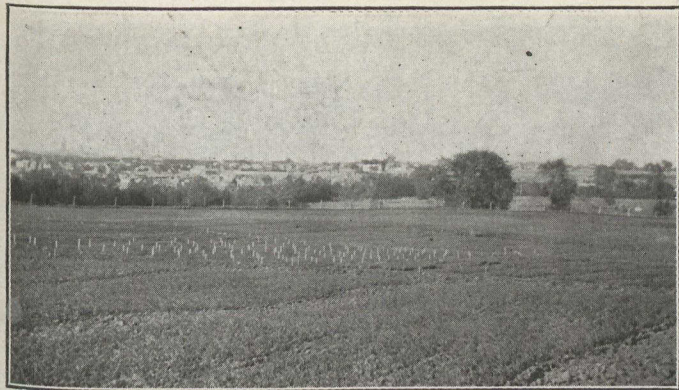
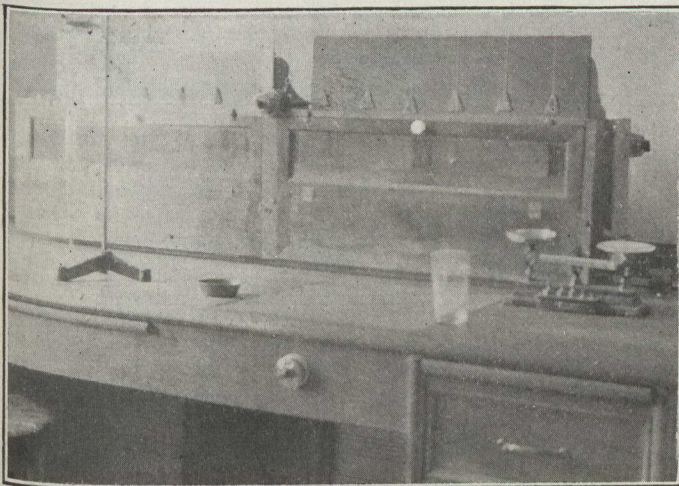




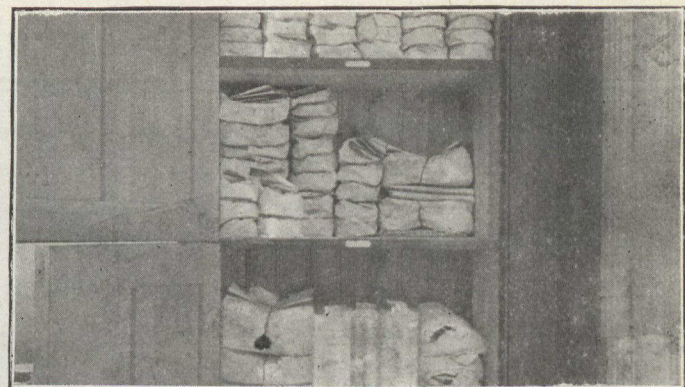
Each peg designates a certain species of unfixed plants.



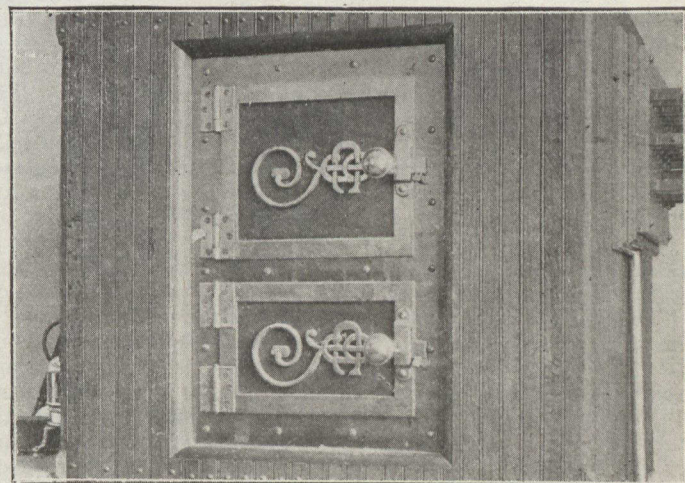
The scientist's bread board and fermenting cupboard.



DR. SAUNDERS ABROAD.



Samples of flour used at the scientific bakeshop.



The ovens used by Dr. Saunders in his scientific bakery.

THE MAN WHO MAKES WHEAT

By MADGE MacBETH

I SHALL always look back upon a particular afternoon spent at the Experimental Farm, with keenest pleasure—which was all the greater because it was so unexpected.

Timid almost to nervousness at the prospect of an interview with a man whose life of recent years has been devoted to issues of tremendous importance nationally and internationally, whose every hour has been used for the furtherance of these issues; prepared to meet somewhat of a misanthropic scientist who would suffer me and my questions with abstraction or intolerance, ignorant to the point of crass stupidity in regard to the nature of the work which engrossed so much of this man's time and thought, I looked forward to my visit to Dr. Saunders with anything but pleasure.

And what did I find?

A kindly, responsive, courteous gentleman, whose tastes are not centred in his scientific work, alone; whose *recreations* we might call them, are intensely interesting to one unlettered (in wheat and grain of all sorts), who, with infinite patience, explained the A. B. C. of his work and evinced no peevishness when asked the same question twice; who, in short, was a scientist and a human being in one!

