

An ordinary tea kettle may be used for supplying steam. Hold the bird in one arm and with the free hand pass the wings one at a time through the steam coming from the kettle spout. The feathers can then easily be straightened out or fluffed up as required, by passing the hand through them. Whether a poultryman is showing at a large exhibition or only at the local township fair he should fit and train his birds.

## FARM BULLETIN.

### Crops and Prices Fair in York County, Ontario.

EDITOR "THE FARMER'S ADVOCATE"

At the time of writing, August 11, the fall wheat has all been harvested. A small acreage but a good crop. The barley is all cut and a good length of straw, but the grain is not plump. Oats are being cut, and considering the drouth will be an average crop; some of the late-sown oats in the low, wet fields are very short, and cutting them with the binder will be almost impossible. A number of fields of

buckwheat have been sown on the low fields, but owing to the dry weather many of them never came up.

It has been good weather for making hay, but not for growing crops. Some of the best hay crops have been harvested in this country for many years. Some fields have been reported to go four tons per acre. Hay was made fast this year with a blazing sun above and the dry, hot ground underneath, and the hay tedder was put into use again. Although the price is dull at present no doubt it will be better before spring, as straw for feed will be scarce. The second crop clover will be short and is in full bloom now, with good prospects of seed. Alsike has been a fair crop, and some first-class seed has been threshed. It has been reported to be selling around \$10.00 per bushel.

The hoed crops are poor this year, the long, wet spell in the spring held the farmers back from getting their roots and corn in, and now the seven weeks of dry weather have made the ground in such a condition that it is almost impossible for the roots to grow, and to hoe and scuffle, but the rain which is falling to-day no doubt will help the turnips and corn yet. More corn is being planted each year and will be a fair crop for those who keep their cultivators at work.

The small fruits are very scarce, and vegetables are drying up in the hard ground. High prices are asked for all fruits. Potatoes are small and high prices may be expected next winter for those who will have any to sell.

Hired men are scarce on account of the war. Many are enlisting now to go when their times are in. The call of the West will hardly be heard in this district as there seems to be plenty of work to do here. Many farmers are alone now on large farms, and yet they talk of conscription for the war.

There is a scarcity of beef cattle, and good beef ringers can hardly be bought at any price. Pork is one of the main stand-bys of the farmers of York County, and high prices have made the business firm. Sheep are scarce and dear. There has been a large decrease in the past few years, but why so when the prices of wool and mutton are so high? What better business is there on the farm when they can be pastured and wintered so cheaply, and what better weed destroyer could you get? The horse market is dull, but no doubt they will command higher prices after the war.

York Co., Ont.

R. E. RATCLIFF.

## Recent Developments in Agricultural Meteorology.

By Ernest H. Godfrey, F. S. S.

EDITOR "THE FARMER'S ADVOCATE":

Two classes of the community are especially dependent upon the weather: those who plough the land and those who plough the sea. Both the farmer and the mariner become weather-wise with experience, and acquire considerable skill in foretelling the approach of weather changes by observing signs of the sky, the wind and the habits of animals. Highly organized meteorological offices exist in every civilized country; but, as a rule, these have paid more attention to weather changes as affecting mariners by the issue of coastal warnings, storm signals and weather forecasts than they have to the influence of meteorology upon agriculture.

### Agricultural Weather Forecasts.

Agricultural meteorology has not, however, been neglected, and statistical records of precipitation, temperature and sunshine, as well as of other meteorological phenomena, have been collected and published for long series of years in most of the older countries of the world. In Great Britain the meteorological office has for many years issued daily telegraphic weather forecasts to farmers during the hay harvest. The substantial accuracy of these forecasts has been verified in a large percentage of cases, and a material saving has been effected by economy of labor in hay making. In the United States, also, warnings are issued by the Weather Bureau at Washington twice daily to more than 2,000 principal distributing points, whence they are further disseminated by telegraph, telephone, mail, and by the newspaper press.

