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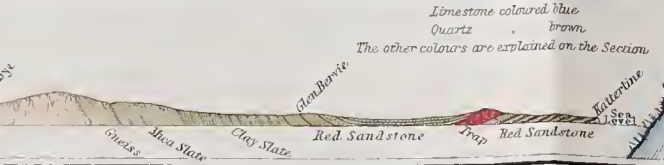
SKETCH MAP
 OF THE
VALLEY OF THE DEE
 AND
BRAEMAR
 BY A. KEITH JOHNSTON, F.R.S.E.
 Geographer to the Queen
 COLOURED GEOLOGICALLY
 From MacDonald corrected by Professor Nicol



MOUTH OF THE DEE
 Lat. 57° 9' Long. 2° 6' W
 NORTH OF THE DEE

NORTH
 SEA

Scale of Map and Section - Four Miles to an Inch
 8 Fms 0 1 2 3 4 5 6 7 8 Miles
 25300 of Nature





Frontispiece.

LOCHNAGAR.

THE
NATURAL HISTORY
OF
DEE SIDE AND BRAEMAR.

BY THE LATE

WILLIAM MACGILLIVRAY, LL.D.

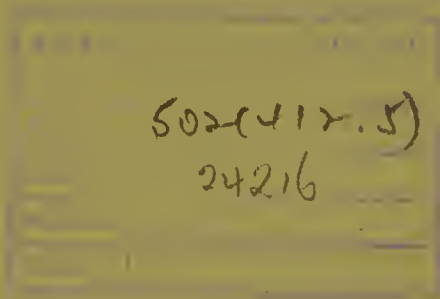
PROFESSOR OF NATURAL HISTORY IN MARISCHAL COLLEGE AND UNIVERSITY, ABERDEEN:
AUTHOR OF A HISTORY OF BRITISH BIRDS, &c.

EDITED BY

EDWIN LANKESTER, M.D., F.R.S.

LONDON:
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1855.

BRADBURY AND EVANS,
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S.L.

EDITOR'S PREFACE.



THE manuscript of the following work was completed by the author just before his death. Had he lived, it was his intention to have published it; but his family not wishing to do so, the manuscript was purchased by the Queen, and is now printed by her Majesty's command. The duty of seeing the work through the press was entrusted to myself. In performing this very pleasing task I have been assisted by several distinguished naturalists, who have taken great interest in the work. With their aid I hope it will be found as free from defects as could be expected, deprived of that careful revision which its lamented and talented author would undoubtedly have bestowed on it. One of the greatest difficulties with which I have had to contend in editing the work, is the spelling of the Celtic names of places; many of these are,

perhaps, now printed for the first time. The greatest possible license seems to be allowed in spelling them, as in Dr. Macgillivray's manuscript the same word is frequently spelt in three or four different ways. An attempt has, however, been made to secure uniformity, but not always with success. Many of the places in the maps, for instance, having been spelt or printed differently from the same places in the text. In no case, however, does this appear to interfere with the immediate recognition of the name.

As the bulk of the work was large for a book intended as the description of a limited locality, it was thought desirable to omit some of the less relevant passages which occurred in various parts of the manuscript.

A few notes, and the Latin or English names, as the case might be, of plants and animals have been added.

In the department of Geology I have been assisted by Sir Charles Lyell, who supplied the note at page 195, and some corrections in the text, whilst the whole of the Botany has been revised by Sir William Jackson Hooker.

The lists of plants have also been submitted to Dr. Dickie, Professor of Botany in the Queen's College, Belfast, formerly of Aberdeen, to Dr. Balfour, Professor of Botany, Edinburgh, Mr. C. C. Babington, of Cambridge, and Mr. N. B. Ward, of London. The two former, from their intimacy with the Flora of Dee side, have added the names of many species and many new localities.

Sir William Jardine, Bart., has revised the list of birds and fishes, and supplied some useful notes.

I am also indebted to Mr. Yarrell, of London, for revising the lists of animals.

The list of land and fresh-water Mollusca was drawn up by the late lamented Professor Edward Forbes. The large list of Coleopterous Insects was supplied by Mr. A. Murray, of Edinburgh, author of the Catalogue of the Coleoptera of Scotland; and the list of the remaining Insects by Mr. P. H. Macgillivray, from his father's manuscripts.

In the department of Mineralogy I have received great assistance from Professor Nicol, of Marischal College, Aberdeen, who not only looked over the proof sheets of

the work, but supplied the list of minerals in the last chapter, and the note accompanying the map.

The geological map has been got up with great labour and care by Mr. Keith Johnston, of Edinburgh, Geographer to the Queen.

Dr. Robertson, of Tarland, and Dr. Adams, of Banchory, rendered valuable assistance, in their corrections of the proofs, and in the notes which they furnished on the natural history of the districts in which they reside.

During the whole progress of the work through the press, I have received constant aid, and important assistance, from Sir James Clark, Bart.

The wood engravings were made from drawings by the Viscountess Canning, Mr. T. M. Richardson, the author, and Miss J. Macgillivray, by the female pupils in the School of Design at Marlborough House, under the careful superintendence of Miss Waterhouse.

The matter contained in the short article on the Red Deer was chiefly obtained from answers to a series of queries drawn up and circulated among those

known to be acquainted with the habits of the Deer. Replies were forwarded by the following noblemen, gentlemen and foresters :—

THE EARL OF SELKIRK.

SIR PHILIP DE MALPAS GREY EGERTON.

J. H. HUDSON, Esq., Rudd Hall.

A. BUTTER, Esq., Faskalley.

RICHARD CAMPBELL, Esq., Jura.

CHARLES ST. JOHN, Esq., Elgin; author of the "Field Sports of the Highlands of Scotland."

MR. McLAGGAN, Factor, of Invercauld.

PROFESSOR OWEN, London.

MR. JOHN HALL, of Sciberscross.

MR. PETER ROBERTSON, Forester to the Marquis of Breadalbane.

MR. JOHN GRANT, Forester, Balmoral.

MR. THOMAS McDONALD, Game-keeper to the Duke of Sutherland.

MR. GEORGE SUTHERLAND, Forester during thirty years to the Duke of Sutherland.

8, SAVILE ROW, LONDON,

August 10, 1855.

P R E F A C E.

THE romance of old Scotland is gone, and for ever. The quiet waters of our sequestered lakes are agitated by the paddles of the steamer ; carriages roll along our mountain-valleys. The sounds of war have long ceased to be heard in the land. In such a state of things, a journey to the central Highlands of Braemar is not necessarily attended with peril ; and if the traveller is of a romantic turn, he must, to gratify his taste, put himself into positions of danger, and subject himself to fatigues and hardships, which, if he be a naturalist, he may easily do, without becoming liable to the charge of eccentricity.

In the autumn of 1850, I performed such a journey

—not for the first time. I had in view to examine the geological structure of Braemar, its alpine vegetation, and, to a certain extent, its zoology. Necessarily connected with these subjects are many others, to which some attention was also to be paid. There were many reasons why I should present an account of observations made on this journey to the public. But the narrative which I offer requires no other prospectus than that to be found in the Table of Contents.

When I consider what acuteness of intellect, what play of imagination, what aptness of illustration, what beauty of style, what force, and point, and polish, are displayed even in our most ordinary popular journals, I feel as if I ought to despair of rendering a narrative so unsusceptible of embellishment as that of the simple journey of a pedestrian naturalist through a very peaceful tract of Scotland, interesting to a fastidious public, or instructive to persons conversant with objects of like nature to those which I should have to present to their view. But when I reflect, that not the wonderful, nor the fanciful, nor the beautiful, are the exclusively useful,

and that a single-minded man may by a right use of his eyes, anywhere that the sun shines, and the winds blow, and the rains fall, find abundant matter for observation and instruction, I am encouraged to think that a selection of objects seen on such a journey may be so presented as to afford considerable pleasure to those who may not have like opportunities of looking upon nature, or who may not choose to undergo the fatigues necessary for such an enterprise. They who would not themselves willingly scramble up the corry of Cairn Toul, or traverse the stony ridges of the Braeriach, may yet be pleased with viewing scenes in the actualities of which a naturalist delights, reflected in a mirror, not uniformly lucid, it may be, but neither exaggerated nor distorted. The world is everywhere replete, not only with wonders to exercise the imagination, but with truths to improve the judgment. Even on the border of the most frequented paths are many things travellers have passed by unheeded or unexamined; and, if the Valley of the Dee has many a time been traversed by the wise and the learned, the man of science and the man of wit, the poet, the painter, and

the tourist, it is equally instructive to the naturalist, who ought, in his own person, to represent all these characters.

Not hopeless, then, of some degree of success, I undertake a survey of this tract.

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INTRODUCTION.

THE DEE AND ITS BASIN.

ABERDEENSHIRE, one of the most extensive and populous counties in Scotland, appears to have been anciently divided into five districts :—Mar, Formartin, Buchan, Garioch, and Strathbogie. A natural division of territory made in accordance with physical phenomena, is both easily intelligible, and more fitted than any other for retaining its hold on the popular mind. These districts, being in a great measure natural, are, accordingly, universally acknowledged by the inhabitants of Aberdeenshire, even at the present day.

The best territorial limits are those formed by expanses of water and mountain-ranges. In Aberdeenshire, which is but a segment of a country not itself of very great extent, there are no large bodies of water, nor continuous elevated ridges of land ; but there are rivers sufficiently large in part of their course, and hill-ranges sufficiently distinct, to form barriers capable of being recognised.

Of the five districts mentioned, Mar, by much the largest, is defined partly by mountains and partly by rivers. It includes all the space interposed between

the Dee and the Don, from the sea, which they enter at the distance of only a mile and three-quarters from each other, to where they cease to be easily fordable under ordinary circumstances, together with the hills and valleys from which their sources and tributaries descend. Its length, from east to west, is about 62 miles, its average breadth about 15, its area 930.

But simple as this arrangement may seem, it presents difficulties in determining its precise limits, and anomalies resulting from the interference of various causes. A very obvious instance of the latter is the parish of Banehory Ternan, which, although mostly north of the Dee, is considered as belonging to the County of Kincardine.

The district of Mar was divided into two subordinate districts: Mar proper, and Brae-Mar, the latter mountainous, the former, though to a great extent hilly, having much of a lowland character.

Braemar, constituting the upper part of the county, and altogether mountainous or hilly, is separated from the other tract by the lower outline of elevated land, extending from the lower part of Strath Don, by the eastern base of the Morven group to the nearest part of the Dee, and along the bed of that river to the mouth of the Feugh, which opens into it at Banehory. This subdivision, which, at one time comprehended the parishes of St. Andrews, also called Braemar, Crathie, Glen Gairn, Glen Muie, Tullieh, Glen Tanar, and Birse on the Dee, together with Invernoehy or Strath Don, is not now generally recognised. The uppermost portion, formerly called the parish of St. Andrews,

subsequently Ceann-drochid, and ultimately Braemar, is that which now usurps to itself exclusively the latter name.

The ancient Braemar comprehends, besides Strath Don, (which geographically belongs to the river-system of the Don,) 1. Braemar and Crathie, united into one parish, called Crathie; 2. Glen Gairn, Glen Muic, and Tullich, united into one parish, called Glen Muic; 3. Glen Tanar, which is now united to Aboyne, the united parishes being called by the latter name; 4. Birse.

Mar proper included all the rest of the district. But a comparatively small tract, consisting of three parishes and a part of two others, all comparatively low, and the whole partially enclosed by a range of hills, is still distinguished by the name of Cromar. These parishes are Logie Coldstone, Tarland, Coul, and part of Tullich and Aboyne. The remaining parishes are Lumphanan, Kincardine O'Neil, Midmar, Echt, Skene, Drumoak, Peter-Culter, and Aberdeen on the Dee, and Towie in part, Cushnie, Alford, Tough, Monymusk near Cluny, Kemnay, Kinellar, Dyce, New Hills, and Old Machar on the Don.

These arrangements are only mentioned to prevent ambiguity. I shall now endeavour to present a succinct account of the Basin of the Dee, or the territory drained by that river.

The Dee is generally considered as commencing with five springs of limpid water issuing from amongst granite detritus on a declivity not far from the summit of a mountain, called Braeriach, which is next neighbour to Ben-na-muic-dhui and Cairntoul—the three forming

the most elevated portion of the mountain-land of Scotland, although but very slightly exceeding some other parts of it. The stream formed by these springs, two of which only are persistent, the rest being sometimes dried, when there has been protracted drought, proceeds towards the brink of a corry, more than a thousand feet deep, over the crags of which it descends in a stripe conspicuous by its whiteness from afar.

Should this stream, instead of thus falling over the precipice, be artificially, or otherwise, directed so as to descend into the basin of the Spey, would the headless river entering the sea at Aberdeen, still be the Dee? This imagined case is only the shadow of a fact:—imagination has no power of invention—a neighbouring river has in this way lost its head; and yet, not the less, it bears the name which it has borne for hundreds of years. “It is a singular fact that the source of the Don has lately been actually turned into the Avon, in order to turn the neighbouring farmer’s mill-wheel.” (Stat. Ace. xii. 530.) A river is nothing but a continuous series of continually renewed drops of water following each other in a groove. It is probable that not a single drop which issues from the wells of Dee enters the sea at Aberdeen. More than this, there are rills that originate farther up the glens, and higher up the hills than this rill with its eataract of a thousand feet. It, however, and these and other rills, unite and form a brook called the Dee, which, successively augmented by rills and brooks, flows eastward, in a course of probably a hundred miles, until its waters find their level in the sea. The river and its tributaries occupy

the lowest grooves of the land over which they flow ; but they have not formed these grooves ; nor, in such a tract could the action of far mightier streams produce much obvious effect upon the obdurate primary and ignigenous rocks which are exposed to its corroding influence. The connected series or system of valleys and grooves in which the Dee flows forms a well-defined tract of hill-ground.

Where the county of Aberdeen is conterminous with the counties of Perth and Inverness, a mountain named Scarsach rises in the midst of a range which runs thence south-eastward, for about fifteen miles, to a mountain called Glasmeal, where it meets the county of Forfar. From thence the ridge proceeds eastward, along a space of about twenty-five miles, to Mount Battock, where it comes into contact with the county of Kincardine. The ridge, already much lowered, continues its course eastward, and ends on the rocky coast of Kincardineshire a few miles south of Aberdeen, the space traversed being about twenty-six miles. In a straight line, the distance from Scarsach to the sea is about fifty-eight miles.

From Scarsach to Cairn-eelar, northward, is a distance of about six miles. That mountain belongs to a range, continued westward in the direction of Dalwhinnie, and eastward to Ben-Aun ; its western part bounding in so far the counties of Perth and Inverness. From Cairn-eelar eastward to Braeriach, on which the counties of Inverness, Banff, and Aberdeen meet, the distance is about ten miles. From Braeriach, by Ben-Aun, to the hill called the Brown Cow, about sixteen miles, the ridge has its northern declivity in the county of Banff.

Thence to Morven, about ten miles distant, and due east, it extends about ten miles, with the parish of Strathdon on its north side. Curving northward and eastward to the Hill of Tarland, about six miles, it then, low, irregular, and tortuous, proceeds eastward, by the northern extremities of Lumphanan and Kineardine O'Neil, to the Hill of Fare, a distance of about ten miles; and thence, about sixteen miles, to the sea, about half-a-mile north of the mouth of the Dee. The greatest length of the tract thus defined by the water-shed of the hill-ranges separating the Basin of the Dee from the neighbouring river-systems, is about sixty-four miles, its greatest breadth fifteen; from the head of Glen Muie to the northern limit of Glen Gairn; its least breadth is about two miles. From the Broad Hill to Gregness, which latter, however, is not its limit on the coast, but Durris, about eight miles, south of Aberdeen, the average breadth may be ten miles, and thus the area would be 640 miles.

The groove or narrow valley in which the Dee flows is, although a little tortuous, directed almost uniformly, from the junction of the two principal sources, the Dee and the Geaulie, from west to east, and occupies nearly the middle line of the space of which it receives the waters. The tributary streams enter this groove very seldom at right angles, but generally in a direction considerably inclined eastward; and thus, some of them, as the Gairn, the Muie, the Tanar, and the Feugh, have a course of from twelve to twenty miles.

The elongated and narrow space thus drained is entirely mountainous in its upper or western half; the

Mona-rua group of mountains, extending from Cairn-eelar and Ben Vrotan to Ben-Main, is in some measure separate and distinct from the rest, and composed entirely of granite. On its southern declivities, and all along the valley of the Dee, are masses, discontinuous and variously inclined, of a stratified rock, composed of quartz and mica, the former granular but crystalline, the latter in scales disposed in films or laminæ. Portions of this deposit present the characters of quartz rock, but are never to the thickness of a foot destitute of laminæ of mica. Other portions agree with the ordinary definitions of mica-slate, presenting alternating laminæ of quartz and mica, the latter sometimes predominating. When, as often happens, the alternate layers are very thin, the mica in very small scales, the quartz intermixed with mica, the rock resembles some varieties of gneiss; but, if any felspar at all occurs in it, the quantity is extremely small. The whole mass is thus mica-slate.

From the sources of the Geaullie eastward to Glen Clunie, the whole space is of this mica-slate, presenting the varieties of character mentioned; often intersected with quartz veins, and presenting irregular beds of crystalline limestone. Dykes and stratiform plates of red felspar porphyry are numerous in this deposit, the direction of the strata of which is mostly north-east and south-west; the dip various, from 10° to 50° ; the inclination south-east. This formation extends beyond Glen Clunie into Glen Callater, of which it forms all the western side.

To the eastward of that valley, however, the mountains, with their prolongations and ridges, from the

elevated summits of Cairn Taggart and Loehnagar, are granite, similar to that of the Mona-rua group, but considerably harder, and somewhat less coarse; as are all the upper portions of Glen Muie and Glen Tanar, as well as most of the higher hills in the parish of Birse. Along the Dee from the mouth of the Clunie to that of the Gelder, mica-slate is seen only in part of the precipitous hill-face opposite Invereauld House. But the ridge between Glen Gelder and Glen Girnae is partly of that rock. Between Glen Girnae and Glen Muie, a range of hills, about three miles long, is formed of hornblende, slate, and mica-slate, through which has protruded a mass of serpentine, forming three conspicuous peaks, and appearing among the disturbed hornblende strata, all along the eastern declivity to near the mouth of the glen.

On the north side of the Dee, the granite of Ben Areuis is prolonged southward, intermixed with mica-slate in comparatively small quantity, and some hornblende-slate. The greater part of Glen Gairn is of these slaty rocks, among which are beds of limestone; but some of the hills are partly of granite, down to near its mouth, as is a great portion of the hill-range that separates it from the Dee. The hills to the north-east of the mouth of Glen Gairn are chiefly of quartzose mica-slate; but the high mountain of Morven is of hornblende rock, as is the ridge proceeding from it northward and separating Strathdon from the Cromar district. Morven, however, is flanked by a range of granite hills, stretching from Logic Coldstone southward to Craig-an-darroh, and bounding the plain in which

are Lochs Davan and Caennor, as well as the valley or plain of Ballater, the southern side of which also is of granite.

The hill-range which separates Glen Muic from Glen Tanar, is in its upper and eastern part of granite; but from a little above the Linn of the Muic to Ballater, of hornblende-slate, partly on its higher part intermixed with mica-slate, and sometimes presenting strata which may be considered as gneiss.

Beyond this ridge, eastward, the slaty rocks are hornblende and gneiss, with beds of limestone. The further we proceed eastward the more distinctly characterised is the gneiss, until beyond the Feugh it assumes the varied aspect presented by tracts, such as those of the outer Hebrides, in which that rock prevails. In this lower tract, the stratified rocks appear to predominate over the granitic, and along the coast of Aigg and Banchory are seen curiously intermixed with them.

Proceeding eastward from Morven, we cross the comparatively low tract of Cromar, which appears to be mostly granitic: the hills at least are of granite, with veins and masses of red porphyry. From Aboyne eastward to Banchory there are extensive tracts of gneiss and mica-slate; but the higher grounds, and especially the Hill of Fare, which is about five miles in length and 1800 feet high, are of granite. The same rocks extend to Aberdeen, the granite still predominating.

The more elevated granitic mountains of the upper part of the basin of the Dee have their summits covered, often paved as it were, with fragments evidently not trans-

ported from a great distance, and their sides more or less strewn with blocks and stones, derived from the disintegration or shattering of the original rocky surfaces. Their valleys present layers and heaps of alluvium, composed of more or less rounded stones and gravel. The slaty mountains are less cumbered with fragments than the granitic. Many of them, however, are continuously covered; their detritus forms a finer soil, and the alluvium of their valleys is more reduced. The bottoms of all the valleys are more or less strewn with alluvium, and in the lower parts of the layer it is often greatly accumulated. Still, there is not so much detritus in the upper granitic tracts as might be expected by one who adopted the theory of the original slaty strata having been broken up by the protruded granite. It would appear that the greater part, in some cases the whole, of the slaty fragments, had been swept away to a distance, that the granitic masses had been left bare, that their sides had been covered with the fragments arising from their own disintegration or shattering, and that the comparatively small quantity of rolled detritus found in their valleys has resulted, not from the action of primæval currents, but of floods or torrents resulting from more modern landwaters. It is in the low grounds to the eastward that we find the ruins of the strata dispersed, and the layers of gravel, sand, and clay resulting from the eviection of the ruins. In the comparatively low tracts extending from Culblean to Kineardine, vast quantities of stones and gravel are spread out; and in part of the Cromar district, where there have been eddies of the waters, and

probably stagnant lakes, there are layers of yellowish or bluish clay, lying on strata of gravel, mixed with blocks and stones. But, in general, the surface-layer, or soil, along the Dee, in nearly its whole course, is gravelly and sandy, readily imbibes rain, and allows it to percolate. There are few tracts in Scotland so destitute of lakes, pools, or stagnant water of any kind as the hollow of the basin of the Dee.

Peat does not form in great quantity, except in the few swampy hollows, and on the broad backs of some of the hill-ranges. In the latter situation, it is sometimes seen covering extensive spaces; for example, on the kind of table-land interspersed with little pools and marshes, between the head of Glen Callater and Mount Keen, and on the ridge that separates Glen Muic and Glen Tanar. In the lower tracts, especially where gneiss prevails, there are, however, large tracts of peat, sometimes of great depth, as, in the neighbourhood of the Loch of Skene, and in the parishes of Nigg and Banchory Devenick.

The streams that come from the granitic tracts to the north of the Dee, from Cairntoul to Morven, are all remarkable for their clearness and agreeable taste. Those from the southern side, are usually more or less, sometimes conspicuously, tinged with brown. Still, the river is remarkably limpid in its whole course, which may be estimated at about ninety miles. It descends from an elevation of 4000 feet, in a course of about twelve miles, to that of 1294 feet; in about thirty miles further, to 780 feet, and in about forty-five miles more to the sea. According to a statement given in the statistical account

of Glen Muic parish, its mean annual breadth there is estimated at about 210 feet; its mean depth at about four feet; its mean velocity at about three miles an hour, and its mean temperature at 40° to 42° Fahr.

The following tables will be found useful, with reference both to what has been already stated, and to the account of the vegetation of the district :—

I. HEIGHTS IN THE VALLEY OF THE DEE.

Dee at the Bridge of	19
„ Burn of Culter	60
„ Drumoak	90
„ Bridge of Banchory	172
„ „ Potarch	280
Mause of Aboyne	417
Dee at Bridge of Ballater	780
Abergeldie Houso	842
Mause of Crathie	860
Invercauld Bridge	1030
Braemar Castle	1070
Alanaeuaiel	1100
Dee at the Linn	1190
Confluence of the Deo and Geaullic	1294
Junction of the Giusachan and Dee	1640
Highest well of the Dee	4000

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II. HEIGHTS OF MOUNTAINS IN MAR.

Scolty	1500
Hill of Fare	Ph. G. 1793
Kerloack	1890
Peter Hill, Birse	.K. 1930
Clachnaben	Ph. S. 2370
Mount Battock	.R. 2600
„	.W. 2611
Mount Keen	.K. 3180
Craigandarroch	St. A. 1400
Knoc	St. A. 1150
Allt-na-Guithasach	.K. 1360
Loch Muic	.K. 1280
Duloch	.K. 2050
Craig of Duloch	.R. 3250
Corbreach	.K. 3450

Lochnagar	(Highest summit)	. . . . .	K.	3800
„	(Second summit)	. . . . .	K.	3780
„	„	. . . . .	St. A.	3814
Cairn Taggart		. . . . .	St. A.	3000
Lake of Lochnagar		. . . . .	K.	2500
Lochani-nan-ain		. . . . .	R.	2450—2800
Scarsach		. . . . .	R.	3500
„		. . . . .	U.K.S.	3390
Morven		. . . . .	K.	2880
„		. . . . .	St. A.	2934
Cairngorm		. . . . .	K.	4050
„		. . . . .	U.	4080
„		. . . . .	A. G.	4095
Cairntoul		. . . . .	K.	4220
„		. . . . .	A. G.	4245
Braeriach		. . . . .	R.	4220
Ben-na-muic-dhui		. . . . .	K.	4300
„		. . . . .	W.	4320

CHAPTER I.

THE TOUR.

THE VALLEY OF THE DEE.—UPPER AND LOWER PORTIONS.—THE FORMER THE UPLAND.—THE LATTER DIVIDED INTO MIDLAND AND LOWLAND.—GENERAL VIEW OF THE LOWLAND TRACT.

THE Valley of the Dee, about sixty miles or more in length, and from fifteen to ten or less in breadth, is naturally divisible into three distinct portions. The upper, commencing in the centre of Scotland, is formed among mountains, some of which are among the highest in Britain, and terminates abruptly at its lower end, on the northern side, in an extended plain; but on the southern it is continuous with elevated hill-ranges. The groove which receives the mainstream runs eastward, in a nearly direct course, for about thirty miles; but at its commencement is joined by a groove of about ten miles, coming from the north, and another of nearly the same length from the west. The stream of the northern groove is called the Dee, that of the western, the Geaulie. This upper mountainous tract, although geographically one and continuous, is ecclesiastically divided into the united parishes of Braemar and Crathie, and the united parishes of Glen Muic, Tullich,

and Glen Gairn. Below, or eastward, of the latter, the valley in which the main stream flows, runs almost directly eastward, from the termination of the mountain land in the plain, of which the Moor of Dinnet is a part, to the sea at Aberdeen. The southern side of this tract is formed of mountains lower than those of the first or upper tract, and gradually declining eastward. Its northern side is an extended plain, partly bounded, and frequently intersected, by hills of no great elevation, and in its eastern half undulated, but presenting one large hill of considerable height, at the distance of from fifteen to twenty miles from the sea. If the district is to be apportioned to the Highlands and Lowlands, it is evident that the whole of its upper part belongs to the former, as does the southern half of the lower part, even to the sea coast; although the northern half of the lower part is not strictly a plain, it is Lowland in its general character.

The groove, or extended valley, toward which the land declines on both sides of this range of country, extending from the junction of the counties of Perth and Aberdeen eastward to the Celtic sea, is widest in the upper part of its lower half, which may be called the Midland tract. The eastern portion of this lower half, from Banchory to Aberdeen, including a space of about eighteen miles in length, and which may not inaptly be called the Lowland tract, is formed of hilly and undulating ground gently sloping toward the bed of the river, and more or less covered with fragments of rock of all sizes, from that of several feet in diameter, to gravel and sand, all more or less water-worn and rounded.

The stream, compared with the other rivers of Scotland, is considerable. It glides with lively speed, nowhere forming cascades, nor anywhere stagnant pools; holding, on the whole, a straight course, yet winding gently in its basin; here wearing away the base of a gravel bank, of which the bare declivity forms a not unpicturesque feature of the landscape; there edging or intersecting a diluvial flat, which, where not restrained by embankments, its waters overspread when increased by heavy rains. There is here and there a slight fringing of natural wood; but the whole tract would be bare and unsheltered, had not man's industry interfered, and clothed it with woods, the alternation of which, with corn-fields and yet uncultivated moors, forms a scene pleasing to the eye of the naturalist, but to which the clear and rapid stream gives its chief beauty.

The rock in all this eastern or Lowland portion of the lower valley of the Dee, consists of gneiss and granite, both so covered with diluvium as seldom to be examinable, and therefore having their limits untraced. Here and there, in the little grooves, or Dens, as they are called, in which the tributary brooks flow, as the Den of Leggart, the Corby Den, that of Durris, and the bed of the Feugh, on the right or south bank of the Dee, the Den of Cults, that of the Burn of Culter on the left, the gneiss is occasionally seen to a small extent. The granite exposed in numerous quarries about Aberdeen, on both sides of the river, varies considerably in character, but is generally rather small-grained, white, or slightly tinged with red, and composed of crystalline

felspar, quartz, and mica. Some large veins of compact felspar, more or less porphyritic, and a few of greenstone, have been detected.

There is nothing peculiar in the general aspect of the vegetation. The heaths are covered with the ordinary plants found everywhere in such situations. The same is to be said of the pastures and fields. The trees of natural growth are the Alder, the Birch, the Hazel, the Oak, the Mountain-ash, the Bird-cherry, the Aspen, several Willows, and some others. There is no (native) Pine in the whole tract, nor, I think, any Ash or Elm. The plantations are numerous and extensive, and present many species, among which *Coniferæ*, and especially *Pinus sylvestris* (Scotch Fir), *Abies excelsa* (Norway spruce), *Abies pectinata* (silver Fir), *Larix Europæa* (common Larch), are the most conspicuous. Next to them, the Ash, the Beech, and the broad-leaved Elm, seem to thrive best. But many plants are met with interesting to the botanist. In the bed of the river, on its pebbly beaches, and in the flat islands which occur in the lower part of the tract, are seen *Alchemilla alpina* (alpine Lady's Mantle), *Oxyria reniformis* (mountain Sorrel), *Arabis petræa*, *Epilobium alpinum* (alpine Willow-herb), (no doubt brought down by the floods, and thus indicating the alpine character of the tract in which the river has its sources); *Galium boreale*, *Primula veris* (Cowslip), *Carduus heterophyllus*; and for some miles from the estuary, a profusion of *Silene maritima*, *Statice Armeria* (Thrift), and *Cochlearia officinalis* (common Scurvy-grass), plants found on the sea-shore, and in all the intervening parts by the river

and its tributaries, up to the summits of the higher mountains at their sources.

In the woods, *Linnæa borealis** occurs at Countess Wells, within three miles of Aberdeen; on the hill to the east of Banchory House, about the same distance from the town; at Kingeausie, about eight miles; near Park House, half-a-mile from the Castle of Drum, to the west; and plentifully, on the south side of the river, on the Durris estate, where it was found by Mr. Anthony Mactier. The Banchory, Kingeausie, and Durris stations are in Kineardineshire, in which county, but on its southern border, at Inglismaldie, this beautiful and much-valued plant, was first discovered as a native of Britain, by Professor James Beattie, of Marischal College, who made many other interesting additions to the British Flora. The other stations in Aberdeenshire in which I have seen it are, a wood within the grounds of Scotstown, where it was a few years ago found, I have been told, by Dr. Andrew Fleming; a wood at Craibstone, about five miles from Aberdeen, on the Kintore road, where it was found by the Rev. Dr. Smith; a plantation called Woodlands, near the Inverury canal, opposite to Fintray House on the Don, where it was found in 1819 by Mr. W. Craigie; and a wood at Kemnay, where it was shown to me, in 1818, by the then minister of the parish, Dr. Mitchell. The not less lovely *Trientalis Europæa* is abundant in the woods, and often on the moors. *Goodyera repens* is too

* This plant was named after Linnæus, the celebrated naturalist. It belongs to the natural order, *Caprifoliaceæ*. Dr. Adams says it is also plentiful in the woods of Tilahilly in Banchory-Ternan.

plentiful to require the indication of stations; and *Listera cordata*, though very inconspicuous, abounds on the dry moors, as well as in woods. Some *Orchidaceæ*, scarce elsewhere, are very common with us, as *Habenaria bifolia*, *Gymnadenia conopsea*, and *Habenaria viridis*; while others are absent or rare; *Orchis maseula* being of the latter, though I have found it in several places on the Dee. *Lepidium Smithii* and *Teesdalia nudicaulis* are both plentiful; *Cerastium arvense* grows profusely, on the left bank of the Dee, about half-a-mile above the bridge, in the fields near Mary-Culter House; on the farm of Balbridie, which is on the limits of the parishes of Banchory-Ternan and Durris, and in other places. In the last-mentioned place, on the right bank of the Dee, and along a brook, opposite Crathie, is abundance of *Aquilegia vulgaris* (Columbine), apparently quite wild. In an island of the river below Kingcausie, and elsewhere, *Lysimachia vulgaris* (yellow Loosestrife) is plentiful; but as it is a common garden plant on Dee side, I fear it has no more claim to be considered a native, than the nearly as common *Mimulus luteus*, *Lupinus hirsutus* (Lupine), and *Aconitum Napellus* (Monkshood). The Corby Den, in Mary-Culter, which is a little picturesque rent in the rock, with a brook, a cascade and a deep pool, is remarkable for containing *Paris quadrifolia*, *Asperula odorata*, *Sanicula Europæa*, *Epilobium angustifolium*, *Ranunculus auricomus*, *Trollius Europæus*, *Pyrola minor*, *Melanampyrum pratense*, *Geranium sylvaticum*, *Rubus saxatilis*, *Braehypodium sylvaticum*, *Aspidium lobatum*, *Polypodium Dryopteris*, *P. Phægopteris*, *Hookeria lucens*, and many other plants.

Between this place and the Feugh are no very remarkable localities, but the moors are frequently covered with a profusion of *Myrica Gale* (sweet Gale), and *Carexes* of numerous species, of which one of the rarest is *Carex præcox*, found in a turfy spot near the Corby Den. On the left or north side of the river, however, there are found, in the parish of Drumoak, *Calamagrostis Epigejos*, *Origanum vulgare*, *Calamintha Clinopodium*, *Carex muricata*, *C. sylvatica*, and *C. lævigata*. At the distance of about thirteen miles from Aberdeen, is a small lake, called the Loch of Park, it being on the estate of that name, which contains *Nymphæa alba* (white Water-lily), *Nuphar lutea* (yellow Water-lily), *Lobelia Dortmanna*, *Utricularia vulgaris*, *U. intermedia*, *U. minor*, *Pilularia globulifera*, *Isoetes lacustris*, *Subularia aquatica*, *Elatine hexandra*, and many other interesting plants. On its southern margin also is a plant which one could scarcely expect in such a place, *Juncus Balticus*, its other Scottish stations being maritime. The stately *Osmunda regalis* (flowering Fern) grows along the stream that issues from the lake. This and another on a rocky sea-bank, near the Cove, three miles south of Aberdeen, are the only stations for it known to me on the eastern side of Scotland, whereas on the western, from the Clyde to Glenelg, and in the outer Hebrides, it is very abundant.

The soil in this tract is various, yet not very diversified. On the higher grounds, the rock is covered with a layer of pale bluish or yellowish clay, mixed with fragments of granite and gneiss, and quartz-gravel or sand. When

this soil is trenched, and the stones, which are often so numerous as, on being raised, entirely to cover the surface, are removed, it yields good crops of oats, barley, and turnips. Great improvers of this kind of land, on the south side of the Dee, are Mr. Thomson of Banchory, Mr. Boswell of Kingcausie, (who has by his various improvements quintupled his rental,) and Mr. Mactier of Durris, whose estate, formerly neglected and barren to a great extent, has in his hands greatly altered its aspect. On the north side of the river, the improvements, though always progressing, have been less extensive. Several handsome villas begin to give beauty to places formerly neglected. In many places, and especially near the river, there are accumulations of diluvial gravel, covered with a thin layer of soil. At Murtle, and thence to Banchory-Devenick are somewhat extensive sandy flats, which in favourable seasons are very productive, but in continued drought often fail. On these flat lands, and in some fields in their vicinity, a good deal of wheat has been cultivated of late years ; but generally the valley of the Dec is not suited to this crop, the soil being too light and sandy. As far north as Stonehaven, *Scandix Pecten Veneris* (Shepherd's Needle), and *Anagallis arvensis* (Pimpernell), are common among the corn ; but here they very seldom make their appearance, although *Agrostemma Githago* (Corn Cockle) is not rare wherever there are wheat and tares. *Papaver dubium* is more common than *P. Rhæas* (red Poppy), but *P. Argemone* I have not anywhere met with. *Arrhenatherum avenaceum* infests the fields, and *Avena strigosa* is extremely plentiful, while *A. fatua* is very seldom seen.

CHAPTER II.



ADDRESS TO THE READER.—JOURNEY COMMENCED.—LOWLAND TRACT OF THE VALLEY OF THE DEE TRAVERSED.

HE who finds no pleasure in simply gazing on the fair face of nature, has a soul deadened to all that is capable of conferring true happiness. Yet, many a man, whose temper is not in accordance with the health-inspiring influences that constantly emanate from all of God's creation that surrounds us, may derive a kind of enjoyment from contemplating the varied features of the landscape spread before him, and, with the unpolluted air of the open country inhale a temporary balm for many sores that have rankled in his breast. We may not therefore judge of the mental condition by the apparent pleasure derived from an escape to the fields and woods, where the lark and the linnet sing, the daisy and wild-rose spread their petals to the sun, and the white clover and honeysuckle perfume the breeze. But well may we be assured that the spirit who wanders unhappy amid the bowers of paradise is under a curse, and that he who feels no inspiration of love and peace on the mountain-summit, where everything around, beneath, and above, whispers of the Eternal, is as yet unfit for heaven. There cannot be spiritual health but in the Divine presence ;

nor can any occupation or pursuit be beneficial to him whose faculties are not in harmony with the Divine attributes. Men who have banished God from their hearts, necessarily and inevitably, in all that they scheme and do, labour to destroy their own happiness, and that of their brethren, even when they believe themselves influenced by benevolence, patriotism, and all the virtues. Let us then humble ourselves, that in contemplating God's works, we may ever see Him in the midst of them. If, in this temper, we traverse the valley of the Dee, and ascend the mountains from which the sources of that beautiful river gush forth, even if we discover little that may be of interest to science, we shall find much that may benefit our spiritual nature. And what would it profit a man were he to solve half the mysteries of external nature, and yet be ignorant of the higher relations of his own being? Strange adventures, perils among rocks and floods, wonderful discoveries, or magnificent theories—cannot be expected from a quiet journey to be made in one pair of shoes, with no other weapon than a hammer.

