

**SYNOPSIS OF THE
VEGETABLE PRODUCTS
OF NORWAY**

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BY
Dr. F. C. SCHÜZLER.

TRANSLATED FROM THE M. S.

BY
REV. M. R. BARNARD, B. A.
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INTRODUCTORY REMARKS.

At the request of the Central Committee appointed for the Arrangement of the Norwegian Contributions to the Great International Exhibition in London, 1862, I have compiled the following extracts taken from a Treatise on the Vegetable Productions of Norway,¹ lately published by me, and printed at the expense of the Royal Norwegian University.

The accompanying pages, printed at the expense of the Norwegian Government, are intended to serve as a guide to the Vegetable Products of Norway there exhibited.

Norway, which forms the north western part of the Scandinavian Peninsula, lies between 58° and 71° N. Lat. Its greatest length from Cape Lindesnes in the south, to the North Cape on the Arctic Ocean is 900 miles.² Its superficial area may be estimated at about 121,800 sq. miles, — half of which is situated at an altitude of more than 2000 feet above the sea, while $\frac{1}{3}$,³ or 3,200 sq. miles, lies within the limits of perpetual snow.

The altitudes at which snow never melts in the accompanying latitudes are as follows:

	Feet above the sea.
In lat. 61° Solutind	5,500.
— 62½° Dovre	5,400.
— 67° Sullijelma	3,800.
— 70° N. Cape	2,400.

¹ Die Culturpflanzen Norwegens beobachtet von Dr. F. C. Schöbeler, mit einem Anhang über die altnorwegische Landwirtschaft. Herausgegeben auf Veranlassung des academischen Collegiums, als Universitäts-Program für das 1ste Semester 1862, mit einem Vorwort von Chr. Boeck, Professor der Physiologie. Mit Karte, Tabellen und Planchen. Christiania 1862. 197 P. 4to.

² English measure is used throughout.

A glance at the accompanying map will show that Norway is, properly, a mountainous country, in which the mountains form the most prominent feature, while the valleys or lowlands occupy but a subordinate part; and even in those parts which have a lesser altitude than 2,000 feet, the same proportion is found to exist, though on a smaller scale.

Towards the frontiers of Norway and Sweden there extends a mass of mountains, from the sixty ninth parallel of latitude southwards, which though, strictly speaking, not a continuous chain must yet be considered to be a mountain range, whose average altitude is 3,000 feet, though this limit is occasionally exceeded. A little to the south of latitude 62°, these mountain ranges begin gradually to decrease in height, so that in the southern part of Norway is to be found, comparatively speaking, a considerable tract of lowland. At lat. 63° they first take a westerly and then a southerly direction till lat. 59°. In this part of the country traces of a continuous chain may here and there be observed, which should, however, with more propriety, perhaps, be termed an extensive plateau, with occasional peaks or ridges rising to the height of 8,000—9,000 feet above the sea. This plateau is of a somewhat undulatory form, having a breadth of 50—70 miles, but a greater length. As far as the eye can reach over these desolate wilds, the home of the wild reindeer, no traces of vegetation can be perceived, with the exception of the reindeer moss (*Cladonia rangiferina*), and other lichens of a similar nature, whose yellow tint imparts a melancholy appearance, and a depressing uniformity to the surrounding landscape. It is in this part of the country, viz. between lat. 60° and 62°, that the highest and wildest mountainous districts, and most of the glaciers are to be found.

As may be seen on the map, the valleys in the south-east of Norway run from north to south, and are frequently so narrow that the river, formed at the bottom by the mountain streams, occupies the principal part of them. On the western coast, however, the sea, in many places, makes deep indentations into the interior from west to east, thus forming firths or Fjords, as they are termed; which, like many of the valleys lying more to the east, may be considered as crevices, or fissures in the mountain mass.

The principal geological formations in the mountains of Norway are granite, gneiss, mica-slate and quartzite. These exercise great influence, not only, on the external formation of the country, but also upon its fertility. In some places, especially towards the S. E., as for instance in the districts adjacent to the Mjøsen Lake, the environs of Christiania, Skien &c., various kinds of slate and limestone are met with, and here the vegetation is found to differ in a very remarkable degree from that of those parts where gneiss, and the rocks allied to it, predominate. At different places, and especially in the S. E., where Norway and Sweden adjoin, the sea has in ante-historical ages deposited a considerable quantity of clay, which forms the substratum of the tillable land.

