Another important phase of our investigations deals with the

WINTERING OVER OF THE RED STAGE OF STEM RUST

The germination was tested of the red spores of stem rust on wheat, that had overwintered. The first test of spores from wheat wintered under natural conditions at Saskatoon, gave a very low percentage of germination, less than 1 per cent. Tests on April 4th, with spores from wheat wintered at Rosthern gave negative results, though spores from beneath the sheath of barley gave a germination of about ½ per cent.

Extensive tests about the first of May, of spores from unthreshed wheat sheaves left out during the winter at Sintaluta, gave negative results. Wheat seedlings were also inoculated with similar spore material, with negative results.

In the spring and early summer, susceptible grasses were carefully observed by the field men for the first appearance of stem rust. If the rust lives over in the grasses by myselium or spores, it was thought that rust would appear on them first. Observations have been continued for a number of years, and every season rust was collected first and in a more advanced stage on wheat than on grasses. This year, however, the first collection of stem rust in Saskatchewan, except that which could be directly traced to the barberry, was made at Rouleau in Southern Saskatchewan. This infection was on the common wild barley grass (*Hordeum jubatum* L.). It was rather severe, and indicated that rust had been present for some time. The infection was very local. No barberries could be located in the vicinity, nor could rust be found in the neighbouring wheat fields. The early appearance of rust on wild barley and its severity at the time of collecting, suggested the possibility of wintering-over on that grass, but infection may have come from wind-blown spores, as the rust was in a more advanced stage on wheat further south, though not prevalent. Two days later a few pustules were collected at Estevan which showed winter spores.

These remarks may suffice to indicate to you the highly intricate and diverse nature of these investigations, only the principal ones of which, among many others, have been mentioned. Other phases of grain disease investigations are carried on, but are not pertaining to grain rust especially. It is hoped, however, that I have conveyed an idea of the vast amount of data that must be taken every year, to be confirmed year after year, until we have really accomplished something of value. There cannot be any doubt that an increase in staff and provision of better facilities will materially aid in securing more immediate results.

The Experimental Farms system further maintains a number of small laboratories devoted to grain disease research:

(1) At the Experimental Farm, Indian Head, a small and—for winter work—quite inadequate laboratory is provided, but one of the absolutely necessary essentials, viz., greenhouse accommodation, is lacking. Hence the plant pathologist stationed there must be moved during the winter months to Saskatoon, with the result of crowding of space in that laboratory. Besides supervision of field experiments on grain rust and smut of grain, the officer in charge specializes in the study of foot rots of grain. He for instance determined the presence of "Take-all". Exclusive of initial equipment and cost of building, this laboratory is maintained on $4,625 per annum, including the salary of one plant pathologist, comprising the whole staff.

(2) At the Experimental Farm, Brandon, Man. What has been said of the Indian Head accommodation is even more true of Brandon. The accommodation is merely suited for summer work. The officer-in-charge specializes in the bionomics of smut diseases, which includes field experiments on their control by the most up-to-date methods, including the new dust treatments. A systematic study of the factors determining resistance to smut diseases is also carried on.