Dr. Charles E. Saunders, B.A., Ph.D., is the son of Dr. William Saunders, Director of the Dominion Experimental Farms from the time of their formation until very recently, when he resigned. He was born in London, Ontario, and attended the High School there. At the University of Toronto he took a General Science course, then went to the Johns Hopkins University, in Baltimore, where he took a course in Chemistry, Mineralogy and Physics. For a while Dr. Saunders taught in Kentucky, but found that he preferred his "ain cuntry," and resigned, to the distress of both students and faculty.

The work of cross-breeding wheat was begun by the elder Dr. Saunders in 1888. He soon found that he, himself, had nothing like sufficient time to devote to the work which grew more arduous each year. When, at this important period in the work of the Farm, the younger Dr. Saunders returned to Canada, nothing was more natural than that he should take up his father's work and carry it on. At least, that is the way it was explained to me.

"But," I objected, "how did you know so much about the work, when you had not been especially trained for it?"

"Well, I had always taken more or less interest in my father's work, here, and had helped him from time to time," answered the Cerealist. "I sup-

pose it came to me naturally—" He stopped and I followed his glance to where it rested on his hands.

Delicate, but not effeminate; supple without being restless; white but not artificial—they are the hands of an artist.

"You play—you are a musician," I said, positively.

"Yes, all our family are musicians," he answered. "I could always do any thing with my fingers—when I was a very small boy, I used to make lace just for the pleasure of using them. So when it came to the delicate work of handling grain I was ready for that, too."

Dr. Charles Saunders took hold of his father's work in 1903. In the earlier years of wheat-breeding, when the laws of heredity were not so well understood, the system of selection after cross-breeding was not so thorough as now known to be necessary. The cross-bred varieties, first introduced, were not, therefore, quite "fixed" in some essential respects, and it was the young Dr. Saunders' work to re-select all the varieties of wheat obtained from crosses up to that time. Since then, he has gone on with cross-breeding from the beginning, and now sees a well-nigh perfect wheat—Marquis—as the result. There are about 20 other fixed varieties of cross-bred wheat.

The rapid settling of the far West, and the North-West was responsible, perhaps, for this work. In a country where the summer is short it was necessary to raise an early ripening grain to avoid the deadly frost. Added to that essential quality, there should be a certain character to the straw—not too long, nor too short; productiveness, also, had to be considered; resistance to disease; and very important, indeed, the bread-making qualities.

I was surprised to learn that the colour of the flour had a good deal to do with the sale of wheat, that is, farmers will not raise wheat of a darker colour than is *the fashion*. Bakers want a white loaf, and if the flour itself is not white enough to please them, they bleach it. This applies to two very good flours of a cross-bred variety, namely, Huron and Preston, which have a fairly high baking strength, and are good in other respects (early ripening, for instance), but are a yellowish colour. The Cerealist told me that personally he preferred a flour which was not dead white, but his taste did not influence the market at Liverpool, so white flour was *the fashion*.

The method of cross-breeding is most interesting. Pollen is taken from one parent plant, and dusted

on the other one selected for breeding. This, of course, at the exact state of maturity necessary. The plant is then tied up and set in a little plot where it is carefully and closely watched.

And a year is not sufficient for perfecting the grain. From three to six years, and sometimes longer, Dr. Saunders has found necessary for the fixing of a type. After that is done the variety is propagated for distribution at other farms, and in some cases a small quantity of seed is sold to farmers who are in the habit of growing seed grain for sale, and who are prepared to handle this grain with the unusual care it deserves.

All this grain is, of course, grown under the direct care of Dr. Saunders, and represents the very best methods of breeding and selection.

Of perhaps greater interest than anything else was the bakery. The fermenting cupboard and the oven were built after a pattern entirely original. The bread board, as house-keepers know them, is made of heavy glass under which is an electric bulb, the light from which prevents the dough from getting chilled. The fermenting cupboard is also heated by electricity. The tumbler on the table is what the dough rises in; the tiny round dish is the baking pan. Water is accurately measured when added to the flour as the greatest amount of fluid it will take the better the bakers like it. (The bread will weigh heavier.) The baking requires twelve minutes, and is done four times so that the flour may prove itself, as it were.

Five pounds of wheat is sufficient for milling and baking the four times, leaving ample seed for sowing a 60th part of an acre the following year. Milling is also done under the careful supervision of Dr. Saunders. During the past winter the baking alone occupied his time from about seven in the morning until late in the afternoon, and then everything which he wished to accomplish was not finished, which will not astonish one after learning that in the year 1910 milling and baking tests were made of fifty new, un-named cross-bred varieties of spring wheat and a large number of named varieties as well, and that Dr. Saunders does every bit of this work himself. In the summer he is occupied in the fields and at odd times he attends personally to correspondence often amounting to two hundred letters a day.

In appearance he is tall and slight; a dark beard covers his face, and he wears spectacles. He is a humourist, and both makes and appreciates jokes; intensely interested in his work, yet he realizes that there are other things in the ordinary human being's life beside cereals. He is a photographer of no mean ability and surprised me very much by making what I afterward found to be very valuable suggestions as to some exposures. A scientist, a musician, and a photographer! Isn't that a rare combination for one mortal man?