The "Granite City" is behind; the clear waters of the Dee glide swiftly beneath my feet, as I stand on the central arch of the far-famed "Bridge of Ruthrieston;" and before me are two paths, leading to the same distant point. The south bank of the river is certainly the most beautiful, and there is no reason why it should not be preferred. A few steps take us to the county of Kincardine, and the estate of Banchory; and though the summit of Ben-na-muic-dhui be far distant, even short steps often repeated will take us there.

On a bank by the river is an aggregation of plants. Clusters of yellow, white, blue, and reddish-purple petals of various forms variously grouped, are presented by the greater Bird's-foot-trefoil, the yellow Bedstraw, the water Ragwort, the northern Bedstraw, the Meadow-sweet, the Sea-campion, the Blue-bell, and the purple Knapwort. Though these plants are still in flower, the summer beauties have faded, and the banks, under the influence of protracted drought, show little but withered herbage. In that large island opposite Drumdewan House, are to be found *Alchemilla alpina*, *Oxyria reniformis*, and *Arabis petræa*, in their lowest station on the Dec.

By the river, and in a ditch, near Dr. Morison's Bridge, are *Carex vesicaria* and *Polygonum Hydropiper*, which also grows in Gilcomston Dam. In the copse, along the ditch, is abundance of *Adoxa Moschatellina*, which is plentiful all the way up to Mary-Culter House. Re-crossing the Dec, we find in the Den of Cults a profusion of *Fumaria capreolata*, plentiful in other places farther up the river; *Hesperis matronalis* (Dame's Violet) occurs in this neighbourhood, but it certainly has no more claim to rank as a native than *Myrrhis odorata* and *Smyrniium Olusatrum*, found in other places, but, like it, always near houses, that are or have been.

We are now on the north side. The sky is serene, the fields are beginning here and there to assume the tints of autumn, the small birds are flying about in flocks among the corn, men are busy cleaning and hoeing the turnips, and everything indicates the rational enjoyment of liberty and peace.

The Den of Culter, about eight miles from Aberdeen, is one of the few places where the rock is exposed. It is here gneiss, as it is also in the Corby Den opposite, and forms a craggy bank on the left side of the stream, which comes from the Loch of Skene, and enters the Dee near Peter-Culter Manse. This Loch of Skene, which is about four miles distant to the north-west, and about ten miles from Aberdeen, is of considerable size, and harbours, among other interesting plants, *Lobelia Dortmanna*, this being its most eastern station known to me. It is also remarkable for a profusion of two forms of freshwater shells—the *Cyclas cornea*, and *Physa fontinalis*, the former uncommon in this part of Scotland.

Further on, we come to the Manse of Drumoak, situated on a beautiful bend of the river. Extending to a considerable distance below it is a high bank, in the greater part of which is more or less exposed the rock, consisting of large-grained granite. Hazel, Alder, Ash, Pine, and Willow ornament this bank, on which are found, among other plants, *Lepidium Smithii*, *Teucrium Scorodonia*, *Helianthemum vulgare*, *Pimpinella Saxifraga*, *Senecio sylvaticus*, *Carex lævigata*, *C. muricata*, *C. pallescens*, *C. ovalis*, *C. flava*, *Brachypodium sylvaticum*, *Calamagrostis Epigejos*; and, along the water's edge, *Oxyria reniformis*, *Silene maritima*, and a single tuft of *Saxifraga aizoides*. By the river, above the Manse, are found *Clinopodium vulgare*, *Equisetum hyemale*, and *E. variegatum*. The last mentioned plant occurs in many other places along the Dee, as the bank at the Railway-bridge, on the east-side, and at Upper Banchory.

At Park House, we made acquaintance with an enthusiast in his profession, in Mr. Law, the gardener, who, after showing us a great variety of objects under his care, accompanied us to the Loch of Park. This small lake contains a surprising number of interesting plants, some of them rare, and a few scarcely to be found elsewhere in the district. The most important of these plants are : *Nymphæa alba*, *Nuphar lutea*, *Scirpus lacustris*, *Phragmites communis*, *Juncus Balticus*, *Subularia aquatica*, *Isoetes lacustris*, *Pilularia globulifera*, *Elatine hexandra*, *Utricularia vulgaris*, *U. intermedia*, *U. minor*, *Potamogeton perfoliata*, *P. heterophylla*, *P. graminea*, *P. pusilla*, *Lobelia Dortmanna*, *Isolepis fluitans*, *Alisma Plantago*, *Sparganium natans*, and *Menyanthes trifoliata*. The most ornamental plants for such places are *Arundo Phragmites* (the Reed), the largest of our grasses *Scirpus lacustris* (the Bull-rush), *Alisma Plantago* (the Water-plantain), *Nymphæa alba* and *Nuphar lutea* (the two Water-lilies), *Menyanthes trifoliata* (the Buck-bean). The *Osmunda* is in danger of being destroyed, it having been, by agricultural improvements, deprived of the water, along which it grew, and has thus been partly eradicated.

From Banchory to the Bridge of Potarch, the hills, mostly wooded, narrow the valley of the river. They are composed chiefly of gneiss, mica-slate, and hornblende-slate, intermixed or alternating. This contraction of the river-bed may be considered as terminating the lower valley of the Dee.

CHAPTER III.

MIDLAND TRACT, BRIEFLY DESCRIBED AND TRAVERSED.—POTARCH.—KINCARDINE.—LUMPHANAN.—LOCH OF ACHLOSSAN.—ABOYNE.—MOOR OF DINNET.

AFTER a refreshing sleep at Potarch, arose at six, and went out to inspect the narrows. The sun had just appeared, over a wooded hill ; the sky was slightly clouded, and a faint mist lay over a distant part of the river, there having been frost through the night. Above the bridge, which has three arches, and is of granite, the bed of the stream is narrowed into a kind of canal, not more than fifteen feet across in one place, and about twenty in another. The water being extremely low, there was no great commotion as it swept through the narrow channel, the lower part of which was found to be seventeen feet deep by the landlord of the inn, who measured it with his salmon-rod. On the south side the rock is gneiss, on the north red porphyry, a dyke of which, about thirty feet in breadth, margins the stream, and farther down traverses its bed obliquely, leaving, however, a wide chasm for the waters. This dyke is closely adherent to the gneiss which intervenes between it and the north bank, and does not appear to have caused any dislocation or alteration of structure in the contiguous rock. *Alchemilla alpina*, *Oxyria reniformis*, and *Polypodium*

Phægopteris, grow among the rocks; *Carex lævigata* occurs on the north bank, and farther up there is abundance of *Calamintha Clinopodium* (wild Basil). There is not much picturesque beauty about Potareh; but the dense and solemn woods on one side, the extended slope of the bare hills on the other, and the singular narrowing of the river, might render it a very pleasant place to one who chooses to be pleased whenever he finds opportunity.

Our first stage being accomplished, we must prepare for the second by viewing the traet before us from an eminence. The Dee emerges from the Highlands by a narrow pass at Camus-o-May, about thirty-eight miles from Aberdeen, by the road, and fourteen from our present station. It passes along the southern edge of a long level moor, and by the foot of a range of hills, continuous with those of the Highland mountains, and extending all the way to where we stand, and even onward to the Girdle Ness at Aberdeen. This range, intersected by numerous valleys, opening upon the Dee, and of course furnishing tributaries to it, is formed of hornblende-slate, mica-slate, and gneiss, with beds of limestone here and there, and a predominance of large-grained granite, of which most of the higher mountains consist. It is more or less wooded in its whole extent, along the glens, and by the river, and also bears numerous plantations. The native woods are of Birch, Aspen, Alder, Oak, and Hazel. The course of the river is more tortuous than in the space from Banchory to Aberdeen. Flat alluvial tracts, terraces of old alluvium, steep diluvial banks, pebbly

beaches, everywhere present themselves. All along the north side of the river, the country is low, often flat, here and there rising into rounded hills of no great height, some of which, as well as portions of the plain, are wooded. There is little cultivation in the upper part; but below Charlestown of Aboyne, on both sides of the stream, are tracts covered with corn and green crops; and at Kincardine O'Neil is a beautiful and highly cultivated haugh, about two miles in length.

Leaving Potarch about eight o'clock, we passed onward, among woods of Birch and Alder, behind which were extensive plantations of Pine, and leaving the road at the toll-bar beyond Kincardine, walked over a hilly tract, partially wooded, to Kirktown of Lumphanan. We then visited the Loch of Achlossan, returned to the Manse, left it about four, and having obtained permission, were rowed over the lake by the man who has charge of the boats. It is a morass, rather than a lake, and is mostly overgrown with *Equiseta* (Horsetails), of which I have not anywhere seen so uniform and continuous an extent. *Carex ampullacea*, and other plants, however, are copiously intermixed. Lumphanan presents the appearance of a large hollow, well cultivated, and rather scantily wooded, among ranges of low, bare granitic hills. The lake, which is about a mile in length, and less than half a mile in breadth, occupies the lowest part of the hollow, and appears to have formerly been of greater extent.

The more remarkable plants observed on it were: *Ranunculus Lingua*, *R. Flammula*, *R. aquatilis*, *R. hederaceus*, *Menyanthes trifoliata*, *Comarum palustre*,

Caltha palustris, *Myosotis palustris*, *Equisetum limosum*, *Senecio aquaticus*, *Juncus effusus*, *J. acutiflorus*, *Potamogeton natans*, *P. gramineus*, *Sparganium ramosum*, *Phalaris arundinacea*, *Polygonum amphibium*, *P. Hydropiper*, *Veronica Beccabunga*, *V. scutellata*, *Myriophyllum spicatum*, *Montia fontana*, *Callitriche verna*. I was surprised to see people cutting the *Equiseta*, which the boatman said were for the horses to eat, but they are relished by them only in the green state.

This marsh is a breeding-place of *Larus ridibundus* (Black-headed Gull), several hundreds of which annually betake themselves to it. Many of them still remained, and, while they were flying around us, as we rowed up a passage cut among the herbage, a hawk shot in among them, and instantly seized and carried off one, the rest raising a great outcry, but not attempting to rescue their companion. Coots and Water-hens were very numerous, and had formed passages among the *Equiseta* and *Carices*, especially well-frequented about a small island, on which were the ruins of a building of some kind. Snipes and Redshanks were numerous, as were Mallards, of which we saw many. According to the boatman, Teal also breed here: Widgeons and a few Golden-eyes occur in winter; also grey Geese, Barnacle Geese, and sometimes Swans.

In passing from Achlossan to the road, we found a good deal of *Saxifraga aizoides*, and some stunted specimens of *Phragmites communis*, in a swanpy place. The road passes by an artificial lake, of considerable beauty, in the Marquis of Huntly's grounds. It was pretty late when we reached Charlestown, pleasantly

situated on a level space, with the wooded hills of Aboyne Castle behind, and the hills of Birse on the other side of the river, over which is a suspension bridge. Leaving the road, we proceeded through the woods and along the river for about two miles, and finding it inexpedient, from the intense heat, to proceed farther, put up at a small inn, where, although the people seemed unaccustomed to entertain travellers, and had only one room, which for some time was occupied by carters refreshing themselves with whisky, we were at length comfortably enough lodged. On the sandy beaches of the river, we observed *Silene maritima* abundant and still in flower, together with *Oxyria reniformis*. By a spring near the inn was a profusion of *Saxifraga aizoides*. Two Oyster-catchers and a Ring-plover were seen by the river. It is a dull place, however, offering little of interest, the flat tract along the stream being covered with broom, killed by the winter frosts and scorched by the heat of summer; while eastward the high gravel bank of the stream was surmounted by straggling pines, the greater part of the woods having been cut down; and westward a barren moor stretched to the base of the hills.

The moor, which presented nothing remarkable except a few bushes of *Rosa inodora*. The Dee, flowing along the foot of the hills to the left, was fringed with trees and bushes of the kinds already mentioned. But here, the moor of Dinnet traversed, we reach our second stage, and bid adieu to the lower valley of the Dee, to enter upon a tract which has to undergo a prolonged examination.

CHAPTER IV.

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UPLAND TRACT.—VIEW FROM THE PASS OF TULLICH.—ABERGAI RN.—MORVEN.—
THE VAT.—LOCH CEANNOR.

THE entrance to the Highlands of Aberdeenshire by the Pass of Tullieh presents scenery in some respects unsurpassed by any in Scotland. In the whole dull lowlands of the eastern part of the middle division of that ancient and renowned kingdom, from Dundee to Inverness, there is nothing that could bear comparison with even a fragment of it. Den Fenella and the Braes of Gight, beautiful in tame tracts of country, if placed here, would form but agreeable features of the scene. As to the little “dens,” and pet places, found here and there, with their pretty waterfalls and neat woods, they might come in naturally enough, and help to fill up the details of a picture beautiful in its parts, harmonious in its composition, imposing in its general effect, and in the solemn dignity of its grandeur satisfying the soul. But the best painting could give but an imperfect representation of the scene before me. Who could paint that distant mountain, rising in stern majesty over the peaks of yon range of green hills, its scarred front glaring dim in the sunshine that casts its fissures into deep shade! A magnificent mass, truly, is Lochnagar, as many a one has felt and said

before now. It may not be the king of the Scottish mountains, but at this moment, at least, when it presents its massive form before me, I am almost willing to accord it that pre-eminence. There are higher mountains in Scotland; but mere height hardly merits supremacy. Lochnagar, however, does not alone form the scene. Its broad mass and picturesque outline are continuous with lower mountains around it. Intervening between us and its base is a beautiful green range, with three peaks, the form of which indicates a different geological



structure. Stretched out before us is the Plain of Ballater, covered with yellow corn and thickets of Birch. On this side of it is a long, rugged range of granite hills, the furthest of which seems to have been rent off by an earthquake, leaving the deep gap called the Pass of Ballater. On that side, over the water, rises a wooded range, with rocky front and bare craggy summit. The river sweeps along the base of those steep banks of

diluvium, crowned with weeping Birches and Pines, winds round the promontory, and between banks covered with copse and wood rushes into the plain.

As we gaze, a dense cloud gathers on Lochnagar, advancing, conceals it from the view, and beautifully displays the serrated ridge of the green hills, which alone are seen in the distance, and seem worthy of closing the scene. Over them, too, it advances ; and as we leave the bridge of Tullich, and diverge to enter the Pass of Ballater, the welcome rain sweeps in flaky streams along the valley. The massive rocks of Craig-an-t'-shcobhaig, the Falcon's Craig, having their base covered with an extended slope of gigantic blocks, seem rather to welcome than to frown upon us as we traverse the pass, and Craig-an-darroch, on the other side, responds amidst its Pines.

On the side of a hill, at the entrance of Glen-Gairn into the valley of the Dee, and conspicuous from afar in its elevated station, is the farm-house of Abergairn, thrust endwise into the bank, and unornamented with shrub or tree. To the hospitality of its inmates I am indebted for the facilities which they afforded me of making an initiatory survey of the extensive tract of mountain land, the inspection of which forms the main object of my journey. Ascending the high grounds along with Mr. Charles Grant, I gazed upon the magnificent corry of Lochnagar, about fifteen miles distant ; the intervening mountains, valleys, and woods ; with the river winding among alluvial flats, and all the details of a scene combining the beautiful, the rude, the gorgeous, and the magnificent. Such was my first impression,

and subsequent gazing produced no different effect. The craggy prominence or ridge, above the farmstead, consists of granular quartz, with large crystals of felspar and others of quartz interspersed. The rocks and stones were crusted with lichens of freer growth and more ample development than any that I had seen in the lower tracts. Just above the house, on the hill-side, is a quantity of stone from excavations made many years ago in search of lead, which was found in some quantity. Mixed with the quartz, and contained in small cavities dispersed through it, are crystals of fluor spar, (fluoride of calcium), mostly of a beautiful wine-yellow colour, but also of various tints of blue and purple.

Desirous of obtaining a comprehensive view of the mountain-land into which I had just entered, I resolved to visit, in the first place, a high hill in the neighbourhood, from which might be seen both the lower and the upper tracts of the Dee, in their whole extent, from Aberdeen to Cairntoul and Scarsach, which are on the extreme inland limits of the district. No eminence could be better adapted for this purpose than the summit of Morven, a mountain the most conspicuous of all from every part of the low country where the view is not interrupted by eminences. Accordingly, on Saturday, the 3rd of August, the sky being clear, and the air quite cool, I crossed the low hills at the mouth of Glen-Gairn, accompanied by my two young friends, Mr. Grant, and my son, the latter an enthusiast in Botany and Ornithology.

Morven or Morveen—Mor-bhein, the great mountain

—is the chief of a group of hills, of heterogeneous mineralogical formation, but both geologically and geographically harmonious in its composition. Nearly due north from Ballater, at the distance of about six miles, this mountain rises conspicuous in the midst of ranges of much less elevation, surrounding its base, and extending from it on all sides. Between it and Glen-Gairn, westward and southward, the hills are of mica-slate, micaceous quartz-slate, and hornblende, with some beds or plates of limestone. Similar hills stretch from it westward and northward into Strath-Don, and north-eastward into the parish of Logie Coldstone. But at the eastern and south-eastern sides of its base is the granitic mass of Culbleen, extending from the Braes of Cromar to Loch Ceannor, Camus-o-May, and along the northern side of the plain of Ballater, to the protuberance of Craig-an-darroch. The hills over which we passed to the base of Morven were slaty, and composed of granular quartz and mica, the former predominant. Seen from the south it presents a somewhat conical shape; but it is more extended from south-west to north-east, and viewed from the east or west has a massy form, but with a somewhat waved outline, scarcely marked enough to render it picturesque. The surface is generally smooth, and invested with a dense turf of *Cyperaceæ*, *Juncaceæ*, Grasses, and a great quantity of *Lycopodium alpinum*, which in many places is the predominant plant. *Alchemilla alpina*, *Gnaphalium supinum*, and *Sibbaldia procumbens* are also very plentiful; and by the springs, among moss, and along the few rills, are *Saxifraga stellaris* and *Epilobium alpinum*. In several places, but

especially toward the summit, are large collections of blocks and stones, angular, slaty, and crusted with lichens. It is only on the eastern side that the rock is exposed, and there but to a small extent. It is hornblende-slate, varying in texture, and generally of a lighter tint than is usual in the district. The hornblende, forming the greater part of the mass, in imperfect crystals, varying in colour from blackish-green to light greyish-green, is intermixed with minutely granular quartz, silicate of lime, crystals of felspar, and frequently magnetic iron ore, and pale iron-pyrites. The exposed surfaces have a singularly curious appearance, the hornblende remaining undecomposed, while the other ingredients have become disintegrated and been removed by the weather. It is no doubt to this peculiarity of structure that the difference of vegetation between this and the neighbouring hills is owing, they being all more or less covered with Heather, of which there is scarcely any on it, but instead of that plant a good deal of Juniper at its base. The southern and eastern sides slope gently into a wide hollow, having good summer pasturage, and the western side is continuous with low hills that enclose a valley, called Glen Morven, partially cultivated, which opens into Glen-Gairn, and extends northward in the direction of Strath-Don.

I ascended directly to the summit, which is rounded, and of small extent, with two cairns, about the principal of which, on the stones, and among them, were numerous lichens, in beautiful condition. Those observed were *Scyphophorus pyxidatus*, *S. cocciferus*, *Cetraria Islandica*, *Gyrophora polyphylla*, *G. proboscidea*, *G. deusta*, *G.*

cylindræca, *Lecidea atrata*, *L. rivulosa*, *L. atro-virens*, *Lecanora atra*, *L. ventosa*, *L. Parella*, *Parmelia saxatilis*, *P. omphalodes*, *P. Fahlunensis*, *P. parietina*, *Solorina crocea*, *Cornicularia tristis*, *C. lanata*, *Sphaerophoron coralloides*, *S. fragile*, *Cladonia vermicularis*, *C. uncialis*, *C. rangiferina*.

My companions, who had ascended another way, having made their appearance, we sat down by the cairn, from which there is a most extensive view. Lochnagar, which raises its massy and picturesque form in the southwest, is by far the most imposing object. From it, extends along the horizon, a range of hills, gradually diminishing in elevation to the sea at Aberdeen. This range, quite continuous, and geographically the same with the upper tract of country, declines towards the Dee, which flows eastward along its base. To the north of the river, however, in the plain, are scattered various hills, some of them of considerable size, the most remarkable being the Hill of Fare, which has the appearance of a low table-shaped mass. From it to the base of the Morven group, is a gradually widening plain, terminated northward at its upper part by the hills beyond Tarland.

Returning to Lochnagar, which forms the finest object in the panoramic scene, we see continued from it a range of mountains gradually descending to the slight groove in which we know the Dee to flow; then rising, and, at the distance of about eighteen miles from us, presenting an elongated rocky mass, nearly flat along the top, but with several singular prominences on its ridge. This is Ben-Aun, beyond which are seen various other

high mountains—Ben-na-buird, Ben-na-muic-dhui, Cairn-gorm—confusedly aggregated, and mostly with rounded outlines. To the north, the districts of Strath Don and Towie, with others along the Don, which commences near Ben-Aun, appear low and inconspicuously bounded; but the irregular range of eminences in this direction terminates in Benachie, a picturesque mountain near Inverury. Beyond this extend the districts of Formartin and Buchan, at the extremity of which is dimly perceived the low, rounded Hill of Mormon.

The comparatively low tract of country stretching away to the east and north-east is extensively cultivated and moderately wooded, but presents large heathy spaces, including most of the hills. The mountain-land, from Aberdeen along the south side of the Dee, to Mount Keen and Lochnagar, and thence to Cairn-gorm, presents extremely little cultivation, but a considerable extent of wood. The greater part of the scene is very tame, and not remarkably interesting, the country being, as it were, spread out to view like a map. It is only in the west that the region of hope stretches out, ridge behind ridge, greyer and dimmer, until it fades away among the thin mists.

The air was rather keen on the top of Morven, so we prepared to descend. My companions returned by Glen Morven and Glen-Gairn, while I descended eastward, in the direction of a small lake a few miles off in the plain. Several Hares (*Lepus variabilis*) were seen, all grayish-brown on the upper parts, gray on the sides, white beneath and on the tail. Very few birds had

been observed; some red Grouse, two hooded Crows, Wood-pigeons, Pipits, and Wheatears.

From the summit a broad ridge descends north-eastward, and at its termination presents some craggy rocks, beyond which the declivity slants gently away to the Braes of Cromar. Proceeding directly eastward, I crossed a hollow, containing a peat bog, which supplies the neighbourhood with fuel, and ascended the low rounded hill of large-grained granite, called Culbleen. A path which I followed led me, near its base, to a stream running for upwards of half-a-mile in a fissure formed by a separation of the rock, which is very coarse-grained, of a reddish colour, and nearly, or often entirely, destitute of mica, easily frangible, and readily disintegrating. The rocks on either side of the rent present irregularly euboidal, sometimes prismatic and tabular forms; in the clefts of which grow, here and there, a few trees of Birch, Aspen, Rowan, Oak, and Sallow. At the lower part of this rent is a very singular excavation, called the Vat, or Burn of the Vat.

In this place the rocks are about sixty feet high on one side, lower on the other. A mass of rock blocks up the fissure, leaving on one side a small passage for the brook, and on the other an aperture from two and a half to four feet broad, and about nine feet high. The water, in floods, is thus impeded, and accumulates in the fissure, where by its swirl it has scooped out the lower part of the rock on either side, in the form of a concavity, like half the top of a dome. The breadth is twenty-four yards below, but only sixteen above. On the floor of one side is a greensward, including Daisies

and some other common plants, with a few tufts of Ferns. On the rocks are a few trees, a considerable quantity of *Epilobium angustifolium*, *Aspidium Filix-mas*, *Athyrium Filix-fœmina*, *Polypodium Dryopteris*, and *Cystopteris fragilis*. Two Ring Ousels were seen in the neighbourhood.

At the distance of about three-fourths of a mile eastward is Loch Ceannor, a rather beautiful small lake, fringed with natural wood, and having in it a little round green island, tufted with some trees, and a smaller bare island. It produces an abundant vegetation of aquatic plants, including several of botanical interest, and is surrounded with heathy ground, continuous with the Moor of Dinnet.

Returning by the Tarland Road, which joins the Ballater Road, I arrived at Abergairn in the evening.

CHAPTER V.

LOCHNAGAR.

ALTHOUGH a comprehensive view of the mountain-land has been obtained from the summit of Morven, the geographical features of such a tract cannot be satisfactorily traced from any one point ; and, thus, it is expedient to betake ourselves to another commanding station. Information received from the natives is always more or less useful ; but it often, when correct, gives erroneous ideas, and is not unfrequently very far from accurate. Uneducated Celts I have always found trustworthy in this respect ; but Celts Saxonised by adopting lowland habits, entirely lose their original acuteness of observation. Thus I had been told that Glen-Gairn was nearly at right angles to the Dee, and that Ben-Aun, on which the Gairn arises, was about eight miles distant. But, on ascending the hills, I found Glen-Gairn, conspicuous in its whole extent, almost parallel with the Dee until little more than a mile from its mouth, when it suddenly bends, and joins the valley of the Dee at nearly a right angle. Ben-Aun, at its head, was at least sixteen miles distant from its mouth. The ridge which separates Glen Tanar from Glen Muie, affords excellent points of observation, and might for this

purpose be resorted to by persons willing to save themselves fatigue ; but I have chosen another spot, fifteen miles distant from the first.

The mountain of Lochnagar, which rises majestically above all the hills on the south side of the Dee, being in many respects one of the most interesting objects that daily meets the view of the sojourner in this part of the country, I left Abergairn at eight in the morning, with the intention of visiting it. My friend, Mr. Alexander Murray, whom I had met the day before at church, had kindly offered to drive me up Glen Muic. So we started from Ballater at nine, accompanied by Mr. Grant and my son. Woods of Birch, Alder, Pine, and other trees, natural and planted, ornamented the valley, in which gleamed here and there a farm-steading, scattered huts, and at least one house of some pretension, that of Birk Hall. In what seems the upper part of the glen, about five miles distant from Ballater, is a very beautiful cascade, not unjustly considered one of the more remarkable natural curiosities of the district. The rock appeared to be gneiss, in nearly vertical strata, running north-east and south-west. *Carduus heterophyllus*, *Trollius Europæus*, *Saxifraga aizoides*, *Alchemilla alpina*, *Melica cærulea*, and many other plants, ornamented the rocky shelves. But our object at present is not to describe Glen Muic, or any part of it. When you emerge from the wood at the cascade, you enter the upper glen, bare and scarcely showing any traces of habitation. Proceeding as far as a place called Inchnabobart, the etymology of which is impracticable, we left our vehicle, and commenced walking. Ascending directly

to a hollow, between the southern shoulder of the mountain and a less elevated conical mass, we found upon the blocks, as well as on the ground, a great variety of highly developed lichens, of which *Cetraria nivalis*, *C. Islandica*, *Cladonia turgida*, *Cl. uncialis*, *Lecidea icmadophila*, *Gyrophora deusta*, *G. cylindracea*, *G. polyphylla*, *Lecanora Parella*, *Parmelia saxatilis*, *P. omphalodes*, *Cornicularia tristis*, *C. lanata*, *Sphærophoron coralloides*, and *Lecidea ventosa* most interested us. The ascent, somewhat fatiguing, was rendered very agreeable by the occurrence of these and many other plants, of which may be mentioned *Azalea procumbens*, *Gnaphalium supinum*, *Alchemilla alpina*, *Luzula spicata*, and *Epilobium alpinum*. On attaining the most elevated part of the hollow, we had before us the magnificent corry, a semicircular range of rifted and shattered precipices, from three to five hundred feet high, with a slope of detritus at its base, streaked by rills, and in the bottom a lake of very dark water. You might imagine it a volcanic crater, and many persons, not particular as to facts, or unable to perceive their indications, have so called it. Ascending, over blocks of all sizes, to the south-eastern edge of the corry, we obtained a more complete view of it, and proceeding along its margin, collected specimens of the few plants that occurred, including *Salix herbacea*, *Juncus trifidus*, *Carex rigida*, and *Agaricus nivalis*. Stopping now and then to look down the fissures, we gazed with wonder, sometimes with awe, upon the huge masses of rock, shattered or partially decomposed, so as to resemble piles of giant masonry,

the granite being divided into tabular and cuboidal compartments, the separating seams of which may have resulted from the original structure of the mass, rendering certain parts more liable to disintegration, or from the rapid cooling which it may have undergone on emerging from the interior of the earth—if such was its origin.

Two points of the summit appear to be nearly equal in height. On one of them is an artificial cairn, erected by the trigonometrical surveying people, in the vicinity of which we saw three Snow Buntings (*Plectrophanes nivalis*). The other point is somewhat isolated, and forms a small peak, at the north-eastern extremity of the crags. This is the part chiefly resorted to by visitors; and from it, as well as from some other parts of the summit, is obtained a most extensive view of the country around, as far as the Lothians, Stirlingshire, the southern Grampians, many of the Perthshire mountains, those of the upper extremity of Aberdeenshire, beyond them some of the great prominences of the counties of Argyle and Inverness; ridges and hills even beyond the Moray Firth, as well as the lower eastern tracts, extending from thence to Aberdeen, and onward to the Lammermuir. The mountains of the adjoining part of Forfarshire were much lower, less rugged, and more verdant. The Grampians from Aberdeen to Dunkeld appeared to form a continuous range, broader to the west of Lochnagar, and not affected by the apparently insignificant valley of the Dee, beyond which it extends into the lofty mountains of Ben-Aun, Bennabuir, Ben-na-muic-dhui, Ben-Vrotan, and Cairntoul. Viewed

from this peak, the greater part of the country seems mountainous, and as the glens are concealed, and the distant plains not clearly discerned, or partly mingled with the hilly ground, the uncultivated land seems greatly to predominate over that which has been subjected to the plough. With respect to the nearer tract intervening between the mountain and the Dee, it is seen that the land descends irregularly but rapidly; that Glen Muie, separated from Glen Tanar by a long ridge, passing far beyond Ballater, is separated by a short ridge of about five miles from Glen Girnae, and this from Glen Gelder by a more irregular ridge; that from a large hill, to the eastward, commencing at Glen Muic, a ridge runs obliquely to Balmoral, and that various hills and depressions decline toward the termination of the higher ridge which separates the hollow of the Beallach-buie Forest from Glen Clunie. The whole tract appears almost desolate, a very few scattered farm-houses only being seen.

My companions being merrily disposed, I had no opportunity of becoming melancholy and cynical. We quenched our thirst from a shallow pool formed by recent rains on a flattish mass of granite, and subsequently with better water from the spring near the summit. From near the most projecting promontory of the precipice we descended by the north-eastern slope, which is covered with blocks, over which we scrambled to the margin of the lake. The aspect of the precipice viewed from the base of its talus is singular and most imposing, the rock being fissured by perpendicular chasms, and partly formed into rude pyramids and

prisms. Skirting the lake, we reached its southern side, and passing over a vast accumulation of enormous blocks, at length gained the mouth of the corry, whence we quickly descended to "the Hut," and presently after reached Inchnabobart. Our progress to Ballater does not require a narrative, and about eight o'clock we were at Abergain.

About forty alpine flowering plants, and twenty cryptogamous plants were collected. Very few vertebrated animals were met with. Not a single quadruped or fish was seen; only one reptile, the common Lizard (*Zootoca vivipara*), which we caught, and about a dozen species of birds: the Rook (*Corvus frugilegus*), the Cuckoo (*Cuculus canorus*), the Dipper (*Cinclus aquaticus*), the Coal-tit (*Parus ater*), the Chaffinch (*Fringilla cœlebs*), the Kestrel (*Falco tinnunculus*), the Buzzard (*Buteo vulgaris*), the Sparrow-hawk (*Accipiter nisus*), all in Glen Muic; and on the mountain, the brown Ptarmigan (*Lagopus Scoticus*), the gray Ptarmigan (*Lagopus cinereus*), the Snow Bunting (*Plectrophanes nivalis*), the Ring Ousel (*Turdus torquatus*), the meadow Pipit (*Anthus pratensis*), everywhere up to the summit.

CHAPTER VI.

FROM BALLATER TO CASTLETOWN OF BRAEMAR.—GAIRN BRIDGE.—MICRAS.—
CRATHIE.—BALMORAL.—BEALLACH-BUIE.—INVERCAULD.—CASTLETOWN.

RAIN commenced just as we arrived, and continued through the night. All next day showers and sunshine alternated. Magnificent thunder-clouds moved slowly along, at great distances from each other, and in various directions. There was much distant thunder. Lochnagar sometimes enveloped with dark clouds, sometimes with a white fleecy vapour, seldom displayed its seared front to open view. The mountains had assumed a majestic appearance, their summits being more or less concealed, so that one might imagine them to shoot far up beyond their actual elevation. This is always the effect of clouds resting upon the hills. In sunshine and a serene atmosphere, Lochnagar looks dull-gray from a distance, and grayish-white at hand; but all day long it truly merited the name of the “dark Lochnagar” given it by the poet. The ground was soaked with rain, the noise of the streams was louder, the cattle fed more keenly, the husbandman seemed pleased, although the rain prevented him from rearing his “sow.” We are never pleased, because ignorant and selfish. Rainy weather seems to many always too protracted, and to others long continued

drought is hateful. We are incessantly complaining of heat or cold, calm or tempest, sunshine or gloom. Take broad views, and there will be an end of all this. The shower that has dragged your best satin dress has been fervently welcomed by the parched grass.

The dawn of this seventh of August gave promise of a bright day. How beautiful is the quiet valley as it basks in the sunshine. The corn-fields, some nearly ready for the sickle, others yet green, are spread out by the margin of the river, which glides along in its winding course, emitting a pleasing murmur, excepting which the ear catches no sound; for the air is still, and even the hair-grass waves not its slender panicle. The cattle are feeding on the after-grass; here and there a peasant is seen in the fields, or near the few cottages scattered over the valley; but otherwise all is very still, and in the gentle beauty of the scene one hardly sees a place for human wickedness. If it is not a paradise we gaze upon, it is a scene well-fitted to remind us of how much happiness our earthly habitation might yield, were it always illuminated by a sense of the Divine presence.

We have to explore this beautiful valley, the glens that open into it, the mountain ranges by which these glens are bounded; and a primary question that occurs is, how are we to proceed. In my opinion the best way is first to walk along the river to its sources, making digressions, it may be, on occasions, and then, returning, submit to as close an inspection as possible, the various objects to which it may be expedient to direct our attention.

Leaving Abergairn, I walked to Castletown of Braemar,

along the valley of the Dee, the scenery of which in the whole of the space traversed is extremely beautiful. Hills of moderate elevation, generally covered for a considerable way up with forests of *Pinus sylvestris* (Scotch Fir), *Betula alba* (Birch), and some other trees interspersed, bound the long groove in which the clear stream winds in its stony bed. At the mouth of Glen-Gairn, about a mile and a half above Ballater, the rock, exposed at the bridge, and forming a high bank on the eastern side of the stream, is hornblende-slate. Several Ash-trees, which have apparently been planted, greatly ornament this little "den," in which are also seen the Rowan or Mountain Ash, the Poplar, the Birch, the Hazel, the Oak, and the Alder. The Ivy is not a common plant in the district, but here it is on that fragment of the old bridge, as well as on the rocks about the new. *Geranium sylvaticum*, *Campanula latifolia*, *Hieracium prænanthoides*, and *Melica nutans*, may be mentioned as growing here. But to-day we cannot enter into details, our purpose having reference to a general inspection only; and so we proceed by the road, gradually passing field after field of the corn-clad alluvial plain, and remarking that the long continuous hill-range to the right, ascending in undulations to a rounded summit some miles on, is composed principally of granite, but with slaty rocks along its sides and base in various places. Near a little inn beyond the entrance of a wood called Coille-erieh, is a deep gully in a hollow of the mountain, filled with blocks and fragments of the large granite carried down by the floods. Among the detritus are to be found good specimens of crystallised common quartz, rock-crystal of

various colours, and ferruginous quartz. Beyond the wood, which is chiefly of Birch, the hill, which is still of granite along its base, attains its greatest elevation, and is named Geallaig, because, it is said, snow often lodges on it before it lies on the neighbouring hills—geal signifying white.

It is pleasant to leave the dusty road in this sunny, sultry day, and wander a while in the Birch woods, although their fragrance is now gone. Thickets of Hazel and Sloe, clumps of Willows and Alders, straggling Briars, and many plants still in flower occur here, but all too common to require special notice, although not too often seen to excite pleasant feelings. Walking alone in these woods, one loses sight of many of the ills that afflict humanity, and enjoys the health-giving influences that emanate from nature. But nature is not alone even here: for many scattered habitations of man are met with; some of very rude construction, reminding us of ancient times when few comforts cheered the rude native, and some presenting all the beauties and conveniences resulting from a highly developed civilisation. More characteristic specimens of highland huts, than those you see occupying very picturesque stations on the hill-side at Micras, one seldom meets with. Yet they are very different from Irish cabins, for they contain abundance of good things, and their inhabitants, Gaelic-speaking Celts, have very little moral affinity with the Celts of the "sister isle." Here a deep rut in the hill-side, caused by some sudden flood, shows the rock to be still granitic.

