Miscellaneous.

Agricultural Regions.

(BY J. M. DECOURTENAY.)

AGRICULTURAL regions upon the surface of the globe are governed by certain laws. Some, inherent to the nature of the soil and climate, are *invariable*. Others, on the contrary, depend upon the progress of civilization, the distribution of population, and other *variable* causes.

They may all be classed within four limits :—

1st. Meteorological.

2nd. Economical.

3rd. Statistical.

4th. Agricultural.

METEOROLOGICAL.

The Meteorological limit may be established,—

1st. By the temperature of the atmosphere and the soil, under the influence of solar heat, during the season of vegetation of each plant.

2nd. By the Hygrometric state of the atmosphere, the frequency and direction of the winds, and the moisture of the earth during each season.

3rd. The temperature of the atmosphere and soil during the winter.

Arthur Young was the first who endeavoured to determine, in a precise manner, the limits of agricultural climates.

In his voyage through France, he established for that country four distinct agricultural regions. The first region was the north, or cereal region, where neither the vine nor Indian corn could be cultivated. In the west one, towards the south, wine was produced, but Indian corn could not ripen its grain. The third division was composed of *both* vine and Indian corn. The fourth was that of the olive. The Count de Gasparies admitted that this attempt of Arthur Young's had not been surpassed. Founded upon the observation of facts, it was generally true, although sheltered places, altitudes, and many other circumstances transformed his straight lines into very sinuous ones. The limits imposed upon all cultures must materially affect, in a remarkable manner, the important and highly valuable ones I am endeavouring to bring before public attention. Before entering upon the *variable* limits mentioned at the commencement of this chapter, I must prove that we are *far within* the circle of the most important of all limits ; because the natural and invariable one—that which has been ordained by our Creator.

In order to explain such limits with any degree of lucidity, I must compare two *distinct* climates,—the one *decidedly within*, the other *absolutely without* the limits in question. I shall therefore establish the comparison between Paris and Brussels. In the first of these situations, vine-growing has been successful. In the last it has never been able to succeed.

PARIS.

Atmospheric heat during the season of vegetation	1925·67
Solar heat	751·00
Total heat	2676.67

This appears the *lowest* degree of heat required for the production of wine,—the season of vegetation for the wine commencing when the temperature rises to an average of 12° centigrade, terminating when it returns below that degree.

At Brussels the thermometer descends below 12° centigrade (as in Paris) by the 1st of October, and it possesses up to that period.

BRUSSELS.

Atmospheric heat	1914.02
Solar heat	619.00
Total heat	2533.02

Thus a simple difference of 144 degrees of heat, separates the region where the production of wine is possible from that where it is not. Ten days more heat added to the climate of Brussels, and the Vine would ripen its fruit. The Count de Gasparies says : Ten days more heat added to the climate of the South of France ; and cotton could there be successfully cultivated, and thus may everywhere be distinguished the limits of agricultural climates.

I formerly published meteorological observations made at the observatory in Quebec by Lieut. Ashe, R. N., F. R. S., and kindly furnished to me by that gentleman, who authorised me to state that the atmospheric heat at the citadel was *some hundred degrees* beneath the ordinary temperature of the climate.

QUEBEC OBSERVATORY.

Atmospheric heat during the season of vegetation of 1861	3079.3
Solar heat	1026.4
Total heat	4105.7
And for the year 1862.	
Atmospheric heat	3294.3
Solar heat	1098.1
Total	4392.4

I desire to explain for the benefit of those who may not be conversant with calculations of Agricultural Meteorology, the meaning of

SOLAR HEAT,

Which differs essentially from the Atmospheric heat daily represented by a given thermometrical figure giving the heat of the air,—a transparent body that only absorbs about a fourth of the solar rays in their passage through it, and which arrives afterwards on the earth, and upon plants, who absorb in their turn a much greater portion. Solar heat, therefore, is a question of immense importance as an element exercising considerable influence upon all vegetation, and very materially upon the classification of agricultural climates, according to its power of action, either from the absence or abundance of opaque vapours interposing themselves between the sun and the earth, or from the inclination and exposition of the soil, or from any other shelter that may reflect, or intercept the solar rays.

In calculating the temperature of a country, we must not forget that the slopes of hills of a Southern aspect transport such situations to a more meridional latitude. The heat of the sun is in proportion to the number of its rays that strike a *plane*, and proportionally to the *sines* of its angle of *incidence*. Before arriving at the earth, the solar rays traverse the atmosphere, and a part (about a fourth) of the colorific are absorbed by the air, and by the vapours that enter into its composition. It is according to the density of those vapours that the caloric rays penetrate to the surface of the earth, and their density, quantity, and state of dissolution, renders them an element most variable according to the period of the year, or of the day, and indeed dependant upon numerous causes scarcely appreciable.

