and at greater depths none came through.

While surface seedings may be successful on pulverized soil the Green Section has found that they do not succeed on established turf. In that case the surface is not loose and open, and rolling has no effect in covering the seed as it does on loose open soil. Experience on the Arlington turf gardens has taught us that when seedings are made on established turf without further treatment the seed is often washed off the small bare areas and into the surrounding grass clumps.

BERMUDA GRASS TURF FROM SEED

In connection with the problem of establishing meadows and pastures of Bermuda grass in Arkansas, the factors involved in the establishment of this grass from seed were studied in nursery strips at the Arkansas Agricultural Experiment Station by E. L. Nielsen. For three successive years from 1938 to 1940, inclusive, he seeded well-prepared and leveled soil at the rate of 5 pounds to the acre at weekly intervals over the 14-week period from the last week in March to July 1, at 0-, ⅛-, ¼-, ⅜-, and ½-inch depths. The aim was two-fold—to determine the most favorable depth of planting and the climatic conditions necessary for the development of the best stand of grass. Hulled commercial Bermuda grass seed harvested in Arizona with an average purity of 93.9 percent and 86.6 percent germination was used for all the experimental seedings.

From the data presented in the Arkansas Agricultural Experiment Station Bulletin No. 409, Nielsen concludes that "seeding should not be made before a mean daily temperature of 65° F. is attained. Lack of sufficient moisture or low temperatures retarded seedling emergence and stolon development. Heavy rains retarded seedling emergence regardless of prevailing temperatures. Relatively high mean temperatures and sufficient available moisture favored rapid stolon development." Results also indicated that seed should not be covered to a depth of more than one-half inch.

Data were also accumulated indicating the importance of such factors as weed competition and winter injury on the establishment of Bermuda grass turf from seed. Isolated plants were rather easily killed as a result of the heaving of the soil in the winter, either following seeding or sodding. In areas where a definite sod had been established, however, there was little winter injury.

All of these plantings were made

in 8-foot nursery strips or approximately 100-square foot plots. The author is desirous, therefore, that the results be considered as preliminary and merely a basis for more extensive field tests.

A DISEASE AFFECTING THE GERMINATION OF PERENNIAL RYEGRASS SEED

It has been noticed repeatedly by the official seed-testing service in New Zealand that occasionally the crop of perennial ryegrass (*Lolium perenne*) seed has exhibited phenomenally low powers of germination. This has been particularly striking when wet weather prevailed between the time of flowering and harvest. Italian ryegrass (*Lolium multiflorum*) is also affected at times, but to a lesser extent.

It was previously thought that perhaps this low germination was the result of defective fertilization due to excessive moisture. Recently, however, it has been shown that the low germination of otherwise apparently sound, well-harvested seed is caused by a disease-producing fungus. J. C. Neill and E. O. C. Hyde, in discussing the disease in the New Zealand Journal of Science and Technology, proposed the name Blindseed disease. According to them, the disease has been found in every seed-producing district in New Zealand and in samples of perennial ryegrass seed grown in England, Scotland, Wales, Ireland, Sweden, Tasmania, and Victoria.

The affected seed is outwardly indistinguishable from healthy seed, and, although heavily infected, a sample of seed may appear plump, bright, and of good bushel-weight. It is only when the seed is tested for germination that the presence of the disease can be detected in the mature seed. It can be detected shortly after cessation of flowering, by careful dissection of the florets, which reveals a colorless or pinkish slime surrounding the immature seed. This cannot be observed after drying takes place.

Field experience supports the idea that true perennial ryegrass is highly susceptible and Italian ryegrass is almost immune. The authors suggest that this may be associated with the fact that Italian ryegrass flowers later than the perennial ryegrass and after the main discharge of the spores of the fungus. Experiments are in progress to determine relative susceptibility and immunity of a range of hybrids and of strains of true Italian and perennial ryegrass.

The fungus is described, but has not as yet been named, except that it has been placed provisionally in