Glancing along the opposite side of the valley, we see

that we have passed, in suecession, the low wooded hill, ealled the Craig of the Knocks, over against the mouth of Glen-Gairn ; then, separated by a level space ealled Strath Girnac, a higher eraggy and wooded hill, named Craighibe, between whieh and the next hill is a narrow opening, the mouth of the Glen Girnac. This next round-topped, rugged, but wooded granite hill is ealled Craighiniais (the Roek of Pines), and is generally likened to the front of a hill close to Ballater, ealled Craig-andarroeh (the Roek of Oaks), the back of whieh you see four or five miles off, blocking up the valley as it were, and separated from the next hill, to the left, by the gap ealled the Pass of Ballater. Right opposite to us is a wooded hollow, beyond whieh rises Craig-na-ban (the Roek of the Women) ; then eomes a stretch of woodland moor, of undeeided character, and farther up a granite ridge, passing behind a prominenee whieh is the termination of the same hill-range at the foot of whieh we stand. The strath or bottom of the valley is alluvial, partly in wood, but extensively eultivated. All this we shall have to examine ; but at present let a simple glanee suffice. The details of the scenery might be interesting to many, and they who search for the picturesque need not wander far to find it in this romantie eountry ; but time passes on, and so must we.

Beyond Micras there is still granite in the hill ; but a great part of it consists of hornblende-slate and micaeous quartz. By the Dee, on its southern bank, is seen the house or eastle of Abergeldie, surrounded with trees.

Having aseended the brae, we observe that the roek is

a kind of gneiss, which, toward its junction with the calcareous bed assumes a very compact structure, and dark-bluish colour, with a porphyritic appearance caused by the interspersions of specks of carbonate of lime. The direction of the strata here is north-east and south-west; their inclination various, but generally south-east at an angle of about 45° . The limestone is crystalline, bluish-grey, or of white and blue layers. It is pretty extensively quarried, and used both for building and as manure. The dark greyish-blue and blackish-grey rock in contact with it is stratified, but nearly massive, although the laminar arrangement is sometimes apparent. It appears to consist of quartz, hornblende, felspar, iron-pyrites, and mica, often of a coppery or brassy tint. The crevices of the limestone at its junction with the gneiss, harbour considerable quantities of *Asplenium Trichomanes* and *Potentilla alpestris*. To the westward, the face of the hill is rocky, and covered with blocks, among which I met with a specimen of the common Lizard—(*Zootoca vivipara*.)

Many of the cultivated fields about Micras and Abergeldie yield very abundant crops of the very conspicuous Ragweed, disfiguring this pleasant valley. A man with a scythe, emblematic of Death, is commencing an unmerciful attack, which he might with more advantage have thought of a month ago. By this time, some of the seeds are sufficiently advanced to be capable of germinating; and when the weeds are prostrated, and submitted to the influence of the sun, they yield a supply for future crops. At all events, even when the fields are cleared in August and

September, enough is left untouched by the fences and in all sorts of corners and by-places to ripen seed for aeres. But all this, if not out of place, is utterly useless. I have elsewhere said enough on the subject of weeds. Our farmers are far too wise either to heed what a mere naturalist might presume to inflict upon them as advice, or to originate themselves, and carry on, a warfare which, let them believe it or not, would be both useful and creditable to them. For fifty—perhaps a thousand—years, Ragweeds have covered the grass-fields, flowered, and seeded, and been cut down or left to stand, in either case to continue the useless race; and, for a hundred years to come the same crop will be seen. “Yes, yes—but then, you, fault-finder, are not a farmer. Let the Tansies (Ragweeds?) alone—we are accustomed to see them; let the water from the byre dribble away down the brae and feed the Doekans; the house is well enough as it is, without rose, or honeysuckle, or neat gravelled walk, or garden-wall; the pool at the door is convenient for the ducks—and so you may as well trudge on with your tin box and hammer.”

Having passed a bit of low moor, sprinkled with very pretty bushes of Bireh, we come, a little beyond the forty-eighth milestone, to the church of Crathie, with the school-house on an eminence, from which, as from many others, is obtained an extensive view of mountain-slope, tufted wood, and winding river. But more than this: there, on that slightly elevated plain, bounded by a curve of the Dee, and covered with Birch-trees, rises Balmoral Castle, the autumnal residence of the



BALMORAL.

royal family. This first view of it, excites the most pleasing emotions. Were it in a bog, or on a sand-bank, it would be, in one sense, just as interesting. Extended and improved as it has recently been, it is a beautiful object in itself, and receives from the Birch forest that stretches far around it an increase of beauty. Whether this be one of the finest sites on the Dec or not, it is yet by far the most interesting, and perhaps ever will be.

Still onward, amidst woods and mountains, and here and there fields, yielding the staple food of the Scot. Let us again look southward, "o'er moors and mosses mony," to the never-tiring glories of Lochnagar, which is now much nearer to us than when we first saw it. Like Edinburgh, it may be viewed with interest from any station. For my part, I could gaze a quarter-of-an-hour on either every day of the year, without getting tired. There, proudly pre-eminent over all around, just as it settled when it was heaved up from the abyss, it stands in solemn grandeur, its ridges wreathed in white vapour. Lochnagar has more dignity than any of our hills, except Ben Nevis.

We now enter a beautifully wooded tract, of which a projecting massy rock may be considered as indicating the commencement. You see that taste and care have removed whatever might tend to mar its beauty. Entering one of the woods, I met with several large Ant-hills. Curious structures they are, though not very artistic. It is astonishing that such heaps of sand and fir-leaves could be raised by such tiny creatures. One of them was seven feet in one direction, five in the other,

and two feet and a half high. Thousands of Ants were moving over and around it, and thousands crowded the paths they had selected among the heather, some going and some returning, but no one meddling with his neighbour. One, going backwards, dragged a double pine-leaf along; another pushed before him the dried larva of an insect; some ran about conveying their own white larvæ to places of security. The heap was full of holes, galleries leading to caverns, by which the Ants were issuing and entering. It was the red species (*Formica rufa*), thorax brownish-red, abdomen dusky. But we have no time left, even to look at the *Boleti* profusely strewn around.

Here, again, in the burning sunshine, stand by this little brook, issuing from the edge of the wood into the grassy plat by the roadside, and, having looked southward, say if ever a more perfect specimen of a Highland forest met your gaze,—an amphitheatre of hills, clothed half way up with Pine and Birch; higher hills in the distance, some sprinkled with wood; and beyond them Lochnagar again, and not unweleome, which here descends apparently in continuity with the nearer ridges. Imagination may suggest a thousand things of such a scene, the glorious reality of which certainly surpasses in truth and nature everything that imagination could picture.

At length we stand on the lofty mid-arch of Invercauld Bridge. Before we pass on, let us pause once more—not because we are weary of travel, or of the world. Here the bed of the Dee is obliquely intersected by a broken ridge of slaty rock, passing from south-west to north-

east. The stream is broken by it into a succession of little falls and rapids, and then glides away over its stony bed to wind afar amidst pine-elad hills. Beautiful scene! I almost weep when I look upon thee; for tears flow from the pure fountain of happiness as well as from the troubled springs of sorrow. How unlike, in thy quiet loveliness, to the fierce rudeness of human nature! Not a living creature is to be seen but a lad whipping the water. The western sun shines in full splendour in a sky unobscured, although scattered flakes of white vapour glide slowly eastward in its upper region. Long shadows are projected from the tall Pines, while the hill-tops, purpled with flowering Heath, or grey with liehen-crusted stones, are lighted with the blaze. Far away up the wooded glens is still seen the scarred ridge of Lochnagar. Not a breath stirs the tiny leaf of the Birch, nor a sound is heard but from the waters. Ought not he to whom Providence has allotted all this to be happy? The scene is mine and thine; but happiness comes not from without. Yet, O Invercauld! thou hast a patrimony of beauty. May it long be enjoyed by thee and thine. I see nothing wanting but scattered homes of happy tenants, and little patches of yellow corn, and cows feeding by the river, and sheep on the hills.

Between the bridge and Castletown is a most beautiful traet, overhung on the southern side by eraggy hills and abrupt rocks, profusely wooded along their bases, and even on their summits. It is still a region of woods; but green pastures and eorn-fields stretch along the river, and on a beautiful green terrae, backed by plantations of Pine and other trees, stands Invercauld

House, on the north side. At length we reach Braemar Castle, and—one more effort—walking as smartly as if nothing were the matter, we arrive at the capital of Braemar.

At the inn were three botanists from Yorkshire, who had arrived a few minutes before, and with whom we were presently made acquainted.

Our third stage is completed, and we are in the very heart of the Highlands. The next and last is the summit of Ben-na-muic-dhui.

CHAPTER VII.



LOCHNAGAR AGAIN, AND TO MORE ADVANTAGE: ITS EXTENT, STRUCTURE, AND VEGETATION.

THURSDAY, the 8th of August, frowned sulkily upon us when we talked of visiting Ben-na-muic-dhui, but occasional glimpses of sunshine encouraged us to make a less hazardous attempt on some nearer mountain. We chose Lochnagar. As the weather was unfavourable, and we expected to pass several hours in the corries, we took a conveyance from the inn to Loch Callater, about seven miles on our way.

It is difficult to give a good geographical description of Lochnagar. It is by much the largest, as well as the most elevated, of the mountains south of the Dee. Its base extends from Loch Muic to Glen Callater, over a space of five or six miles, and with a breadth of three or four; and it sends off ridges in various directions, but especially towards Invercauld. Its summit is three miles or more in length, and presents towards its eastern extremity the great corry, or nearly circular cavity, a thousand feet deep, with rocks varying from two to five hundred feet high, and a slope of detritus at their base of at least equal height, and slanting down to a somewhat circular lake, apparently of great depth—its water,

though very pure, seeming almost black or deep blue. It is this lake which originally bore the name given to the whole mountain, Lochan-a-ghār; the precipices above and around it were named Creacan lochan-a-ghār. Lochan means a little lake, and Creacan signifies rocks or precipices. The etymology of Lochan-a-ghār is difficult. It is conjectured by a friend of mine, a first-rate Gaelic scholar, to mean the little lake of the dyke, or wall, Lochan-a-ghāridh: the dyke or wall being the great precipice. I have often thought that the true name is Lochan-nan-ccār, the little lake of hares, of which there are many on the mountain, especially as a lake in another corry is named Lochan-eun, the little lake of birds, it having formerly been frequented by Gulls, (*Larus ridibundus*,) as a convenient breeding-place. The name of the eastern lake has been transferred to the mountain itself, its whole mass being now popularly called Lochan-a-ghār, or Lochnagar.

From Loch Callater we proceeded eastward, over the-hill-range, until we came to the large corry on the northern side of Lochnagar. The rocks here are nowise imposing, being of little elevation and not continuous, although extending nearly a mile in a curved direction. As usual, their sides and bases were covered with a great quantity of blocks. In the bottom of this corry are three small lakes, one of which is Lochan-eun. On the declivities we found abundance of *Veronica alpina*, *Saxifraga stellaris*, *Gnaphalium supinum*, *Luzula spicata*, *Carex rigida*, and some other alpine plants. *Saxifraga rivularis* was met with in several places, and over a very extended space was

dispersed the very rare *Carex leporina*, of Linnæus (*C. lagopina* Wahlenberg), first found here by Dr. Dickie. *Phleum commutatum*, also, occurred in considerable quantity. At the eastern extremity of this corry, high up on the mountain, is a large flat surface of granite, which looks as if it had been smoothed—some might suppose by the sliding of ice or snow, but it is probably only the plane of a natural seam in the rock, from which the superincumbent part had been removed by disintegration or otherwise. It is seen glistening in the sunshine for the distance of many miles.

On ascending from this corry to the moor-ground above, I happened to come upon a Dotterel (*Charadrius morinellus*), which flew from among some stones, pretending to be crippled, and hovered around, sometimes limping on the ground, and sometimes flying to short distances. I shouted for two of my companions, who had gone ahead towards the summit of the mountain, and who returned accordingly. Although it was evident the bird had a nest or young ones, as it kept near, and, on being pursued, ran along, making a very pretty pretence of being so lame as to be easily caught, we failed to discover its charge. We now ascended towards the higher tract before us, where we saw several Ptarmigans and a Hare.

Of the fissures or rents by which the great precipice is scarred, one, the largest of all, commencing not far from the eastern peak or summit, may be descended to the base of the rocks, and into the hollow of the corry. In the upper part of this great fissure we found several interesting plants :—*Poa minor*, *Sedum Rhodiola*,

Saxifraga rivularis, *Cerastium alpinum*, *Cryptogramma crispa*; and with them several species of birds, which, like the meadow Pipit (*Anthus pratensis*), and the Raven (*Corvus corax*), thrive on the sea-coast, and at all intermediate stations, up to 4000 feet:—We also found *Cerastium viscosum*, *Euphrasia officinalis*, *Lychnis dioica*, *Alchemilla vulgaris*, *Rumex acetosa*, *Potentilla Tormentilla*, *Rhinanthus Crista Galli*, *Anthoxanthum odoratum*, *Aira flexuosa*, *Festuca ovina*. Our three English friends descended by the cleft in search of plants, while we went down by the neighbouring ridge, and over a vast sheet of large blocks slanting from it to the lake. Then ascending to the base of the precipices, we searched the shelves as far up as we could reach, and were joined by one of the party. The other two, after emerging from the great fissure, erept up a very steep part of the rock, in quest of *Mulgedium alpinum*,* which they found, but not in flower. The crags in this place ascend almost perpendicularly to appearance, so that a person looking on them from below could hardly believe them to be accessible to human foot; and, certainly, to the uninitiated it would seem little less than madness to attempt such rifts and crags as those among which many of the best alpine plants are wont to occur. Two sedate elderly gentlemen, little apt to be sent astray by impulses of enthusiasm, clinging with their hands to the face of a precipice five hundred feet high, in a place two hundred feet from the base, on to which should they fall, they would certainly never reach it alive;—and this risk incurred for the mere

* Its only stations in Britain are Lochnagar and Clova.—ED.

chance of finding a few rare plants that few people care much about—one can hardly designate it by any other name than Phytomania. However, they came down quite safely, having found a shelf that led into the great fissure, and brought with them a bunch of the *Mulgedium*. We searched a long time among the rocks and detritus, which here consisted of enormous blocks. Beautiful large-flowered *Hieracia* (*H. Halleri*, *H. alpinum*, and *H. nigrescens*) presented themselves in the fissures, often, however, in parts inaccessible. Among the rubbish carried down from the rent were numerous tufts of *Poa minor* and *P. laxa*, together with many other plants.

Masses of vapour sailed at intervals over the mountain, and some showers gave promise of more, which, although greatly needed by the country at large, we could individually have dispensed with. The partial envelopment of the precipices by the grey mist produced a singular effect. Faces of rock that had seemed continuous were broken up into cones and pyramids, the spaces between which were partially filled with vapour. Among the blocks that formed the great talus slanting toward the lake, were some that had recently fallen from the rocks, and in passing them one could hardly refrain from looking up, to see from what point danger might be apprehended. Some of the masses seemed so little secure that the concussion of a thunder-burst might suffice to dislodge them, and, in fact, a great mass was a few years ago shattered and sent to the bottom by lightning. A dense cloud to the southward threatened heavy rain, and several distant

peals of thunder were heard. We hastened to escape from the corry, where we might be subjected to peril from torrents as well as rocks, and had scarcely gained the open heath beyond the lake when the rain overtook us. The thunder passed away over the Forfarshire hills ; but several heavy showers descended, and the wind blowing in strong gusts at the same time, we were all more or less wetted, although furnished with umbrellas.

Directing ourselves north-westward by compass, and crossing two hill-ranges obliquely, we came into a bare glen, which led us into the Beallach-bhui Forest, as we entered which, a doe with her fawn bounded from a hollow. Dwarf Birch, *Betula nana*, in tufts or bushes, from a foot to eighteen inches high, occurred in abundance on the heath, as it also had on our ascent from Glen Callater ; and in a hollow space near a brook we found plenty of *Carex pauciflora*. Descending along the Garavalt, we visited the celebrated falls of that well-named stream :—Garbh-allt, rough brook—and had frequent occasion to admire the many picturesque forms assumed by the Pines, some of which were of large dimensions—from eight to twelve feet in circumference, though by far the greater number were of ordinary size. Pretty thoroughly wetted, and considerably fatigued, we were glad to find our vehicle waiting us near the falls, where we arrived at half-past eight. Very pleasant it is when fatigued to perform the last four miles of your journey in an easy seat ;—at least when nothing by the way requires examination.

Lochnagar and all its projections, processes, and dependencies, some of which extend several miles into

the surrounding tracts, consist of granite, rather coarse-grained, reddish, with little mica. The felspar is a pale flesh-colour, in irregular concretions or imperfect crystals; the quartz dark brownish-grey; the mica brownish-black, in very small scales. The rock is easily frangible, and has decomposed very extensively in the abrupt crags of the corries. In the great precipice, the fissures are nearly perpendicular, with transverse rents, giving the rock the appearance of being stratified. It is only in the upper ruin-like parts, between the vertical rents, that the rock is thus split into tabular fragments or plates; farther down, it is more distinctly fissured, and in the unbroken surfaces that appear on the upper parts of the mountain, it is solid or massive.

I visited the corries of Lochnagar on the 9th and 10th of August, 1830, and on that occasion took note of many of its plants. The two recent visits enable me to give a pretty extended list:—

<i>Trollius Europæus.</i>	<i>H. Lawsoni.</i>
<i>Cochlearia officinalis.</i>	<i>Azalea procumbens.</i>
<i>Cerastium alpinum.</i>	<i>Vaccinium uliginosum.</i>
<i>Silene acaulis.</i>	<i>Veronica alpina.</i>
<i>Alchemilla alpina.</i>	<i>Veronica scrypyllifolia</i> , var. <i>humifusa.</i>
<i>Sibbaldia procumbens.</i>	<i>Armeria maritima.</i>
<i>Epilobium alpinum.</i>	<i>Oxyria reniformis.</i>
<i>Epilobium alsinifolium.</i>	<i>Polygonum viviparum.</i>
<i>Sedum Rhodiola.</i>	<i>Salix herbacea.</i>
<i>Saxifraga stellaris.</i>	<i>S. arenaria.</i>
<i>S. rivularis.</i>	<i>S. Myrsinites.</i>
<i>Cornus suecica.</i>	<i>Juncus trifidus.</i>
<i>Rubus Chamæmorus.</i>	<i>Luzula spicata.</i>
<i>Gnaphalium supinum.</i>	<i>Carex leporina.</i>
<i>G. sylvaticum.</i>	<i>C. rigida.</i>
<i>Apargia autumnalis</i> , var. <i>Taraxici.</i>	<i>Phleum commutatum.</i>
<i>Mulgedium alpinum.</i>	<i>Aira alpina.</i>
<i>Hieracium alpinum.</i>	<i>Poa minor.</i>
<i>H. Halleri.</i>	
<i>H. nigrescens.</i>	

The above list refers exclusively to the main mass of the mountain, with its two corries. Of species observed upon it by other persons, chiefly, I think, by Dr. Balfour, are to be added:—

Salix lanata.

Luzula arcuata.

Carex Persoonii.

Carex vaginata.

C. rariflora.

Alopecurus alpinus.

Of Ferns and *Lycopodia*, the following were observed:

Allosorus crispus.

Polypodium vulgare.

P. Phegopteris.

P. Dryopteris.

Lastrea Filix-mas.

L. spinulosa.

Cystopteris fragilis, var. *dentata*.

Athyrium Filix-fœmina.

Blechnum boreale.

Pteris aquilina.

All the British species of *Lycopodium*, excepting *L. inundatum*.

Several species of *Agaricus* occurred in the corries, on the sides, and even on the summit of the mountain. *Agaricus nivalis*, in particular, attracted notice by its large size and pale tint, as it grew profusely both at the upper edge of the corry of Lochan-eun, and at that of the great corry, in a place where the snow had laid until recently. The numerous Lichens which were found may be reserved for another occasion.

From the western part of the ridges connecting Lochnagar with the mountains bounding Glen Callater, a hollow descends southward, leading to a small lake, named the Duloch, from which issues a stream that flows into Loch Muic. But the description of the wild valley through which you pass downward to Glen Muic, will come better in connection with that of the valley just named.

CHAPTER VIII.



FROM CASTLETOWN TO THE LINN OF DEE.—MICA-SLATE AND MICACEOUS QUARTZ-SLATE, WITH VEINS OF PORPHYRY.—CORRYMULZIE.—ACTION OF WATER ON THE FISSURE AT THE LINN.—PINES—BIRDS.

WE had purposed to visit Ben-na-muic-dhui; but it rained in the morning, and showed no intention of clearing. We resolved, therefore, to keep at home. But becoming uneasy in idleness, I took up my hammer and vaseulum, and strolled up the valley of Dee, which is at least as beautiful here as in any other part of its course, although narrowed and somewhat wilder than in its lower part. Just to the west of Castletown is a large hill, named Morrone,—Mor-sthroine—the base of which is composed of quartzose mica-slate, in thin and very regular layers, generally nearly horizontal, but variously inclined. This rock continues from Castletown to the Linn of Dee, over a space of about seven miles, but changes its character there, and becomes decidedly micaceous. In several places there are large veins of compact felspar, generally porphyritic. Two of these veins, opposite Mar Lodge, which is on the north side of the river, are of great size, and pass from north-east to south-west, across the western declivity of Morrone, conspicuous by their reddish tint from a great distance. It

is of importance to mark the characters of these two rocks, because they occur over a very extended space, and present modifications so great as to render them liable to be mistaken.

The laminated and stratified rock is composed of quartz and mica; the former minutely granular, but crystalline, transparent or whitish; the latter in scales or little plates, dark-coloured or silvery. The strata are always very distinct, the laminæ straight and parallel. Sometimes the rock consists almost entirely of quartz, granular, but often with crystalline specks or patches interspersed. In this case it is quartz rock. Sometimes it is almost entirely micaceous; when it is, of course, mica-slate. The two extremes, however, are connected by strata varying, and intermediate, and often there are bluish-grey and white laminæ alternately. Considering all the varieties as belonging to one geological formation, I yet purpose to name them mica-slate, and micaceous quartz-slate, according to their structure.

The porphyritic rock is equally various. Sometimes it is to appearance altogether compact felspar; but when examined with a lens, discloses interspersed crystals of common felspar, and usually some quartz. Then it is compact felspar with abundance of quartz fragments or imperfect crystals interspersed, the quartz generally of a darkish tint, and some clear crystals of felspar. Sometimes mica also is interspersed, and then the rock resembles, or is, a small-grained granite. This rock I shall call felspar porphyry, whatever aspect it may assume.

Many valleys open into that of the Dee, on either

side, each, of course, having a tributary stream. In these valleys are sometimes rents, or narrow passages for the streams, displaying the rocky strata, which are generally invested in part with an abundant vegetation of ferns, mosses, and phenogamous plants, together with trees of the kinds common in this district. Of these crevices one of the most interesting is that containing the Linn of Corrymulzie, nearly four miles from Castletown. The road crosses the crevice at its upper part by a bridge of considerable height. The rock is mica-slate, in thin layers, often nearly horizontal, but variously inclined. The crevice rapidly deepens, and the stream dividing into two, slants down a steep plane, at the bottom of which the separated streams converge, and form a turbulent pool. The height of the fall, including an upper portion, of about six feet, may be forty feet. A narrow zig-zag path leads to the lower part of the crevice, the sides of which are covered with trees, ferns, and a great variety of other plants. The upper part of this narrow "den" is left in a nearly natural state as to its vegetation, the trees being the Rowan, the Aspen, the Birch, the Hazel, and the Bird-cherry; but the lower part, where it opens into the plain, is disfigured with planted trees and shrubs of several species, as the Spruce, Laburnum, and Barberry. Few, however, object to such mixtures, and they who care not about distinctions of this kind greatly approve of whatever tends to ornament such a place, whether congruously or not. The rocks are crusted with Lichens, among which the bright-yellow and white *Leprariæ* are very conspicuous. The plants here are as numerous as in the Corley Den, near

Aberdeen, that is eight miles from it, and mostly of the same species, exceptions being made on either side. Among those noted were:—

Epilobium angustifolium.
Rubus saxatilis.
Lonicera Periclymenum.
Fragaria vesca.
Stellaria Holostea.
Stachys sylvatica.
Mercurialis perennis.
Anemone nemorosa.
Geranium sylvaticum.
Valeriana officinalis.
Carduus heterophyllus.
Spiraea Ulmaria.
Oxalis Acetosella.
Saxifraga aizoides.
Hieracium vulgatum.
H. prenanthoides.

Alchemilla vulgaris.
A. alpina.
Chrysosplenium alternifolium.
C. oppositifolium.
Asperula odorata.
Primula vulgaris.
Solidago Virgaurea.
Tussilago Farfara.
Melampyrum pratense.
M. sylvaticum.
Anthoxanthum odoratum.
Festuca vivipara.
Melica nutans.
M. uniflora.
Aira cespitosa.
Brachypodium sylvaticum.

The Ferns were—

Polypodium vulgare.
P. Dryopteris.
Lastrea Filix-mas.
L. spinulosa.

Cystopteris fragilis.
Athyrium Filix-femina.
Blechnum boreale.

Beyond this romantic fissure, and the so-called cottage,* bearing the same name, rises a rather lofty wooded rock, called Creac-an-Fitheach, the Ravens' erag or rock, nearly opposite to which, on the north side of the Dee, is Mar Lodge, on a level space at the base of a wooded hill. A wooden bridge has here been substituted for that of stone, which was destroyed by the great flood of 1829. About half-a-mile farther on is Inver-Ey village, at the mouth of a long valley, drained by a considerable stream. Nearly opposite to it, on the

* The hunting-seat of General Duff, said to be the highest gentleman's residence in Scotland. It is about 1800 feet above the level of the sea.—ED.

other side of the Dee, is the mouth of Glen Lui, which winds among the hills to the base of Ben-na-muic-dhui. Beyond Inver-Ey is a rather low rounded hill, partially



covered with Pines, and a flat space along the river, by which the road passes on to the Linn of Dee.

Many people who visit it in expectation of a splendid sight are disappointed, and become vituperative ; others, finding it a very curious place, are well pleased. I visited it in 1816, 1819, and 1830. My opinion of it in one of these years was this. It is by no means interesting, consisting merely of a pretty large stream

dashing between rocks of no great height. At one place the breadth of the chasm is not more than four feet; and here a person may leap over, though there is some danger in returning, because one side is higher than the other. The leap is trifling; but the fury of the torrent boiling below makes it appear hazardous. I stepped over without disengaging myself from my knapsack or shoes; and, not caring to leap up again with my baggage, elambered up the rock and continued my journey. When I came to it in 1850 I found my opinions quite altered: it seemed very interesting, and I felt no desire to step over it.

The Dee, as yet of no great size, here meets in its rather rugged passage a jagged and tortuous fissure in the slaty rock, into which it rushes, forming a small cascade of four or five feet, and then shoots along, boiling and foaming, through the crevice, of which the sides project in several places, so as to approach within six, five, and even four feet of each other. The sides have been in part worn smooth; but, great as the force of the stream must be, it has failed to wear off the projecting angles, or to straighten the passage. Considering the power of running water, and especially the wonderful effects it is represented as producing, we naturally think it strange that this fissure, in not very hard rock, should remain so little changed. The Dee with all its floods, and many they have been, has rushed along this narrow rent, I suppose some thousand years, without so much as fairly smoothing its sides. At the lower part of the fissure, which extends about four hundred yards, the rocks are higher; and there are some apparently very

deep pools, in which the water appears of a brownish-black colour. The rock is mica-slate, containing a large proportion of granular quartz, and intersected by veins of quartz.

Some Pines about the Linn and along the north side of the river, are remains of the original forest with which the country was covered. They are not of great size; one measured six feet nine inches in circumference at the height of five feet. Two trees, denuded of bark, showed the wood twisted spirally from right to left. In the crevices of the bark of some of the others was a profusion of *Alectoria jubata*, a Lichen, which is common on large pines all over the district.

Very few species of birds were seen along the valley. I met with a straggling flock of *Parus ater* (Coal Tit), *P. cœruleus* (Blue Tit), *Regulus cristatus* (Gold-crested Wren), and *Phyllopneuste Trochilus* (Willow-wood Wren), very actively engaged in searching the woods for food. They made very little noise, but flew incessantly from twig to twig, and appeared to be in perfect harmony, as well as in a state of great enjoyment. It was pleasant to see them clinging to the delicate hanging twigs of the weeping birches. They appeared to consist of numerous families, old and young together. Of other birds, I saw the Kestrel (*Falco tinnunculus*), the Rook (*Corvus frugilegus*), the Magpie (*Pica caudata*), the Pied Wagtail (*Motacilla Yarrellii*), the Chaffinch (*Fringilla cœlebs*), the Wren (*Troglodytes Europæus*), the Heron (*Ardea cinerea*), and a single individual of the Common Swift (*Cypselus apus*), the only one seen between Ballater and the Linn.

It rained a good deal through the day ; and when I returned to the inn at seven, I found that my companions had only taken a quiet stroll in the neighbourhood, nursing their strength for the ascent of Cairntoul and Ben-na-muic-dhui.

CHAPTER IX.

GLEN CLUNEY.—MICA-SLATE, CONTAINING LIMESTONE, AND INTERSECTED BY DYKES OF PORPHYRY.—GLAS-MHEAL, OF SIMILAR STRUCTURE.—CORRY OF CAN-LOCHAN: ITS SCENERY, EXTRAORDINARY RICHNESS IN ALPINE VEGETATION —ITS GEOLOGICAL NATURE.

ON Friday, the 9th August, the weather being unsettled, we resolved to visit Canlochan, on the Forfarshire border, by Glen Cluney and the Glas-mheal.

Castletown is situated at the junction of Glen Cluney with the valley of the Dee. The glen, which is rather narrow, and bounded by hills of moderate elevation, stretches southward for about nine miles, and then meets the upper extremity of Glenshee. It is drained by a stream of considerable size, of which the bed at Castletown is rocky, with high banks. The rock is chiefly mica-slate, composed of granular quartz in plates, with thin films of scaly mica interposed. At Castletown the strata are nearly horizontal, in some places undulated and contorted. Near the bridge, on the western side of the stream, is a quarry, in which the irregular bed of limestone is broken and intersected by a substance resembling greenstone in its fracture and other circumstances, but composed of limestone, smaller-grained, and intermixed with iron pyrites. The limestone is crystalline, glistening, of a pale greyish-blue

colour, variegated with white, in layers parallel to the seams of stratification. Further up the glen are extensive strata of the same kind of limestone, especially on the farm of Tomantoul, at the base of Morrone. One of these strata crosses the stream, and large blocks are found on the opposite side. Quarries have also been opened in two places on the ridge of hills on the eastern side of the glen. There certainly is no want of limestone in this district, and it might, by proper management, be obtained in any desired quantity.

We started at nine, and were conveyed eight miles up the Glen. Sylvan vegetation soon ceases, there being none along the river beyond three miles from Castle-town. Our drive through this pleasant pastoral valley was very agreeable, the road being tolerably good, and the weather having improved. The hills on both sides seemed chiefly composed of quartzose mica-slate, intersected by veins of porphyritic red felspar. The tract is under sheep, for which it is well adapted, the pasturage being generally good. The stream, which is of considerable size, is rather rapid, but presents no peculiarity. Nor is the valley in any way very remarkable.

Leaving the vehicle, we walked onward about a mile to the highest part of the glen, whence we could see down Glenshee, and then ascended the hills eastward, collecting Lichens and other plants as we proceeded. The rock was still micaceous quartz-slate, or mica-slate, and two dykes of red felspar porphyry occurred in our course. The Lichens on the porphyry were beautifully developed. A specimen of the common Lizard (*Zootoca vivipara*) was taken.

On the broad summit of the Glas-mheal, we had a superb view all round, including in the south-west and west the mountains of Perthshire; continuous with them, and ranging northward and eastward, the great mountains of Cairntoul, Braeriach, Ben-na-muic-dhui Bennabuird, Benaun, and others. Not far distant was seen Lochnagar, which, on this side, makes no great figure, on account of the vicinity of hills of not much inferior elevation. Around us, and to the south and east, extended Glen Esk and the Clova hills, generally round-topped, and green, their valleys beautifully verdant. These hills contrasted strongly with the stony summits of the Aberdeenshire mountains. To the east were seen Mount Keen and Mount Battock, conspicuous among lower hills, which gradually descended, and faded away in the distance. The mountain on which we were, seemed to be formed chiefly of quartz ore, mica-slate, with prominences of red felspar porphyry. On its summit we saw three Dotterels, and farther on several Ptarmigans. Alpine Hares were numerous. One Snow Bunting and several Pipits were also seen.

Descending eastward, we came to stony and marshy ground, among which were several interesting plants, and especially *Carex aquatilis*, *C. rariflora*, *Phleum commutatum*, *Alopecurus alpinus*, *Cerastium latifolium*, and *Salix arenaria*. Proceeding in the same direction, we entered, by a very steep grassy descent, the Corry of Canlochan (Ceann-lochain, head of the little lake), a very beautiful hollow, surrounded by rocks and steep verdant acclivities, unless on one side, where it opened into a short, partly wooded valley. A vast profusion of

plants occurred in it, and we were occupied with gathering them until near seven o'clock.

Toward that hour, rocks chipped, plants collected, some bread eaten, and pure water drunk in abundance, I sat down to gaze upon the scene. The notes I took were precisely as follows: "The sky is somewhat obscured with sheets of greyish-blue vapour, alternating with white and pale-red flakes. At times a slight breeze comes eddying through the cory, and when it has died away, the murmur of the rills which pour down the declivities comes gently on the ear, fitfully varied in its cadences. Two of my friends are lying on the rocks behind me, another scrambling across an avalanche of fragments, about a quarter of a mile off to the right."

This is a most lovely specimen of a cory, to which there is nothing equal in the neighbouring county, either in its beautiful proportions, or in its brilliant verdure, much less in the number of its alpine plants. It is bounded by rugged precipices, seared and shattered, grey, black, red, and of various tints, some of them seamed with white quartz, and all overspread with shelves of bright green grass, on which grows a profusion of alpine, sub-alpine, and upland plants, mingled with those of the valleys and plains. Stony declivities alternate with grassy banks, slanting away into a hollow, covered in part with the most beautiful verdure, in part with patches of bog-peat, contrasting singularly by their deep black. Pools, it is said, form there in wet seasons, and in cold summers the snow lies long in the hollow. At present there is neither snow nor water, excepting that of the

little rills, creeping along, to join the stream in the further part of the valley.

On the right are two great masses of red porphyry, separated by a scar. The nearer margin is abrupt, and there is interposed an avalanche of detritus between it and a narrow and low ridge of rock, also chiefly of porphyry, which, in like manner, is succeeded by a broad scar. Then, forming the upper part of the valley, and immediately behind us, is a great fissured rock of hornblende, varying in texture, sometimes approaching to claystone, sometimes resembling greenstone. Red porphyry also appears in it, in the form of a vertical dyke; and there are intermixed masses of a kind of mica-slate approaching in texture to clay-slate. Then comes a very steep grassy declivity, and beyond it a more abrupt space, with dark scars, looking as if formed in serpentine. The rock, however, is a dark-coloured, somewhat micaceous clay-slate. We now resume our original position, and turn toward the opening of the valley. Bordering on the clay-slate, to the left, is a grassy-sloped ravine, beyond which stretches away a broad-faced hill of porphyry, partly craggy, and in part grassy, slanting away into the valley below, where there is a larch wood, pretty enough, but not in harmony with the scenery. The valley is not more than a mile and a half in length, and opens into a main valley, stretching far southward among the hills.

If there are other places in Scotland which contain as many interesting plants as this, they must be very few. *Cerastium alpinum*, *Saxifraga nivalis*, *S. stellaris*, *S. oppositifolia*, *S. hypnoides*, *Veronica saxatilis*, *V. alpina*,

Silene acaulis, *Erigeron alpinus*, *Potentilla alpestris*, *Draba incana*, *Saussurea alpina*, *Gentiana nivalis*, *Epilobium alsinifolium*, *Aira alpina*, *Poa alpina*, *P. cæsia*, *Phleum commutatum*, *Alopecurus alpinus*, *Salix lanata*, *S. Myrsinites*, *S. reticulata*, *S. herbacea*, and *Mulgedium alpinum*, form a collection scarcely to be found elsewhere, and in the profusion and luxuriance of its individual plants, contrasting with the granite corries of Aberdeenshire.

