sation of treatment). In none of the remaining tests (28) did indications of estrus appear, although some animals were subjected to repeated courses of injection.

From the quantitative standpoint, therefore, the results were negative, and similar to those previously obtained[22] in tests of adrenal extracts on ovariectomized rats. In the latter experiments the estrous type of smear appeared in about 30% of cases, although the results were statistically negative. It is concluded that cortico-adrenal extracts of known life-maintaining potency possess no estrogenic value when administered to completely hypophysectomized rats.

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Non-specificity of Orchid Mycorrhizal Fungi.

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While isolating the mycorrhizal fungi from various species of native Wisconsin orchids, several features were noted which are at variance with the usually reported results of European investigators concerning the specificity of mycorrhizal infections. Thirty-three isolations have been made from temperate species, of which at least 16 are morphologically different. All of the strains* possess typical Rhizoctonia "spore-forms" as described by Bernard[1] for fungi from tropical and European orchids. One also has a perfect stage with basidia, but its exact taxonomic status has not yet been determined.

There is an apparent correlation between ecological habitat and fungus type, rather than between orchid species and fungus. For example, *Habenaria leucophaea* from a tamarack-sphagnum bog was infected with a different strain of Rhizoctonia from that found in the same orchid growing in an open prairie. The two fungus strains differed markedly in spore size, growth characteristics and physiological properties. On the other hand, 4 other orchid species from the above sphagnum bog, *Habenaria dilatata, H. hyperborea,*

[22] Corey, E. L., and Britton, S. W., *ibid.*, 1934, **107**, 207.

* The word "strains" is here used to denote cultures differing markedly in both morphological and physiological characteristics.

[1] Bernard, Noel, *Ann. Sci. Nat. Bot.*, 1909, **9**, 1.

H. lacera, and *Pogonia ophioglossoides,* were all infected with a fungus strain morphologically identical with that from the bog *H. leucophaea.* In another instance, 3 widely separated orchid species, *Goodyera pubescens, Habenaria psycodes,* and *Liparis liliifolia,* growing in and on the sides of a rocky pine-covered ravine, all contained the same fungus.

The extent of this non-specific infection is seen in the number of distinct strains found in the same orchid species from diverse localities in Wisconsin. Thus 3 Rhizoctonia strains were isolated from *Spiranthes cernua,* 3 from *Pogonia ophioglossoides,* and 4 from *Habenaria leucophaea.* Perhaps the most significant finding was the growth of 2 entirely different strains of Rhizoctonia from opposite ends of the same root piece of *Habenaria leucophaea* on the isolation plate. In one the diameter of the hyphae and "spore-cells" was 4 times that of the other, while the form and number of the "spore-cells" was also distinct. In addition to these cases where morphologically unlike fungi were found in the same orchid, strains exhibiting marked physiologic differences also occurred. Thus 2 microscopically similar strains would often possess distinct carbohydrate and nitrogen requirements, and would produce different Eh and pH changes in the medium.

These observations appear to conflict with the assumptions of Bernard[1] and Burgeff,[2] who held that each orchid species or group of related species contained its own specific mycorrhizal fungus, which was intimately concerned with the physiological well-being of the plants and with the germination of the seeds. These observations seem rather to uphold the theory that the orchids may be infected by any mycorrhizal Rhizoctonia present in the surrounding soil, and that the character of the fungus is determined more by the nature of the ecological habitat than by the species of the orchid.

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[2] Burgeff, Hans, *Samenkeimung der Orchideen,* Jena, 1936.