluid has been used, which could not be if the granules were precipitated either in dying or with the acid reagent.

Bühler maintains that the granules are not seen in a fresh state, or even in a fixed condition, but this is no argument for their non-existence in the living cell, for the nucleus is often invisible in a fresh state.

Ruzicka believes the granules are only due to differentiation in staining, because if you overstain you do not see them, and if you extract too much they are invisible.

I agree with Held and Bühler that these granules are invisible in a fresh condition, and with Bühler also that the granules are hardly visible as such in the fixed cell. If one examines an unstained section of a spinal

82 L. c., 1895.