Among these and the other alpine and subalpine plants, are found many species that grow in the lowest situations, even on the sea-shore. The following were observed :—

<i>Euphrasia officinalis.</i>	<i>Alchemilla vulgaris.</i>
<i>Lotus corniculatus.</i>	<i>Geum rivale.</i>
<i>Anthyllis vulneraria.</i>	<i>Rumex acetosa.</i>
<i>Campanula rotundifolia.</i>	<i>Polygonum viviparum.</i>
<i>Angelica sylvestris.</i>	<i>Scabiosa succisa.</i>
<i>Heracleum Sphondylium.</i>	<i>Habenaria viridis.</i>
<i>Cerastium viscosum.</i>	<i>Lychnis diurna.</i>
<i>Epilobium montanum.</i>	<i>Arabis hirsuta.</i>
<i>Veronica Chamædrys.</i>	<i>Poa annua.</i>
<i>V. officinalis.</i>	<i>Agrostis vulgaris.</i>
<i>Apargia autumnalis.</i>	<i>Festuca duriuscula.</i>
<i>Hieracium vulgatum.</i>	<i>F. ovina.</i>
<i>Crepis paludosa.</i>	<i>Dactylis glomerata.</i>
<i>C. succisæfolia.</i>	<i>Anthoxanthum odoratum.</i>
<i>Bellis perennis.</i>	<i>Aira cæspitosa.</i>
<i>Leontodon Taraxacum.</i>	<i>Avena pratensis.</i>
<i>Stellaria uliginosa.</i>	<i>Pyrola rotundifolia.</i>
<i>Montia fontana.</i>	<i>P. minor.</i>
<i>Pyrus aucuparia.</i>	<i>P. secunda.</i>
<i>Luzula sylvatica.</i>	<i>Botrychium Lunaria.</i>
<i>Juncus lampocarpus.</i>	<i>Parnassia palustris.</i>
<i>Triglochin palustre.</i>	<i>Cystopteris fragilis.</i>
<i>Gnaphalium rectum.</i>	<i>Athyrium Filix-fœmina.</i>
<i>Galium saxatile.</i>	<i>L. selaginoides.</i>

The alpine and subalpine plants were the following :—

<i>Thalictrum alpinum.</i>	<i>Vaccinium uliginosum.</i>
<i>Draba incana.</i>	<i>Gentiana nivalis.</i>
<i>Cochlearia officinalis.</i>	<i>Veronica alpina.</i>
<i>Thlaspi alpestre.</i>	<i>V. saxatilis.</i>
<i>Silene acaulis.</i>	<i>Oxyria reniformis.</i>
<i>Cerastium alpinum.</i>	<i>Salix herbacea.</i>
<i>C. latifolium.</i>	<i>S. Myrsinites.</i>
<i>Dryas octopetala.</i>	<i>S. lanata.</i>
<i>Alchemilla alpina.</i>	<i>Betula nana.</i>
<i>Sibbaldia procumbens.</i>	<i>Tofieldia palustris.</i>
<i>Potentilla alpestris.</i>	<i>Juncus castaneus.</i>
<i>Epilobium alpinum.</i>	<i>J. triglumis.</i>
<i>E. alsinifolium.</i>	<i>Luzula spicata.</i>
<i>Sedum Rhodiola.</i>	<i>Carex Persoonii.</i>
<i>Saxifraga stellaris.</i>	<i>C. atrata.</i>
<i>S. aizoides.</i>	<i>C. rigida.</i>
<i>S. hypnoides.</i>	<i>C. vaginata.</i>
<i>S. nivalis.</i>	<i>C. capillaris.</i>
<i>S. oppositifolia.</i>	<i>C. rariflora.</i>
<i>Erigeron alpinus.</i>	<i>C. aquatilis.</i>
<i>Gnaphalium supinum.</i>	<i>Phleum commutatum.</i>
<i>Saussurea alpina.</i>	<i>Alopecurus alpinus.</i>
<i>Mulgedium alpinum.</i>	<i>Poa alpina.</i>
<i>Hieracium alpinum.</i>	<i>P. cæsia.</i>
<i>H. Halleri.</i>	<i>Polystichum Lonchitis.</i>
<i>H. nigrescens.</i>	<i>Asplenium viride.</i>
<i>H. pallidum.</i>	<i>Lycopodium annotinum.</i>
<i>Azalea procumbens.</i>	<i>L. Selago.</i>

Two plants have been entered in the above list on the authority of the Messrs. Backhouse :—*Cerastium latifolium* and *Mulgedium alpinum*. For the determination of the *Hieracia* I have also trusted chiefly to them, that being their pet genus—a very troublesome pet it will no doubt prove.

Were Canlochan within our district the nature and arrangement of its rocks would require a special description. As it is, they are interesting, in so far as they show that here, as in other tracts, the mica-slate of

Braemar is continuous with that of Forfarshire; that micaceous traets produce much finer pasturage than granite, and, in like circumstances, yield a more copious alpine vegetation.

The porphyry observed on an eminence, about nine miles from Castletown on the Glenshee road, is of a deep flesh-red tint, compact, with uneven, somewhat splintery fracture, and having small irregular crystals of transparent quartz, as well as crystalline felspar, interspersed. It exactly resembles the porphyry of Glen Cluney and the valley of the Dee in Braemar. The other dyke of porphyry, observed on the western side of the Glasmeal, presents a rock of a darker red, more crystalline, generally without quartz, and having interspersed through the mass, abundance of dull green chlorite, in small plates. The fracture is very uneven, and the rock rather difficultly frangible. The exposed surface is of a bright brick-red colour, which renders these dykes very conspicuous.

The clay-slate at the head of Canlochan, on the left hand, and along that side, is slaty, in very thin, undulated laminæ, glistening, generally so soft as to be easily impressed or grooved by the nail. The colour is blackish-grey, that of the powder pale grey. It is sometimes meagre to the touch, generally soft, often unctuous. There is scarcely any quartz in it; but it contains iron pyrites, and protoxide of iron, and the laminæ of the slate itself are often coated with an iridescent film.

Part of the rock at the head of the glen, that which is most productive of plants, is of mica-slate, composed of

laminæ of mica and quartz. The texture and aspect have been altered by an irregular mass of trap, in the vicinity of which it has become compact, the quartz assuming a semifused porcellanic appearance.

This trap is an extremely tenacious hornblende rock, of crystalline texture, with uneven indeterminate fracture, and having a very little granular quartz intermixed. It may be ordinary hornblende-slate, or clay-slate, altered by the porphyry.

The porphyry is various. Generally, it resembles that described above as occurring on the western side of the Glas-mheal: but sometimes it is granite; and often contains larger crystals of red felspar, along with chlorite.

The granite has a very peculiar appearance, being porphyritic, and variegated, with a basis of grey and flesh-coloured compact felspar, intermixed with greenish-black mica, and having conspicuously interspersed through it crystals of albite, and fragments or concretions of white quartz. It is easily frangible, with uneven fracture.

But it is now beginning to get dusky. The croak of the Raven seems to warn us of the approach of night. Poor bird! he has little cause to harbour friendly feelings towards us; for fearful has been the persecution which he and his race have suffered, if not at our hands, yet at those of our kindred. Very seldom now is a Raven to be met with, even in this wild tract of mountain and glen: gamekeepers and sheep-farmers, with guns and traps, have left but a very scanty residue of a once prosperous and respectable race. The same inconsiderate

selfishness which has cleared Van Dieman's Land of its aboriginal population, has destroyed our magnificent Eagles, and sagacious Ravens. It is indeed a rare pleasure to hear the barking and yelping of that distant bird which from the red crags to the right calls aloud to his mate, perched behind us on that rugged ridge where we have just gathered our finest specimens of *Saxifraga nivalis*, and *Poa cæsia*.

We began at seven to ascend the corry, two of us one way, two another. We never met until after traversing the shoulder of the hill, passing along an extended grassy ridge, and descending from it over some rough and boggy ground, we reached the road, and found our vehicle, which carried us to Castletown, where we arrived about ten.

CHAPTER X.

CAIRNTOUL, BRAERIACH, AND BEN-NA-MUIC-DHUI.

THE great feat, which few travellers attempt, and of which they who accomplish it boast, is a journey to the top of Ben-na-muic-dhui, the highest mountain in Braemar. In 1830, I accompanied Drs. Graham and Greville to this celebrated mountain, from which we returned by Loch Aun, and the Derry. Its geology, which is very simple, proved rather distressing, as it subjected me to a load of granite chips, in addition to a closely packed vasculum.

Our object was to visit and inspect the great mountains at the sources of the Dee, with the view of informing ourselves of their geological structure and vegetable productions.

At five of the morning of the 12th of August we joined the Messrs. Backhouse at the inn, and in about half-an-hour after commenced our journey. The sky was clear, the air keen, a white fog lay upon the river and its tributaries, and hung in flakes upon the hill-sides. To save time and unnecessary labour we were conveyed to the Linn of Dee, a distance of seven miles. Traversing the Pine woods for about two miles, we came

to an open grassy strath nearly three miles in length; and on passing it, observed a gamekeeper's house on the edge of a wood. At this, the only human habitation in Glen Lui, we obtained some milk and information, both useful for our further progress. The Glen of the Derry, leading to Loch Aun, opens a little below this station, and that of Glen Lui Beg, which ascends towards Benna-muic-dhui, we passed as we proceeded. At the distance of about two miles from the cottage, we entered Glen Dee, which extends from a little above the Linn, into the midst of the great mountains of the Mona-rua group, toward which we were hastening. We were here a little above the middle of the glen, which is bounded by a range of hills gradually becoming more elevated and abrupt, and presenting more variety of aspect than is usual among granitic masses, in Scotland at least:—massy forms, ranges of precipices, semicircular corries, ridges and peaks, stone-covered declivities, and heathery slopes.

Nearly opposite to us, a little to the left, is Ben Vrotan, on the further side of the glen. Continuous with it, a range of hills passes northward, forming the western side of a valley, called Glen-Giusachan, from which flows a stream bearing the same name. The western side of this valley is very rugged and commences with a huge conical rock, named Bod-an-diaouil, continuous with a great mountain, Cairntoul, having on its upper part two corries, and at its eastern base projecting so as to form the nearer part of the entrance to a glen running northward out of sight, and having on its further side a massy mountain, named Braeriach,

between which and the next great mountain, Ben-na-muic-dhui, from which a high ridge comes down to where we stand, is a narrow, elevated glen or hollow, apparently of no great extent. From this last little glen a stream descends, to join that from the larger glen of the Garrachory, opening at the further base of Cairntoul, and which is the principal source of the Dee. It flows onward along the base of Cairntoul, and here opposite to us, unites with the Giusachan. The stream formed by the union of the Garrachory and Giusachan brooks is named the Dee, which flows southward to the mouth of Glen Dee, where it receives, at Dubrach, a stream of nearly equal size, coming from the west, and named the Geaully, and then hastens eastward to the Linn.

Passing the Giusachan, we proceed toward the base of Cairntoul, and, fording the stream, beside which we find abundance of *Arabis petræa*, and *Alchemilla alpina*, plants which also occur within a few miles of Aberdeen, in the bed of the Dee, we forthwith ascend the steep acclivity, keeping as near as we can to the brook which comes gliding and rushing down from a corry high on the mountain. Many interesting plants are met with, especially *Hieracia*, and the largest "blue-bells" I have ever seen, displayed their cœrulean charms on the banks of the stream.

The ascent was difficult; but at length we reached a space entirely covered with great blocks of granite, passing over which with comparative ease, we entered a spacious corry, of a semicircular form, with fissured crags, and steep stony slopes. The concave bottom or basin of this magnificent excavation is altogether covered

with blocks and stones, among which the rills that descend from its side disappear, but toward its mouth form two small pools of the most limpid water, from which issue the brook that has guided us hither. We all set to work in earnest, one ascending a rifted crag, two going slant across the face of the precipitous declivity, the other examining the base, and then climbing beside a small rill, over stones and shelves, and by fissures and gaps, until we all met, each with an abundant gathering enclosed in his vaseulum, on the very summit of a narrow ridge, where, to my delight, being especially addicted to Lichenology, I found a quantity of *Solorina crocea* in great perfection. The most interesting plants discovered in this corry were *Saxifraga rivularis*, *Cerastium latifolium*, and *Stellaria cerastoides*, the latter in great profusion.

Emerging, as it were, into open space, and inhaling the cool air with delight, we now found ourselves on the back of the mountain, across which we proceeded toward a ridge that overlooked the Glen of the Garraehory. There being here more places than one that gave promise of plants, we separated. The Backhouses went northward, along the ridge, and descended into the upper part of the glen, while the Maegillivrays descended by a steep slope of detritus into a corry immediately beneath. Just as we were commencing our descent, we found several tufts of *Luzula arcuata*, growing in a dry place, upon coarse granite-sand. By a stream toward the bottom, I came upon a large patch of a *Carex*, conspicuous from its black spikes, *C. saxatilis*. Many alpine plants occurred which it is needless to specify here, as

they will be found in the appended list. In the bottom of the hollow is a lake, whose stony banks presented little of interest, excepting a solitary Dipper (*Cinclus aquaticus*). This elevated corry, which is on the eastern side of Cairntoul, and slants down from its highest peak, is separated from the Glen of the Garraehory by a high rocky bank, along which we descended with great difficulty and some danger. On it we found *Sabia Myrsinites* and *Saussurea alpina*, together with many of the more common alpine plants. A great talus of blocks lies along its base, and the stream that issues from the lake, and falls among the crags and blocks, descends from an elevation of nearly a thousand feet.

We had been a considerable time in this second corry of the Lochan-Uaine, or little green lake, and when we reached the stream in the glen below, it was nearly five o'clock. My son went up to the two upper corries, to look for our friends, but failed in discovering them. Supposing them to have preceded us, we moved downwards toward Ben-na-muic-dhui, which rose in massive grandeur right opposite to us. But, still, on reaching its base, the appointed place of meeting, we saw no one.

Toward the mouth of the long, narrow and steep glen of the Garrachory, one of the best places in the world for a glacier—and certainly if such a thing ever existed in Scotland, here it must have been—even now, in this our milder epoch, there is snow unmelted in the upper part of the glen. Here, towards the mouth of the Garrachory Glen, and that of the narrow glen between the Braeriach and Ben-na-muic-dhui, are more than a hundred mounds, of a size varying from a few feet to thirty, forty, or fifty

in diameter, at various elevations, and of various heights, generally low, and rounded, and composed of fragments of granite, mostly angular, and of all sizes, from four or five feet down to mere gravel or sand. Farther down, a little beyond the junction of the two streams, is a large barrow, or elongated mound, about two hundred paces in length, and twenty or more yards in breadth, formed of the same materials. It is laid across the valley, and is cut through, toward one end, by the stream.

How were these mounds formed? Are they moraines? Well, the Broad Hill at Aberdeen, it is said, was considered an undoubted moraine by M. Agassiz; and some heaps of gravel along the Dee, opposite Banchory House, another naturalist of great estimation holds to be moraines also. Let us allow them to be so: a glacier filled the valley of the Dee, and melting at Aberdeen, left heaps of gravel there, to mend the roads, and make mortar with. Where did this glacier commence? If it crept along the Valley of the Dee, and filled it, its commencement must have been here, in the glen of the Garrachory. Now glaciers do not melt away and leave heaps of gravel, just where they begin to form; and if the Garrachory glacier melted every summer and formed these mounds, there could not have been a continuity of it extending all the way to Aberdeen.

But supposing the Dee glacier did at one time stretch from Braeriaeh to Footdee, the earth may have become warmer, and perhaps, bit by bit, the glacier may have melted away, leaving moraines at Banchory in the year 1000 before the Adamie epoch, at Potareh, in 900, at Aboyne in 800, at Camus-ó-May in 700, at Ballater, in

600, at Crathie Kirk in 500, and so on, until in 100 it had altogether disappeared up to the mouths of the highest glens, when the little moraines were for a while regularly deposited every summer or autumn ; and here, certainly, are some of them.

Well, it may be so ; but there is no particular reason to suppose that it was, and no proof whatever that a glacier ever existed here or elsewhere in Braemar. Floods there certainly have been, and their traces are everywhere apparent ; and these mounds are as naturally accounted for by the action of water, as the great sheets of diluvium that cover the oases of the declivities, and stretch along the stream, and the heaps and hillocks of gravel, and even fine sand that cumber the plain in Cromar and other tracts. Therefore, I prefer floods of liquid to rivers of frozen water.

These observations occupied the time for a while ; but some Midges (species of *Tipulæ*) made a desperate attack upon us, and to avoid them I went up the hill to get into a colder atmosphere. There, seated on a granite block, in the dried bed of a torrent, I mourned for my lost companions and our own hapless fate. At length, when I had searched every square acre of the Glen, which is about four miles in length, two black dots were seen slowly descending it. I shouted the joyful tidings to my son, who was sitting far below, like a hooded-crow, on a grey stone ; and in about half-an-hour after the two lost ones and we met on the stony and steep acclivity of the great hill. They had lost each other among the corries, and thus we all lost much valuable time. So we ascended slowly by a very steep hollow, down which

came a necessarily very rapid stream, and found ourselves on a stony shoulder of the mountain. Few plants presented themselves here; or, if they did, we bestowed small attention upon them. *Luzula arcuata*, however, was abundant, in little tufts, in the sandy places. The sand of Loehnagar is not at all like that on the sea-shore at Aberdeen, its angular quartz grains being about the size of those of a mixture of swan-shot and No. 1, with partridge shot and "sparrow-hail." After a walk of about half-a-mile over sand and granite slabs, gravel and rough stones, we arrived at the centre of the broad top, and seating ourselves on the base of the pyramidal cairn of the Trigonometers, made our evening meal. It was eight o'clock; a thick mist suddenly covered the mountains, and enveloped us in its aerial mantle: so we lost the prospect for which we had not looked.

Not at all dismayed, we found by our compasses the direction in which we ought to proceed. There is a great precipice——But I had almost forgot that the kind reader who has accompanied us to this desolate place may not be acquainted with its geography. We are on a broad, roundish, and to a great extent, nearly flat space, covered with slabs and stones of coarse-grained granite; and we are involved in mist, dry, white, electrical mist, causing no darkness at all, but preventing us from seeing two hundred yards around. Now this Ben-na-muic-dhui on which we stand "consists," as I find recorded in my journal of 1830, "of a huge rounded mass of granite, which on the western side, towards the summit, presents a corry formed by a semicircular range of precipices, the rocks of which are marked by nearly

perpendicular fissures, with transverse rents, covered toward the base by débris, and sloping into a small lake named Lochan-Uaine (green little lake), the waters of which are singularly clear, and have a bluish-green tint, which has a remarkable effect as contrasted with the ordinary tints of the Scottish lakes. On these precipices, as well as on other parts of the mountain, patches of snow remain unmelted during the summer and autumn. On the opposite side the mountain declines irregularly toward the head of Loch Aain, terminating in a magnificent range of precipices." These, however, there is no danger of coming upon. But, as I was going to remark when I interrupted myself, there is a great precipice not very distant from us, which we must avoid.

So we directed our course eastward, descended over a long tract of very stony ground, passed some melting snow wreaths, disturbed a large flock of Ptarmigans, and passing round the head of Glen Lui Beg, crossed a stony place to a hollow between two hills, expecting to find an easy descent into the valley of the Derry. But by this time it was so dark that we could not have guided ourselves with safety among the rocks and stones of the very steep declivity down which we gazed. Turning away from it, therefore, we ascended a hill entirely covered with large stones, passed on westward, and found a gradual slope leading to the valley. All this long slope, however, was covered either with stones or long heath, interspersed with plashy spots, and intersected by streams. The stones in all the tract which we had traversed were not what in the low country we

usually call by that name ; but rather blocks, many of them from three to ten feet in diameter. It may seem wonderful how one gets over them so easily, even at night ; but, being rough, they afford very secure footing, and being white, or light grey, they can be seen pretty well in the dark. Heather, on the other hand, is detestable in darkness ; you never know where to place your foot, but push on at random ; and often when you suppose your next step is to be nearly on the level of the last, you come down into a hole two feet deep, or usually less, with a jerk that shakes your whole system, or you knock against a bush, or projecting piece of turf, and the next instant are prostrate. I never once fell among granite blocks ; but this night, in the course of our most weary progress over the heather, we all slipped or tripped many times. It would be tedious to describe, and more so to read, an account of our most fatiguing descent into the Derry. It seemed as if it would never terminate ; but down we did get at last ; and then we plunged into the stream, and on the other side searched for a path, but found none. We did not reach Castle-town till three o'clock in the morning.

CHAPTER XI.

THE CORRY.

IN the Gaelic Language, the word *Coire* is used to signify a cauldron or kettle, and also a large hollow embosomed in hills, or formed in the side of a single hill. Sometimes the hollow is deep, and bounded by precipices, as in Lochnagar ; sometimes it is the extremity of a valley, as in Canlochan ; sometimes appended to the side of a valley, as in the Corry of Loch Candler. In Braemar, however, very shallow depressions on the sides of hills, or between two hills, are often called “corries.” Rocky concavities of this kind are of common occurrence among granitic mountains, and not unfrequent among those of various other formations. A definition may give a correct enough general idea ; but a visit to a characteristic corry cannot fail to make an impression not liable to be easily effaced. Many excellent examples are to be seen in Braemar ; but the Mona-rua mountains present several in close proximity, and showing considerable differences. Two of them have been briefly spoken of. A more extended description, made “on the spot”—as, indeed, are all my descriptions—will serve to illustrate both the geology and the botany of Cairntoul and Braeriach.

The former of these mountains, which ascends from the Valley of the Dee to a great height, presents at its upper part a large hollow, scooped out, as it were, in a semicircular form. On both sides of this hollow are rocks, fissured and shelved, nearly a thousand feet high. From them have descended fragments of all sizes, some many feet in diameter, which cover the slopes that curve from the rocky walls, to form a coneave bottom, also covered with bloeks and stones. Many rills traverse the declivities, most of them fringed with verdure, and some triekling amongst mosses of the most brilliant emerald green. In the ereviees and on the shelves, as well as here and there in patches, and scattered among the lower detritus, are numerous grasses, *Cyperaceæ*, and some other plants. How pleasant it is to the botanist to ramble among these craigs, and search their recesses, where the rarest plants are to be met with!

In this very corry, if you were present, you might see far up in the crevice of what seems a perpendieular eliff one of my strolling brethren. How he got there he best knows himself; but he must have glorious piekings. Croaking aloud, he informs us that he has found *Stellaria cerastoides*, to which I reply that it is very abundant here, by the brook. Another is slowly ereeping over the face of a slanting ledge of roek, while a third, four hundred feet up the craggy hollow, seems bent upon reaching the base of the ridge that bounds our very limited horizon. The fourth is seated on a large bloek, crusted with blaek *Gyrophoræ*, is gazing around, trying to account for the peculiar form of the hollows, listening to the

singular cries of the Ptarmigans, concealed among the grey blocks, and the pleasant twitter of the snow-buntings, which are flitting about on the stony slope.

To one who has not before seen such a place, its aspect must be very strange. Hills and rocks and rills his imagination may combine in any manner, incongruous and fantastic, so as to represent pictures all untrue to nature, unless in some of their details. But here is a true scene, altogether unlike any thing imagined:—a hollow, half a mile in breadth, formed in a granite mountain four thousand feet in perpendicular elevation, covered with blocks, forming a kind of rude pavement little fitted for walking on. When the blocks are very large, it is not easy to get along, as you have sometimes very long steps to take; yet I never saw any one stumble on granite, its surface is always so rough. Snow has long lain in the recesses above, among the crags, and from it and the many rills that are seen even in the greatest droughts, has come the water that forms the two clear deep pools below, from one of which issues a stream that hastens down the declivity of the mountain.

At first sight one might believe the corry almost destitute of vegetation, excepting by the rills; but when you inspect its sides, it is wonderful what a number of species are observed; and among them, even up to the summits, many that grow in the pastures all the way down to the sea-shore. Of these may be mentioned, in the order in which they occurred:—

Anthoxanthum odoratum.
Nardus stricta.
Aira cespitosa.

Melica cærulea.
Festuca ovina.
Galium saxatile.

Montia fontana.
Narthecium ossifragum.
Euphrasia officinalis.
Triglochin palustre.
Stellaria uliginosa.
Caltha palustris.
Melampyrum pratense.
Gnaphalium uliginosum.

Carex stellulata.
Aira flexuosa.
Empetrum nigrum.
Juniperus communis.
Lycopodium selaginoides.
Veronica serpyllifolia.
Polypodium Dryopteris.

The alpine and subalpine plants observed were—

Thalictrum alpinum.
Trollius Europæus.
Arabis petraea.
Cochlearia officinalis.
Silene acaulis.
Stellaria cerastoides.
Cerastium latifolium.
Alchemilla alpina.
Sibbaldia procumbens.
Epilobium alpinum.
Epilobium alsinifolium.
Sedum Rhodiola.
Saxifraga stellaris.
S. aizoides.
S. rivularis.
S. oppositifolia.
Erigeron alpinus.
Hieracium alpinum.
Gnaphalium supinum.

Azalca procumbens.
Vaccinium uliginosum.
Veronica alpina.
Veronica serpyllifolia, var. humi-
fusa.
Armeria maritima.
Oxyria ventiformis.
Polygonum viviparum.
Salix herbacea.
S. Myrsinites.
Tofieldia palustris.
Juncus trifidus.
J. triglumis.
Luzula spicata.
Carex rigida.
Phleum commutatum.
Aira alpina.
Poa alpina.
Lycopodium annotinum.

CHAPTER XII.



THE SOURCES OF THE DEE.

WHATEVER may be the relation of time and space, there are circumstances in which they are not of much direct importance. We have passed along and across a portion of the upper part of the Valley of the Dee, ascended and descended the mountain of Cairntoul, with its two corries, entered and descended the glen of the Garrachory, at the mouth of which were the so-called glacier-mounds; but the approach of night prevented us from searching the upper part of that wild valley, and so we returned, taking Ben-na-muic-dhui in our route, which passed through the Derry and Glen Lui. The source of the Garrachory stream, which at its upper part we saw descending a vast precipice like a white streak many hundred feet in length, we have yet to discover. A journey made to it in 1850 would not differ much from one made in 1819, the glen not having undergone any alteration from draining, trenching, and fencing since that time.

In September of the latter year, a poor student of King's College, Aberdeen, ascended to the sources of the Dee, on his way to Kinguisic, and Fort William. From his

journal I make the following extract :—“ About three or four miles above the Linn, the Dee is joined by a river equal in size, named the Geaully, the source of which I had explored in 1816, when I came across the mountains from Blair Atholl. Hitherto I had travelled in a westerly direction, but now proceeded northward, following the river. There are no houses beyond the junction mentioned. About a mile above it, I came in sight of a most magnificent rock, with a mountain peak behind it, of greater elevation. When I reached this rock I learned by the light-scarlet colour of the clouds on the ridges, that the sun was setting. Passing the rock, I entered a valley bounded on both sides by very lofty and rugged mountains, and terminating in a vast mass, towering above the whole. Before I reached the upper end of this magnificent, though wild and desolate valley, night fell. About this time I saw a deer, not far from me. Near the upper end of the valley, the stream which I had followed separated into two. It was with great difficulty that I elambered to this part, to see which was the largest, that I might follow it. Having ascertained that the largest stream came from a valley which branched off at a right angle from the extremity of the main one, I entered this valley, and proceeded about three-quarters of a mile. It was by this time completely dark, and I determined to rest myself.”

The narrative goes on to state that the night was passed here, in a sheltered place, but with little sleep, some shivering, and many melancholy thoughts.—“ About midnight I looked up and saw the moon, with some stars. They were at times obscured by masses of

vapour, which rolled along the summits of the mountains. I had now a better view of my situation. I was near the upper end of a high valley, completely surrounded by enormous masses of rock. Behind me, my face being towards the mouth of the valley, there rose at its upper end a high mountain involved in clouds; on the right hand was another, in the form of a pyramidal rock, and, contiguous with it, a peak of less elevation; on the left hand, a high ridge running from the mountain in the north-west, and terminating at the mouth of the valley in a dark conical mass; and, straight before me, in the south-east, at the distance of nearly a mile, another vast mountain. The summits of all were at times enveloped in clouds. The wind, which blew from the west, was not keen, and the night was such as in comfortable circumstances might be called warm. Yet on awakening from my slumber, I felt chilly, and soon after began to shiver. I then rose, and gathered a few large stones, and a good deal of grass and short heath, with which I formed a somewhat snug sort of couch. Unloosing my pack, I took a night-cap and a pair of stockings from it, which I applied to their proper use, for my feet had been wetted in crossing a brook, and my hat alone did not keep my head warm after the perspiration it had undergone. Then, eating a little of my scanty store of barley bread, and drinking two or three cupfuls of water from a neighbouring rill, I lay down, put heather and my knapsack over my feet, placed myself in an easy posture, and fell asleep.

“ I awoke fresh, but weak, about sunrise. The stream which I had followed here divided into two, and

I chose the largest. It led me to a magnificent corry, in the form of a deep hollow scooped out of the great ridge, on the left of the glen, as described, but now on my right hand in ascending it. The sides of this corry were formed of sloping rocks of vast height. The rivulet came tumbling down the centre in the form of a cataract. Here the rocks were most abrupt; but I had determined to proceed—at least to attempt the ascent. Before I reached the base of the rocks, I felt very weak, and was obliged to halt every now and then. However, I proceeded, and at length, being well accustomed to rock-climbing, found myself on the very summit of this vast mass of rock. It was covered with mist, which rolled rapidly along the ridges. The sun now and then appeared through it. The view down the corry, which I had just ascended, was delightful—dreadful it might have been to some:—the whole glen, the deep corry just beneath, with its fearful rocks, the opposite mountains with an alpine lake before me. The scene was truly sublime, and I contemplated it with great delight.

“The plants which occurred in the corry were *Gnaphalium supinum*, *Alchemilla alpina*, *Saxifraga stellaris*, *Cerastium alpinum*, *Poa flexuosa*, *Lycopodium alpinum*, *Lycopodium Selago*. *Alchemilla alpina* in the upper regions had its leaflets tripartite.* Even here were specimens of *Rumex acetosella* (Sheep sorrel), but they were very small. I saw *Rhodiola rosea* in a few places. It was very diminutive, compared with the

* The student must have mistaken *Sibbaldia procumbens* for the plant mentioned.

luxuriant tufts which ornament the rocks along the western shores of the outer Hebrides, where I had first become acquainted with it. *Trollius Europæus* was also met with. *Juncus trifidus* and *Apargia Taraxici* were frequent. Yet, among these plants, and at the very summit of the corry, grew *Viola canina*, *Salium saxatile*, and *Nardus stricta*.

“ I had now reached the rounded summit of the ridge, and proceeding along the streamlet, which was the principal object of my research, I traced it to two fountains, and several smaller springs. I took a glassful from each of the larger, and drank it to the health of my friends. Near these fountains, which were among coarse granite sand, I saw a covey of Ptarmigans, and a small bird, which I took for *Alauda pratensis*. The only phænogamous plants which grew on the summit of the mountain were *Silene acaulis* and *Salix herbacea*, both in abundance, the former still in flower.

“ Descending on the northern side of the mountain, I came upon a precipitous corry, down which I did not venture; and further on, found myself on a precipice, from which I had a view of a deep valley, with a lake and a stream, ending in a plain partially covered with fir. The view from this place was vast, and I thought I distinguished the sea; but of this I was not certain, as the mist obscured the view at times. In my descent I saw a considerable number of Ptarmigans, and some specimens of crystallised quartz, though not very fine. On the northern side of the mountain some alpine lakes occurred, in which I could not find anything but *Sparganium natans*, and a few poor specimens of *Caltha*

palustris, which plant I also saw in the rivulets. Holding still a northerly direction, I crossed a broken plain, and ascended a gentle acclivity, at the end of which I found a larger plain, which I also crossed. At the end of this plain, I came to an opening which led into a deep valley, bounded by rocks and rapid gravelly slopes. Descending by this valley, which I found very long and very rugged, into a plain which led to a stream of considerable size, and evidently a tributary of the Spey, I at length reached the low ground, and directed myself westward. In the descent I had found *Alchemilla alpina*, *Thalictrum alpinum*, *Rumex digynus*, *Arabis petraea*, *Cerastium alpinum*, *C. latifolium*, *Poa flexuosa*, *Pteris crispa*, and *Polypodium Dryopteris*."

Not knowing by name a single one of the localities mentioned in the above narrative, I had not been aware of my having passed up Glen Dee to the base of Benna-muie-dhui, and slept in the Glen of the Garraehory. But the journey of 1850, performed under circumstances in some respects more favourable, has shown me that I had in 1819 visited the so-called sources of the Dee on the ridge of Braeriaeh, and crossed the range to the valley of the Spey. The description above given, brief and without ornament, is perfectly correct and quite intelligible. My condition at that time was very different from my present state; but the lapse of thirty years has not diminished my enthusiasm, nor in the least impaired my faculties, physical or mental.

Two days after our visit to Cairntoul and its neighbours, the Messrs. Baekhouse returned, with the view of more thoroughly searching the Corry of the Lochan-

Uaine. My son, who accompanied them, has furnished me with the following report of proceedings :—

August 14th. Messrs. Backhouse and I left Castletown at half-past five, and drove up Dee-side till opposite Glen Dee. We then dismounted, and walked up the side of the river, which is here merely a pretty large brook. On the rocks about a small waterfall a short way from the junction of the Geaully, we saw abundance of *Epilobium angustifolium*, and, in a bog, a little farther on, a few specimens of *Drosera anglica* were plucked. When opposite the northern side of Cairntoul, we began to ascend in a sloping direction, so as to reach the Corry of Lochan-Uaine (or the Green Loch), so named from a small lake at the bottom of it. On the ascent we got a considerable quantity of *Saussurea alpina* in full flower, and of an unusually large size, as well as a few specimens of *Hieracium persicifolium*, and a single tuft of *Dryas octopetala*. After a fatiguing scramble over a great extent of loose stones and débris, we reached the corry, and were soon busily engaged packing our vascula. Next to Canlochan, this place afforded us the greatest store of alpine plants, more than even the far-famed Lochnagar. In marshy ground above the loch was plenty of *Carex saxatilis*; and on the rocks in the course of the largest stream was a considerable quantity of *Saxifraga rivularis*. But it was on the wet shelving rocks on the western side that we reaped the richest harvest. On them we got abundance of *Carex saxatilis*, *C. leporina*, and *C. vaginata*, *Cerastium latifolium*, *Stellaria cerastoides*, *Aira alpina*, *Epilobium alpinum*, and *E. alsinifolium*, *Hieracium Halleri*, *Phleum com-*

mutatum, *Poa alpina*, *Salix Myrsinites*, *Thalictrum alpinum*, and many others. In ascending the rocks on the west side of the upper corry, we again got *Carex leporina*, and a single tuft of *Cryptogramma crispa*, and on those on the other side *Saxifraga rivularis* and *Luzula arcuata*. Mr. Backhouse and I then ascended out of the corry, and walked round the top of the Braeriach to the source of the Garraehory. On our way we raised several flocks of Ptarmigan; but these, besides a few Snow-buntings, were the only birds we saw in the whole of this range. In the corry, farthest up which is also the largest, and seems to separate Braeriaeh from Cairntoul, was an immense unmelted mass of snow, frozen so hard that it did not even give rise to a rill. Running north-west from the lower part of the Braeriach and the head of the Giusaehan, where there was a little lake, was a vast table-land of brown Heath and peat bogs, unvaried by a single rock or eminence of any kind. Shortly after this, we came upon the wells of the Garraehory, in a slight hollow near the top of the mountain. This stream, which we afterwards ascertained to be the main source of the Dee, springs from several wells of limpid water, situated among clear granite sand, without any vegetation, even the slightest, and immediately forms a considerable torrent. After flowing for about half-a-mile it is precipitated, by a succession of small waterfalls, down some broken crags and a vast bank of débris, into the corry below, and on issuing into the glen is joined by several other rills. The rocks about the fall were pretty minutely examined by the Messrs. Backhouse on a previous excursion. Among

other plants they got *Phleum commutatum*, *Alopecurus alpinus*, and *Carex leporina*. From the top of Braeriach we had a splendid view of most of the Highlands of Scotland. On the one side we saw the Perthshire hills, rising ridge after ridge as far as the eye could reach ; to the west, Ben Nevis, and what we supposed to be the mountains of Argyll and Skye ; and, to the north, those of Sutherland and Caithness, in the dim distance scarcely distinguishable from the clouds, with the Moray Firth between us. Below us, to the north, was the large valley of Strathspey, clothed with vast and sombre-looking forests of pine. Leaving, however, the source of the Dee, we descended to the valley beneath, at the entrance of which we were joined by Mr. Backhouse junior. We then proceeded down Glen Dee, and reached Castletown at eleven.

Plants seen on this excursion :—

Thalictrum alpinum.

Arabis petræa.

Cochlearia officinalis.

Silene acaulis.

Stellaria cerastoides.

Cerastium latifolium.

Dryas octopetala.

Sibbaldia procumbens.

Epilobium alpinum.

E. alsinifolium.

Sedum Rhodiola.

Saxifraga stellaris.

S. rivularis.

Gnaphalium supinum.

Saussurea alpina.

Hieracium Halleri.

H. persicifolium.

Veronica alpina.

Armeria maritima.

Polygonum viviparum.

Salix Myrsinites.

Tofieldia palustris.

Juncus trifidus.

Luzula spicata.

L. arcuata.

Carex leporina.

C. saxatilis.

C. vaginata.

C. rigida.

Phleum commutatum.

Aira alpina.

Poa alpina.

Cryptogramma crispa.

Lycopodium annotinum.

CHAPTER XIII.

THE MONA-RUA MOUNTAINS—THEIR GEOLOGICAL NATURE.

BEN-NA-MUIC-DHUI is the most elevated of an extensive and well-defined group, to which various names are applied. Many consider it as the central portion of the Grampian Range, from which, however, it is disconnected; while others call it the Cairngorm Range, the Braeriach Range, and the Ben-na-muic-dhui Range. The people of Strathspey, looking southward, see the mountain-slopes streaked toward their base with red detritus, and name the whole group Monadh-ruadh, the Red Mountain. Those of the opposite side, between them and Inverness, they name Monadh-liath, the Grey Mountain. The comparatively dark-coloured hills of Atholl they call Monadh-dubh, the Black Mountain.