The greatest part of the country, therefore, consists of immense mountainous tracts intersected in different directions by deep valleys. The bottom and the sloping sides of these are adapted for the abode of man; but it is extremely rare to find human habitations, at least of a stationary character, at higher altitudes than 2000 feet; and even the "Sæters", where the people resort for a couple of months in the summer with their cattle, are seldom above 3,000 feet over the surface of the sea.

Norway abounds in lakes, mostly of an inconsiderable size, and often lying at great altitudes above the sea, as

	in length	feet above the sea
Gjendin 11 miles		3,270
Bygdin 15 —		3,575

both in lat. $61\frac{1}{2}^{\circ}$. From several of these, rivers take their rise, and flow in totally opposite directions. The most remarkable instance is to be found in Lessjøværk's lake, lat. 62° . This lake is 7 miles long, and 2,050 feet above the sea, and is the source of two rivers, — the Logen flowing to the south, and the Rauma to the north.

The whole country abounds in morasses, many of which are capable of being reclaimed for agricultural purposes, but which, in their present state, have an injurious effect upon the climate, and render the cultivation of corn in their immediate neighbourhood, a matter of extreme uncertainty.

In the Diocese or "Stift" of Christiania alone, which comprises about $\frac{1}{4}$ of the superficial area of the whole country, there are not less than 1,156 sq. miles of marshy ground below the limit of corn, and 764 sq. miles above. During the last few years the people have been gradually awakening to the advantages of a rational system of agriculture, and have, in many places, by reclaiming marshy ground, and by applying a system of drainage to their cultivated lands, produced good results, which are becoming every year more and more apparent.

Although of late years the forests have been much reduced, yet they still occupy a considerable proportion of the surface of the country. They consist chiefly of Scotch fir, and Norwegian Spruce fir. Moreover, in some places in the south small woods of oak and beech are to be found; and in the north especially, birch woods are common; but these five sorts of trees are the only ones which appear in Norway in such quantities as to be said to constitute a wood. Other sorts appear only sporadically.

From the above remarks it will readily be seen that the tillable land in the whole of Norway cannot be extensive; and yet, on taking into consideration the superficial area of the country, one cannot but feel surprised to learn, that this tillable land does not exceed 1,060 sq. miles. Consequently, even in the most favourable years, Norway has still to import a great quantity of corn. What proportion of this area is arable land, and what pasture land (either natural or artificial) is, at present, impossible to state even approximately.

As Norway, as stated above, covers 13 degrees of latitude, it is very evident that there must be large room for changes of climate in a country of such extent. There are, however, other circumstances connected with this which must be taken into consideration. Proximity to the sea prevents extremes of heat and cold all along the extensive seaboard. On penetrating, however, for a very few miles into the interior, a most striking difference may be remarked. As an instance of this, the parish of Valle, in Setersdal, may be adduced (the church lies 1,000 feet above the sea, lat. $59^{\circ} 12'$, long. $25^{\circ} 11'$ E. Ferro), where in summer the thermometer may show $+ 42^{\circ}$, and in winter the mercury may fall to $- 35^{\circ}$.¹

¹ The Centigrade thermometer is referred to.

In the interior of the country the winters, generally speaking, are long and severe, while the summers are short and hot.

The accompanying table of Observations, taken at the Royal Norwegian Observatory in Christiania (59° 52' 43" lat. 28° 23' 19" long. E. Ferro), shows the state of the thermometer and barometer during the 24 years last past, together with the quantity of rain fallen.

Respecting other parts of the country, as far as meteorological observations have been made, the annexed table will show the state of the temperature.

	North Latitude.	Mean temperature for the whole year.	Mean temperature for the winter months.	Mean temperature for the summer months.
North Cape	71° 10' 20"	+ 0,1	- 5	+ 6,25
Thronhjelm	63° 25' 45"	+ 4,25	- 4,75	+ 15,0
Bergen	60° 23' 37"	+ 8,21	+ 2,21	+ 14,75
Ullensvang in Hardanger	60° 16'	+ 7,25	- 1,0	+ 15,16
Christiania	59° 54' 43"	+ 5,37	- 5,0	+ 15,5

At the Alten copperworks in Finmarken (69° 57' 30" lat., 40° 41' E. Ferro) the mean temperature, after eleven years observation, can be computed as follows:

January, - 7,490, February, - 8,957, March, - 5,993, April, - 0,695, May, + 4,525, June, + 9,418, July, + 13,113, August, + 13,254, September, + 7,298, October, + 0,341, November, - 4,033, December, - 5,619.