### Correlation of the Weather With the Yields of Field Crops.

In another direction, statistics of meteorological phenomena have been utilized to illustrate the correlation of the weather with the yields from certain of the principal field crops. In 1905, Dr. W. N. Shaw, F.R.S., Secretary of the British Meteorological Council, read before the Royal Statistical Society a notable paper on "Seasons in the British Isles from 1878." In this paper he tabulated for a long series of years, and for a particular district of England, a great variety of meteorological data, correlating these data with the yields of wheat, barley, oats and a few other crops. One of the most interesting and important deductions from the statistics he then presented was the influence of the autumn rainfall upon the yield of wheat in the ensuing year, wheat in England being a fall-sown crop. It was shown that a heavy yield of wheat in any particular year was almost invariably preceded by a dry autumn, the rule being so constant as to warrant the anticipation of an under-average yield whenever a wet autumn prevented the preparation of a proper seed-bed for the sowing of wheat. A somewhat similar conclusion was arrived at along different lines, as the result of the continuous wheat growing at the Rothamsted Experimental Station. In the "Book of the Rothamsted Experiments," by W. A. D. Hall, F.R.S., then Director, the effect of a wet autumn and winter upon the ensuing wheat crop was thus explained: "If the wheat be sown in October or early November, it spends the next three or four months almost wholly in developing its system of roots. Should the weather be wet, and the soil in a saturated condition, the root system will be restricted, both because of the deficient aeration and because the roots need not extend far to obtain the water necessary for growth."

In 1907 the line of inquiry suggested by Dr. Shaw was taken up by Mr. R. H. Hooker, F.R.S., Met., Soc., Head of the Statistics Branch of the Board of Agriculture, in a paper which he read before the Royal Statistical Society on "Correlation of the Weather and Crops." In this paper the author's conclusions were arrived at by the application of mathematical formulae to meteorological statistics. The particular method adopted was the calculation of the correlation coefficients between the yields of the crops and the meteorological data of various periods, the assumption being that the maximum coefficient indicated the period of greatest influence. The results obtained for wheat were in striking corroboration

of those of Dr. Shaw. The coefficient for the period at and just before the sowing time indicated that absence of rain in September and October was more important for a good wheat crop than rain or temperature at any other period of the year. A variety of other interesting points was brought out in this paper by the same method. It was shown that a factor of considerable importance was the condition of the seed as harvested in the previous year. But it does not follow, writes Mr. Hooker, that the period which is most critical for the quantity of a crop is also the most critical as far as regards total value (quantity plus quality). In the case of wheat, therefore, the condition of the seed is a very important factor, perhaps second only to the weather at the time of sowing and during winter. Temperature conditions were shown to affect the bulk and condition of the seed differently, and the deduction is that cool weather is a desideratum for a heavy yield, but that for good condition the preceding summer should have been warm. These considerations suggest an explanation of the phenomenon that a good crop is often succeeded by a poor one. For barley the chief requisite was shown to be a cool, dry summer; for oats also a cool summer; but this crop requires rain in the spring. For both barley and oats the spring and summer are of preponderating importance, the seed-time being relatively unimportant. For turnips and Swedes rainy weather during the sowing season is required, and for mangolds a cold spell from the beginning of March until the end of June. Cool weather is desirable for condition in potato seed, and this fact supplies a theoretical reason besides exhaustion of the stock for the practice of importing seed from the cooler climate of Scotland for the potato-growing districts of England. The same practice is strongly recommended by potato experts in Canada. W. T. Macoun, the Dominion Horticulturist, is insistent upon the importance of obtaining fresh supplies of potato seed from the cooler climate of the Maritime Provinces for planting in the Eastern and other parts of Ontario.