The Monadh-ruadh, or Mona-rua, mountains are all of reddish coarse-grained granite. Commencing with a not very high hill, called Ben Vrotan, on the west side of the valley of the Dee, the range is continued into several mountains, running northward along the little Glen of the Giusachan, which intervenes between them and the broad and high mountain of Cairntoul. This mountain forms the western side of the narrow

Glen of the Garrachory, of which the eastern side is formed by one of the faces of Braeriach, the two mountains being continuous round the head of the glen. Cairntoul has prominences along its northern and eastern sides extending toward the Spey, and on the southern side has its base in contact with that of Ben-na-muic-dhui, a high narrow valley only intervening. Ben-na-muic-dhui, the highest mountain of the range, though it does not very much exceed Cairntoul and Braeriach, is of a massive and rounded form, and sends a prolongation from its western side, running about three miles in that direction, opposite Cairntoul. The corries of this latter mountain, and of the Garrachory of Braeriach, have already been described. There is one also on the southern side of Ben-na-muic-dhui, descending from near the summit to a great depth, with a range of fissured precipices above, and, as usual, a great slope of detritus, with a green lake, Lochan-Uaine, in the hollow. On the opposite side, the mountain declines irregularly toward the head of Loch Aun, and terminates there in a magnificent range of precipices. The rocks at the head of this lake are divided by two wide rents into three great masses, which present nearly perpendicular faces to the lake. These rocks appear to be from three to eight hundred feet high, and exhibit a tendency to the columnar structure. The fissures in two of them are perpendicular, with transverse rents; in the other inclined at angles of from 45° to near the perpendicular. There is no appearance of stratification, although the perpendicular, and sometimes pretty regular fissures, with the cracks or clefts at right

angles to these fissures, might lead one at first to take them for such. These masses bear a striking resemblance to many greenstone rocks, but have a coarser aspect, owing to the disintegration of their surfaces, which leaves them rugged and granulated, and destitute of vegetable incrustation. Toward the top they are much broken, and the irregular columns there separate into transverse tabular masses, disintegration having taken place so as to form parallel fissures, and the uppermost plates lying quite loose. The great rents between the masses exhibit along their sides columns and obelisks of various forms, resembling ruins, and form the beds of torrents which have carried the débris toward the lake in the form of long reddish stripes.

To the right of these precipices, when one faces them, the mountain descends toward the lake in a broad slope of bare granite, which has suffered little disintegration, or, at least, is at present encumbered with few fragments. A torrent which rushes along this slope is full of blocks and stones toward the bottom.

Some of the blocks which have fallen from the precipices are of enormous size. One of them, probably ten yards in diameter, has settled so as to leave a large cavity beneath, which the shepherds have rudely walled up, so as to convert it into a cave capable of containing about twenty persons. As usual, the largest blocks have rolled to the greatest distance.

On the left hand as you look down the lake is a range of lofty precipices, with steep slopes at their base, covered by débris. These precipices form part of the Cairngorm group, which is a continuation of Ben-na-

muic-dhui. The other side is less precipitous, but of the same general character. The lake, which is apparently two miles long, is narrow. Its waters are exceedingly clear, and of a greenish-blue colour. No vegetation is seen in it; but it is said to contain a few small Trout.

A'Charn-ghorm, the blue cairn or tumulus, commonly called Cairngorm, is of an irregular form, and rises to a great elevation. Its structure is similar to that of the other mountains, its surface rugged and bare, or covered with blocks and stones. Between it and Ben-na-muic-dhui and Braeriach, is another mountain called Beinn-a'-mhain, Ben-Aun, more rounded, and of less elevation, but otherwise similar.

On the south-western side of Ben-na-muic-dhui, separated in part by a steep and narrow valley, called Glen Lui Beg, is a ridge of less elevated mountains, of which the highest also bears the name of Cairngorm, and may be called the Braemar, or southern, the other being the Rothiemurchus, or northern. This ridge terminates to the eastward in a semicircular range of precipices several hundred feet high, partially inclosing Loch Etagan. This lake has the same transparency and colour as the other. It contains few Trout, and apparently no vegetation. I looked for *Mollusca* in these lakes, but found no traces of any. The bottom consists of stones and sand as clean and bright as those of the surrounding wastes. The water of all the rills is also exceedingly clear.

From Loch Etagan, south-eastward, runs the Glen of the Derry, with high hills between it and Glen Lui Beg, and opening into Glen Lui, as already mentioned. The

hills along its southern side are low and rounded. From Loch Aun and the Derry, the ground rises irregularly into a vast mass of elevated land of very irregular outline, and forming the great mountains of Ben-na-buird and Ben-Aun, the southern extremities of which are from eight to nine miles distant from Castletown.

Benn-a-buird—probably mountain of the table—Table mountain, and the neighbouring mountain, Meall-teanail, and Ben-Aun, are formed of granite precisely similar to that of the Ben-na-muic-dhui group. Their summits are flattened to a great extent, and present curious protuberances of fissured and disintegrated rock, which are especially conspicuous on Ben-Aun. These mountains, however, may, with more advantage, be especially referred to at a subsequent part of our progress.

Now, the whole of the Mona-rua group, extending from the western base of Ben Vrotan to the eastern base of Ben-Aun, and consisting of several mountains of great magnitude, presenting rounded outlines, several precipices forming corries, and summits and sides covered with disintegrated and decomposing blocks, stones, quartz gravel, and sand, is formed of granite, exhibiting little diversity in its structure and colour. It is composed of flesh-coloured common felspar, dark-grey quartz, and black mica. The latter substance is in small plates or scales, not generally exceeding one-eighth of an inch in diameter, and bears a very small proportion to the other ingredients. The felspar appears to form more than half of the mass, and presents concretions of all sizes, from the smallest up to a diameter of an inch. The

quartz presents no regularity of form, but in transparency approaches rock-crystal, of which irregular pieces of considerable size sometimes present themselves. Sometimes also there are irregular crystals of felspar, of the length of about half an inch, interspersed. In general, however, the uniformity of the mass is very remarkable, there being few concretions, patches, or veins of large-grained granite. Some small veins of white quartz occur, but rarely, and in general present a tendency to the crystalline form, the irregular prisms being transverse to the direction of the vein.

Notwithstanding the general uniformity of structure and aspect, several varieties, as to the colour and size of the felspar and quartz, might be pointed out. Sometimes, but rarely, there are seen cavities, crusted with crystals of quartz, usually whitish at the base, and dusky towards the apex. But it is almost exclusively among the fragments or detritus lying on the surface that these crystals are found. Many of large size and fitted for cutting have been obtained. Crystals or fragments of topaz and beryl have also sometimes been met with.

The mountains of this tract are very remarkable for their extreme sterility, and the desolate aspect which they present. The summits are rounded, sometimes flattened, seldom conical, as that of the lesser Cairngorm, or peaked, like that of Cairntoul. They are entirely covered with blocks and stones, together with angular gravel and sand, excepting a few places where the singular protuberances mentioned above present themselves. The rock wherever it is exposed, and especially in the protuberances, and toward the upper part of the

walls of the corries, has split into tabular masses, generally pretty regular; and looking like strata, intersected by rectangular fissures. The true nature of these tables, however, is readily understood on examining the precipices, where they are best seen. There is no tendency in any part to the concentric or globular arrangement, and the masses in decomposing or disintegrating never present that appearance.

The mountains in Glen Dee and Glen Garrachory present extensive surfaces of granite in their declivities and corries, in which, however, I saw no appearance of stratification, whether on a great or small scale. The fissures or seams ran in all directions. Generally the exposed slanting surface of the rock on the sides of the corries had few fissures, and indicated a solid interior. On some of the ridges or backs of the mountains, however, long parallel rents are observed, crossed by others at right angles, as if a superficial plate of rock had been raised up and had subsided by forces acting in two directions.

In disintegrating, the rock generally crumbles into fragments, and the felspar is decomposed and washed away. In disintegration of a less degree the red tint of the felspar remains; but when the surface is exposed to water in the torrent-beds, it generally assumes a whitish colour.

Unless along the slopes at the base of the precipices, it is difficult to determine whether the blocks and stones which cover these mountains are partially disintegrated and decomposed fragments of the constituent masses, or of diluvial or other origin. They are generally flattened

or tabular, lie in all directions, and at present have in very few places any decided appearance of being fragments broken and decomposed *in situ*. Sometimes a large extent of ground is paved, as it were, with flat slabs. Judging from the fissured protuberances, and the tabulated mode of disintegration of the upper parts of the precipices, I should have no hesitation whatever in considering these scattered slabs as more or less transported fragments of the original surface of the granite masses.

On the summits, there are extensive tracts of angular gravel and sand, among which hardly any rock-fragments occur, excepting, occasionally, pieces of quartz. In some places, the covering consists of fragments intermixed with gravel and sand; and in others of tabular fragments irregularly distributed, with very little gravel in their intervals. Rounded blocks or stones, such as usually appear in diluvium or alluvium, are nowhere to be seen. The gravel formerly contained numerous crystals of quartz and rock-crystal, which have in a great measure been removed by the numerous persons who have searched these mountains for them. Crystals still occur, however, and I found several in the course of my excursions.

The débris on the declivities is of the same general nature. Numerous springs exist on the summits and sides. These uniting, form rills, which, enlarged by rains and the melting of the snow, carry down the fragments. In the beds of these torrents we find the stones and blocks worn and rounded. In those of the larger streams at the bottom of the hills, and in the

valleys, the blocks and stones are much whiter than on the mountains, the felspar having become softer and altered in colour. In many fragments I found it converted into a substance resembling steatite, sometimes white, sometimes red, green, and even black.

In the larger glens there are immense deposits of diluvium or alluvium. Hillocks of from ten to sixty or eighty feet occur abundantly. These heaps are of various forms, but hardly present any appearance by which the direction of the currents that had formed them could be decidedly inferred. Their general direction is that of the valley, although they are also sometimes transverse to it, and often rounded. Where the present streams have cut through them, they present numerous irregular strata, of sand, gravel, pebbles, and rounded blocks. These blocks are generally solid at the surface, and hardly ever present the crumbling appearance exhibited by the tabular fragments and the rocks of the mountain summits and precipices. Granite of the same kind as that of the surrounding mountains, forms exclusively the materials of these accumulations of débris. There can be no doubt, therefore, that they have been derived from the mountains. Not a single fragment of gneiss, hornblende, or any other rock, occurred to me in the valleys or on the acclivities of the central portions of this range. In forming theories, this fact requires to be specially attended to, as well as the many others which I have stated.

Viewed from any of the principal summits, the mountains seem to have no regular direction, but run amongst each other in long round-backed ridges. The

proportional size of the valleys is very small, contrary to the idea which one might form in passing along their bottoms.

The view from the summits of these mountains extends in a circle comprehending the wildest and most desolate scenery in Scotland. On all sides, to the verge of the horizon, are seen mountain summits and ridges, with glimpses of the Moray Firth and Celtic sea, and even of the Atlantic Ocean. Small portions of the valleys of the Dee and Spey and of Glen-Gairn are the only parts in which cultivation is seen. The murmurs of the distant torrents, the rushing of the winds, and the croak of the ptarmigan, are the only sounds to be heard, unless occasionally the thunder bursts on the stunned sense or mutters its threatenings from afar. I have never been in a heavy thunder-storm in Braemar, and only once in one of short duration; but, from what I then saw I can imagine how magnificent must be the scene in the glen of the Garrachory, when thick darkness broods over it, when the lightnings flash from side to side, illuminating the corries, the sharp rattling of the thunder reverberating among the crags, and the more distant peals rolling along from the far-off mountains, to be prolonged by the echoes from the recesses of Cairntoul and Braeriaeh. The bare and light-grey summits, the declivities furrowed with the red streaks left by the torrents, the masses of blue vapour resting on the distant hills, and the white wreaths floating over the ridges, form together a picture of grandeur and sterility, the view of which, if it does not excite a melancholy feeling, soothes the mind, and inspires a religious awe.

CHAPTER XIV.

BENABUIRD.—BEN-AUN.—CRAIGANDAL.

ALTHOUGH a long and fatiguing excursion may not require a day's rest to restore the physical energies, it may demand even more to enable the naturalist to arrange his observations, complete his descriptions, transcribe his notes, and preserve his specimens. On the Tuesday and Wednesday following the 12th of August, on which good execution was done by us on the granite mountains, I was occupied from ten until two in the morning in disposing of collected materials, and preparing for future labours.

In the evening of Tuesday I ascended the hill immediately to the west of Castletown. It is of considerable height, has a rounded form, is mostly covered with heather, becomes stony and bare toward the top, presents the usual upland and subalpine plants, and is remarkable chiefly for the very extensive view which it affords. The Mona-rua mountains, in particular, are very distinctly seen: Ben Vrotan, Cairntoul, Braeriaeh, Ben-na-muic-dhui, the lesser Cairngorm, Benabuird, Ben-Aun, and several others. Morven, the ridge beyond Ballater, and Mount Keen, are conspicuous in the east. A special

object of attraction is Balmoral, gleaming amidst its birch woods, at the distance of nine or ten miles in the valley of the Dee. All round are mountains, which we need not enumerate.

This mountain, Mor-sthroine, Morrone,—the great nose or projection,—is formed of quartzose mica-slate, in strata inclining to south-west. Its upper part is strewn with fragments of that rock and of quartz, plentifully crusted with lichens. On its western side, more than half way up, are two great parallel dykes of red porphyry, already mentioned as seen from the road to the Linn of Dee. They are of compact felspar, with crystals of felspar and quartz. One of them, the lowest, is upwards of a hundred feet in breadth, the other less. On the south-east side also there is seen a dyke of the same nature, high up on the hill, running in a nearly horizontal direction, apparent only here and there, but its detritus forming a conspicuous streak. At its base, on the east and north-east, are strata of limestone, already alluded to.

On the summit, I found two gentlemen and a lady, inspecting the surrounding country with the aid of a telescope. When I had told them the names of most of the mountains I knew, one of them asked permission to look into my vasculum, in which were some Lichens, the nature of which he did not well understand, never having imagined them to be plants, or in any way possessed of life. Almost every person you converse with considers the study of botany as a kind of amusement, perhaps, but at the best a very unprofitable pursuit. People say it may possibly lead to the

discovery of something useful in medicine, and they can form no higher idea of it. The great utility of all science with them is simply its possible economical application. It is no doubt necessary that men should provide themselves with food, clothing, and lodging, and proper that they should cultivate various arts; but, the human mind has other requirements than those which have reference to the maintenance of a healthy condition of the body. These very persons will not deny that general information is useful; that the faculties of the mind, as well as of the body, may be developed by exercising and training them; that there are mental occupations more estimable than any that have reference to the ordinary concerns of animal life; and where can they be found so surely as in the works of God exposed to our view, and traceable by faculties given to us for that very purpose, or in the direct revelation of His nature and will, rendered intelligible to us by His grace. Our objects in examining the stone, the rock, the lichen, the moss, the flower, the fruit, the insect, the bird, or the quadruped, is to exercise our faculties by learning how beautifully, and with what wisdom all things have been constructed, how wonderfully they are formed with relation to each other, and how manifestly they display a power of which we could form no conception were we not to attend to its working as exhibited by them. It is true, we cannot fully comprehend the complicated relations of the most common objects, much less understand the ordination of the universe, or even of our own world; but we labour in hope; we are studying, some

of us, no doubt very superficially—others more profoundly—the works of the Deity, and the more progress we make, the more we glorify Him by an intelligent, not a vague, admiration. There are some who aim at the knowledge of general laws, some who seek simple facts. Both parties will find enough to engage their faculties, and neither will do the work of the other efficiently. There is no reason why one should despise the other. Contempt of anything but vice indicates an unsound mind, a defective judgment, an ignorance of the relations which men have to each other, and to their Creator, an undue self-estimation, and a contempt of the rights of other men. He who measures the orbit of a comet, has not, therefore, higher faculties than he who examines the cytoblast of a fungus; and there is far more to be seen by us in a beetle than in a planet—upon that granite mountain opposite, at the distance of nine or ten miles, than in the sun and the moon and the stars.

On the 10th September, 1819, I crossed the Dee by fording it, opposite Castletown. In an island I found *Rubus saxatilis*, which, although a common plant on the Dee, was then new to me. Proceeding northward I entered a narrow valley, and then followed the course of the stream for several miles. *Vaccinium Vitis-idaea* (red Whortleberry), *V. Myrtillus* (Bilberry), *Arctostaphylos Uva-ursi* (Bear's Whortleberry), and *Empetrum nigrum* (Crowberry), very common in all this tract, produced abundance of fruit. *Rubus saxatilis* and *R. Chamæmorus* were also seen, and *Betula nana* (Dwarf Birch) was not very uncommon. The hills are rounded and not of great elevation; but some trees are

scattered along their bases, and among them many aged and decayed Birehes, which cause a feeling of regret, as you gaze upon their rugged trunks lying prostrate on the moor. *Epilobium angustifolium* (narrow-leaved Willow-herb) grows profusely on some erags by the stream, *E. alsinifolium* in a rut near the upper part of the glen, and near the same place, the beautiful *Parnassia palustris*, more common in the lowland than in the highland traets of Aberdeenshire. When you have emerged from the valley into the open tract above, you have before you the massive mountains of Benabuir, to which you proceed directy over the hollow, crossing by the way a pretty large brook which drains the valley to the right, and on the banks of which are found *Gnaphalium supinum*, *Alchemilla alpina* (alpine Lady's Mantle), *Galium saxatile*, and *Digitalis purpurea* (purple Fox-glove), all very eommon in such plaees. Having my mind full of vague notions as to the distribution of plants, I divided the mountain into three regions: 1st. A plain rising gently at the further end with a pretty rapid aelivity, terminating about one-third up in the stony part of the mountains. 2nd. All the rest to within three or four hundred feet of the summit, consisting of stones or gravel, with some vegetation interspersed. 3rd. The remaining portion, similar to the last, but more sterile. Like the surrounding mountains, this was rounded in outline, excepting in one part, where there was a rocky corry or hollow, from the summit to about half-way down.

The plants which oecurred in the first division were, *Calluna vulgaris* (Ling), *Arctostaphylos Uva-ursi* (Bear-

berry), *Erica Tetralix* (Heath), *Scirpus cæspitosus*, *Eriophorum angustifolium* (common Cotton-Grass), *Narthecium ossifragum* (Bog Asphodel), *Pinguicula vulgaris* (Butterwort), *Juncus squarrosus*, *Juniperus communis* (common Juniper), *Vaccinium Myrtillus* (Bilberry), *Lycopodium Selago* (Fir Club-Moss).

On entering the second region, I found the heath and other plants much diminished in size ; but this arose solely from want of soil retaining moisture ; for where it was pretty deep, they were of their former size, or even larger. The plants which occurred in the lower part were, *Calluna vulgaris*, *Arctostaphylos Uva-ursi*, *Lycopodium Selago*, *Blechnum boreale*, *Vaccinium Myrtillus*, rare and without fruit, *Empetrum nigrum*, rare and without fruit, *Aira flexuosa*, in tufts here and there, and of very large size. Near the upper part of a projecting mass of the mountain, *Juncus trifidus* occurred. Here I observed that the stones were not very much rounded, but had in most places been frittered away into a coarse sand, which had no vegetable covering. About the middle of this division, and about half way-up the hill, commenced *Alchemilla alpina* (alpine Lady's Mantle), and the alpine variety of *Juniperus communis*, that is in dry parts, for by the streams the *Alchemilla* is found in all the glens. *Lycopodium alpinum* grew here abundantly. On the ridges and gravelly places, vegetation was scanty and dwarfish ; in the hollows, however, it was more vigorous. By a rivulet, were *Alchemilla alpina*, *Galium saxatile*, *Vaccinium Myrtillus* (very stunted), *Gnaphalium supinum*, *Blechnum boreale*, *Epilobium alpinum*, *Agrostis vulgaris*. At the termination of this division, and about

five hundred yards—not perpendicular—from the summit, the plants were, *Empetrum nigrum*, *Vaccinium Vitis-idaea*, *Vaccinium Myrtillus*, all stunted and fruitless; *Salix herbacea*, very abundant; *Lycopodium Selago*, of the common size; *Lycopodium alpinum*, also well developed; *Alchemilla alpina*, rare; *Juncus trifidus*, common; *Festuca vivipara*, *Aira flexuosa*, common, but diminished in size; *Galium saxatile*, rare; *Gnaphalium supinum*, common.

In the third region, the surface was covered with stones. A few Mosses and Lichens appeared here and there. In some places were *Alchemilla alpina*, *Silene acaulis*, *Lycopodium Selago*, *Aira flexuosa*, *Agrostis vulgaris*, *Gnaphalium supinum*, *Allosorus crispus*, the last very abundant, and with fructification. Near the summit I found a solitary specimen of *Armeria maritima* (Thrift), still in flower.

On reaching the summit, I found it to be a long, broad, rounded ridge, covered with stones, some of which were rounded, others angular. Here were a few Mosses and a considerable quantity of *Carex rigida*. The scene which here presented itself was exceedingly striking and impressive. All around, mountains appeared behind mountains, with their rocks, ridges, and valleys. A solemn stillness prevailed; nor was a living creature to be seen; the clouds rolled their dusky wreaths along the ridges. The beams of the setting sun darted here and there through the clouds, which exhibited a hundred ever-varying shades. In one direction, a vast livid mass hung over the ridges of a mountain, its lower fringed margin beautifully tinged with deep crimson.

In another place, the white vapour which elung to the summits of the mountains, assumed, where opposed to the sunbeams, a roseate hue of the greatest delicacy. From a small lake in a rocky cerry, five or six miles distant, a white streamlet poured down an alpine valley bounded by precipitous crags. In the west, through an opening of the clouds, was seen a range of lofty mountains, rising behind each other, the most distant being probably fifty miles off. To the west and north-west, the mountains continued undiminished in size, as far as the eye could reach; but, to the east, they rapidly diminished. The desolate ranges of Braemar have a solemn grandeur independently of atmospherie drapery, but partially enveloped in massy clouds, or overhung with a wavy eurtain of gorgeously tinted vapour, their glories are superbly enhanced. But by degrees, the purple and burnished gold and roseate hues faded away into dull bluish grey, dimness crept over the mountains, and my home was eight miles distant.

So I descended by a corry facing the south, and having on one side an immense mass of granite rock. There, after finding the head of the glen, I proceeded for two hours in the dark, until coming to the Dee, just as the moon began to show an indistinct light over the shoulder of a hill, I found a place where the stream was fordable, and at half-past nine reached the inn.

In August 1830, I again visited Benabuir, and, having then paid attention to its form and structure, am enabled to present such an account of them as may be useful to persons intending to explore its rugged corries and broad baek.

Although continuous with the Ben-na-muic-dhui groups, by means of granitic ridges, the intervening tract being mostly low, the broad masses of Benabuird, Meal-teanail, and Ben-Aun, appear to form a distinct group, at least when viewed from the south. Two of these mountains are continuous, and Ben-Aun is only separated from Meal-teanail by a narrow valley. Their summits may be described as depressed, being extended and more or less flattened. That of Ben-Aun is remarkable for the protuberances which appear upon it. They consist of granite more or less disintegrated, forming masses divided horizontally into tabular segments, and intersected perpendicularly by fissures; they are evidently portions of the mass of the mountain, which have either originally protruded beyond the surface, or have resisted destruction while the intervening portions have been disintegrated.

Benabuird presents at its south-eastern extremity a high corry, named Coire-nan-clach, "the stony corry;" at the upper part of which is a rocky prominence of a somewhat conical shape, and forming one of the most elevated parts of the summit. This prominence is appropriately named Cioch, "the breast," or, there being no right Saxon name for it, "mamma." Northward from this, the edge of the hill is precipitous, and forms a corry, having at its base a circular lake, named the Dhuloch, "black lake," the water of which is of a deep blue colour. Some parts of the cliff are magnificent. Enormous blocks have fallen from it, and I was informed by a person accustomed to visit these mountains, that masses occasionally come down in winter. The

precipice, continued northward from the mouth of the corry of the Dhuloch, after stretching out nearly half a mile, winds round the head of a long glen, and, becoming less abrupt, forms part of the southern side of Meal-teanail, which is only a ridge of the same mass as Benabuir. In the upper part of this glen, or corry, is also a small lake, the stream from which unites with that from the Dhuloch, to form the Beachan Burn, which passes through Glen Candlic to the Dee, entering it at Milltown, not far from Invercauld House.

In August 1830, Mr. McNab, of the Edinburgh Botanic Garden, found at the base of the precipice a tuft of *Saxifraga cæspitosa*, portions of which he gave to me, as I was near him when he happened to find it. It is said to have been subsequently gathered by Dr. Martin Barry.

On the 16th August, 1850, we crossed the Dee in the ferry-boat, and proceeding through the woods, entered Glen Candlic, where we found a made path in excellent order, which we followed to opposite the nearer corry of Benabuir. The rock in all this course is micaceous quartz-slate, of precisely the same nature as that already described, on the south side of the Dee. The dying and dead Birches observed in 1819, attracted our notice to-day. The same plants were met with, and the berries of the *Vaccinium* were equally irresistible. Among them were two or three unripe fruits of *Vaccinium uliginosum* (Bog Whortleberry), a plant which, although plentiful in Braemar, I had never before seen in fruit. A game-keeper's house has been built at the head of the glen. We had not proceeded far beyond it when we were over-

taken by a man who informed us, that at this season, visitors are prohibited from proceeding further. But after some civil talk between him and Mr. Baekhouse, who gave our names to present, with our respects, to the Duke, he made no further objection, and only requested us to keep to the left, which we did. Visits like ours are certainly an annoyance to the deer-stalker, who, I should think, is quite justified in preventing them, especially in the commencement of the shooting season. But, not knowing the law of the case, and assuming that a naturalist has a right to go where he chooses, unless formally prohibited, I never hesitate to visit any piece of unenclosed land, although I should always avoid disturbing the game on it.

Crossing the heath, where many fine Lichens, especially *Cetraria Islandica* (Iceland Moss), *C. nivalis*, and numerous forms of *Scyphophorus* occurred, we passed at a distance from Coire-nan-clach, specimens of which, however, we met with in the form of some enormous blocks which had far outrolled their neighbours. Mr. Backhouse junior, and I, entered the second corry, that of the Dhuloeh, while our friends went on to search for the Saxifrage. The plants which I noted there, are :—

Alchemilla alpina.
Veronica alpina.
Epilobium alpinum.
Phleum commutatum.
Saxifraga stellaris.
Saxifraga aizoides.
Festuca vivipara.
Cornus suecica.
Azalea procumbens.
Juncus trifidus.
Juncus triglumis.

Luzula spicata.
Carex rigida.
C. capillaris.
C. vaginata.
Oxyria reniformis.
Tofieldia palustris.
Vaccinium uliginosum.
Polygonum viviparum.
Cochlearia officinalis.
Silene acaulis.
Stellaria cerastoides.

Cerastium alpinum.
Thalictrum alpinum.
Betula nana.
Sibbaldia procumbens.
Polypodium Dryopteris.

Cystopteris fragilis.
Lycopodium annotinum.
L. Selago.
L. alpinum.
L. selaginoides.

Euphrasia officinalis and *Caltha palustris* were abundant, and many other plebeian species, common in the lowest pastures, had presumptuously stationed themselves among the alpine exclusives. *Saxifraga rivularis* was found by Mr. Backhouse, junior.

Having met our friends near the Dhuloch, we descended the valley by its eastern side, along which the hills extend a little beyond the extremity of Benabuird. Then crossing in an easterly direction some low ground, succeeded by a rounded eminence, we came in sight of the deep cleft, somewhat rocky on both sides, which separates a large hill appended to Ben-Aun, from a lower hill stretching about three miles south-eastward. The rocky faces of the cleft are named the Great, or Mickle, and Little Craigandal. The bare moor which we traversed was in some places very productive of Lichens, of which many were collected. While resting on the eminence mentioned, we observed on the opposite hill of the Little Craigandal about two hundred Deer moving slowly along the declivity. Crossing the little valley which intervened, we ascended the hill, and, judging by appearances, directed our course toward the station of *Astragalus alpinus*, which we accordingly found.

Among the grassy herbage intermixed with many common plants, it presented itself in great abundance, but not very conspicuously, although many individuals were still in flower. Within a small space, and making

little show on the green hill-side, we found a very great number of the plants which, in the eyes of the botanist, give their chief interest to the alpine corries. One cannot guess the reason of their preferring this spot, the hill being of little elevation, and not obviously different from those near it, which are of quartzose mica-slate. The plants observed here were:—

Armeria maritima, still in full flower.

Azalea procumbens, in fruit.

Saxifraga aizoides, in flower.

Silene acaulis, in fruit.

Saxifraga stellaris, in flower and fruit.

Luzula spicata.

Saxifraga oppositifolia.

Polygonum viviparum.

Tofieldia palustris.

Thalictrum alpinum.

Gnaphalium supinum.

Epilobium alpinum.

Carex capillaris.

C. vaginata.

C. rupcstris, of which only a single specimen was found by my son.

Intermixed with these were:—

Carex pulicaris.

C. flava.

C. cæspitosa.

Juncus lamprocarpus.

Festuca ovina.

Agrostis vulgaris.

Salix fusca.

Euphrasia officinalis.

Calluna vulgaris.

Erica Tetralix.

Polypodium Dryopteris.

Carex rigida.

We had another view of the Deer, which had descended to the hollow and turned into the pass. Proceeding southward by the ridge of the hill, we saw an Eagle soaring over the side of Ben-Aun, and heard a Raven croaking in the same direction. Twelve Deer attracted our notice farther on, and subsequently we raised two young Roes from among some long Heather.

Mealteanail and its prolongations are of the same coarse, reddish, granite as Benabuird; as is Ben-Aun. Part of the Larger Craigandal appears to be of

porphyry, and the hill of which the Lesser Craigandal is the extremity, is of laminated micaceous quartz and mica-slate; the rock containing scarcely any mica in some places, but a large proportion in others. In Glen Candlic, the strata are well seen, and have various degrees of inclination, but are more frequently nearly horizontal.* The existence of *Astragalus alpinus* on the hill may have relation to its geological structure; in which case it may be expected in many other places in Braemar. It is not known to occur on any of the granitic mountains; and it has been met with only in another station, in Glen Doll, where the rock is slaty.

* About two miles down the Glen, the strata on both sides have an inclination of about ten degrees from the horizontal, and dip to the N.E. The rock there contains so little mica that it might pass for quartz-rock. Farther down towards the mouth of the burn of Milltown, opposite Braemar Castle, the strata are much contorted, and along the stream show numerous variations of inclination. A granite vein or mass appears below the bridge. A great part of the hill to the west is also of granite, as are the opposite rocks of Craig Choinnach, and, in part, the Lion's Face on the south side of the Dee.

CHAPTER XV.

GLEN DEE, GLEN LUI, GLEN CUAICH, GLEN CANDLIC.—UPPER VALLEY OF THE DEE.—MICA-SLATE INTERVENING BETWEEN IT AND THE MONA-RUA.—SCARSACH AND THE GEALLY.

WE have seen that all the mountains of the Mona-rua are composed of granite, uniform in its structure, coarse-grained, with flesh-coloured felspar, grey quartz, and a very small proportion of dark-coloured mica, sometimes none at all. The space intervening between them and the Dee, from three to eight miles in breadth, and extending from Invercauld House to Glen Dee, is of primary slate, very regularly laminated, but varying extremely in its inclination and direction, though often nearly horizontal. It has evidently undergone disturbance and dislocation. Very probably the protrusion of the granite from beneath has been the cause of the irregularities now presented by it. But our business at present is to observe; when facts have been accumulated, we may theorise a little. In the mean time, I have to state that the slaty rock is nowhere, that I have seen, traversed by veins from the granite, but is often intersected by dykes or veins of red porphyry, having a basis of compact felspar, usually interspersed with small nodules or crystals of quartz, often also with crystalline

felspar, and sometimes with mica, in which latter case it resembles granite, but not the ordinary granite of Braemar. In the portion of the Valley of the Dee, which extends from the mouth of Glen Garrachory and the base of Ben-na-muic-dhui, to the junction of the Geaully, no valley or glen of any considerable size joins it from the east. Parallel to Glen Dee, on its eastern side is a low range of hills, for the most part slaty, which separates it from Glen Lui. That glen first receives at its upper part a high valley, called Glen Lui Beg, running westward from the south-western side of Ben-na-muic-dhui, and separated by a granitic range, of which the Lesser Cairngorm is the most elevated part, from the Glen of the Derry, which opens into Glen Lui, the lower part of which is of mica-slate. The next valley that opens into that of the Dee is Glen Cuaich, of only a few miles extent, and coming down from the western base of Benabuird. The high hill forming the western side of this valley at its mouth, and stretching behind Mar Lodge to the mouth of Glen Lui, is composed of mica-slate, as is especially shown by its eastern face, which is abrupt and rocky, with the strata very regular and nearly horizontal. Between Glen Cuaich and Glen Candlic is a large hill, mostly of mica-slate, but partly granitic. Lastly, Glen Candlic, as already stated, is of mica-slate, from the base of Benabuird to the Dee; as is the range of low hills beyond it, commencing at Craigandal.

We have already found the southern side of the Valley of the Dee, from Glen Clunie to the Linn, to consist of the same slaty rock, intersected by the same

porphyritic veins. In so far as I have hitherto seen, the whole country on that side of the Dee is similar. The mountains are of less elevation and more continuously covered with vegetation. Three large valleys open upon the Dee on its southern side. The first, rather a wide moor than a glen, commences where the streams begin to flow eastward, nearly halfway between Castletown and Blair Atholl, where the counties of Aberdeen and Perth are conterminous. There, a mountain named Searsach, rising to a very considerable elevation, gives rise to rills which, meeting with others, form a stream, gradually obtaining accessions as it proceeds directly eastward, until at last it equals, or almost equals, the Dee, with which it unites about three miles above the Linn.

Now, this is all I know of that desolate upper tract in which are the sources of the Geaully, which is, in one sense, the real commencement of the Dee, inasmuch as its course is directly continuous with that of the valley of that river. The water of the Geaully is dark-coloured, it being in fact an infusion of peat, while that of the Dee is perfectly clear. For half a mile beyond the junction of the two streams, each keeps its own side and retains its own colour. All the streams from the mica-slate tracts are more or less tinged from the same cause.

CHAPTER XVI.

THE PINE FOREST.

THE gigantic size of the Pines of Braemar, Glen Tanner, and other tracts on the Dee, has often been asserted, with so much confidence that when one approaches a forest of these trees, expecting a very wonderful sight, he cannot but be disappointed on finding hundreds of stems not a foot in diameter, intermixed with others varying from that to three feet. On my asking an "intelligent native" at Inver Ey, what were the dimensions of the largest Fir-tree he had ever seen, he informed me that it measured seventeen feet round the base, but, a little above that was only twelve feet, and that the finest trees are scarcely ever more than eleven or twelve feet in circumference. This latter statement agrees with my own observations, on which I necessarily place more reliance than on rumours and traditions. On the other hand, I have been informed by a most respectable individual, that there are still trees in Braemar from three to four feet in diameter, and that not very many years ago, there were many much larger. Dr. Skene Keith, in his "General View of the Agriculture of Aberdeenshire," (1811) asserts, that "there are

thousands of Fir-trees in Braemar, some of which are nearly six feet in diameter, and which are superior in point of quality to any wood of that denomination that was ever imported into any place in Great Britain.”* I fear this assertion is rather rash. At all events I will not be responsible for any trees above twelve feet in circumference, at the height of four feet. There are also statements which would lead us to believe that two or more species are confounded under the name of *Pinus sylvestris* (Scotish Fir). There is, however, only one species of native Pine on the Dee.

It attains a height of from fifty to sixty feet, and, at the height of five feet, a girth of ten feet, sometimes considerably more. When a tree of this size stands well apart, and has room enough to assume its full development, it has a fine appearance. Fixed to the ground by numerous roots, which spread all around to the length of from ten to twenty feet or more, it rears its columnar stem, covered with brownish-red bark, rifted into large plates, in the crevices between which is a profusion of *Alectoria jubata*, looking like tangled hair. Numerous branches of large size spread abroad, like great arms, horizontal or drooping, generally waving or tortuous, and much divided. The upper branches are gradually diminished, and more or less inclined upwards, the top being rounded or slightly flattened. The finest and straightest trees, most esteemed for timber, have the top conical; but the most

* In the interval between 1811 and the period of Professor Macgillivray's visit, the greater and by far the finest part of the Braemar Pines were sold and cut down.—ED.

picturesque send out great irregular boughs, and in so far resemble an Oak or a Sycamore. The variety of form, in fact, is very great, and the least beautiful is that of the densely crowded trees, which have shot up into slender spars, denuded of branches up to the very top. Strongly contrasting with this form is that of the tree which growing solitary on some craggy knoll, and freely exposed to the winds, presents, in its variously bent and irregularly branched stem, the appearance of strength and vigour, with a stunted stature.

But, as we approach the forest, we observe that it covers the sides of a wide valley formed by the declivities of opposite hills, between which flows a clear stream, the tributaries of which descend from many of those distant granitic mountains. Above its straggling margins, the ground is densely covered with Heather, interspersed with swampy strips, bearing *Carices* and other Cyperaceous plants. Beyond the upland moors the mountains raise their massive and rounded summits, covered with gray stones, while in the extreme distance is seen the peak of some noted mountains, purpled with haze, or glowing in the sunshine. Many storms have swept over these hills, and adown the wooded valley, and many stately trees have been prostrated by their impetuous rush. Strewn about in the forest, they impede the passage of the wanderer, and over them he may sometimes see the red Deer bound as it avoids his presence. A solemn and sombre aspect has the whole scene; the dark-green foliage, rigid and tufted, shows no grace; but there is a massiveness in the Pine forest which is not seen elsewhere. A Larch wood has quite a different

appearance, and is more beautiful, or at least more lively; but in Bracmar it is not in its proper place. Of the exotic trees that best harmonise with its scenery the finest are the Spruce (*Abies excelsa*) and the Silver Fir (*Abies picea*), which, if indigenous, would exceed the common Pine in effect.