The air becomes less saturated as the temperature of the day increases, and *vice versa*, which will enable us to calculate the extinction of light or heat produced by a relative humidity of atmosphere. From the zenith, each degree that removes the sun from the vertical position, augments the angle of inclination, and consequently diminishes its colorific power. Its angles, with an inclined plane, will be the same as those it would make with a country whose horizon would be parallel to the same plane. Suppose the ground inclined to the south, its plane would be parallel to the horizon of a more meridional latitude to the west, with an occidental longitude.

In the intermediate positions, a south-east inclination, for example, it will change *both* its latitude and longitude. Thus the effect of each inclination will be : If north or south, to transport the position to another climate. If east or west, to change the hours of the day when the heat will be the greatest. A slope exposed to the south, with an inclination of 25 degrees, and in latitude 45 at the "Solstice," will obtain its rays at right angles, the solar heat being therefore 27°.72, and atmospheric 27.8, will produce a heat of 55-6 degrees (centigrade.)

As the effect is often altogether local, scientific men had long neglected its application ; but they have now perceived the enormous influence it exercises upon the march of vegetation. Monsieur de Humboldt never ceases to recall the necessity of studying its effects, in order to be enabled to judge with any accuracy upon the comparative maturity of plants, although he had at one time attempted to furnish a classification by the following

MAXIMUM TEMPERATURE.

Cacao	29° cent.	to	23
Indigo	28 "	"	22
Banana	28 "	"	18
Sugar cane	28 "	"	22
Coffee	27 "	"	18
Cotton	28 "	"	20
Dates	23 "	"	21
Citrons	17	minimum	7° 5
Chesnut	19	"	9
Vine	27	to	20
Wheat	25	to	15
Barley	11	to	8 or 9

No one has more felt than Monsieur de Humboldt himself, how insufficient a proof can be offered by a maximum of temperature. The climates of France have been classed so accurately, that their vines have also been classed in seven divisions, according to the heat required for the maturity of each.

DIVISION.	DEGREES.
"1. Total heat	2264
"2. "	3400
"3. "	3565
"4. "	4133
"5. "	4238
"6. "	4392
"7. "	5000

"The first division are eating grapes alone, and "unfit for the manufacture of wine."—*De Gasperies vol. 4th, page* 606.

On some future occasion I will give a list of French vines, and their classification into each of the above divisions; and it will be found in theory (as I proved it correct in practice) that the best Burgundy vines can flourish in the climate of Quebec.

Now the season of vegetation in Burgundy, Mons. De Gasparies informs us, varies from 168 to 174 days, with an exceptional year of 162. Whilst our season of vegetation (calculated as in France when the temperature rises to 12 centigrade, and falls below that degree) varies from 135 days to 150 days, our amount of heat during that season is *far superior* to that of Burgundy with its 174 days, notwithstanding that our contrasts between the temperature of day and night are much greater. And these very variations of temperature demonstrate our purity of atmosphere *as the former is produced by radiation of heat, which is the consequence of the latter*.

If the best authorities in Europe are correct in asserting, "That the *best* wine is made where the "*greatest* heat is concentrated into the *shortest season of* "*vegetation*, and where there exists the greatest con-"trasts of temperature," I must be correct in my estimation of our climate, based not only upon the the .., of such undoubted authority, but also upon my own most successful *practical experience in both provinces*, and upon the *fact* that I have produced a good sound wine in both sections of the Province.

Moreover, M. de Gasperies, vol. 2nd, page 354, states a simple rule without an exception :—"The "climate of the vine is characterised by the possibi-"lity of attaining a total heat (solar and atmospheric) "of 2680 degrees centigrade."

To those who may suppose that the severity of our winters can effect our position as the best climate upon this continent for "the agricultural region of the vine," I can only say, let them visit Clair House vineyards during the winter, and examine if a single plant is protected from the inclemency of the season, or if any suffer from such exposure.

In the following chapter I shall endeavour to explain the remaining limits of agricultural climates.

☞ The *Ohio Farmer* says that a coating of three parts lard and one part rosin, applied to farm tools of iron or steel, will effectually prevent rust.

SIGNS OF RAIN.—When the odour of flowers is unusually perceptive, rain may be expected, as the air when damp conveys the odour more effectively than when dry. Damp air being also a better conductor of sound than dry, the sound of mills, railway trains, distant bells, &c., may be heard plainly just before rain.

FARMING TOOLS.—There is a plough out in the snow, and the horse-rake is up in the middle of the field. Neglect left them there when he went off fishing instead of finishing his work. Neglect will always be a shiftless, thriftless fellow. Bring them in and see if they want repairing. Yes, a tooth is gone, and a handle of the plough is split. Well, look about, examine all the tools, and place those that want repairing in the shop. The first stormy days day that comes they must be repaired, and so of all other tools that need mending ; devote the stormy to them till all are in order and ready for use. Every farmer should have such tools as are necessary to do the ordinary repairs of his farming tools. If he has not got such, let him get them forthwith. It will be money in his pocket.—*Mirror and Farmer*.