As may be anticipated from the configuration and situation of the country, the quantity of rain falling in different localities varies exceedingly. Thus, while but little rain falls in the eastern districts, the quantity that falls in some parts on the western coast is extraordinarily great. At Bergen the quantity of rain that falls during the whole year may be estimated at 85 inches, while at Christiania, taking the average of 20 years (1839-1858), it was 20,7 inches.

When, furthermore, it is borne in mind that the sea never freezes along the whole extent of the western and northern coasts, it will be perceived that Norway enjoys a far milder climate than any other country in the world under the same degree of latitude. The cause of this is, that the Gulf Stream, in its course towards the north, approaches or impinges on the northern coast under the sixty second parallel of latitude. It is by no means improbable that a smaller branch of this stream takes a southerly direction along the coast; but at all events, from a number of facts (which space will not allow me to introduce here) it is clear, that the Gulf Stream takes a northerly direction from this point of impact, and follows the line of coast at a greater or less distance to the Russian frontiers on the Arctic Ocean. From thence, it has been ascertained, that it flows into the White Sea, and afterwards, taking a bend towards Nova Zembla, touches the coast of Spitzbergen in lat. 80°. Whether it now loses itself in the Arctic Ocean, or mixes with the cold sea stream, which flows in a southerly direction between Iceland and Greenland, has not hitherto been ascertained.

The fact above alluded to is undoubtedly the cause, that the northern parts of Norway are not only habitable, but are also considered by many as agreeable places of residence. But there is also another circumstance which exercises great influence on the vegetation over

the whole of Norway, and especially towards the north, viz. the long days, or, in other words, the continual light.¹

Moreover during the short nights, the earth does not become so cooled as in more southern latitudes; vegetation therefore continues, night and day, without interruption. In other words, a lower and continuous degree of warmth produces the same effect in Norway that a higher temperature, interrupted by proportionally colder nights, produces in countries lying more to the south.

From investigations and observations I have made for several years, I may cite the following results.

The temperature of the atmosphere and of the soil decreases, as is well known, directly as the distance from the equator. Consequently, it might be premised that more time would be requisite for the development of a plant the further it is found towards the north. Yet corn and other plants will ripen under a much lower temperature, and in a much shorter time in Norway than in countries further towards the south; and even in Norway itself, a considerable difference in this respect may be observed, between the southern and northern districts.

Corn or other seeds brought from a southern to a northern climate require at first a longer time to ripen than the same species, which have been cultivated there for some time. But after the lapse of two or three years, the plants obtained from foreign seeds generally acquire the same ripening peculiarities as their corresponding species, which have been cultivated for a longer time in the country. And I have further remarked, that if seeds are brought from a higher to a much lower latitude, they will in the first (and perhaps also in the second) year ripen earlier than the corresponding plants of the same species, which belong to that lower latitude, though after a time they become similar in this respect.

So long as a plant is not cultivated further northwards than it is able to attain its full development, the seed increases in size and weight for the first 2—3 years, the nearer it approaches this limit; but, it diminishes in like manner, if cultivated several degrees further south. The greater the difference in latitude between the respective places, the more marked is this difference.

Again, the further north a plant is cultivated, under the above restriction, the more strongly does the pigment of the epidermis become developed. This peculiarity is very marked in several varieties of yellow peas, which become green when cultivated in high latitudes, and in white kidney beans with red spots or stripes, which get a more extended and more intense pigment deposit. But after the lapse of 1—2 years, and under a more southerly latitude, the seed loses this peculiarity.

In several plants also, the flowers assume an intenser colour; and the leaves of wild

¹ Under the seventieth parallel of latitude, in Fimarken, from May 24th till July 19th, the sun never sinks below the horizon. At Thronhjelm, lat. 63° 25' 45", the sun rises at 1 hr. 50' a. m. on June 1st, and sets at 10 hr. 18' p. m.; and even at Christiania, lat. 59° 54' 43", when the sun rises 2 hr. 40' a. m., and sets at 9 hr. 23' p. m., it is so light, that for two or three weeks it is quite possible to read during the whole night, when the sky is entirely free from clouds.