all animals and in well-stained sections is easily observed. Vacuoles are also quite frequent in the nucleolus, a fact which has attracted the notice of several observers. That this is quite correct is shown by the action of alkalies or of digestive fluids on the nucleolus. The action of digestive fluids in sometimes leaving a shell of undigested material has been referred to, but the effect of alkalies is more convincing. Held found that after prolonged treatment in the alkali the nucleolus no longer stained with methylene blue, and he thought that this showed that the nucleolus was formed of fine grains embedded in a ground mass. Alkalies have an altering action on the nucleolus similar to that on the Nissl granules but the action must be prolonged. If tissue which has been fixed in sublimate is used the action is very slow and one can often find the outer covering of the nucleolus broken, between the portions of which the oxyphile centre may be seen. This structure can be seen in sections stained with eosin and toluidin blue, or in iron-alum hæmatoxylin, but the clearest way of demonstrating it is the gold method of Apathy.[49] Figs. 9 and 10 are the nuclei of cells that have been treated with potash and then stained with this method. The oxyphile centre can be seen between the pieces of the basophile covering which has undergone fragmentation.

The above considerations render it clear that there are at least three distinct nuclein compounds in nerve cells, the Nissl granules, the basophile covering of the nucleolus and the oxyphile nuclear substance. Each of these bodies contains iron and phosphorus, the usual constituents of many nucleo-proteids. Van Gehuchten[50] and Cajal[51] believe the nuclein is condensed into the nucleolus, while v. Lenhossek maintains that the nerve cell does not contain true nuclein or chromatin. There seem to be many different nuclein compounds in different cells, but we shall see that for the nerve cells these different nuclein compounds are genetically related, and that intermediate substances are found in the nerve cells of different animals.

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49 Apathy, Stefan, "Das leitende Element des Nervensystems, etc," Mitth. aus der Zool. Station zu Neapel, XII, p. 495, 1897.

50 Gehuchten, A. van, "L'anatomie fine de la cellule nerveuse,' La Cellule, XIII, p. 313, 1897.

51 Cajal, S. R., Revisto Trimensal Micrografica, 1896. (Original inaccessible, quoted from van Gehuchten).