Experiments in view of determining which group in the molecule is actually responsible for this specific activity are under way, and other diazo- and azo-compounds are being tested in this respect.

The study has not progressed to a point where it is possible to discuss the chemical relationship between the synthetic spreading factor and the biological one obtained from certain tissues and from invasive bacteria. As far as can be judged, their activity in increasing tissue permeability and enhancing infections is identical, and no other chemicals have been found which bring about these results. Recently a crystalline product has been obtained from testicle extract and from *Staphylococcus aureus* extract. In the latter this product is comparatively easily isolated, and even after five consecutive recrystallizations it retained the typical spreading and enhancing properties. The chemical constitution of this material is being investigated.

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A PHYTOPHTHORA DISEASE OF SNAPDRAGONS

DURING March, 1932, a wilt disease of snapdragons appeared in several greenhouses near San Leandro, California. Approximately 50 per cent. of the plants were either killed or so badly injured that they were of no commercial value. As a result of the damage done by this disease several thousand dollars' worth of flowers were destroyed. The grower was not familiar with the trouble and had no conception of what was doing the damage. He thought it might be due to improper soil or water conditions. The disease was found in all parts of the affected houses. Plants were observed in all stages of infection ranging from those on which a few stem branches were wilted to those which were browned and drying up. A careful examination showed that the outer tissues at the bases of the stems and on the larger roots were decayed. On a good many of the plants the cortical tissue was so badly decayed that it had become separated from the plant, resulting in the wilted condition. On some of the plants only a very narrow band of living tissue on one side of the stem was keeping the plant alive. The lesions were found at the ground line or beneath it. They ranged in color from a very light yellow to a deep brown. Affected tissue appeared at first to be water-soaked. As the disease progressed the lesions became sunken, followed by sloughing off of the outer tissues, thus eliminating all the growing part of the plant stem. On a few of the plants the fungus was observed attacking branches several inches above the surface of the soil, but this occurred only when the plant stems were very wet.

Isolations were made from tissues and three organisms were found; a bacterium which produced a yellow culture, a fungus *Cephalosporium acremonium* Corda, and a Phytophthora which has been tentatively identified as *Phytophthora cactorum* (Leb. and Cohn) Schrt. These three organisms were repeatedly isolated from diseased tissue both separately and together in mixed cultures. A pure culture of each organism was used to inoculate plants under greenhouse conditions. Snapdragon plants were grown from seed in sterilized soil until they were near the blooming stage. They were inoculated with cultures of the fungi which were grown on corn-meal and sand and with a spore suspension of the bacterium. Inoculations were so made that each organism was placed on plants alone and in combination with the other two. As a result of these inoculations it was found that only the Phytophthora was pathogenic on the snapdragon plants. Neither the Cephalosporium fungus nor the bacterium gave any indication of being pathogenic. All the plants exposed to the Phytophthora fungus wilted down within two weeks of exposure and showed symptoms identical with those noted in the greenhouse at San Leandro. The Phytophthora fungus was reisolated from all the inoculated plants which became diseased. Tissues from the diseased plants were fixed, sectioned and stained. A study of these slides shows that the fungus belongs to the *Phytophthora cactorum* group of Phytophthora. Studies are now in progress covering the growth of the fungus on various kinds of media. An effort was made to trace the source of the infestation in the greenhouse. It was found that one of the sources of the water in the greenhouse was contaminated and also the compost soil used by the grower was infested. The disease was entirely eliminated during the past winter season by using clean water and sterilizing all soil from the compost pile. Work on this problem is continuing and a more complete account of the study will be given in a later paper.

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