

Temperature of Atmosphere and Its Relation to Agriculture.

By R. C. MOFFATT, M.A., Department of Physics, O. A. C.

ATMOSPHERIC temperature has ever been a matter of much concern to agriculturists. A high temperature, although necessary and beneficial in some cases, is detrimental in others, but in each case requires a liberal amount of precipitation. On the other hand the destructive frost of late spring and early autumn is an unpleasant but frequent visitor to the agriculturalist. Man has harnessed much of nature and made it his servant, but as yet no one can say that man can control the atmospheric temperature, although he may modify it in a few instances or overcome some of its disastrous effects.

The primary source of all heat is the sun. * Old Sol shines and heat and light travel the intervening 92,000,000 miles of space with a velocity of 186,000 miles per second. Some of this heat is absorbed in its transit by dust particles, water-vapour and the air itself, thus increasing the temperature of the air. The remainder is absorbed by the earth and thus raises its temperature and the temperature of the air in contact with it. The latter has the greatest effect on air temperature.

Local conditions have a great effect on temperature. Water requires about five times the quantity to raise its temperature one degree as does soil, thus large water areas tend to prevent high temperatures. Also, as there is always slow evaporation and it requires about 300 times as much heat to evaporate one gallon of water as to raise its temperature one degree, the

temperature is kept more moderate. Large swamp and bush areas free large quantities of water to the atmosphere, as well as retaining the spring water longer in the country and consequently have a modern effect.

Frosts are also prevented by water, swamp and bush areas because they produce a high humidity and are not so readily cooled as large land areas. Air of high humidity acts as a better blanket as it were, than the dry air. Also the temperature at which dew is formed is higher and the lowering of the temperature may be sufficiently arrested to eliminate any danger of frosts.

The type of agriculture in any section is decided by its air temperature. Any new crops which are imported must first become acclimatized to that section before they are a success. Winter cereal crops of Ontario and hay crops are not affected by extremely low temperature unless growth is started by warm weather followed by low temperature or by heaving of the soil about the roots. Late spring and early fall frosts cause much damage. If the temperature does not drop below 28 degrees Fahrenheit only the tenderest vegetation suffers, but, if below it, wholesale destruction results. High temperatures cause strong evaporation from the leaves of plants and thus the need of a large amount of precipitation to prevent stunting or death itself.

Continued on page xvi.