and obliteration of the vessels consequent on, defective capillary circulation, arising from imperfection of the respiratory movements.

5. Tubercles are composed of metamorphosed organized elements—a metamorphosis co-ordinate with the fatty and the waxy degenerations. This is the opinion of Virchow. His views are developed at some length in the papers placed at the head of this article; and as they contain much that is peculiar and novel, we shall enter into them somewhat fully.

To do justice to the opinions of Virchow, we shall first describe what we understand him to mean, and then give his own summary of his opinions in the words he has himself used in one of the papers above mentioned.

A tubercle is composed essentially of dead tissues, the death of the part being occasioned by the accumulation of cells amid its vessels, and consequent compression of those vessels, and cessation of the circulation through them. The cells which thus play so important a part in the formation of tubercle may have their origin,—

1. In the physiological cells of a structure or organ. The mode in which the increase in these cells takes place may, he says, be exquisitely perceived in the lungs. The first step in the tuberculous metamorphosis in these organs is an increase in the epithelium of the air-cells by endogenous formation. "I have seen," Virchow says, "cells with five large, oval, granulated nucleolated nuclei." Subsequently the "cells fall to pieces, a granular detritus is left, in which the nuclei remain for some time as shrivelled, irregular, opaque bodies, finally these also crumble, and an entirely amorphous, finely granular mass remains behind." It is these nuclei, shrivelled, irregular, and opaque, which, in Virchow's opinion, constitute the tubercle-corpuscles described by Gluge and Lebert. "*They are not*," he says, *exudation corpuscles*." "The peculiarity of the local process lies in the tendency of the organization, and by no means in a peculiar exudation." In *lymphatic glands* affected with so-called scrofulosis, there is hypertrophy of the elements of the part through indogenous nuclei formation. The cells enlarge to five or six times their normal size, and as many as twelve pairs of nuclei may be seen in the same cell. The nuclei probably increase in number by cleavage into pairs. What share an exudation takes in this change, Virchow says, he "cannot decide." Still he maintains that tubercle is not developed exudation, but merely metamorphosed pre-existing tissue-elements—elements to which, in their primary state, the name of tubercle could not be applied; and that, consequently, the tuberculous metamorphosis is not the mark of a specific process of a particular constitution.

2. The cells by the accumulation of which the vessels are compressed and death of the part produced, may have their origin in the endogenous development, or in atrophy of the cells of cancer, pus, or typhous matter, but not in their simple desiccation.

3. These cells may be developed in the fibrine poured out in what is termed tuberculous inflammation. Is the tubercle here formed directly of inflammatory exudation-matter? Virchow says, No: the whole mass of fibrine passes on to organization; but while "one part developes itself into uniting tissue and vessels, another forms nucleated and cellular formations, which rapidly increase by endogenous growth, so that their number at some points is very great, and the amount of the endogenous nuclei is occasionally even colossal." The subsequent steps of the process—*i. e.*, death of the part, disruption, atrophy, shrivelling, desiccation of the cells, are the same in all three cases.

But although all pathological and all physiological cell-growths may thus tuberculize, yet there is a local process which leads to the exudation of a material, the cells resulting from the development of which, whether they be physiological or pathological, so constantly tuberculise and lead to local death, that this may be said to be the ordinary termination of the process. This process, in the phraseology of Virchow, is tuberculosis; while scrofulosis is used by him to signify the constitutional state in which tuberculosis occurs.