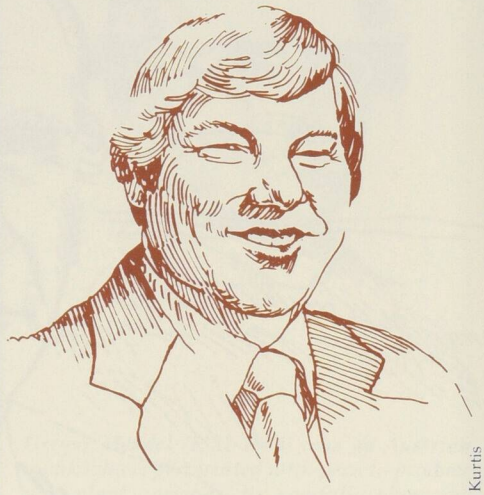
cess consisting of ploughing, discing, and harrowing. With zero tillage these steps are dispensed with and a farmer only seeds and sprays. Modified seeder equipment cuts a narrow slit for the seed, disturbing only a small portion of the surface of the land.

Zero tillage has both economic and conservation advantages. It cuts fuel consumption and costs, and decreases labour and heavy machinery requirements. Because the land is largely undisturbed and the stubble is left on, wind and water erosion of soil is sharply reduced and moisture loss through evaporation is prevented. Manitoba trials of zero tillage have shown reduced fuel consumption as high as 50 per cent and, in some cases, increased yields.

The principal interest of zero tillage for the winter wheat project, however, is the stubble which is left on the field over the winter. Under zero tillage, winter wheat is planted directly into this stubble in the fall. The project's field trials have demonstrated that upright stubble between 15 and 30 cm tall will serve as a snow trap and provide adequate insulation to ensure the survival of winter wheat during Prairie winters.

Dr. Evan's primary goal in his winter wheat breeding research is to develop hardy and rust-resistant



Dr. Elmer Stobbe.

Ajli Kurtis

winter wheat cultivars (cultivated varieties) for use with the zero tillage system of cultivation. Spores of the fungus *Puccina graminis*, which causes the devastating wheat rust disease, pass the winter in the United States and are blown northward to the eastern Prairies on prevailing spring winds. Because of the direction of these winds, few spores reach the western prairies, where rust is less of a problem. As a result, winter wheat varieties developed for use in southern Alberta at the Lethbridge Agriculture Canada Research Station have inadequate rust resistance for eastern Prairie use.

In his breeding project, then, Dr. Evans is concentrating on breeding rust-resistance into hardy winter wheat varieties. He has crossed the hardiest winter wheats, such as Norstar, developed at the Lethbridge Alberta lab, with rust-resistant spring varieties like Glenlea, currently grown on the Prairies. The offspring, or progeny, of these matings are then backcrossed with the original winter wheat parent over a number of generations in an attempt to restore the parental hardiness while maintaining rust-resistance. Each successive generation is tested for these two essential characteristics.

Evans has already completed the third backcross and hopes to have material ready for comparative field trials by 1985. If all goes well, he expects that new varieties of winter wheat suitable for growing on the Canadian Prairies will be in the hands of farmers by 1990. He emphasizes, however, that the breeding research is only part of the "complete production package" the project is developing for winter wheat. The zero tillage system of cultivation and crop management guidelines are equally important.

Given the potential economic advantages of this production package to farmers, the successful completion of the wheat project could radically alter agricultural practices on the Prairies. However, the winter of 1982-1983 provided a sobering lesson. Lack of snowfall left fields bare and much of the experimental winter wheat crop was damaged. Evans warns that once every ten years or so such conditions might reoccur and the crop could fail.

N.F.B. Photothèque