### Agricultural Meteorology in Russia and Italy.

During recent years large sums have been devoted to the improvement of agriculture in the Russian Empire, both in the direction of education and of experimental research. In this connection, important efforts have been directed toward ascertaining the influence of the weather upon crops, and the possibilities of controlling the factors which enter into success or failure. In 1896 a Meteorological Bureau of the Scientific Committee of the Russian Department of Agriculture was established for promotion of the following objects: 1, the organization of local agricultural meteorological stations; 2, determination of the relations between the growth and yield of plants and meteorological factors; 3, the creation of Russian agricultural districts corresponding with climatic conditions; and 4, the study of atmospheric phenomena causing serious damage to agriculture. Translations of monographs and other meteorological studies by the chief of the Russian Meteorological Bureau (Prof. P. Broounoff) and other meteorological experts have lately been published in the Bulletin of Foreign Agricultural Intelligence, issued by the Canadian Commissioner of the International Agricultural Institute. From these we learn that the main principle governing the work of the Russian Bureau is that for each crop there is a "critical period" during which, for the proper development of the plant, it is essential that the weather should correspond to the actual needs of the plant. Consequently the idea is that if these "critical periods" can be accurately determined, as well as the average probability of the particular weather required falling within a given period, then the farmer can so adjust his practice that the two periods shall coincide. This he may effect in different ways as, for instance, an alteration in the date of seeding, the use of forcing

manures, and the adoption of improved varieties. Some progress has already been made towards the determination of critical periods, for which, of course, observations extending over a series of seasons are requisite. The crop to which most thorough attention has hitherto been devoted is oats, and for this crop it is stated that there exists a particular period which is critical in respect to precipitation. During this period an abundant rainfall produces a good yield, and its absence determines a poor one. The critical period for oats, during which an ample precipitation ensures a good yield, is, in Russia, about ten days before heading. Professor Broounoff writes that the physiological explanation of the phenomenon is easy. The plant needs more moisture at the period when it develops a great number of new vegetative organs. The absence of moisture means weak organs which do not afterwards acquire vigor. To the phase of heading succeeds that of inflorescence when too much rain is injurious.

Apparently the work in Russia has not proceeded far enough to warrant similar conclusions in respect to wheat; but Dr. Girolamo Azzì has applied the Russian principles to conditions in Northern Italy. There, in the Province of Bologna, he writes, the critical period for wheat, in respect to rain, falls within the twenty days which precede heading. If during the ten days immediately preceding the phase of heading the total rainfall be not less than 30 mm.; or, if this period be dry, yet during the preceding ten days 60 mm. have fallen the probability of good yields is very great, even if no more rain should fall until harvest. Another critical period in Italy relates to the high winds and heavy rains that cause lodging. New varieties of wheat possessing greater elasticity of stem, and consequently greater powers of resistance against lodging, have been introduced, and it is recommended that they be sown at such times that the critical period shall not fall within the time that is meteorologically unfavorable.

### Agricultural Meteorology in Canada.

Weather records extending over many years have been kept and published by the Dominion Meteorological Service at Toronto, under the direction of Sir Frederick Stupart, and in the Canada Year Book of 1913 and 1914 average temperatures and precipitation at a large number of selected stations in all parts of Canada, and based upon many years' observations of the Dominion Meteorological Service were tabulated for purposes of reference. For many years, also, careful meteorological records have been kept at the Dominion Experimental Farms and Stations, and since 1908 have been published in the reports from the farms which appear in the Census and Statistics Monthly. These records embrace mean, maximum and minimum temperatures, precipitation, and the possible and actual hours of sunshine. Inspired by the Russian example, an Agricultural Section of the Dominion Meteorological Service was established in 1914, under the charge of R. W. Mills, B.S.A., the intention being to co-operate in the scheme outlined conjointly by the International Meteorological Committee and the International Institute of Agriculture. During the year 1915 this Section co-operated with the Dominion Experimental Farms in a field experiment on spring wheat in relation to the weather or meteorological environment. Observers at fourteen stations recorded crop notes on a printed form adopted from Russian and United States models. The questions called for information, including: 1, general field conditions and farming methods; 2, dates in the important stages in the life of the wheat from sowing to reaping, and the general condition of the plants at the time of these stages; 3, average height of the plants on the plot every seven days; 4, the damaging effect of adverse weather on plants and soil at any time throughout the season, and losses due to meteorological and other factors, and 5, final yield and quality. After threshing, the completed forms were returned to the meteorological office for careful correlation of the weather and crop data.

In regard to several of the results described above