We have entered the wood, and are advancing amongst the tall columns, which obstruct only the distant view. All around, the ground is covered with tufts and continuous patches of *Vaccinium Myrtillus*. Where the trees are thinly distributed, there is abundance of tall heather, with tufts of *Melica cærulea*, and many plants which we are accustomed to see on the moors. Often the ground, destitute of vegetation, is strewn with withered pine-leaves and decaying cones, among which now and then spring up conspicuously a large *Boletus* or *Agaricus*. The gentle murmur of waters comes in varied cadence from the clear stream, which glides over a bed of granite stones, and is fringed with Alders, Aspens, and Willows. Marshy grounds, covered with Cyperaceous plants and Bog-mosses, and tufted with Bog-Myrtle (*Myrica Gale*) occur here and there.

Over the valley and along the hills the forest extends, often intermixed with Birch. On the hill-sides, the trees gradually diminish in size, and become less crowded; and in many places are seen stumps and decayed stems, indicating that in former times the forest was more extended. Now there opens before us a long stretch of level ground, free of wood; grassy fields and ridges that have once been cultivated, but are now left to the

natural vegetation that furnishes the Deer with their choicest food.

Farther up, the valley branches off into two glens, each with its stream of clear water, its numberless rills pouring down the declivities, its alluvial flat of stones and gravel, its stretch of Pine wood, clustered Birches, and heathy moors. Here the trees are in vigorous health, there partially decayed; and all along the upper parts numberless dead and naked trunks are scattered among the living. Emblems of decay, their bark removed, their wood bleached and crumbling—these trunks give an aspect of desolation to the stony moors and rugged hill-sides.

Not a human habitation is there in all the stretch of valley,—this extended range of wood, pasture, and heath,—excepting a gamekeeper's cottage, occupying a pleasant situation on the margin of a brook, in the midst of trees. Not a cow, save his, nor a horse, nor even a sheep, is to be seen. You may wander a whole day, and not encounter a human being. Deer you may chance to meet with, or you may not; a Roe may bound across your course; Grouse, black or red, may frequently attract your notice, as they fly off to avoid your unwelcome presence. You may sometimes meet with merry groups of Titmice and golden-crested Kinglets, frolicking, it might seem, among the twigs, but in reality, engaged in diligent search for insect food. Few other birds are to be seen or heard: Rooks, which occur almost everywhere, except on those desolate mountains around: a few Magpies, a Hooded-crow, or a Hawk, sometimes a Dipper by the streams. But the Pine forest

is a place in which there is no stir—a solemn, melancholy range, in which you may saunter, if allowed, and indulge in many sad reflections.

The Pine forests of Braemar are equally Deer forests, and so, you may view them in either light. But Deer are not confined to woods; they mostly prefer the hill-ranges and green straths; and they thrive just as well in districts where there is no wood at all. They prefer the richest pastures, and when they have access to them, neglect the hill-grass. I was surprised to see the often luxuriant green and succulent pasture of the corries perfect, without the least appearance of ever having been touched by an animal. On the moors and hills also, even in the woods, and in most cases in the valleys and haughs, the pasturage seemed quite entire and luxuriant. It is evident, therefore, that a great deal of cattle-food annually runs to waste; and that what the Deer leave untouched would suffice to feed a vast number of Sheep, Goats, and cattle.

CHAPTER XVII.

GLEN CALLATER.—CORRY OF LOCH CEANDER.

WE have completed our survey of the country north of the Dee, there being nothing there that, with our limited views, we need to look after, excepting perhaps the Falls of the Buaich; and we have partially examined the southern tract, of which the mountains are less elevated. Two principal valleys only remain to be explored, Glen Ey and Glen Callater.

On Saturday, the 17th August, having left our pleasant habitation on the left bank of the Clunie water, we proceeded up the glen of that name about two miles, and crossing by a wooden bridge of fragile structure, betook ourselves to the farm-house of Achallater, where we were most kindly received by the ladies thereof, including the matron and her three daughters. Mr. M'Gregor was busy superintending the marking of his lambs; but, on being informed of our arrival, offered to accompany us to the head of the glen, nearly the whole of which he occupies as a sheep farm. So we went on, by the road, until nearly opposite the lake, when, by his advice, we left the valley, and began to ascend the mountains to the right. Here we may take a

comprehensive view, to render our progress and purpose intelligible.

Glen Callater opens upon Glen Clunie, about two miles from Castletown. It extends about nine miles in a south-easterly direction, is of moderate width, and bounded by hills, at first of no great height, but toward its upper part of considerable elevation. About eight miles up, is seen to the right a recess, which is named the Corry of Loch Ceander, and beyond it, about a mile or more, the glen terminates, in the form of a hollow more extended from east to west than in the other directions, and bounded by four mountains, named Creag-leagach, Tulman, Torn-bridge, and Carn-na-claishe. The rills from these mountains unite to form a stream, which in passing the corry just mentioned, receives a brook that falls from a high rock, forming the Break-neck waterfall, and that which descends from Loch Ceander. The stream then passes down the valley about two miles, when it enters a lake, called Loch Callater; beyond which it proceeds, receiving tribute from the hills, until it enters the Cluny at Achallater. It is by this glen that Lochnagar is most easily visited from Castletown, the ascent to it commencing at the gamekeeper's house, at the lower end of Loch Callater. The mountains from thence to the head of the glen, along its eastern side, are part of a range, connected with Lochnagar, but separated from it by a valley continuous with Glen Muic; and the mountains at its upper part are continuous with those of Forfarshire, and not far distant from the head of Glenshee and the Glas-méal, already visited. The rock in this glen is mostly mica-slate and granite.

The ascent from near Loch Callater southward, though in a course of four miles, was easy, under the guidance of Mr. M'Gregor. It rained rather heavily at times; and, on coming to the brink of the corry, we took shelter for a few minutes in a very neat hut, built by his shepherds, and having in it a place for a small fire, two stone benches, and two recesses in the wall for pipes or other articles. We then walked round the corry, along its brink, and descended into it by the southern declivity, at a place steep enough, but presenting little difficulty. When half-way down I seated myself on a grassy spot and essayed a description of the objects before me:—

One may visit many corries, and not find two of them very much alike. Others may be very dissimilar; and yet we see at once the propriety of giving them all the general name of “corry”—a hollow of large size scooped out of a mountain towards its summit. Here is a very beautiful one, forming a recess in the bosom of a mountain, and communicating with Glen Callater. Its length is not more than half-a-mile, its height from the bottom to the summit of the enclosing rock, about eight hundred feet. I am seated at its mouth, on the southern side, with a ridge of rocks behind me, and opposite, a steep grassy slope, strewn with blocks and stones. Rugged precipices, slopes of detritus, broken ground, green shelves, a large grassy hill-side, a small deep lake, rills from the cliffs, and a stream from the lake, carrying off the waters of the whole corry, are the materials for description.

You may see them all very clearly without pictorial aid. Beginning at the left, close at hand, is a long

broken, green descent, from the craggy summit to the stony base; where, the eye, having alighted, loves to linger, upon a greenish-blue lake. It has a roundish form, its outline, however, with undulation sufficient to rescue it from the reproach of mathematical regularity. What a pleasant thing it is to reflect that lakes are not to be measured by the compass, nor of any definite form—square, triangular, or even elliptical or oblong—and that rocks are not geometrical surfaces—perpendicular, horizontal, or inclined. Let those persons who, because they know nothing of particulars, talk incessantly of general principles, come to the corry of Loeh Ceander, and reduce its features to geometrical formulæ. There they are—beautiful in their wild impracticability. The lake is still, for there is hardly a breath of air blowing; but its surface is here and there dimpled by the Trout—lean and hungry fishes they are—which, in rising to it, cause beautiful eccentric undulations, soon fading away. A little farther on, a mountain rises to a peak, from which sheer-down comes a deep perpendicular fissure, two hundred feet long, not continuous, but branching out and interrupted. On both sides are crags and shelves, with little green strips, rills, craggy prominences, with stunted Willows, and a variety of alpine and common plants intermixed. There the Daisy and the alpine *Erigeron*, the common and the alpine Lady's-mantle, the Wood Sorrel and the *Oxyria*, the Blue-Bell and the Mountain Saxifrages, grow side by side; but to see them, we must search, for they cannot be recognised at this distance. The ruins hurled from the rocks, form a steep slope, passing down into

the unmeasured depths of the lake ; beyond the upper end of which ascends a green flat, drained by a winding rill, to the base of a lofty fissured rock, forming a nearly perpendicular face to the mountains, on whose ridge is the shepherds' hut, mentioned as a shelter from the rain. Curving toward us, and then passing directly eastward, parallel to the southern side of the valley, the northern ridge gently descends, and, at length, just opposite, ends in a steep declivity. The face of this great mass, half a mile in length, and a quarter of a mile in breadth, is a green grassy plane, slanting down to the bottom of the hollow and the shores of the lake. Its beautiful smooth sward, but slightly grooved by a few rills, forms a perfect contrast to the other or rocky side. The varying accidents of light and shade, storm and calm, rain and snow, no doubt cause great differences in the aspect of this beautiful corry. In winter, vast quantities of snow are drifted into it, and in spring lie long unmelted. At present there is sunshine in a blue sky, partially invaded, but not obscured by white cumuli ; even the rocks are cheerful, and the green slopes are smiling, while the lake reflects the unmingled tints of sky, cloud, and mountain. In these precipices sheep often descend upon the shelves, enticed by the verdure, until unable to return they have to be rescued by the shepherds, who let down a man upon a rope, sometimes to the distance of a hundred and fifty feet. The Raven once bred here, and I heard one croaking on the precipice.

The rocks in the corry of Loch Ccander are various. The mountain in which it is excavated is mostly

composed of micaceous slaty quartz, minutely granular, but laminated, and of a grayish or bluish-white colour with dark-bluish-gray laminae, and sometimes with hornblende and actinolite interspersed. At the upper part of the corry, to the south of the hut, the rock is in part red felspar porphyry, composed of minutely granular quartz and compact felspar, of a pale reddish colour, and containing quartz and some crystalline felspar. The exposed surface has a singular light brick-red colour, which extends to the depth of half-an-inch or more, gradually fading. Over the soil here there is a quantity of bog iron-ore, as well as fragments of quartz cemented by it. The precipices, on the south side, over the lake, are of minutely laminar, undulated, and contorted quartzose mica-slate. More eastward, on the same, or southern side, is a ridge of hornblende rock, which descends from the brink of the corry, and is composed of irregularly aggregated imperfect crystals of dark greenish-gray hornblende, intermixed with granular felspar, and resembling a trap-rock in appearance, and in being unlaminate. It is, however, continuous with stratified and laminated hornblende-slate, which forms the face of the promontory on which is the conspicuous and somewhat celebrated Break-neck waterfall. The brook forming this little cascade comes tumbling down the rocks, and has ploughed a large groove in the detritus at their base. I had supposed its name of recent origin, but it is only a translation of the ancient name—Eas-aullt-rist-amhach,—fall of break-neck brook. Some projecting blocks at the base of the promontory are named Clach-mhaduibh,—stone of foxes. Among the

fragments at the base of the cliff above the lake, were some of pale purplish-gray hornstone, and large-grained granite; but I did not find these rocks in situ.

The corry of Loch Ceander is remarkable for the great number of alpine plants which it contains, and in this respect approaches in interest to Caenlochan. The species observed upon it in 1830, and on the present visit, were:—

Saxifraga hypnoides.
S. oppositifolia.
S. stellaris.
S. aizoides.
Alchemilla alpina.
Oxyria reniformis.
Silene acaulis.
Sibbaldia procumbens.
Thalictrum alpinum.
Veronica alpina.
V. humifusa.
Guaphalium supinum.
Trollius Europæus.
Sedum Rhodiola.
Galium boreale.
Festuca vivipara.
Polygonum viviparum.
Carex rigida.
C. rupestris.
Cerastium latifolium.

Cochlearia officinalis.
Epilobium alpinum.
E. alsinifolium.
Erigeron alpinum.
Juncus triglumis.
J. trifidus.
Luzula arcuata.
Salix herbacea.
S. reticulata.
S. Myrsinites.
S. lanata.
S. arenaria.
Silene acaulis.
Thalictrum alpinum.
Tofieldia palustris.
Saussurea alpina.
Hieracium alpinum.
H. Halleri.
H. nigrescens.
H. Lawsoni.

Carex rupestris in the above list was found by my son, *C. Vahlîi* had been entirely extirpated.

Leaving the corry, we descended the rough ground along the stream, and about a quarter of a mile further on came opposite the Break-neck fall. Farther up the glen is another and larger corry, with similar rocks, but without a lake. We did not visit it, however; but proceeded downward, along the green strath, with high

rocks and mountain slopes on the right and less elevated ground on the left. The mountains on the right side of the valley are named Creag-an-leasdair, Carn Tsaggart, Creag-an-loch—all of granite; Meal-ant-slugh, Creag-loithte, Creag Pharig, Creag-an-Tcargag. Those on the left side; Carn-Tuire, already mentioned, Easc-chabuill, Carn-Tuire-bheag, Carn-na-caillich, Torn-a-chuilcan, Creag-na-goidhir, Feadan-dubh, Sron-dubh. These are chiefly of quartzose mica-slate, as are the bases at least of those on the right side below the lake. Loch Callater is not remarkable for beauty, its shores being destitute of wood, of which there is none in the whole valley, excepting a few scattered bushes and small trees. Having passed along the eastern side of the lake, we found a bed of good limestone near its lower extremity. A descent of about three miles brought us to Achallater. In this course, we passed a green hillock, on which a man still living has seen fairies dancing, with a piper playing to them. The rock when exposed was slaty quartz, with little mica; but opposite to and above the steep hill called Creag-an-Tcargag, granite appears in the bed of the stream. At the opening of the glen into Glen Cluny, by the side of the stream, are two quarries of mica-slate, one of which is at present worked. The strata incline W.S.E., at an angle of from 35° to 40° . The slate, which is used for roofing, is thick, and rather coarse, very durable, it is said, but expensive, owing to the thick bed of gravel over it. It is of a dark-gray colour, consists of thin laminae of mica and quartz, and contains iron pyrites.

The soil in the lower part of the glen consists of

angular gravel and clay, with a general covering of peat. The diluvium consists of gravel and clay, with comparatively few blocks of granite, but numerous angular fragments of mica-slate.

Mr. M'Gregor, who had kindly accompanied us, stated that the leaves of *Carex rigida* afford the best food to sheep on the hills; that they often eat *Luzula sylvatica* in winter; and that *Nardus stricta*, which is plentiful, is entirely useless, being never touched by them. He also informed me that he found, on the summit of Lochnagar, a large piece of flint, having an external white crust, and internally a yellowish-gray colour. It was broken up, and used by his shepherds to light their pipes. Other pieces also, he stated to have been found at various times.

Few birds occurred in the course of our excursion. Red Grouse, our host informed us, are much less numerous than they were twenty or thirty years ago. A few Eagles and Ravens are occasionally seen. There are many Plovers on the hills at the head of the glen, and sometimes Dotterels are met with there. Window Swallows (House Martins) breed every year at Achallater; but we saw none elsewhere in Braemar; and Sand Martins are very rare.

On Saturday the temperature was mild, and a good deal of rather heavy rain fell in scattered showers. On Sunday, the weather was rough and cold, but without rain. On Monday, boisterous, with much rain. In the afternoon, however, we walked to Alanacuaich, where we had the pleasure of being entertained by the hospitality and instructive conversation of Mr. Cuning, factor on

the Fife estates. The Rev. Mr. M'Rae accompanied us. About two miles from Castletown, is a very small water-fall, called the Carr Linn, and about half a mile beyond it, at some distance below the road, is another of greater size, having a tortuous shelving bed, and ornamented with wood. Crossing the Dee by the bridge, near Mar Lodge, we passed through a wood composed of large Pines and Birches of considerable size. Some of the former were three feet in diameter, and of the latter a foot-and-a-half. They were much overgrown with Lichens. At the base of the hill is a bank of rock, composed of horn-stone porphyry; but the rock elsewhere is micaceous quartz-slate. The stream of Glen Cuaich forms a very beautiful fall, in the style of the Linn of Dee, but on a smaller scale, there being a fissure in the slate, extending to a considerable length, and, at the commencement of the fall or rush, only about three feet in width, perhaps nearly four, as I did not measure it. There is a wooden bridge, which, I think, mars the beauty of the fall, as bridges do of all falls, although most people seem to think otherwise. On our way back, we recrossed the Dee, which was much swollen, in a boat. The river often rises very rapidly when there has been heavy rain on the hills, and sometimes nearly as rapidly subsides.

CHAPTER XVIII.



GLEN EY.

IN the morning of Tuesday, the 20th of August, I accompanied as far as Mar Lodge my son, who was to traverse the Mona-rua, on his way to Inverness. I then proceeded to Inver Ey, with the intention of examining the glen.

Nearly opposite the mouth of Glen Lui, and on the south side of the Dee, there opens into the strath, or alluvial tract, a narrow valley, which, bounded by hills of moderate elevation, extends southward and westward, to the distance of about eight miles. Proceeding from Castletown, and having passed Mar Lodge, we come to a straggling village, formed of five or six thatched cottages, built in the modern style, and about as many more, of inferior construction, illustrative of the olden mode of living. A rather large stream from the glen enters the Dee, margined with trees. Beyond it is another village, of similar composition, but with the ruder huts more numerous in proportion. Between these villages, or straggling collections of human habitations and the Dee, is a level tract, well cultivated, and bearing crops of oats, barley, potatoes, and turnips. Some cattle of the

Highland breed are grazing about the houses, a few children are tending them, and three or four reapers are commencing the barley harvest. The clear voices of the young Celts, the lowing of the cattle, and the crowing of cocks, with now and then the chirp of a Chaffinch or Wagtail, mingle with the sigh of the breeze, as it comes fitfully down the valley of the Dee. Continuous, but rising and falling in gentle undulation, sometimes swelling into loudness, and then almost dying away, is heard the murmur of the river.

I have seated myself on a knoll, of which the dry and gravelly soil is covered with short Heather in full bloom, mingled with dwarf Willows, trailing Bear-Berry, and small Cranberry plants, together with some *Carices* and Grasses, and several species of Lichens, chiefly *Cladonia* and *Scyphophori*.

In the north-west is a scene, the magnificence of which might well repay a journey of a hundred miles—at least to a person of some taste, a little superfluous money, and plenty of spare time. Directly opposite is a long hill-range, having its broad flank covered with a forest of Pine and Birch, its shoulders and rounded head purpled with flowering Heather. Its outline descends gently into Glen Lui, on the other side of which, to the westward, rises a lower brown hill of similar aspect. Beyond this western hill, and at the head of the wooded glen, rise, ridge behind ridge, the mountains of the Mona-rua, presenting various forms, most of them massy and rounded. Behind these, the far distant summits of Ben-Vrotan, Cairntoul, and Ben-na-muic-dhui, rise in beautiful magnificence, clothed with snow—not in

small and isolated patches, the remains of their winter clothing, but in continuous sheathing, the result of yesterday's storm. It would be difficult for a person not looking upon these mountains, to imagine the beauty which they have so suddenly received. But two days ago, and they were simply prominences of from three to four thousand feet, or a little more, above the sea level, much less, of course, above the general elevation of the district;—now they seem a superb range of lofty mountains, having their summits clad in perennial snow; and they thus represent the great ridges of the earth, the Pyrenees, the Alps, and the Andes. You may fancy them any height—fifteen thousand feet, if you please—their actual aspect will accord with the supposition. Instead of from twelve to fifteen miles, let them be supposed thirty miles distant—or you may contemplate them in their actual and unexaggerated condition;—the highest of our Scottish mountains, on which the white mantle of winter gleams among the sober tints of autumn. How beautifully their white summits contrast with the blue sky above, and the purple hue of the lower hills, or the dark green of the solemn Pine-forests!

As I gaze, a dense mist creeps over one and the next summit, glides along, obscuring another and a fourth. They seem abolished, obliterated, swallowed up. The nearer hills are now involved. Fifteen minutes have sufficed for this envelopment. We watch the progress of the rain-cloud, and in fifteen more the whole Valley of the Dee from Ben-Vrotan to Craig Cornach is overhung with a sheet of grey vapour. Rain falls in flakes,

driven by the wind into wavy streaks; now in one continuous deluge, it comes upon us, and we crouch beneath our portable tent, that is, our ealio umbrella. Alas, for the truth, how it mars the picturesque! If I had a shepherd's plaid and a highland bonnet, they would accord with the scene, and be comfortable enough; but a green umbrella and a white hat—what have they in unison with a storm of rain sweeping down the Strath of the Dee? I am content, however, to have only one arm thoroughly wetted, and my note-book blotched.

Dimly gloom through the rain the massy forms of the nearer hills; then, behind them, ridge after ridge, the whole presenting a rather melancholy, though still beautiful scene, which one would scarcely wish to continue. Presently, the conical peak of Cairngorm, white with snow, shoots up clear from amidst the vapour; beyond it, Ben-na-muie-dhui discloses its massy form, its summit still involved in clouds; the other mountains appear successively; the rain-clouds have passed down the Valley of the Dee, and are watering the pines of the Beallaeh-buie, and the Bireh-woods of Balmoral and Abergeldy. Glimpses of sunshine gleam upon the hills. But in the far west, another vast mass of vapour rolls its wreaths along, enveloping hill after hill, and advancing towards us.

Let us now ascend Glen Ey. From the side of a low hill we obtain a more extended view of the distant mountains, and are surprised to find that the summit of Cairngorm is almost entirely cleared of the snow, which but an hour ago covered it—so heavy has been the

rain. The white stripe of a torrent is seen stretched from a hollow at its base to the bottom of the Derry, showing that the brook must be greatly swollen. But let us attend to our steps.

Few flowers are now to be seen in the pastures. The Heather, as I have said, is in full bloom, and covers the hills. The Tormentil, the Bird's-foot Trefoil, the Eyebright, the Gentian, the Scabious, the Blue-Bell, and two or three more species, still keep up the remembrance of departed summer. The moors are covered thick with the Reindeer Lichen (*Cenomyce rangiferina*), and other species; the stones would yield a large collection to one disposed to strip them. *Arctostaphylos Uva-ursi*, *Lycopodium alpinum*, and *Alchemilla alpina*, are abundant.

About half a mile from the village, a low rounded hill seems to divide the glen. On each side of it, in a rent of the rock, a torrent comes rushing down. Two wooden bridges afford facilities for crossing them. They are too neat to be intended for mere rural requirements, and must have relation to game. The rock is micaceous quartz, very regularly laminated and stratified, and here inclining to the S.E. at angles varying from 15° to 25° . On the rocky banks of the streams are to be seen most of the plants usually found in such situations. Among others:—*Hieracium prænanthoides*, *H. sylvaticum*, *Solidago Virgaurea* (Golden Rod), *Centaurea nigra* (Black Knapweed), *Scabiosa succisa* (Devil's Bit), *Achillea Ptarmica* (Sneezewort), *A. Millefolium* (Yarrow), *Thymus Serpyllum* (*T. Chamædrys*? Wild Thyme), *Lotus corniculatus* (Bird's-foot Trefoil), *Alchemilla vulgaris* (common

Lady's Mantle), *A. alpina* (alpine Lady's Mantle) *Tussilago Farfara* (Coltsfoot), *Euphrasia officinalis* (Eyebright), *Galium verum* (Cheese Rennet), *G. saxatile*, *Tormentilla officinalis* (Tormentil), *Polygonum viviparum*, *Chrysanthemum Leucanthemum* (Ox-eye Daisy), *Aira flexuosa*, *Luzula sylvatica* (great Woodrush), *L. campestris*, *Rubus Idæus* (Raspberry), *R. saxatilis*, *Vaccinium Myrtillus* (Bilberry), *V. Vitis-idæa* (red Whortleberry), *Arctostaphylos Uva ursi* (Bearberry), *Sabia cinerea*, *Pyrus aucuparia* (Mountain Ash), *Alnus glutinosa* (Alder), *Populus tremula* (Aspen), *Betula alba* (white Birch).

The eastern stream is that from Glen Ey. About four hundred paces from the bridge, where the miller has formed a dam or diverticulum, is seen a vein of greenstone, running N.E. and S.W. The rock continues to be micaceous quartz-slate, and the abrupt crack in the strata gives passage to the stream for nearly two miles. At its upper part, the glen widens. There are cultivated fields which have run into fine pasture, and among them the ruins of several farmsteadings.

There is in the rugged rent, in which the stream finds a passage, a concealed recess, said to have yielded a refuge to some murderer or rebel—how many years ago I did not enquire. I had passed it nearly half a mile and so returned; and, finding some men making a path to it with mattock and spade, had no difficulty in discovering it. You descend by a rocky bank, overgrown with trees and herbage.

And now, seated on a ledge of slaty rock, with a craggy, overhanging cliff behind and above, I look for-

ward into the brown eddying pool formed by the swollen stream, which comes rushing and tumbling into the ravine, glides quietly through it, covered with flakes of foam, and continues its course over broken ledges, and among fragments of rock ; the water-bed is here from ten to twenty feet in breadth. On the opposite side is a perpendicular fissured and craggy wall, with jutting abutments, and ledged recesses. It is formed of laminated quartz-slate, in nearly horizontal layers, rises to the height of forty to fifty feet, is crusted with bright yellow and white patches of species of *Lepraria* and other Lichens, and is adorned with a profusion of green Mosses, beautiful tufts of Ferns, and a variety of flowering plants, among which the most conspicuous are *Epilobium angustifolium* (Willow Herb), *Solidago Virgaurea* (Golden Rod), *Hieracium prænanthoides* and *Angelica sylvestris*. A solitary dwarf Pine grows in a singular situation, on the summit of a projecting crag, of which a large fragment has been nearly detached by its roots, they having expanded the fissure between it and the body of the rock. Tree and rock-fragment seem both ready to fall. Of plants not named above, I saw in this place :—

Aspidium Filix-mas.
A. Filix-fœmina.
A. spinulosum.
Polypodium vulgare.
P. Dryopteris.
P. Phegopteris.
Cystopteris fragilis.
Blechnum boreale.
Luzula sylvatica.
Aira cæspitosa.
Valeriana officinalis.
Hypericum pulchrum.
Scabiosa succisa.

Alchemilla alpina.
Rubus saxatilis.
Geranium sylvaticum.
Spiræa Ulmaria.
Oxalis Acetosella.
Vicia sepium.
Hypochæris radicata.
Campanula rotundifolia.
Vaccinium Myrtillus.
V. Vitis-idea.
Populus tremula.
Betula alba.
Pyrus aucuparia.

There is a nearly horizontal ledge of rock, a few feet above the level of the stream, about 100 feet in length, and from four to twelve feet in breadth. From this narrow platform, the rocky bank rises perpendicularly, some parts of it overhanging. At its base is a recess, having the horizontal ledge for its floor, the rock overhanging and projecting, leaving a vacant space of about twelve feet in length, from two to four feet in breadth, and about two-and-a-half or nearly three feet in height. This was the resting-place of the culprit. It is also an excellent place for Lichens.

Having reached the spot whence I had returned, I crossed the stream by a wooden bridge, and proceeded along the east side of the glen, which has the appearance of terminating at about the distance of a mile and a half. Coming to the ruins of a cottage, I sat down on one of the stones, and made a survey of the valley.

Shall I rejoice, or take up a lamentation? Subjects of gladness and grief are before me. A fair, green, strath, smooth as a well-kept lawn, and covered with herbage of the finest quality, as beautiful as that of an English park. Were it not rich soil, there would not be so many mole-heaps, and had it not long received the care of man, fewer Ragweeds would mar its beauty. The brown hills almost encircle it. The stream glides pleasantly among the green fields, Birch and Alder along its banks. About the middle of the valley is a little wood of Birch. Not a living creature is to be seen but a few flies, a host of little midges, and a solitary Wheatear, jerking out its white tail-feathers on a dyke-top. The heath of the hill-sides has been burnt in wide spaces,

which are now covered with verdure; but all around not a single sheep is to be seen.

Having ascended one of the hills on the eastern side of the valley, I obtain a more comprehensive view of the green strath. It is a little more than a mile in length, nearly level, with the stream winding through it. On the south side are four hills of moderate height, a more elevated hill at the fork, and several others are in view. They are all rounded, and the largest does not appear to attain an elevation of more than 3000 feet.

Turning from this spot, I gained the summit of a hill, where, among the short Heather, I found a profusion of Lichens. The ridge that forms the eastern side of Glen Ey is continuous with a curved and rounded ridge running in to the western side of Morrone. Passing first over the summit eastward, and then across a broad hollow ending in a valley which opens near Corrymulzie, I ascended the shoulder of Morrone, then inspected the two great parallel dykes of porphyry, already spoken of, and betaking myself to the summit, took a last view of the great mountains in the north-west, gazing upon them with lingering look. It may be the last. Monuments of power, they speak of the greatness of God, and the last picture they have presented to my view is one of sublimity. Looking south-eastward, I was surprised to see Lochnagar perfectly free of snow: the storm had been confined to the Mona-rua range.

CHAPTER XIX.

GEOLOGICAL STRUCTURE OF THE TRACT FROM SCARSACH TO GLEN CLUNY.

IN so far as it has been practicable, time and opportunity being limited, I have examined the tract of mountain-land, to the south of the Valley of the Dee, and extending from the sources of the Geaully to Glen Cluny; and, although not nearly all the details of its structure have been observed, I am enabled to state that in general it is composed of a primary, stratified, and laminated rock, consisting of minutely granular quartz and mica in small scales, the quartz generally predominating, the mica sometimes equalling the quartz, and rarely exceeding it. However much it may vary in the proportion of its component minerals, and in its colours, which may be white, greyish-white, bluish-grey, reddish-grey, or of two or more of these tints in layers, it is certainly one and the same rock. The strata are variously inclined, generally to the S.E. and the direction is usually N.E. and S.W.; this inclination from 10° to 90° , but usually from 20° to 40° . They are intersected by dykes of felspar porphyry, of a light red colour, and varying in texture from hornstone to common compact felspar, always containing quartz, and sometimes crys-

talline felspar ; in some rare cases also, mica. I have not met with any true granite veins in this tract, and with only one of greenstone, in Glen Ey. Beds of crystalline limestone, white, greyish-blue, or of both colours, occur at Inver Ey, and in many places in Glen Cluny.

The hill-range which separates the lower part of that glen from the tract lying more eastward, might be considered the natural boundary of the upper tract of the Dee ; but as it meets or faces no corresponding ridge on the other side of the Dee, it scarcely constitutes a true limit ; nor does any such exist until we reach the ridge that separates Glen Muic from Glen Tanar. It is not even a good geographical boundary ; and, in fact, the whole mountain-land is continuous as far as the Feugh, if not beyond it.

There can be little doubt that the whole geological basis of this tract is granite, which forms the surface of all the higher and many of the lower hills, and that there is superimposed upon it, in strata, generally inclining from south-east to north-west, a discontinuous, variously inclined, plate or mass of primary slaty rock, occupying extended spaces, and traversed by dykes of porphyry. This slaty rock is of one and the same formation ; but varies in its structure. It is essentially composed of minutely granular quartz, in plates and laminae, always with scaly mica interposed in laminae, but varying greatly in quantity, and sometimes predominating. Irregular beds of hornblende slate are also, but not extensively, intermixed ; and there are numerous layers or beds of crystalline limestone, which, being of

economical utility, have attracted more attention than the hornblende strata.

This primary slate lies immediately upon the granite, and, we may suppose, at one time covered the whole tract. The dykes of porphyry which intersect it, were part of its original constitution. That is, whether thrust into it from beneath or not, they existed before the slaty mass was disturbed and fractured; for some of them are parallel to the broken edges of the strata, and have been exposed to the same accidents as they.

We may suppose that the original slaty layer, nearly horizontal, formed the superficial crust of the country; that the subjacent granite, gradually upheaved, broke up the slaty strata, and projected through it; that while this was going on, currents of water swept away the slate fragments; that the upheaval continued, but locally presented differences of elevation, portions being more protruded than others; that the convex masses, more shattered and fissured, were more readily disintegrated, and formed the fragments with which the granite mountains are now covered; that the corries were formed at this period, by partial elevations and depressions, and have received little subsequent modification. This supposition results from a general and practical consideration of the phenomena presented at the present day, and agrees with them in all respects.

The protrusion of the granite amidst the slaty masses is nowhere manifested in the form of veins or dykes; so that when the upheaval was taking place, the slate was not floating on the surface of a fluid mass of granite. The large hill on the north side of the

Dee, opposite Castletown, and named Carn-na-drochid, shows an intermixture of granite and slate easily understood according to the above supposition.

To the east of Castletown, a small hill, elevated about 300 feet above the Dee, and named Crag-Choinnach, "the Crag of Kenneth" (the king), forms the extremity of the range which bounds Glen Cluny on the east. In ascending it from the village, you pass through a belt of wood, beyond which, the hill-side is covered with a vast quantity of *Arctostaphylos Uva-ursi*. The granite rocks at the summit are encrusted with *Gyrophora* and other Lichens; and from this spot you have a beautiful view of the alluvial flat of the Dee, extending up to Mar Lodge, in high cultivation, and all under crop. To the eastward is another rocky prominence, of less elevation, but presenting to the Dee a perpendicular rock of great beauty, named, not inappropriately I think, the Lion's Face, but known to the older natives as Cregg-a'mhurdair, "the Murderer's Crag." It is profusely crusted with yellow and white *Leprariæ* and other Lichens. Directly opposite is Invercauld House, beautifully situated on a green haugh of considerable extent, with the Dee winding in front, and extensive woods covering the hill-sides beyond. Between the two prominences mentioned, there is a deep and narrow hollow, cumbered with blocks and long heather, and full of trees. It is named the Duclash Dubhclais, "Black Furrow," and is said to be a great resort of wounded deer. The rocks there are of slaty quartz, as are those of the so-called Lion's Face. About three hundred paces eastward from the latter, the rock is granite. In this way the granite and mica-slate are

intermixed along the rocky front presented to the Dee ; but the hills ascending from thence toward the western ridges coming from Lochnagar are mostly of granite.

Farther eastward, are ranges of high rocks, called Craig Chuny, and the river continues to be overlooked by rough and elevated ground, until we enter the Bealach-bhui Forest. All this romantic tract, from Craig-Choinnach downwards, is beautifully wooded with Birch and other native trees, among which, however, are numerous planted trees, many of them of great size. The ordinary vegetation of this pass, and indeed of Braemar generally, differs little from that of the lower tracts of Aberdeenshire. Among the plants observed here were the following :—

Helianthemum vulgare.

Rubus saxatilis.

Mercurialis perennis.

Veronica Chamædrys.

V. officinalis.

Galium saxatile.

Oxalis Acetosella.

Digitalis purpurea.

Stellaria Holostea.

Cnicus heterophyllus.

Solidago Virgaurea.

Viola canina.

V. tricolor-amœna.

*Thymus Serpyllum.**

Vaccinium Myrtillus.

V. Vitis-idea.

Potentilla alpestris.

Pyrola media.

P. secunda.

Avena pratensis.

Aira cæspitosa.

Arrhenatherum avenaceum.

Melanopyrum pratense.

Hieracium sylvaticum.

H. maculatum.

H. Lawsoni.

Geranium sylvaticum.

G. Robertianum.

Luzula sylvatica.

Alchemilla alpina.

Saxifraga aizoides.

Polypodium Dryopteris.

Asplenium viride.

Cystopteris fragilis.

Polypodium vulgare.

Blechnum boreale.

Aspidium Filix-mas.

Aspidium spinulosum.

The sylvan vegetation of the Dee has little variety.

* Babington in his "Manual of British Botany" says, the true *Thymus Serpyllum* has not been seen in Britain. The above is probably *Thymus Chamædrys*.—ED.

Birch and Pine forming almost exclusively the large woods or forests, the whole tract along the river, from the lower limit of Birse to the Linn may be considered as a Birch forest, sometimes dense and continuous, generally straggling. It has been attempted to convert our native birch (*Betula alba*) into two species. For this and other reasons, I have made it an object of very extended and minute observation, the results of which are given in the next chapter.

CHAPTER XX.

THE BIRCH FOREST.

WHAT tree is more graceful than the slender Birch? which, springing from a rift in the rugged and lichen-patched crag that overhangs the mountain torrent, rears its white stem aloft, and spreads all around its brown branches, dividing into countless twigs, which become more and more delicate, until at last they almost resemble slender cords, hanging in separate groups, as if drawn down by the weight of the numberless tiny and glancing leaves that flutter in the breeze. Thousands of such trees are to be seen along the Dee and its tributaries; and though you may have admired a hundred of them individually, the next that presents itself will still attract your regard. If it be associated with other trees of native growth, it will appear the more beautiful by contrast. There it stands in its simple beauty, pre-eminent among the dark-leaved Alders, and light green bushy Hazels. When the sun shines upon it after rain, its leaves reflect the light like gems, and its delicious fragrance fills the air around. When the fitful blast sweeps along the valley, its long drooping twigs gracefully sway, and its slender top yields, to resume its

stately grace when the calm succeeds. In gloomy weather, when the mists have gathered on the hills, and the rains have soaked the ground, its dripping twigs hang gleaming in beauty; and in winter, when the hills and valleys are clothed with snow, tufts of which rest on the more robust trees, it projects into the cold atmosphere, unencumbered, to endure with impunity the most biting frosts. Gladness, and patient endurance, and quiet sorrow, find sympathy in the Birch, or emanate from it. The Pine is a gloomy and stubborn tree, but the Birch responds in its graces to the gentler emotions.

