hours has taken to itself all the protoplasm, secreted a dense envelope, and is a ripe ovoid spore, smaller than the mother-cell, and lying loosely in it (*cf*. figs. 9, 11, and 12). In the case of the simplest and most minute Schizomycetes *(Micrococcus,* &c.) no definite spores

have been discovered ; any one of the vegetative micrococci may commence a new series of cells by growth and division. We may call these forms “ asporous,” at any rate provisionally.

The spore may be formed in short or long segments, the cell-wall of which may undergo change of form to accom­modate itself to the contents. As a rule only one spore is formed in a cell, and the process usually takes place in a bacillar segment. In some cases the spore-forming protoplasm gives a blue reaction with iodine solutions. The spores may be developed in cells which are actively swarming, the movements not being interfered with by the process (fig. 5, D). The so-called “Köpfchenbacterien” of older writers are simply bacterioid segments with a spore at one end, the mother cell-wall having adapted itself to the outline of the spore (fig. 5, F). The ripe spores of Schizomycetes are spherical, ovoid, or long-ovoid in shape, and extremely minute *(e.g.,* those of *Bacillus subtilis* measure 0·0012 mm. long by 0·0006 mm. broad according to Zopf), highly refractive and colourless (or very dark, probably owing to the high index of refraction and minute size). The mem­brane may be relatively thick, and even exhibit shells or strata.

The germination of the spores has now been observed in several forms with care. The spores are capable of germination at once, or they may be kept for months and even years, and are very resistent against desiccation, heat and cold, &c. In a suitable medium and at a proper tem­perature the germination is completed in a few hours. The spore swells and elongates, and the contents grow forth to a cell like that which produced it, in some cases clearly break­ing through the membrane, the remains of which may be

seen attached to the young germinal rodlet (figs. 5, 9, and 11); in other cases the surrounding membrane of the spore swells and dissolves. The germinal cell then grows forth into the forms typical for the particular Schizomycete concerned. @@1

*Pleomorphism.—*As already stated, some Schizomycetes have been shown to present as vegetative forms, or phases in one and the same life-history, “ cocci,” “ bacteria,”

“ leptothrix-filaments,” and even spiral and curved forms known as “ spirillum,” “ vibrio,” «fcc. On the other hand, several Schizomycetes which have been long and diligently investigated by the best observers show no such pleo­morphism. As examples of the latter we may select *Bacillus megaterium* (fig. 9) and numerous *Micrococci* which produce similar cells generation after generation. A remarkable example of a pleomorphic form is *Clado- thrix dichotoma* (fig. 16). According to Zopf this species passes successively through the stages known as “coccus,” “ bacterioid,” “ bacillar,” and “ leptothrix,” by mere elongation and division by transverse septa ; the observer named declares that these

simple filaments have formerly received generic and specific names *{Leptothrix parasitica*

and *L. ochracea,* Kiitz.). Certain of the threads then partially break up, and the portions become slightly dis­placed from the linear series ; these portions go on growing in a direction at an angle with the previous one, but still in contact, and thus produce the “false-branching” to which *Cladothrix* owes its name. Finally the filaments break up into segments corresponding with the septa which have been formed across them. This fragmentation is peculiar in that the filaments separate first into shorter filaments, then into rodlets, and finally into “cocci.” Portions of the filaments or branches may become separated and travel with a gliding movement, or even become more active and swarm by means of cilia. Such portions may break up into shorter filaments or rods which also

@@@1 Cohn, *Beiträge zur Biologie,* passim ; Zopf, *Die Spaltspilze,* 3d ed., 1885 ; De Bary, *Morph, und Biol. der Pilze,* &c., 1884, and

*Vorlesungen über Bacterien,* 1885. The enormous and scattered literature on the morphology of Schizomycetes is collected to a great extent in the works cited.