might be anticipated if primary implantation in the epithelial cells were the first step of the infective process. The findings are also inexplicable on the basis of early viremia.

Proof of the negative is always difficult, but it is a good general rule to give preference to explanations for which there is sound positive proof. In the case of poliomyelitis, neurocytotropism and axonal conduction of the virus *in vivo,* which have been proved beyond reasonable question (*11, 12*), provide an adequate explanation of the essential characteristics of the disease, whereas the theory of extraneural affinities, although revived periodically for several decades, remains without factual proof and only serves to becloud the pathogenesis of the disease.

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Fissidens pauperculus Howe and *Orthodontium gracile* Bruch & Schimper: Mosses Associated with the Coast Redwood Forest

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The geographical distribution of mosses appears to correspond closely with that of conifers in California. This hypothesis was first formulated by the writer (*1*) as a result of comparing the known distributional patterns of mosses with the units of various systems of classifying vegetational units pertaining to California. At that time a distribution pattern among mosses identical with the coast redwood forest was unknown, although known stations for *Fissidens pauperculus* and *Orthodontium gracile* were recognized as restricted to redwood areas (*2–4*).

With these facts in mind, the writer initiated a study of the bryophytes of the coast redwood forest, supported by a postdoctoral fellowship for the academic year 1950–51 from the Horace H. Rackham School of Graduate Studies at the University of Michigan.

The known range of the coast redwood is from Curry County, Ore., southward in the coastal counties of California to Monterey County, covering an area roughly 450 miles long and averaging 25 miles wide (*5*).

F. pauperculus was originally discovered in Marin County near Mill Valley in 1893 (*6*) and was not rediscovered until 1947 (*3*), when it was found near Larkspur and on Mount Tamalpais in Marin County, and also in the Big Basin Redwood State Park in Santa Cruz County (*4*). It has been listed as one of 16 mosses endemic to California and Baja California (*7*).

O. gracile was also first found in California by Howe, who found it on a redwood stump near Eureka, Humboldt County, in 1896 (*8*). In the same year Howe also found it in Mendocino and Sonoma Counties (*2*). In 1906, H. B. Humphrey collected it on King Mountain in San Mateo County. The writer found the moss in the Big Basin Redwood State Park in Santa Cruz County in 1947 (*4*). *O. gracile* has an interesting history in Europe (*9*), where isolated stations in Great Britain and France are known.

In September 1950, the author[2] visited the Chetco River Redwood Park in Curry County, Ore., and discovered both *F. pauperculus* and *O. gracile* there. This northernmost remnant of redwood forest is in grave danger of losing its vegetational character because of indiscriminate lumbering in the immediate vicinity.

The coast redwood forest has its farthest inland station on Howell Mountain in Napa County, where it grows in stream canyons. *F. pauperculus* was found there in Wildcat Canyon on the property of W. L. Wright, but *O. gracile* was not seen. If the latter species no longer grows on Howell Mountain, the thorough disturbance of the area by owners and Boy Scouts is no doubt a contributing factor.

Recently the Big Sur Redwood State Park in Monterey County was visited, and collections of both mosses were made in the park. Both species have been found to be abundant in the Armstrong Redwood State Park and in Russian Gulch in Sonoma County. Undoubtedly they will also be found in the remaining unexplored areas in which the coast redwood predominates.

The remarkable parallel distribution of *F. pauperculus* and *O. gracile* with the coast redwood appears too exact to have been the result of chance. Both ecological and historical factors are probably involved. The writer has previously (*1*) postulated a closer correspondence between the distribution of bryophytes and conifers than between either of these groups of plants and flowering plants. It was suggested that the common antiquity of bryophytes and conifers, when compared to flowering plants, may

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be a contributing factor. According to the literature reviewed by the writer, there appear to be several additional instances of marked similarity between the distribution of certain mosses and conifers, but these have not been verified in the field.

Voucher specimens for the new stations of both species in the coast redwood forest will be deposited in the Herbarium of the University of Michigan.

The parallel geographical distribution in California and Oregon for the coast redwood and two mosses *F. pauperculus* and *O. gracile* is considered to be evidence for the previously formulated hypothesis that there is a close correspondence between the distribution of many mosses and conifers. The occurrence of *O. gracile* in isolated stations in Europe may be explained on the basis that mosses, because of their small size, may survive in microhabitats in areas where larger plants of similar ecological amplitude or tolerance (*10*) are unable to exist. The principle of microhabitats (*11*) promises to be of far-reaching significance in the study of the distribution of the smaller terrestrial organisms.

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Skeletal Muscle Changes in Scurvy with a Note on the Mechanism of the Attachment of Myofibrils to Tendon[1,2]

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It has long been known that degeneration of striated muscle is common in scurvy. Hyaline degeneration and fragmentation of the fibers, with great proliferation of nuclei are usually described. Dalldorf (*1*) noted that these changes varied with the degree of muscular activity and regarded them as part of the scorbutic syndrome, but Aschoff and Koch (*2*), Goettsch and Pappenheimer (*3*), and Wolbach (*4*) did not consider them to be specific to this disease. Others (*5–7*) have also described these changes in scurvy. Murray and Kodicek (*8*) studied guinea pigs who were receiving suboptimal doses of ascorbic acid, and whose fibulas had been fractured. The fibers of the adjacent muscles degenerated, and the sarcoplasm and myofibrils were removed by invading wandering cells. This phenomenon was interpreted as due to an increased degree of susceptibility to injury of the muscle of animals on diets deficient in ascorbic acid.

Fig. 1. Longitudinal section of thyroarytenoid muscle of guinea pig #25, which was on the scorbutigenic diet plus 0.5 mg ascorbic acid daily for 77 days. This and other sections were stained with hematoxylin and eosin. This section shows normal fibers and those in the early and late stages of hyaline degeneration, with much nuclear proliferation. × 400.

In the course of an investigation of the bones and teeth of scorbutic guinea pigs, the present writers noted that the hyaline and proliferative changes described by the above-mentioned workers occurred frequently in the muscles around the knee joint, ribs, scapulas, and tracheas of animals receiving suboptimal doses of ascorbic acid for long periods (Fig. 1).

In acute scurvy, hyaline degeneration of these muscles was much less common. The finer structure of the muscle fibers became prominent, showing clearly the myofibrils and cross striations. The sarcoplasm seemed to be reduced in amount. Finally the fibers pulled apart. Nuclear proliferation occurred but to a less degree than in chronic scurvy (Fig. 2).

The changes in the muscles around the temporomandibular joints differed in both chronic and acute scurvy from those described above. Hyaline changes were only occasionally observed in chronic scurvy. In acute scurvy, areas were found where the muscle fibrils and sarcoplasm were seen to end suddenly, leaving intact and empty sarcolemma sheaths between

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