

History school, taught that disease was an entity, a sort of parasite sojourning temporarily in the body, just as Paracelsus had once spoken of "a microcosm within a microcosm." Schonlein, more specifically, looked upon disease as a sort of equivocal infusoria, the existence of which he logically predicated, but never, of course, physically demonstrated. These infusoria, the existence of which were thus gratuitously assumed, were easily enough imagined to consist of genera and species, each producing different clinical phenomena—a sort of empirical prophecy of the germ theory which has since played so important a role in medical philosophy. It was against such theoretic doctrines, then dominant, that Virchow brought the evidence of the microscope and the revelations of the mortuary. He began in the truly scientific manner, which consists always, first in the observation of concrete facts, next in their classification, and third in their ultimate generalization. His labors at Wurzburg, supplemented by those conducted under more favorable auspices after his return to Berlin, enabled him to announce, as the seminal doctrine of his philosophy—and I employ the words he subsequently used at the Fiftieth Congress of Naturalists and Physicians—namely, that the new science was based "chiefly on the recognition of the fact that the cell is actually the ultimate, proper morphological element of every vital manifestation, *omnis cellula e cellula*, and that we must not remove the proper action beyond the cell." In the early elaboration of this doctrine, taking up the work where Schwann and Schleiden had left it, he proclaimed the importance of the nucleus to the maintenance and multiplication of the cell, and emphasized the fact that tissue growth implies cell multiplication, while the contents of the cell, and even the material deposited outside of it, are of controlling importance to function. He taught, furthermore, and as a necessary corollary of the preceding postulates, that tissues vary in function according as they vary in cellular construction. He insisted upon the existence of an inter-cellular tubular system that supplemented the recognized circulatory systems in the work of ultimate nutrition. As a result of his investigations of the circulatory apparatus and of the blood he taught that the walls of the blood vessels were impervious, and argued that blood, or even the nutrient elements of the blood, could not escape from them without rupture of the walls, which rupture was, however, rarely, if ever, demonstrable. It would seem that in this doctrine, which I believe is as near an approach to empirical dogmatism as could be found in all his teachings, Virchow laid a logical foundation for the new doctrine of Osmosis that to-day promises to take both physiology and pathology largely into the realm of physics. He directed his arguments speci-