

of the climate and soil to the crop of barley, particularly as to its brewing qualities.

RELATION OF CEREAL CROPS TO CLIMATE AND SOIL.

By Prof. T. L. LYON.

(1) *Modifications in cereal crops induced by changes in their environment.*

Experiment and observations show that modifications occur in plants when carried from one environment to another.

These modifications affect the habits of growth and the yield and quality of grain.

Immediate modifications due to the definite effect of environment.

Permanent modifications accounted for by transmission of previously modified characters.

Modifications sufficient to form new strains or varieties. They become more pronounced each succeeding year until they come into equilibrium with the environment.

The same environment may produce different modifications in different plants.

The influence of previous environment in reference to variety testing.

The influence of previous environment on the practise of changing seed.

Productiveness and quality of grain not directly correlated.

There would seem to be an optimum development of vegetative portion of the plant for each environment, in order to produce a maximum of grain.

(2) *The relation of wheat to climate and soil.*

(a) Influence of climate upon yield and composition.

A fairly cool, moist growing season favors a large yield of grain.

A hot, dry growing season favors a high nitrogen content by arresting the development of the kernel.

A hot, dry growing season also favors a large accumulation of nitrogen by the plant on a soil rich in nitrogen.

(b) Influence of soil upon composition and yield.

Incomplete maturation produces high nitrogen content on manured soils.

A poor soil may produce a wheat high in nitrogen thru failure to mature the crop.

Nitrogenous fertilizers may slightly increase the percentage of nitrogen in wheat.

(c) Influence of soil moisture upon composition, yield, and length of growing period.

A concentration of the soil solution increases the percentage of nitrogen in the grain, and permits of rapid growth and early blooming.

An insufficient supply of soil moisture prevents complete maturation of the crop and thus shortens the growing period.

(d) Conditions affecting the accumulation of nitrogen by the grain, or the yield of nitrogen in grain per acre.

The supply of available nitrates and other plant food materials.

The degree of concentration of the soil solution.

The rate of transpiration.

(e) The conditions under which hard wheat is produced.

Yellow berries in hard wheat.

(f) Improvement in yield accompanied by lower nitrogen content.

(3) *The relation of corn to climate and soil.*

(a) Influence of climate upon yield.

Relation of heat units to length of growing period.

Relation of yield to length of growing period.

Relation of temperature to tillering.

Relation of color of grain to climate.

(b) Influence of soil.

Relation of tillering to available fertility.

Relation of barren stalks to available fertility.

Effect of available nitrogen on composition of kernel.

(c) Influence of soil moisture.

WEATHER BUREAU MEN AS EDUCATORS.

Classes from schools and colleges have visited the Weather Bureau offices to study the instruments and equipment and receive informal instruction, as reported from the following stations:

Dubuque, Iowa, May 18, 1907, about a hundred students from the Iowa State Normal School at Cedar Falls.

Honolulu, Hawaii, May 17 and 22, 1907, the physical geography section of the freshman class of Oahu College, in two divisions.

Little Rock, Ark., May 1 and 2, 1907, the physical geography class of the Little Rock High School, in two sections.

Reno, Nev., May 29, 1907, the physical geography class of the Reno High School.

Syracuse, N. Y., May 11, 1907, the physical geography class from the Warners, N. Y., High School.

THE COLD SPRING OF 1907.

By A. J. HENRY, Professor of Meteorology. Dated June 24, 1907.

The record of temperature for a year is made up of varying periods of increasing and diminishing heat. In spring the successive increments of heat are offset in a measure by incursions of cold northerly winds. These interruptions to the normal annual march of the temperature ordinarily last two or three days, sometimes a week, much less frequently a month, and in extraordinary cases, two months or more, as in the case of the present year.

The length of the cold spell in the south was about two months; in the northern part of the country east of the Rocky Mountains, about seventy-five days. At this writing, June 24, unseasonably cold weather prevails in southern Idaho, Nevada, and Utah, a part of the country exempt from the cold of April and May.

During the progress of the cold weather it was observed, first, that areas of low pressure had almost completely forsaken the main path which follows along the northern boundary to the Lake region and thence down the St. Lawrence Valley; second, that instead of following the northern route, they moved from the southwest to the New England coast, and there remained stationary for several days, meanwhile increasing in strength, and causing a succession of northeast to northwest winds with snow or rain over the whole of New England, the Middle Atlantic States, and as far west as Indiana and the upper Lake region. This departure from the usual behavior of lows continued thruout April.

In May and June the lows were mostly in the form of barometric troughs, which, developing in the far west, were continually crowded a little to the south, so that the northern portions of the respective troughs, instead of passing down the St. Lawrence Valley, generally past east-southeast over the Middle Atlantic States and the ocean south of New England. A movement in this direction holds the winds of New England and the Middle Atlantic States continually in a northerly quarter.

In June, lows from the Southwest, after reaching the Ohio Valley, were effectively blocked in their northeastward course, the result being the formation of secondary disturbances off the Virginia coast, which moved slowly northeastward over the ocean, and thus kept the wind in a northerly or northeasterly quarter over the northeastern portion of the United States. It was not until the middle of June that the prevailing high pressures in the north began to weaken, thus paving the way for southerly winds and warm weather.

Two broad principles in regard to the influence of pressure