heats, the heating of the non-grain material will provide favorable conditions for the growth of molds and other damaging micro-organisms which injure the grain.

Grain may be damaged for seed probably long before it reaches the bin. This will be especially true of grain threshed from the swath or shock where sprouting has taken place. Such grains may be sprouted before it gets to the bin and hence will not show a normal germination percentage.

We are not likely to see a lot of dark red kernels this year. Many kernels of grain have been bleached or discolored. That damage which may be slight in character may not have any real effect upon the germination, but organisms causing blights and rots may be coating the kernel and yet you can't see them at all.

Warning No. 4

Treat all grain next spring for control of diseases carried on the seed. A lot of the blights and rots as well as the smuts are carried on the dry seed. North Dakota Agricultural Experiment Station Circular 69 describes suitable seed treatments for wheat, oats, barley, flax, emmer, and millet. Seed treatment will not eliminate all blights and rots from next year's crop because the soil may be infected. Seed treatment does insure a better start for the seedling.

Warning No. 5.

Because of the extensive wet fall one may hesitate to try to plow heavy clay soils and may be tempted to wait for spring plowing. Even though the fall plowing may leave some of the soil in bad physical condition, the freezing and thawing which takes place in the spring will provide a better condition than will working down a spring plowing of heavy clay soil.

Warning No. 6.

Wet weather means weeds, all kinds of weeds, old enemies like perennial sow thistle and Canada thistle will appear in larger numbers than they have in the dry years. With the shortage of labor, plants have been allowed to go to seed when they might have been mowed had labor been available. Weeds have stolen a march on us during the war and we are going to have to bring up reinforcements promptly to tackle these weeds. Some of the land needs a rest and while it is resting it is a good time to kill weeds.

Flax, Wheat and Chromosomes

L. R. WALDRON

WITH the Invention of the Compound Microscope man found a new world, a world of the very small. This new world does not get simpler as it gets smaller—perhaps the contrary. Both plants and animals are found to be composed of cells. The average human being is said to be made up of something like 1000 billion cells. Each cell is so complicated scientists have yet only a meager knowledge of its structure. An interesting set of gadgets practically always present in each young cell are the chromosomes or colorbodies, which are of the highest importance in the life history of the plant or animal for they bear the heritage of the race. Each chromosome in a cell has its mate with which it pairs each time the cell divides. At the time of reproduction of the plant or animal the number of chromosomes is halved in each sex cell so then it has half the normal complement. Then when the male cell unites with the female egg cell the fertilized egg regains the normal number of chromosomes and proceeds to develop a new organism generally much like the parent average. Changes within the cromosomes and changes of the chromosomes themselves furnish the

main method, it is believed, whereby the higher organisms, plants and animals, have developed from simpler ones. These chromosomes and their contents, in fact, furnish the basis of evolution, the development of our whole organic world.

So much preliminary to a recent study made upon the chromosomes of the flax plant by Charles Ray, Jr.[1] The cultivated flax plant has 15 pairs of chromosomes or 30 total in each cell. And so each ripe pollen grain has 15, and each flax egg has 15, chromosomes. The fertilized egg thus has 30 chromosomes and this continues in all the cells as the plant grows.

Most of us know flax only from the cultivated kind which certainly shows much variation among the different varieties. It is surprising to learn that there are about 100 kinds or species of flax in various countries. There are about 25 species of wild flax in this country of which three are found on the prairies of North Dakota. Our cultivated flax, as stated, has 30 chromosomes (15 pairs). The wild Lewis flax of North Dakota, with blue flowers, has 18 chromosomes, 9 pairs. In his report on 36 flax species, Ray judged that half of them carried 18 chromosomes while 8 flaxes had 30. It is possible sometimes to see how species may have arisen from more primitive plants by chromosome studies but not much was revealed by the work done by Ray.

From a study of the chromosomes of common wheat it appears that this most valuable food crop likely arose from a cross, probably a natural one, between an emmer-type wheat and a wild grass related to the wheats, later to be improved by selection and crossing through thousands of years to form our fine wheats of today. Common wheat has 42 chromosomes, 21 pairs, which makes a complicated system. Very recently Sears[2] of the Missouri Experiment Station has constructed a "common wheat" by crossing the "timopheevi" wheat (an emmer with 28 chromosomes) with the scaly aegilops (a wild grass with 14 chromosomes). The hybrid between these two plants had $14 + 7 = 21$ chromosomes and when the hybrid was treated with colchicine, a drug from meadow-saffron, the chromosomes were made to double, $21 \times 2 = 42$, and so Sears made his "common wheat." This very brilliant piece of work shows a new epoch is opening in the forming of new varieties. Later, after many years, new varieties of wheat may be bred quite different than any we are now acquainted with.

A New Series of Perennial Grass Plots were seeded at the Station at Fargo in the fall of 1941 by T. E. Stoa, agronomist. These include Russian wild-rye, crested wheatgrass (Standard strain), crested wheatgrass (Fairway strain), green needlegrass, Fescue, bromegrass (Standard strain) and Parkland bromegrass. Stand notes taken in the fall of 1942 were recorded as O. K. for Russian wild-rye, Standard crested wheat and Fairway crested wheat; a 10% stand for green needlegrass, an excellent stand of Fescue and fair stands of the two bromes. Stand estimates made June 15, 1943 were 85% for Russian wild-rye, 60% for Standard crested wheat, 65% for Fairway crested wheat, 25% for green needlegrass, 30% for Fescue, 90% for Standard brome and 80% for Parkland brome. Especially worthy of note on June 15, 1943 was the improvement in the stands of the two bromegrasses and the sharp decline in the stand of Fescue.—[H.L.W.]

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[1]Ray, Jr. Charles. Amer. Jour. Bot. 31: 241-248. 1944.
[2]Sears, E. R. Mo. Expt. Sta. Res. Bull. 336. 1941 and later publications.