Sometimes it rises with ascending branches and taper summit; and is then nearly as beautiful as when covered with pendulous twigs. But it is not always graceful nor even lovely, for it assumes plebeian forms, or even becomes grotesque; and often degenerates into a mere bush, the leafy twiglets of which are browsed upon by the cattle and the wild Deer.

That rugged and round-topped tree has little beauty. Its trunk, neither imposing by its magnitude, nor pleasing by its graceful bends, is at the base, and here and there all the way up to near the smaller branches, rough with black and rugged rifts and prominences, the intervals between which are covered with white bark, transversely streaked with darker hues. The branches, some large and crooked, some slender, come off irregularly, and shoot out in various directions. Many of the twigs are pendulous, some of them gracefully so; others spread out obliquely. The leaves are beautiful as ever; but the general form is rounded and clumsy. When a wood is composed of such trees, it has a tufted appearance; and

when it covers a large tract, it presents a uniform aspect, the eye, as it glances over it, detecting nothing but a repetition of the same forms.

Often you meet with a Birch wood, of which all the trees have crooked or distorted stems. They rise to the height of from ten to twenty-five feet. Some are single, others having two, three, or more stems. I have counted as many as ten, all springing from the same spot, whether distinct plants, or only stems from a common root, or a stump, I cannot say. The trunk may be from five to ten feet without branches; the tree then spreads out into a large roundish mass of twigs and foliage. The trees hardly deserve the name, yet they are not bushes. Such a wood presents a number of small white stems, none of them nine inches in diameter, bearing great bunches of foliage. One stem leans this way, another that; one has a single bend, another two or three; another is distorted, or variously bent; not one is straight; and there is not a graceful form in the group. Such a collection of trees is a poor representative of a wood.

Scattered over a hill-side, among fallen blocks, and intermixed with copsewood of various kinds, the Birches scarcely rise above the size of bushes, although here and there a tree shoots up in its proper beauty. Such a thicket harbours many forms of vegetation, and is therefore interesting to the young botanist. In this part of the country, the more experienced searches the mountain tops and crags.

On the ascent of Glen Ey are some beautiful Birch thickets. The bushes grow so closely together that it

would be almost, if not entirely, impossible to force one's way between their slender, erect stems, which grow to the height of ten or fifteen feet, and are not generally much thicker than a stout walking-stick; their slender twigs hang with tiny glittering leaves, the deep green of which contrasts pleasantly with the pink-flowered and brown-tinted Heather.

In ascending a valley towards the higher grounds, and after passing through a Birch wood, you come upon scattered trees, having an aged aspect, and stunted dimensions. Some are yet vigorous in their old age; others, gnarled and knotted, with torn and ragged bark, partially denuded and decayed wood, and thinly-clad branches. Many vicissitudes have these aged denizens of the forest seen: sunshine and gloom, calm and tempest, the enlivening heat of summer, and the cramping frosts of winter, have come over them—how often, one cannot tell. In the midst of them has the half-savage Celt of the olden time shot his arrow into the stately Stag, and but yesterday has the smooth-faced and trimly-clad Saxon sent from his rifle, as he leant against one of their trunks, the whizzing messenger of death, to the herd that reposed in peace upon the mossy knoll. Farther on, many trees lie prostrate on the hill-side, among a scattered group of melancholy survivors; and yet further up the valley, the ground is covered with trunks, erect, but decayed, broken down, shaggy with moss and lichen, rotten to the core, and crumbling under the action of the weather. Said I not well, that trees harmonise with human feelings? He who for the hundredth time could pass by such a scene, and not

experience its depressing effect, must have a heart unfit for any gentle emotion. A trumpet could not more forcibly proclaim the inevitable death of all organic being than do these lifeless and silent monuments of ruin.

The Heather blossoms around them, the trailing Bear-berry displays its ruddy fruits, tempting to the eye, but disappointing to the palate; the beautiful Blue-bells hang on their slender stem; as if nothing had happened. The red Grouse leads his family among the tufts, and the Adder lurks on the dry turf. But no young trees spring up to replace the old. The Celts have disappeared from the glen, and their progeny will never more find a habitation there.

“Tha mulad, tha mulad,
Tha mulad ga m'ionadh,
Mu Mhic Grigar nan ruadh bhoc,
Dham bi dual bhi n Gleann Livhan.”

Gentle reader, if the above be unintelligible to thee, it may pass for nothing. Translated into the prevailing tongue, it is to this effect:—“I am filled with grief for Maegrigar of the red-roes, whose heritage is Glen Leven.” Like the snow in the recesses of the Gana-chorraeh-Dhe, or the mist on the brow of Cairntoul, the tribes are dwindling away or mingling with other races. In a hundred and fifty years hence, Celtic sounds will cease to be heard in the Bireh woods of Craehie.

The Bireh tree (*Betula alba*) which forms the subject of this chapter, and grows plentifully in that parish, may be thus described from a characteristic specimen selected from among its fellows, in the wood that covers the base and sides of Morrone.

Of moderate stature, attaining a height of about twenty-five feet, and a girth of three. Roots spreading, much branched; stem erect, at first covered with white bark, which ultimately cracks at the lower part, when the underlayer of bark is exposed and becomes rugged and dark-coloured; the upper part remaining smooth, white, with dark transverse lines, but tinged above with grey and brown; the branches irregular, ascending or spreading, dividing into twigs, of which the last are filiform, and more or less pendulous; the upper branches and twigs ascending; all with dark-brown, glossy, smooth epidermis. Leaves alternate, on short cylindrical petioles, which are reddish above, pale green beneath, broadly ovato-rhomboidal, about an inch in length, thin, doubly inciso-serrate, except at the base, pointed, glabrous, deep green and glossy above, pale green and nearly opaque beneath, penniveined, with reticular venules. The ultimate twigs densely covered with very short, spreading, unequal, greyish hairs, as are the basal margin of the leaves, and their midrib and veins beneath, their upper surface minutely downy, and covered with small, scattered prominences, which seem to be glandular excretions, and appear to give the plant its peculiar fragrance, which is chiefly sensible in spring and early summer. There is great difference in the size and form of the leaves, on the same tree, as well as in the degree of hairiness. The minute glandular bodies are all situated on the venules, and are of a circular form, depressed or slightly convex, dull yellowish with a paler margin, and somewhat resemble the apothecia of a *Parmelia* or *Lecanora*. They are about equally nume-

rous on both sides of the leaf. The female amenta are solitary, on a very short twig, bearing two leaves, which are like the others, sometimes a third, and a fourth, very small leaves. They are oblongo-cylindrical, obtuse, narrow at the base, pendulous, on a short filiform peduncle densely imbricated; scales cruciatio-hastate, having two lateral, spreading, somewhat deflexed lobes, an erect, tapering, obtuse tip, and a basal part tapering downwards; the substance thick, becoming membranous at the margin, uneven, convex, downy, the margins with longer hairs. Fruit elliptical, compressed, with broad, rounded, crenated, membranous wings, of a light brown colour; seed elliptical, compressed, smooth; the fruit crowned by the two very short, tapering styles and filiform stigmas.

One of the most characteristic of the many Birch woods of the Dee is that in which the specimen just described is growing. It extends from the mouth of Glen Clunie several miles westward, between the Dec and the hill of Morrone, up which it stretches a considerable way. The ground is generally dry and gravelly, but with swampy spots interspersed; the rock is micaceous quartz-slate; fragments lie scattered over the surface, and are crusted with lichens. The common Heather is the predominant plant. *Vaccinium Myrtillus* and *Arctostaphylos Uva-ursi*, are also plentiful; *Erica Tetralix* occurs in wet places, and *Myrica Gale* is abundant, forming continuous thickets in damp situations. The plants are the same as those of the heaths and pastures; for, in general, the trees are not so close as to injure the vegetation, and often so scattered as to leave it perfectly

exposed to the weather. It would be difficult to find a tree more than a foot in diameter. Many of the trunks are very small, and most of them bent or crooked. Sometimes they grow closely together, and here and there are thickets of bushes. An extensive tract of rising ground thus covered with Birch affords an agreeable sight; but one is apt to become wearied with its sameness, and to seek the variety of the river side, where the Birch alternates with the Rowan, the Aspen, and the Alder. You may wander a whole day in a Birch wood without seeing a single quadruped. Very few birds occur in it, though you may sometimes come upon a flock of Titmice and Ringlets. The Viper, the Lizard, the Frog, and rarely the Toad, are the only reptiles found there; and seldom it is that one sees them. Numerous mosses and lichens crust the ground and trees; various Agarics and *Boleti* might be mentioned also. On the whole, a continuous Birch forest becomes tiresome. But day after day, without diminution of interest can one gaze upon it, when its margins are broken; and when interspersed with green pastures, patches of corn, and farm-steadings nothing can be more pleasant to look upon.

Economically considered, the Birch is not of much interest. Its wood is hard and durable; but as it does not yield large timber, it is here used chiefly for firewood and paling. The bark is not now used for tanning. The sap, which in spring flows copiously, and has a sweetish taste, is collected from cuts made in the bark and outer wood. It is then fermented, and forms an agreeable drink.

Such is the Common Birch ; but there are many varieties of it. There is one called the Weeping Birch, which you may easily distinguish, when it presents itself in its characteristic form. But the drooping of the twigs, though very remarkable in it, is not distinctive ; for the common birch may have drooping twigs also. On making inquiries on this subject of several persons, I was informed by one that the weeping birch is certainly different from the common. He said it was taller, frequently straighter, had the bark always fissured, rough, and dusky ; the leaves thinner ; the wood much finer, veined, and capable of being formed into beautiful articles of furniture. Another, Mr. Gruar, of Castleton, to whom I was referred by his minister, informed me that, about twenty years ago, the birches on his farm were mere bushes ; whereas now, most of them are trees of from twenty to twenty-five feet in height ; and that one of them, of the weeping kind, had outshot all the rest by twenty feet, although it did not then differ from them. He had the kindness to lead me to it ; and, certainly, the difference between it and the surrounding trees was very remarkable. It had a straight trunk, covered with longitudinally cracked, thickened, and dark-coloured bark ; whereas that of the other trees was white and continuous, excepting occasionally some roughness at the base. At the height of about fifteen feet, it divided into two nearly equal branches, which rose stem-like, erect, and straight, to the height of about thirty feet. The slender spreading branches ended in long, filiform, drooping twigs, sparsely covered with broadly ovate, acuminate, doubly serrate, thin, deep green, glossy leaves,

flat, slightly curvate, at the tip; the twigs and leaves entirely free of pubescence. The forking of the stem is, of course, not essential, but rather a blemish. Yet nothing could be more graceful than this tree as it rose pre-eminent in the wood, its delicate twigs, and glittering leaves, swaying with the breeze.

But the variations exhibited by this tree are very numerous; and a form, the very opposite of that of the weeping birch, may be described: a low bush, with several stems, and erect and spreading branches and twigs, having a brownish-red entire bark; the branches glossy, glabrous, the smaller dark reddish-brown; the twigs of the same colour, closely covered with short, spreading hairs. Leaves broadly ovato-triangular, cordate or sub-cordate, widely and doubly inciso-crenate, with the crenatures very broad, and acute, or inciso-serrate, the tip short; the substance rather thick; both surfaces soft to the touch, with numerous very short, flexuous, greyish hairs; the breadth of the blade generally greater than the length; the petiole very short, reddish, downy.

This is the form which, with several others, would come under the definition of *Betula glutinosa*.

There is a surprising difference in the form of the leaf, even in the weeping variety: it may be elongated rhomboidal, short rhomboidal, rhomboideo-triangular: with the serratures small, or deep, very unequal or nearly of the same size; perfectly glabrous or slightly downy. In the common Birch of ordinary form they vary just as much in shape, and sometimes are subovate, or slightly subcordate; their substance thin or rather thick; their surface downy or glabrous.

On the upper limits of the Birch woods, on the hillside, as well as on the open, elevated moors, I have several times met with small bushes, some of which were so like *Betula nana*, that the first twig which I pulled I thought to be that of some variety of that species. The leaves were small, roundish-ovate, simply serrate, rather thick and downy. It appears to me to be Wahlberg's var. δ *intermedia*, of *Betula alba*. (Fl. Suec. ii. 624.)

Ten or twelve distinctly definable varieties might be made out of the Birch of Braemar; all of which, however, I have satisfactorily traced into each other.

CHAPTER XXI.



BEALLACH-BHUI FOREST.—BALMORAL.—ABERGELDIE.—BALLATER.

ON Friday, the 23rd of August, having packed my specimens of all kinds, and directed them to Aberdeen, I left Castletown, where I had enjoyed much happiness, and had earned refreshing slumbers by daily fatigues. My kind host, and a guest of his, a young gentleman who had been a pupil of mine, accompanied me several miles. We passed the castle, the rocky prominence of Craig Choinnach, the picturesque rock of the Lion's Face, and the loftier precipices of Craig Clunie. These beautiful rocks, with their summits and stone-cumbered slopes adorned with trees, overlook the narrow pass in which glides the Dee. On the opposite side is a wooded hill, on the beautiful green platform at the base of which stands conspicuous the mansion of Invercauld. Along the base of Craig Clunie, among other trees, are many fine specimens of the weeping Birch, all of which have the bark of the trunk reft and rugged: of the blocks that had fallen from the rocks, one, named the Big Stone of Clunie, is conspicuously remarkable, both for its great size and its isolated position in the narrow plane. Everything upon this estate appears to be in fine

condition, and therefore I need not say that the game-keeper's lodge here, at which we called to inquire respecting some birds, is very pretty, and ornamented with an artificial lake, curiously adorned with a mixture of flowers and shrubs.

Once more in the Beallaeh-bhui forest, I seat myself on a mossy bank, and gaze around. I am in the middle of a seeming amphitheatre of hills, formed of ranges extending from Craig Clunie, on the right, up to the crags of Loeh-nan-eun, on the shoulder of Loeh-nagar, and a ridge descending, on the left, from that mountain, down to the Dee. Beyond the river, northward, is seen the rugged and partly-wooded face of a brown hill, forming a kind of eorry, and a Pine wood extending from it. But that all on that side may be excluded from the scene, we turn from it.

There is a sprinkling of Birch in the lower parts of the forest, and here and there along the hills; but Pines, stately and solemn, rear their columnar stems around;—some of giant stature, but the greater number of ordinary size;—all, however, healthy and vigorous. Here, in the wood, the sunbeams glanee upon us; for there is no continuous obscuration of the sky by the foliage; but far up the valley, and along the hills, the trees seem crowded into masses of dark verdure. The breezes, as they sweep over the woods, sound like the noise of the ocean-waves, as they dash upon a distant rock. Suddenly a rushing sound is heard coming from afar. It advances, and as it passes by, resembles the roar of a mighty flood. A blast from the mountain-pass has swept over the forest, bending the stiff tops of the

lofty Pines. Were a hurricane, or even a winter tempest, to invade the valley, rending off the massy limbs, and prostrating the old trunks, the scene would be terrific. We may fancy, too, the magnificence of a protracted thunder-storm,—impenetrable gloom over all the forests, lightnings blazing, and thunders crashing: but I have never found imaginary scenes so instructive as real occurrences, and that chiefly because they are radically unreal, and one knows them to be so. The wind has ceased, and the forest rests in solemn stillness. You can see far away into the forest, between the stems, which are destitute of branches to a great height. Here the ground is covered with luxuriant tufts of Heather in full bloom; there the stones are coated with Moss and Lichens; and on that low knoll, the continuous verdure is due to the yet fresh leaves of the *Vaccinium Myrtillus*.

But what more can be seen or said of Pine-woods, and picturesque trees, and straggling Birches, and rough Heaths, and block-strewn hills, and torrent-groves, than has already been seen and said? Wandering on, we are led by the sound of waters to the Garvalt, which we find rushing and foaming down a rocky cleft, and then hurrying over the blocks and stones which form its path, and rise on either side into ridges.

We now enter a tract where the trees are young, and of an ovate or pyramidal form, but mingled with some of older growth, and with numerous Birches. On the north side of the river is a rock, tufted with Larches, and forming an abutment of a craggy hill composed of micaceous slate. At the base of the rock is a wood, on

the margin of which, by the road side, on a level space, is a gamekeeper's cottage. From the high bank or declivity on the south side of the river, opposite to this cottage, you have a fine view of the forest, through which we have passed, stretching up into a valley, terminated by two rocky mountains. The craggy hill opposite, a person whom I have accosted informs me is named Meall Alvie. Beautifully winds the river along its base, its rapid current rippled by the opposing blocks in its bed, and its stony beach gleaming white beside the brown heath and bright-green larches. Eastward, on the north side, low hills succeed, covered with young wood. On the south side, the native Pine continues, but is mixed with Birch and some other trees.

Here the road winds very tortuously through a long wood ; on emerging from which we come upon an open space. On the north side of the Dee is seen a very pleasant valley, or wide hollow, enclosed by hills. Pastures, corn-fields, woods and thickets, with farm-buildings and cottages intermixed, form an agreeable scene, over the enclosing brown ridge of which project from afar two of the granitic knobs of Ben Aun. Small birds become more common : — Linnets, Chaffinches, yellow Buntings, and some others, which frequent cultivated places or their neighbourhood. The woods on the western rocky hill are of Larch ; in the valley, and along the eastern hill, which limits it on that side, they are entirely of Birch.

It were useless to describe every particular feature of scenery like that of Crathie. From near a very



THE DEE, FROM BEALLACH-BHUI WOOD.

handsome cottage is obtained a fine view of Lochua-gar:—the great corry, part of the crags of Lochaneun, intervening heathy hills, and at hand rocks and woods. Then, on the north side of the Dee comes another hollow between two hills, with the same display of corn-fields, pastures, woods, and cottages. Opposite the middle of it, we come, somewhat abruptly, upon the royal residence, embosomed among trees. The surrounding woods are chiefly of Birch, and besides covering a great part of the plain, or alluvial tract, on which the Castle is situated, extend up a low ridge of hills, which are singularly rocky and bare on the other side, and stretch away to the southward, to mingle with the elevated moors. On the other side of the Dee, which sweeps round the Balmoral grounds, is seen the church of Crathie, somewhat more handsome than most of our parish churches. Behind it rises a craggy hill, from which extends along the valley of the Dee the elongated hill-range, already mentioned, of which the culminating point is Geallaig.

Proceeding eastward, we come next to Abergeldie House. The grounds about it are pleasant enough, and there rises near it a rather large rounded hill, covered with Pines, but disfigured by the manner in which they have been treated. All the large trees have been removed, and only distant and slender spars left shooting up straight, with a solitary tuft of leafy branches at the top. How different from the great spreading sturdy Pines of the Forest of Mar!

Beyond this hill, which is named Craig-na-ban, is another, appropriately named Craig-ghinaiis—Pine crag.

Between this latter, and a similar hill, to the east, emerges the small water of Girnae. Beyond it, we enter upon a more pleasant tract, which extends several miles, to Ballater, and is well cultivated. A wood, about two miles in length, stretches along its southern side, rising to the summit of a low, conical hill, called the Craig of the Knoeks. On the north side, it is bounded by a bare stony and heathy range, having a



sprinkling of wood at its base. The plain, or strath, seems closed below by a range of low hills, descending from higher ground to the north, and toward its southern end abruptly cut into by a craggy gap, the Pass of Ballater, which cuts off a rounded hill, wooded toward the top, and named Craigandarroeh. Between it and the wood of the Craig of the Knoeks the river winds, and a little behind it is the village of Ballater.

The walk from Castletown, whether by the north or the

south side of the Dee, is very pleasant, and if leisurely performed, presents many objects of interest to the naturalist. These, however, I have purposely omitted to mention, as the whole district has to be submitted to a regular examination.

From the Linn to a little below the mouth of Glen Gairn, the Dee flows rapidly along the valley in a nearly straight course; but at the mouth of Glen Muic, and the upper end of the plain of Ballater, it forms a curve of about a mile in diameter, and then passes north-eastward, for about four miles, after which it resumes its eastward progress. The plain of Ballater, bounded by granite hills, mostly wooded, and the lower part of Glen Muic, nearly on the same level, but separated from it by the Dee, form a tract seldom exceeded in beauty or salubrity, and, although celebrated in Aberdeenshire for both qualities, yet little known to the inhabitants of other parts of Scotland.

The village of Ballater, which is of inconsiderable size, but formed of respectable-looking houses, many of which are let as lodgings to invalids and others, who resort thither in the summer and autumn, is pleasantly situated on this plain, on the left side of the river, over which is a wooden bridge.

At twelve o'clock, having arranged specimens, and completed notes, I ascended the hill to the westward, named Craigandaroch, which rises with a steep ascent. Toward its upper part it presents broken ranges of precipices of no great height, the blocks and stones from which cumber the slope, and has its summit craggy and rounded. It is wooded all over, except the

precipitous parts ; with Pine at the top ; Oak-copse, cut every twenty years, on the southern side ; Oak, Birch, and Aspen intermixed, farther down ; and Pine below and over a gently-sloped prolongation passing obliquely down the side of the valley. Toward the lower end of this wooded slope is the house of Monaltrie, finely situated on a narrow platform slightly elevated above the plain. Having crossed the hill, I descended by the rocks and stony declivity at their base, into the pass. The whole hill is formed of coarse-grained reddish granite, having very little mica in its composition, and for the most part easily frangible, and soon undergoing partial disintegration. It has been quarried on the southern side for building, for which it is in some respects well adapted. The northern side of the pass presents much higher precipices, fissured, grooved, and shelved, composed of the same red granite, with a similar but more extensive slope of blocks, some of which are of very large size. These rocks, named Creag-ant'-the-ombraig, form the southern extremity of a hill-face, covered with wood, and extending to the village of Tullieh. There, a third craggy hill faces the plain, and beyond it a fourth, from which proceeds eastward a low promontory, ending at the mouth of the valley or plain.

Having returned to the village, and spent some time in describing a few plants, I went out again at six, crossed the Dee by the bridge, and walked along its eastern side, by the road to Panannich. It was a beautiful still evening. The sun sent a gleam of light through the Pass of Ballater into the plain, and illumined the hill-

tops on the western side, while their shadows spread far over the fields. The hill along the base of which I walked, is covered with Pines, and, partly, opposite the village, with Birches. Great numbers of Chaffinches flew along from tree to tree, apparently enjoying the sunshine, occasionally chasing each other, and engaging in mimic conflicts. I was drawn into the wood by hearing a singular chorus of many shrill voices in the trees, and looking up, observed a multitude of little birds of several species, frisking about in great glee. Most of them were coal Tits, Ringlets, blue Tits, and willow Wrens; but there were also many Chaffinches, and some common Linnets. Great numbers of Ringlets occurred in other parts of the wood. I was amused with the movements of a pair of coal Tits, which separated from the rest, and betook themselves to an excavation in the diluvium, from the turf margin of which there hung a number of slender tree-roots. One of the Tits flew in among them, frisked from one to another, clung to a long filament, and appeared to enjoy the motion, as it swayed backwards and forwards. The other bird then joined it, and they seemed content for a while to amuse themselves apart from their companions. There was a general merry-making among the little birds. They seemed, after the labours of the day, old and young together, to indulge in frolic, before retiring to rest.

Many species of Mammalia, birds, and fishes, evidently pass a portion of their time in sport. Young animals are especially addicted to romping, as may be seen in foals, calves, and especially lambs and kids, as well as puppies and kittens. The same is observed in

birds, wild and domestic, in Hawks, Rooks, Finches, and poultry. No birds are more gracefully sportive than Ducks of all kinds are on the water. Not the gentle only, but also the ferocious, enjoy themselves in this manner. Eagles and Ravens I have often seen wheeling and gliding through the air in sport, while they gave expression to their delight in loud and modulated cries.

Having proceeded until opposite the village of Tullieh, which is about a mile and a half distant from Ballater, and situated on an irregular eminence encroaching on the plain, I observed on the hill a remarkable crag, which had previously attracted my notice from various distant positions. Ascending toward it, through the wood, I found, at some height, the ground covered with *Vaccinium Vitis Idæa* (red Whortleberry or Cowberry), of which many plants were in full flower, while others, but not a great number, bore ripe fruit. This year, the flowers of the wild berries were mostly destroyed by frost, which also blasted the potato-stems in Braemar. These latter, however, sent out new shoots, and the crops, although somewhat late, were now most luxuriant. There are no Averans (*Rubus Chamæmoris*) in fruit this year; few Blackberries or Cowberries, and only here and there, unless in very favourable localities, a Cranberry or an Arbutus. In such cases, I have been told, *Vaccinium Vitis Idæa* flowers a second time, and, should the season be propitious, yields berries, seldom ripening, late in autumn. This statement, not entirely credited, I now found in so far authenticated.

Having, with some slight difficulty, attained the base

of the precipice, which slants from the summit of the hill halfway down, I found it to be of large-grained red granite. Looking up at its highest part, where it is nearly as smooth and erect as a wall, the declination from the perpendicular not being more than about ten degrees, I felt almost afraid to remain long gazing, or to break off a specimen, lest something should fall, or a person above should, as is a frequent and dangerous practice with idle people, throw down a stone. Several trees grew in the cracks; tufts of Ferns had sprung up in great luxuriance, amidst an abundance of *Epilobium angustifolium* (Willowherb), some Foxgloves, and numerous common plants, *Populus tremula* (Aspen), *Betula alba* (Birch), *Pyrus aucuparia* (Rowan or Mountain Ash), *Hieracium murorum* (Hawkweed), and various grasses, were among the plants observed; but no truly alpine species were seen. On a green slope along the base of the highest part, Nettles were plentiful, indicating that man had at some time lurked here—which is not at all improbable—as the recesses in the rock could afford an asylum. In descending, I came upon a deep groove, extending from near the top to near the bottom of the hill, and recently formed by an avalanche of blocks, which were strewn in its whole length. Among them I found several minerals, as well as varieties of the granite.

Having regained the road, I had a very quiet pleasant walk in the dim twilight. The hills had assumed a uniform dusky hue; the air was still; the birds had all retired to rest; and no sound was heard but the incessant rushing noise of the river. I stood to gaze

upon the scene, closing in dim obscurity, and the river ever gliding along, like the tide of time, unceasing, from a period to a period, with reference to created objects, but unbeginning and unending.



CHAPTER XXII.



VALLEY OF THE DEE, FROM BALMORAL TO CRAIGANDARROCH.

BRAEMAR, with its lofty granitic mountains, less elevated ranges of quartzose mica-slate, narrow valleys, and extensive forests, has presented little other difficulty in examining its structure and geographical features than what has been overcome by considerable physical labour and some attentive observation. But we are now in the midst of more intricate ground, which will require a protracted examination. The civil or ecclesiastical divisions of the district are not always accordant with its geographical and geological features ; and, therefore, I shall make little reference to them. The labour of four days has already been expended in obtaining a comprehensive idea of the tract to be described, in examining many of its details, and in preparing for a special description.

The Dee, as has been seen, continues its eastward course from the lower limit of Braemar to Craigandarroch. The valley in which it flows is distinctly defined, having on its northern side a long hill range, without a single break, and on the southern a series of rounded hills, of no great size. A long valley, named Glen

Gairn, extends eastward from Ben Aun to near the base of Morven, and then, curving southward, opens into the valley of the Dee, near the western base of Craigan-darroch. On the southern side, there descend from the elevated ground slanting from Loehnagar, ridges, which bound two small valleys, named Glen Gelder and Glen Girnac. We may thus examine, first, the valley of the Dee traet, then Glen Gairn, and lastly, the southern glens.

Having already made a partial inspection of the first of these traets on the 7th and 23rd, I have now to complete its description on this, the 30th of August. Leaving Ballater, after ten, along with my eldest daughter, who had come to assist in collecting and arranging specimens, and who was most loyally anxious to see the Queen's sylvan palae, I passed the mouth of Glen Gairn, in the Ivy of the remains of the old bridge of which I observed several birds of a species very rare in this part of the country, the domestic Sparrow, (*Passer domesticus*). Walking cheerfully along, we admired the weeping Birehes, the corn fields, the "blooming heather," the graceful windings of the river, and the distant corry of Loehnagar, to which all eyes that can see so far, naturally turn more frequently than to any other object. The hill range to the right is principally of granite, rather large-grained, with reddish felspar, hyaline quartz and very little blackish mica. Having passed through, the long Birch wood, called Coille-eriich, we left the road, and ascended the hill-side.

Two very different landscapes await our inspection—one, to the left, down the valley; the other to the right,

extending to Braemar. Looking in the former direction, we see, continuous with the declivity on which we are seated, a long stretch of hill-side, covered with gray stones and long Heather on its upper parts, with Birch trees and bushes along its base. At its extremity, is the rounded hill-lump of Craigandarroch, a most unpicturesque object, with a formal stone dyke, separating the wood which clothes its upper portion from the moor below, and limiting two lairds' dominions. Beyond it is the hill-range bounding the plain of Ballater and Glen Muic to the eastward. Then, on the southern side of the Dee, we observe, first, the low hill called "the Craig of the Knocks," covered all over with pine; nearer the round-topped and craggy hill of Craig Phibe, wooded to half-way up; nearer still, Craig-ghinai, with its thick woods and scattered trees. The Dee, which glides along at the foot of the declivity before us, disappears among the trees about half a mile down, and in the rest of its course is concealed by a small wooded hill, occupying the bottom of the valley at the distance of about a mile. It seems a region of woods and hills, and we might fancy it a wilderness, did we not know from previous observation that it contains a considerable extent of cultivated and fertile land.

The view up the river is far more interesting; for, besides its variety, beauty, and even sublimity, it affords ample scope to the imagination, both as to the formation of its mountains and valleys, and the possible uses to which they might be applied. Man, no doubt, passes a life of labour among these hills, but labour is in perfect accordance with his faculties. Nearly opposite

rises from its broad base, the rounded, granitic mass of Craig-na-ban, very similar to its neighbours on the left, and once densely covered with Pines, most of which have been cut.

Craig-na-ban, "the Rock of the Women," must have its name from some fact in the economy of the ancient inhabitants. Some say it was thus—A long time ago, when there were witches all over Scotland, and decent people burnt as many of them as they could convict, an old woman, of unenviable celebrity, who lived by the Dee, was accused of witchcraft, and condemned to death: an old man, of like character, and under the like sentence, was confined along with her. One dark night, the witch made her escape. The warlock engaged to bring her back, on condition of his being pardoned. He had not travelled very far when he spied a hare, which he knew to be the witch. Transforming himself into a greyhound, he pursued, and had almost caught her, when she suddenly became a mouse, and ran in between the stones of a dyke. But the greyhound, instantly assuming the form of a weasel; pursued, and seizing the mouse, brought her out. They then resumed their proper forms, and the old woman, delivered to her enemies, was burnt on the top of the hill opposite, which has since that memorable event been named Craig-na-ban. Without at all objecting to the story, I am not satisfied as to this etymology; for the literal translation is Rock of the Women, not of the Woman or Witch, which would have answered better. However, there it is, and over its shoulder are seen the peak and northern ridges of Lochnagar, with the

mountains of the Beallach-bhui forest descending from them. Nearer, and seemingly parallel to them, is a lower series of bare and craggy hills passing down to the valley of the Dee, where its wooded extremity slips behind a rocky protuberance, named Craig-an-iui, forming the extremity of the hill-range on which we are seated. The floor of the valley is a flat alluvial strath, partly cultivated, and glowing with the yellow tints of the cereal crops, while its more distant parts are wooded, but present glimpses of corn. The continuous range of hill-ground, from Craig-an-iui, more or less wooded, or yielding green pasturage below, attains its greatest elevation just behind us, though its summit, about 3000 feet high, is not here visible.

Descending from our station on Easter Micras, we crossed a brook cumbered with a great quantity of detritus, and inquired of some reapers respecting a person celebrated for his acquaintance with the animals of this tract. They directed us to a field at some distance, where we found him busily engaged in the labours of the harvest. He laid aside his scythe, however, received us with great politeness, and conducted us to his Museum, a little hut, built of stones and roofed with divots, and having a small window, a fireplace, and some rude shelving along the unplastered walls, to afford suitable accommodation for his stuffed mammals and birds; of the latter of which there was a very considerable number; the most conspicuous were a golden Eagle and a sea Eagle. Mr. Brown, whom we found most intelligent and communicative, very willingly afforded all the information desired

respecting the objects of my inquiry. I mentioned by name all the quadrupeds and birds likely to be found in the district, and noted down his observations, which will be subsequently found in the general account of the vertebrated animals of Braemar. I regretted detaining him so long from his field labours at this critical period of the year, but he kindly persisted in his good offices, and expressed his pleasure in meeting with one whose work on the "British Birds," he said, he had very carefully read.

Granite occurs farther west than Mieras, and is succeeded by mica-slate and hornblende-slate, in which is the limestone bed, the quarry in which is so conspicuous on the hill. Beyond it is the promontory, at the base of which is the church of Crathie. From an eminence, we gazed with admiration on Balmoral, which rose, not proudly, like the palace of a great empire, but in graceful beauty, becoming the sylvan reign of the Queen of the Isles, retiring from the turbulent world to enjoy, for a short season, the quiet of nature.

The promontory is of granite, rather small grained, but varying, and porphyritic; reddish or greyish, with more mica in its composition than the granite east of Mieras, harder and less readily disintegrating. The mass of the hill is of this granite, and seems to have raised the schistose strata, in the midst of which is the bed of limestone which supplies the district.* From

* On this subject, Dr. Robertson of Tarland has supplied the Editor with the following remarks:—"It is singular that the extensive bed of limestone which crops out in so many parts on the north side of Craig-ghobhan should have escaped the observation of Professor Macgillivray. From the abundance of this mineral there can be no doubt the name Balmoral—the Town of

this eminence, a good view is obtained of the low range of craggy hill, commencing at Balmoral in the form of a rounded prominence, named Craig-ghobhan, Smith's Crag, and ascending toward the neighbourhood of Glen-Muic. Between it and Craig-na-ban is an extensive high moor, partly covered with wood.

Crossing the Dee by the bridge, we collected in the Birch wood above Balmoral, specimens of about thirty plants, to be kept as a memorial of our visit. I then ascended to the crags on the nearest summit of the hill, by its eastern side, and found them to consist of coarse porphyritic granite, resembling that of Lochnagar, but finer, and generally less red, though varying in texture and tint. A peregrine Falcon, the only one I have seen, flew along the rocks on Craig-ghobhan, as I approached them.

In the tract extending from Balmoral to Craigandaroch, we have thus, on the northern side, a long hill-range composed of granite, with mica-slate, hornblende-slate, and some limestone, unconformably distributed upon it.* On the southern side, the ridge of Craig-

Plenty or Abundance of Lime—is derived. Thus *Bal* (Town, or Farm, or Homestead), *mor* (large, plenty, abundant), *aol* (Lime, Limestone, Chalk). At the lime quarry a little to the west of Balmoral pure trap is seen overlying the limestone. Sir Charles Lyell pronounces this junction of the igneous with the crystalline rock to be one of the most perfect he has seen."

* Sir Charles Lyell has supplied the Editor with the following note:—
 "Both on the north and south side of the Dee, masses of stratified crystalline limestone occur here and there, associated with gneiss. One of these, close to the Dee, in the grounds of Balmoral, has been quarried, and a vein of trap or greenstone is there seen to penetrate the limestone. In the latter rock numerous garnets appear at its contact with the greenstone, and in some places crystals of this mineral are traceable for a distance of several yards from the junction—a phenomenon not without its geological interest. Analogous

ghobhan, at Balmoral, is granite, of which also, is the greater part of the tract from thence to Craig-na-ban, which is partly of granite and partly of slaty rock. The next prominence, Craig-ghinai, is granitic; but that named Craig-phibe, at the mouth of Glen-Girnae, is of hornblende, as is the neighbouring hill of Creag-lia. The Craig of the Knocks, opposite the mouth of Glen-Gairn is slaty, presenting a mixture of hornblende-slate and mica-slate, continued across the valley of the Dee to Glen-Gairn mouth and Morven. Craigandarroeh, however, is of granite, as is the hill to the north of it, which is continuous with the granite mass of Culblean.

changes have been observed elsewhere, evidently caused by the intrusion of igneous rocks into strata containing calcareous matter. Thus near Plas-Newydd in Anglesea, Professor Henslow found crystals of garnet (a mineral often containing twenty per cent. of lime) in a calcareous state in those places only where the shale approached a dike of greenstone; and in High Teesdale Professor Sedgwick describes the appearance of garnet in a limestone invaded by basalt."

CHAPTER XXIII.

—♦—
GLEN-GAIRN.

GLEANN-GHARAIN, commonly called Glen-Gairn, also Glen-Gairden, and variously otherwise designated, may be seen in nearly its whole extent from Morven, or the hills on its south-western side; or it may be viewed with equal advantage from Ben-Aaan, at its upper extremity. From that mountain descend the rills which unite to form the water of Gairn, Uisge-Gharain, which flows eastward, and, at the distance of about eighteen miles, enters the Dee about a mile-and-a-half from Ballater. Glen-Gairn presents at its mouth an expansion of alluvial ground, continuous on either side with that of the valley of the Dee; but presently, hills of moderate elevation rise on both sides, and at their base the stream, which is about the same size as that of Glen-Muic, issues by a stony channel narrowed by rocks, chiefly of hornblende-slate, ornamented with trees, and with their grassy shelves and recesses presenting a bit of picturesque scenery of very pleasant aspect. The Aberdeen and Braemar road here crosses the Gairne by a stone bridge of good construction, a little below which are some remains of an older bridge, which, having been

found unsuitably narrow, was taken down some years ago. A mill for earding wool, on the right bank of the stream, may be considered as adding to, or detracting from, the beauty of the little "Den," according to the taste of the visitor. There are trees of several species, and a considerable variety of other plants, of which may be mentioned *Campanula latifolia* (Giant Bell-flower), *Geranium sylvaticum* (Crane's-bill,) *Hieracium proenanthoides*, and *Melica nutans*. The Ash-trees, some of them of large size, appear to have been planted.

Between Glen-Gairn and the plain of Ballater a broad hill-range descends from Morven. Its eastern portion, continuous with Culblean, is of granite; but the western, to which belong the hills of Cean-na-ereag, and Prony, is chiefly of micaeous quartz-rock and hornblende-slate. On the farm of Abergairn, which is on a cultivated acclivity rising on the eastern side of the glen, there is, above the steading, a ridge of porphyritic rock—named the Craggans—Na Creagain—of a peculiar kind; it having a basis of minutely granular quartz, white or reddish, with quartz in small fragments or imperfect crystals, and large crystals of flesh-coloured or whitish felspar interspersed. It is further remarkable for the profusion of well-developed Lichens which it presents, and of which I observed:—

Gyrophora cylindrica.

G. deusta.

Lecanora ventosa.

Lecideia fusco-atra.

L. confluens.

L. ceehumena.

L. Ederi.

L. atrovirens.

L. silacea.

L. atro-alba.

Verrucaria epipolæa.

Isidium corallinum.

Sphærophoron coralloides.

S. fragile.

In the vicinity of this ridge, and just above the farm-

house of Abergairn, is a quantity of stones that had been dug out of the hill in searching for lead-ore, in a vein or mass of quartz. The workings were discontinued and their place is now ploughed over. Galena, in cubes and plates, is found in masses, and fragments of a mixture of quartz and carbonate of lime, among which is also some heavy spar. Masses formed of fragments of limestone, held together by crystallisations of quartz and fluor-spar, are also common. Other blocks, composed chiefly of earthy whitish fluor, are full of cavities crusted with cubical crystals of fluor-spar, mostly wine-yellow; but often purple or blue of various tints: wine-yellow rock crystals of small size also occur. I owe to Mr. Charles Grant my knowledge of this locality, in which he efficiently aided me in procuring specimens. Great quantities of sulphuret of iron, mostly decomposed, appear connected with the slaty rock in the neighbourhood.

On the hill-side are some crags which I found to be mica-slate, inclined to the south-east at an angle of about 45° . Farther on, in the hill, the craggy protuberances were of granite, by which the mica-slate appeared to have been broken up and displaced. The scenery of Glen-Gairn is not very remarkable; but from the height at this place, one has a pretty enough view. Opposite, is the high rounded hill of Prony, thickly covered with grey stones; at its base, along the stream, a diluvial bank from ten to thirty or more feet high; below it the Hazel brae, then the long slanting tract of corn-fields, ending in Craigandarroeh. Extending to about half-a-mile beyond this farm-house is a wood, composed entirely of weeping Birches, some of which are very handsome

specimens of their kind ; then comes a stripe of alluvial land covered with green pasture and crops ; after which, on rough ground, comes a Bireh-wood, occupying the declivity of a granitic hill.

On the eastern side of the glen is seen the narrow glenlet by which the first stony hill, Craig-Phroni, commonly called Craig Prony, is separated from the second hill of the Morven group, which has an extraordinary investiture of grey stones, and is named Ceannaeraig. At its base, where the rock is coarse red granite, the stream makes a sudden bend, as does the valley ; so that we now proceed westward, until we arrive at Ben-Aun.

In traversing the hills in summer and early autumn, one sometimes, though rarely, comes upon a pair of Ring-ouzens, or perhaps a small scattered flock, in a corry, or on a rocky declivity ; but the number thus seen in the course of a protracted ramble is small. By the end of August, however, when the berries of the Mountain-ash have assumed a bright-red colour, great numbers of these birds are to be seen feeding upon them in the glens. In the Bireh-wood at Inverenyie, near this place, was a Rowan-tree covered with berries, to which the Ring-ouzens were resorting. They emit, on being disturbed or alarmed, a kind of scream, followed by a series of ehueks, not very unlike that of the Wheatear, but much louder. On this account, and because they are often found in places where Juniper, called Aiten, is abundant, they are in all this district called Aiten-chaekarts. The Wheatears, which are common enough, are called Steen-chaekarts.

Descending from the farm-house of Larie, by a beautiful green bank, I found the same coarse red granite as at Ceannacraig by the water's edge at its base. The Gairne Water here winds among Birch-woods, corn-fields, and green pastures. Proceeding along it, and emerging from a beautiful depression among little eminences, I passed through a long Birch-wood, on the side of a large hill, called Mami, partly composed of mica-slate, among which limestone has been quarried in a place in view from Larie, and farther up, on its south-western declivity. Along the stream were thickets of Alder and Willow. The weather being very beautiful, it was extremely pleasant to wander among these green knolls and thickets, although nothing of much interest occurred. Few plants now remain in flower, as the season is unusually early, those seen were :—

Centaurea nigra.

Apargia autumnalis.

Hypochaeris radicata.

Achillea millefolium.

A. Ptarmica.

Senecio Jacobæa.

Campanula rotundifolia.

Scabiosa succisa.

Trifolium medium.

Galium verum.

Euphrasia officinalis.

Ranunculus acris.

Tormentilla officinalis.

Viola tricolor-amœna.

Calluna vulgaris.

Erica cinerea.

Erica Tetralix.

Seeing a limestone quarry on the south side of the stream, I crossed by two spars laid over the water ; but obtaining some desired information from a very civil person, who was working in a field, I crossed the water, and continued to ascend the valley, over a partially cultivated hollow, in which were two small churches,—one of them thatched, and resorted to by

the Roman Catholics of the glen, who are comparatively numerous, the other belonging to my own Christian community, I went on till I came to craggy ground forming a ridge, descending from a hill of considerable height, and giving promise of something interesting.

Ascending the hill-side to these crags, I found its lower part formed of granite of several varieties. The crags, which might have been expected to be of some different formation, were formed of great masses of laminated rock, often singularly contorted, and generally more or less undulated. Some portions of it appeared to remain in situ, but the greater part was simply a mass of ruins. As I walked along its eastern base, wondering what could have caused all the confusion of pile heaped upon pile, crags hurled from above and split into fragments, I discovered granite protruding amidst the ruins. It was rather small-grained, grey, with a large proportion of hornblende and some black mica; but it varied considerably in tint and texture. Nothing could be more evident than that a bed of laminated mica-slate had been broken up and scattered around by an eruption of hornblendic granite, different from that of which the surrounding part of the hill is formed. On the summit of the crag, the mica-slate, having its laminae undulated and contorted, is alone seen, and there presents a little platform, which is bounded on the hill-side, at a short distance, by an abrupt fissured rock, which one might suppose to be of the same nature. On examining it, however, it was found to be granite, reddish, with black mica, but varying in texture from large to small-grained; other

crag, apparently of the same nature, extended farther up the hill; but the declining sun warned me off the ground.

So I sat down on the brow of the crag, which seemed to be about 250 feet above the stream, and looked around upon the massy, unbroken, but stone-covered hills, by which the valley is everywhere bounded. The only rugged mountain to be seen is the far distant Ben-Aun, which stretches its long tuberculated back along the western horizon. There is, in truth, little of the picturesque, and nothing of the magnificent in Glen-Gairn. Right opposite, on the other side of the stream, at the base of the long heath-clad declivity of that large shapeless hill-range, of which Geallaig, already spoken of, is the most prominent part, you see a shooting-lodge, on a bit of level alluvial ground. It is named Gairden Shiel—not after the Glen or the stream, but after Mr. Gairden of Troup, who, I believe, built it.

Descending from the crags, where I found abundance of *Vaccinium Vitis-Idæa* in full flower, and some bearing ripe fruit, though in small quantity, I regained the road, which led me to a farm-house situated on a small eminence, near a craggy spot, where a dyke of porphyry had burst through the granite. Here I was directed to some lime-quarries, but seeing before me a hill, with a cairn on its summit, I betook myself to it, before going to look for the limestone, a little quarry of which, however, I observed about a mile off, near the top of a ridge. The cairn was built of grey compact porphyry, a dyke of which ran across the top of the hill, but was almost entirely concealed by fragments of itself. Of

this rock it was almost impossible to obtain a single specimen, it was so extremely hard and tenacious, although thin splinters were readily detached, and flew whizzing to a distance. Granite presented itself in its immediate vicinity. The breadth of the porphyritic dyke could not be determined, as its limits were visible on one side only. Its natural fragments were generally of small size, few of them being three feet in length, of a greyish or reddish-white colour at the surface, but crusted with lichens; the fracture uneven, somewhat conchoidal, sometimes splintery; the texture minutely granular, the colour light greyish-blue, with irregular crystals of whitish felspar interspersed.

The view from this summit extended to a vast distance, and differed in its character from any previously spoken of, as it presented a great extent of low and undulated moorland, in the midst of mountains. When I had finished my survey, the sun had sunk behind the dark ridge of Ben-Aun, and I hastened to examine the limestone quarries, which I saw on a declivity about half a mile distant. They disclosed nothing very remarkable, as they were only small excavations in the detritus, out of which enough of stone had been taken to supply the wants of a few farmers. The limestone, however, is of good quality, crystalline, light greyish-blue, more or less veined with white. The rock in the neighbourhood is mica-slate, but in the hill above, granite. On going to the top of the ridge, I was a little surprised and much pleased, to see at the distance of from two to three miles northward, a hollow, bright with yellow-corn and green pastures, and with a white

monument on one of its prominences. I knew it to be part of the valley of the Don, probably Corgarf. But a cold and piercing breeze blew over the ridge; the sun had set, and I hastened to descend the long slope.

Arriving at the farm-house Tullich-na-carrig in the dusk, I accepted the owner's kind invitation to remain during the night.

Next morning having been directed to a wonderful place, of which I had heard as of undoubted volcanic origin, and which is on the shoulder of the hill just above Tullich-na-carrig, although not visible from the house, I ascended, and in fifteen minutes came right upon the entrance of a deep groove, half filled with blocks and stones, which had fallen in from the crags on either side. What was in the bottom could nowhere be seen, as it was thickly covered with rubbish. So I ascended the eastern side, which I found to be of granite, coarse-grained, and reddish, but toward the brink more compact, and sometimes assuming the appearance of porphyry. It was the same all the way to the upper extremity of the groove, which continued about six hundred yards. I then came down by the other side, which was formed of porphyry, varying greatly in texture and colour. In a great part of its extent it resembled granite, it being composed of compact felspar, of a light-red tint, with dark-coloured quartz and mica interspersed, as well as larger crystals of whitish felspar. From this, it varied to grey compact felspar, with white crystals of common felspar; and to a grey minutely granular felspar, with very few crystals. Its breadth at one place, where only I could trace its

limits, was thirty yards. The porphyritic dyke thus projects a little from the surface of the hill, and forms the western side of a fissure of about double its breadth, partially filled up with fragments of itself, as well as of the granite of its eastern side. The name of the somewhat singular place, which has attracted the notice of some at least of the inhabitants of the valley, is Clais-a-mhaduidh,—literally Furrow of the Dog,—but as the dog meant is the madadh madh, red Dog, *Canis rufus*—the English for it is the Fox's Furrow. Some call it Chashvat.

Descending from the fox's retreat, my host introduced me to Mr. Niel, the minister of the glen. I went with him up the valley a short way, to see two mineral wells, both chalybeate, one of them with a slightly nauseous taste. Beyond this neighbourhood, nothing is to be seen in the geographical sense but extended moors, bounded on the north by a long ridge, smooth, and covered with heaths, and on the south, by the range separating Glen-Gairn from Deeside. Near the end of the glen, to the south, rises a large rounded granitic hill, named Corandaven, and at its extremity is the great shapeless mass of Ben-Aun. For about eight miles of this moor, no cultivation is to be seen; nor is there any wood. It may be viewed advantageously from many of its prominences; from the summits or sides of Ben-Aun, or from the Brown Cow. But, to retain the great mountain as part of the scene, and include the tract south of the Dee, certainly the most picturesque in the district, we may take our station on some eminence near the middle of the valley

toward its northern limit, and what we see may with propriety be called—

THE HIGHLAND MOOR.

Leaning against a cairn constructed of angular stones of grey porphyry, supplied by a heap close at hand, I survey an extensive tract of mountain and moor. The sun, shining clear in a cloudless pale blue sky, gives some warmth to my right side, while a breeze from the north-east, comes whirling at times round the cairn, chilling me with its piercing blast. It is the 4th of September, near sunset. I stand in the midst of a region, which might be thought one of stillness and desolation, were it not that symptoms of human life are seen in five little patches of cultivated land, and a group of black huts, in a hollow, from one to two miles distant. Yet the range of vision is not less than fifty miles in one direction. Just behind me are the summits of a hill range, not more than a mile distant, beyond which nothing is to be seen; and therefore I have turned my back upon them. To the left is a rounded hill, running down into a smooth ridge, over a depression in which are seen the hills beyond Ballater, topped by the conical summit of the more distant Mount-Keen, singularly white, in the pale rays of the western sun. Low ranges extend from it, until there rises, in the south, the massive form of Lochnagar—both its corries conspicuously displayed; the western illuminated, the eastern in deep impenetrable shade, veiled by a filmy grey vapour. A most beautiful undulated ridgy descent leads the eye to the Glen-Ballater mountains, the Beallach-bhui, and

the Braemar hills as far as the upper part of Glen-Ey. The great mountain stands conspicuous in its massy breadth and towering height, as if upheaved beyond its ordinary elevation. At its base, near Loch-Muic, is a large rounded hill; but elsewhere, all down to the Dee, the ground seems low, presenting only some undulations, which, although really of some considerable height, are scarcely noticeable from our present station. On this side of the Dee, the position of which is known only by recollection, is a range of low hill, undulated in its outline, but high enough to prevent us from seeing those hills that seemed mountains to us as we traversed the valley. Where the Braemar mingle with the Atholl ranges in the extreme distance, the horizon is next bounded by a roundish hill, only about five miles distant. Then Ben-Aun rising behind, with its long unwaved, but curiously knobbed ridge, leads us to the blaze of the western sun, just passing behind the broad head of the Bho-dhoun, which, at only the distance of two miles, seems continuous with the hill on which we stand. The long shadows cast upon the grey and brown moors by the many prominences of the Lochnagar group have a singular and rather perplexing effect; for they give the well-known tract an aspect different from any under which we have contemplated it, whether in the sunshine of noontide, the diffused light of a cloudy day, or when the summits, involved in vapours, hid themselves from our view, and the bases of the mountains seemed more massy than they ever do when their entire forms are disclosed.

But now, over the ridge of Ben-Aun, creeps a thin

and flaky mass of vapour, glowing on its northern side with a roseate tint; purplish rays diverge from behind the brown hill to our right: the white summit of Monachaine has assumed a roseate hue, and Lochnagar is tinged with a pale purplish blue. Beautifully delicate are the tints of the few fleecy cloudlets that rise in the north-west; but the setting sun assumes no imposing glory, and as he passes on seems to smile a gentle good night on the brown moors of Glen-Gairn.

The red Grouse call to each other on the hill-side; here, a solitary grey Hare bounds quietly among the short heather, stops to listen and look around, then pursues its way; some hooded Crows, that have been prowling about, are flying down the little valley; dimness envelopes the low-grounds, then the bases of the hills, creeping upwards, slowly, imperceptibly, but surely, like age and time, ever moving onward, and involving all things in darkness. There is now no sound, but the sighing of the breeze; and as we descend over the long smooth declivity, clad with thick heather, we pause not to listen to the hum of distant waterfalls, or the shriek of the white Owl, for no torrents rush over these moors, nor ruined towers rise on the brown hills, where the Gorcock (*Lagopus Scoticus*), escaped from the gun of the unpitying sportsman, crouches with the remnant of his family.

In late seasons, or even in common harvests, the red Grouse frequent the corn-fields in great numbers. A farmer in Glen-Gairn informed me that he has seen hundreds of them sitting in the morning on his stooks, which they were busily employed in robbing, and that

a neighbour was obliged to hire a man to keep them from his corn. The red Grouse is, in fact, as fond of corn as the red Deer. But still, the Heather is its proper food; and it is only where that shrub grows in abundance that it thrives. The wilder and more remote from man and his associates—dogs, cattle, and sheep—the moors are, the better fitted are they for the red Grouse.

Heather (*Calluna vulgaris*) will grow in a great variety of situations:—On the sandy links along the sea, on the low gravelly tracts in its vicinity, on hills of every elevation, up to that of four thousand feet, and on any kind of soil. But it thrives best on gravel composed of fragments of granite or other igneous or primary rocks, although it is found abundant on secondary tracts also. I have seen it growing luxuriantly on gneiss and hornblende, without any soil, except what had been formed by the decay of its own leaves and of some mosses and other plants. There is not a better place for it, however, than the long and wide moors of Glen-Gairn, gravelly, with a mixture of clay, comparatively dry, smooth, and destitute of either wood or grassy herbage. Over continuous acres it there grows so thickly and evenly as to resemble a crop carefully kept of uniform length. Intermixed with it in some places, and often over large spaces, are the Cranberry and the Bear-berry. Very little *Erica cinerea* is anywhere to be seen; but wherever there are wet or damp spots, *Erica Tetralix* is to be met with. On hill-sides or elsewhere, when old and strong, it is burnt, to give place to a young crop. In such burnt places, *Vaccinium Vitis-Idæa* often springs

up in great abundance. Otherwise, the moors in this tract do not differ from others, the same species of plants being found upon them as elsewhere.

But, on the lower limits of the moors we find patches of cultivated land, around rude farm-steadings; and from thence all the way to the mouth of the glen, the stream flows through green pastures, corn-fields, and woods of Birch and other trees. Below Tullich-na-carrig it receives a brook coming from the south-west, and along which is some cultivated land.

As already mentioned, there is exposed by the roadside, at Tullich-na-carrig, a dyke of porphyry, intersecting the granite, and about 30 yards in breadth. It is of the same nature as the dyke of Clais-amhaduidh, and in all probability is a portion of it, as is also the small part of a dyke seen on the hill-top, about two miles to the north. The greater part is of a light-grey colour, compact, with a splintery, somewhat conchoidal fracture; but it varies to grey with reddish interspersed, and containing whitish crystals; and to red, with white crystals, and blackish mica and quartz. The bounding rock is granite, in close contact, and presenting little appearance of alteration. Many fragments lie in the hollow below the road. This is the carrig, or rock, from which and a neighbouring hillock the farm derives its name.

At Gairden Shiel, where there is a good stone bridge, red granite is seen along the left or north side of the stream. We crossed, and proceeded by the road until opposite the limestone quarry, to which we ascended.

It has already been stated that from the mouth of Glen-Gairn to the church of Crathie, there extends, over a space of about seven miles in length, a range of hill, of which the highest eminence, above Mieras, is named Geallaig. This range intervenes between the valley of the Dee and that of the Gairn, and in so far as it extends, forms the sides of these depressions. Now, upon a projection from the north side of Geallaig, at the height of about 300 feet from the bed of the Gairn, is the quarry which supplies the greatest part of Glen-Gairn and a large extent of country below the mouth of that valley with limestone of good quality, but now obtained with more labour than formerly, the rock being mixed with more of the bounding deposit. At the base of the declivity, by the river, is the farm of Dal-nam-bo, and so that name is given to the quarry. The quarry, which is quite superficial, was originally indicated by a kind of natural cairn formed of fissured blocks, partly in situ, some of which still remain. The strata seem as if thrust up from beneath, and curve in conformity with the surface of the brow of the hill, which is gently convex. The superficial strata are formed of a grayish black minutely granular substance, intersected by veins of calcareous spar, and filled with vesuvian and cinnamon stone in imperfectly crystallised masses, together with patches and veins of light green sahite, granular and crystalline.

These strata vary in thickness to eight or ten feet. The limestone strata are mostly of excellent quality for lime, crystalline, white with irregular colour-veins of greyish-blue, mostly more or less conformed to the

planes of the strata, but often oblique or waved. Patches and layers of aggregated imperfect white crystals of carbonate of lime also occur interspersed.

From what has been said of Glen-Gairn, it will be apparent that it is chiefly granitic; but that mica-slate, micaceous quartz-slate, and hornblende slate are extensively distributed in it. Limestone has been found amongst the slaty rocks in a few places, apparently where it has been heaved up by the granite, which probably forms the mass of all the larger hills, as it has been observed at the base of some and the summits of others. The only vein of porphyry I have seen has been described, and I have not met with any veins or masses of trap, unless the hornblendic granite of the Craigs of Reacharchrie may be considered as such.

In the course of my visit of only two days, I did not meet with a single quadruped but the white or grey Hare mentioned, and with not more than thirty species of birds, all of which are common in other tracts. Information given by Mr. Stewart, formerly minister of Glen-Gairn, and by other individuals, together with what I have myself seen, will however enable me to present at the end of the volume a complete list of the *Vertebrata*.

CHAPTER XXIV.

WATERFALLS AND HILL-TOPS.—GEOLOGICAL STRUCTURE OF LOCHNAGAR.—GLEN-
GELDER.—GLEN-GIRNAC.—CRAIG-PHIBE AND CRAIG-GHINAIS.—THE ASPEN.—
LICHENS AND BIRDS.

THERE are two kinds of objects of paramount importance in the eyes of most persons who stroll about Braemar and Ballater—waterfalls and hill-tops—both very interesting and instructive, but out of which nothing of either quality is usually extracted by visitors. There are not many falls on the Dee itself, and none of them are very wonderful. The first is that of a small stream, formed by the united rills of the wells of Dee, which boil up from among granite detritus, near the top of Braeriach. This stream descends the rocky face of a magnificent corry, forming a series of cascades, 800 feet in length at the least, and seen from a distance as a white streak. There is a singular fall on the Dee, about seven miles above Castletown. Being one of the seven wonders of Braemar, and not far distant from Castletown, it is visited by most visitors of that district, and has often been described. There is simply a narrow crack in a bed of mica-slate, into which the stream rushes. You may at one place step over the roaring torrent, which, however, is not very

great. There is no other fall, properly so called, on the Dee in its whole course, excepting that at Potarch, caused by a narrowing of the bed of the stream by a dyke of porphyry.

In some of the glens that open upon the Dee, there are falls of greater or less beauty. Up Glen Ey, at Farquharson's Cave, so called, is a very romantic rush of the water through a crevice. Corymulzie, nearly opposite Mar Lodge, presents a very beautiful ornamented fall, injured, I think—many consider it improved—by having a high bridge over it. The fall at Alan-a-cuaich resembles that of the Dee, and is equally injured by a bridge; as is that of Garravalt, in the Beallach-bhui Forest. Glen-Muic boasts of two falls; one widely celebrated and much visited, the other little heard of and very seldom seen. From the Corry of the Duloch, far up above the head of Loch-Muic, a stream, fringed with curious greyish-white-leaved willows, comes rapidly down a granite declivity, in one part of which is a high-walled fissure, into which it rushes. Taken in connection with the Duloch and Loch-Muic, and all their magnificent rocks and mountains, this little fall of the remote corry is far more worthy of a visit than the other.* No bridge mars the simple beauty of either of the falls of the Muic. That generally visited is about five miles distant from Ballater, in a narrow pass artificially ornamented with

* The *Lin* or fall of the Glass-alt is omitted; Professor Macgillivray was evidently ignorant of its existence. The Burn of the Glass-alt drains the whole of the south declivity of Lochnagar, is equal in dip to the Geldic, and forms one of the principal feeders of Loch Muic. Some distance before it enters the lake, it is precipitated over a granite rock, upwards of 160 feet in height.—*Dr. Robertson.*

wood. Most people call it very pretty, some beautiful, I think it is both. The Gairn has no fall, nor has the Tanar. All falls are pretty, it being pleasant to see water pouring, gliding, rushing, and tumbling. When nothing better can be had, people go to a mill. As every one stands to look at a fall, there must be something in it accordant with some faculty of the human mind, otherwise we should be disposed to wonder at so many people hurrying to see a stream pass over a rock.

Let us ascend Lochnagar once more—this time only in idea—solely for the purpose of overlooking the space extended from it to the Dee on the one hand, and Glen-Muic on the other. Ballater is directly north-east, distant about twelve miles; Castletown of Braemar, north-west, distant about eight miles; Balmoral, north, distant about five miles. The granite mass on which we stand, slants away in all these directions, declining in irregular alternating rounded ridges and hollows to the valley of the Dee, into which open first, to the west, the Beallach-bhui Forest tract; then, about the middle of the space, Glen-Gelder; and thirdly, a little to the east of it, Glen-Girnac; separated from the lower or more distant half of Glen-Muic, by a ridge of conspicuously green hills. In the southern part of Lochnagar commences a descending hollow, leading to a small lake, the stream from which falls into Loch-Muic, about two miles distant from us. That lake occupies a basin about two miles long, between high hill-banks, and from it to the Falls of the Muic extends northwards a rather open valley, which contracts, and then expands into a wooded

and cultivated tract, extending to near Ballater. The undulated ground just before us is all of granite, and covered with heath, a bare and not very interesting tract, across which there runs obliquely from near the lower end of Loch-Muic to Balmoral, an uninterrupted range of hills, commencing in a rather elevated mass, not more than a mile and a half distant from us, and called Conachcraig.

The Geldie is a small brook which proceeds northward over an undulated moor, and descends by a shallow valley, naturally and artificially wooded, to the Dee, which it enters at Abergeldie. On its western side the hills are of little elevation, and chiefly of granite. Its eastern side is formed of a higher range, partly of granite, but also of hornblende-slate and mica-slate, and terminating in the granite hill of Craig-na-ban, already repeatedly mentioned. At its base, by the road, about a mile east of Abergeldie, the granite, which is light-red, and similar to that at Micras, on the opposite side of the Dee, is traversed by a vein of quartz containing galena.

The Girnac Burn is also a small stream, which, commencing upon the oblique ridge about a mile and a half from the summit of Lochnagar, runs northward between the Geldie and the Muic, and enters a short valley, bounded by the nearly straight range of the green hills on the east, and the range already mentioned on the west. Towards its mouth it expands into a hollow about a mile in diameter, opening westward upon the Dee by a depression between Craig-na-ban and Craig-ghinai, and eastward by a narrow gap, through which the

stream passes, between the hill just named and Craig-phibe. Craig-ghinai, thus placed in the mouth of Glen-Girnac, is of granite, but the eastern ridge, ending in Craig-phibe, is of hornblende-slate.

This little glen I visited in July, 1843, and again one afternoon in September, 1850, to recall my remembrance of it. Along the base of the hill of the Craig of the Knock, and especially by the road, to a little beyond Polpholloc Ferry, the rock is seen here and there. It is of hornblende-slate, inclined to the south at various angles. Craig-phibe, a very rugged hill, rises abruptly from a little plain called Strath-Girnac, to an elevation of about 900 feet, and at its north-eastern extremity presents several crags, from which a great quantity of blocks has fallen. The rocks and detritus being grey and massive, one might suppose them to be granite; but on examining them, he would find, in the extreme difficulty with which fragments can be detached, an indication of a very different rock. This part of the hill is, in fact, composed of hornblende rock, of a massive structure, full of fissures running in all directions, and resembling an igneous rather than a stratified rock, although in some places seams of stratification are to be seen, inclining to the south. This hornblende is of a dark greyish-green colour, crystalline and granular; the crystals short, broad, lying in all directions, and not arranged in laminæ. It is difficult to believe that such a mass is not cruptive, and yet we find in some places the structure laminar, and in others the massive continuous with the decidedly slaty. In most cases, so tenacious is the rock that it is easier to

break a block into fragments separating by the natural fissures than to obtain a good geological specimen having clean fracture-surfaces. The sides and base of the hill are wooded, and undulate into the little alluvial plain forming the strath.

On passing it we come to the brook called the Girnac Water, over which is a bridge. A farm-steading, several cottages, and an elegant school-house, lately erected by the Queen and His Royal Highness Prince Albert, ornament this locality, which otherwise would present little of interest, and might be passed over without anything more being remarked of it than that it is between the two abrupt hills of Craig-phibe and Craig-ghinai. This is, however, the mouth of Glen-Girnac. On passing into it and proceeding about a quarter of a mile, in which space there is a good deal of cultivated land, you find it suddenly expand into a hollow bounded by the southern face of Craig-ghinai on the north, and by Craig-na-ban, and a ridge continuous with it stretching away to the south, and sending eastward a low range projecting to the base of Craig-phibe. This corry, or hollow, opens into the valley of the Dee, by a depression between Craig-ghinai and Craig-na-ban, as well as by the narrow mouth of Glen-Girnac, by which we have entered.

Turning to Craig-ghinai we observe that it is more extended in a direction parallel to the Dee than in that of the glen; while the reverse is the case with Craig-phibe, which, only about a quarter of a mile in breadth, extends a mile and a half at Glen-Girnac, and joins the green range separating that valley from Glen-Muic. Its

whole southern face is rocky and stony. The hill looks as if shattered by violent concussions; for the rock, which in several places presents itself to view, and in two or three forms precipices of small size, is fissured into blocks and slabs, which form continuous heaps of detritus, resembling those of the corries of the higher granitic mountains. Scattered among them are numerous Pines, together with a few Birches, Poplars, and Rowan trees. I ascended half way up the hill to the most conspicuous of the precipices or crags, which I found to be of coarse red granite. At its base were several plants of *Epilobium angustifolium* in fruit, but with a few flowers remaining. A vast profusion of *Arctostaphylos Uva-ursi* covered the stones; large Juniper bushes were dispersed over the declivity, and at its wooded base the Heather was so strong as to be with difficulty passed over.

The quantity of Lichens, in beautiful condition, which crusted the face of the precipice, as well as the blocks, might surprise those imaginative persons who describe the granite rocks of Braemar as scarcely yielding a solitary Lichen. The truth is, their Lichens are truly magnificent. On the steep slope I sat down on one of the blocks to look at three fine Aspens (*Populus tremula*). After all, I do not think this tree inferior in beauty to any of the other native trees. Was the reader here with me, he could not but admire the tall, taper, pale greenish-grey stem of that young tree, which, from among the granite fragments, shoots right up to the height of about twenty feet. The branches come off irregularly at angles of from 20° to 70°, slender, and much divided,

the twigs erect or ascending. The foliage is thin, though the roundish flat leaves are rather large, and has a very peculiar appearance, each blade being perfectly distinct in the mass. Every little breath of air puts the leaves into vibratory motion. Some of them are moving from side to side in a most artificial manner, while the rest are still. When a pretty strong breeze blows among them, their rapid movements are accompanied with a rustling sound, which contrasts with the faint murmur of the Birch. The remarkably bright green of the leaves renders the tree conspicuous from afar, and is peculiarly grateful to the eye when viewed at a short or moderate distance. Green as the Birch leaves may be, they look grey beside those of the Aspen, while the deep glaucous-green tint of the needle-like leaves of the Pine appears absolutely gloomy.

As I was looking, a Wren came from among the granite blocks, every one of which was completely crusted with Lichens — grey, brown, and red — and perched beside me, making a very great outcry for so small a bird. It then frisked about, flew into a Birch bush, returned, and scolded most amusingly. Presently its chatter was responded to by that of another Wren at some distance. Birds are not like rational beings, who often make a great noise when there is little cause: they have reasons for all their actions. So, on looking round, I saw a young Wren pass out from a hole and disappear in another. The bird had its young ones about the cairn where I was seated.

Having descended, not without toil, on account of the slipperiness of the Heather and herbage, I traversed

the low moor, or hollow, to the south, and crossing a small ridge beyond it, came to a Birch wood by the stream. Farther on, the valley again opens up, and you come to a farm-steading, beyond which is another, and round the low ridge, out of sight, a third, named Bovaglae, on the limits of cultivation. The valley is well defined on its eastern side by the green range, the declivity of which is mostly of hornblende-slate, but is scarcely defined in the other directions, its undulating surface blending with the base of Lochnagar and its buttresses.

CHAPTER XXV.

COIAL HILLS, OR SERPENTINE RANGE BETWEEN GLEN-GIRNAC AND GLEN-MUIC.—HORNBLLENDE-SLATE, MICA-SLATE.—PORPHYRY.—SERPENTINE: ITS STRUCTURE, RELATIONS, ERUPTIVE CHARACTER, AND VEGETATION.

BALLATER, 7th September, 1850. We have now to explore the long valley of Glen-Muic, which, commencing between Lochnagar and Cairn Taggard, passes first eastward, then north-eastward, and then northward, over a space of about fifteen miles, until it terminates in a plain, separated from that of Ballater by the Dee, into which the water of Muic enters, at the more eastern side of the plain. This tract I found much more diversified in its geological structure than any of those hitherto spoken of. The anxiety which I felt to understand it induced me to spend several days upon it, and to take opportunities of making excursions into it, without reference to the methodical examination which would best suit a narrative, but which was in fact impracticable, as one result of each day's labour was to disclose new views and render necessary a recurrence to many points. I have, therefore, in presenting an account of this valley, to return to the 26th of August, and bring up the narrative of observations to the present date.

At ten, having put things in order, I was on the

bridge of Ballater, with the scene of the day's operations before me. The river, swollen and dark, comes beautifully curving down, and glides away as if commissioned to reach the end of its journey as quickly as possible. To the right is Craigandarroeh with its oak copse and pine woods: beyond it, the long hill range extending to Crathie. On the opposite side of the Dee, still to our right, is the beautiful low wooded hill of the Knock, on a little green prominence, on the eastern side of which is the ruined castle, which forms so conspicuous an ornament to the scene. Several low hills rise in ridges, to terminate in a long wavy and peaked green range, evidently differing in structure from the other hills, ascending to a considerable elevation, and bounding the horizon. This range is what we have to explore to-day. Its eastern declivity, gently slanting, and beautifully wooded, is interspersed with corn-fields, of which the produce is ripe for the sickle; patches of green, turnip and potatoes, pastures, and cottages, with some larger farm-houses sheltered by trees. Right before us is the old manse, unroofed and broken down, with a new manse in progress beside it. A bridge near them spans the water of Muie. A little to the right, and about two miles distant, is Birk Hall. The eastern portion of the scene is formed of gently undulating and heath-clad declivities, descending to the bottom of the valley from a long range of hill-ground, continued down into these wooded great banks, which here in the valley seem mountains, but are in reality the lower parts of the range. Over all, in the southwest, is seen the summit of Loehnar.

Yesterday, about sunset, the appearance presented by the atmosphere indicated high wind ; the sky was of a



pale greyish-blue tint, perceptible only in small patches here and there, ranges of light fleecy clouds, of a bluish colour, edged with white, driving along from the north ; the air keen and dry. It blew furiously through the night. To-day the weather is tempestuous, a cold wind from the north bringing up successive masses of grey vapour, now and then pouring down sheets of rain, which at times dim the hills as if with a filmy grey veil.

Crossing the Muic Water by the high and narrow bridge, in the immediate vicinity of which are the manse garden and grounds, ornamented with trees, we pass over a flat cultivated tract, about half a mile in extent. The wind comes in strong gusts, and the fields and road are strewn with ears of barley, swept away from the overthrown and scattered stooks. Little wooded hills now meet us, seen from the base of which

the valley appears as if enclosed by a semicircular range of hills.

Knock Castle, in ruins, is beautifully situated on a hillock, on which are seen numerous blocks of serpentine; but whether the interior be of that rock, cannot be determined from any appearances presented at the surface. The castle is built of slaty stones, hornblende, and mica-slate intermixed with others of granite; the lintels of the latter.

To the west of it rises a low wooded hill, on the southern face of which, at the distance of rather more than a quarter of a mile, are seen some grey rocks, which we have next to inspect. Passing through a Birch thicket at the base of the hill, and traversing about half a mile of Larch and Pine wood, we come, in a curving direction, to these rocks, which disclose the nature of the hill. They are of mica-slate, inclined to the south at an angle of about 45° : the mica blackish and grey, the quartz in laminæ, sometimes in patches, and crystalline. The view is very beautiful, there being nothing along the Dee from the Beallach-bhui to Craigandarroeh, nearly so fine.

Crossing the southern shoulder of the hill, through the wood, we emerge at a shooting lodge, and come upon Strath Girnae, which opens upon the Dee, and has on its opposite side the rounded eraggy hill named Craig-phibe, composed of hornblende, at the base of which are a farm-house and some cottages. Craig-phibe is continuous with a hill, called Craiglia, wooded, but presenting some patches of rock toward its summit. Ascending the western shoulder of this hill, I found it

composed of mica-slate, with some hornblende intermixed. Craiglia overlooks the Craig of the Knocks, from which it is separated by a hollow, on its north-eastern side, and is continuous with a low ridge, gradually rising, to terminate in Craig-phibe. The hollow between these three hills, and opening northward upon the Dee, is called Strath Girnac, the burn of that name being on its western margin. Craiglia forms the northern extremity of the range of green hills so conspicuous from Ballater, and which we have to examine. It forks, as it were, into Craig-phibe on the west, and Craig Knock on the east. Proceeding along the ridge continuous with Craiglia, southward, we find the rock exposed in many places, and to a considerable extent. It is of hornblende of several varieties, slaty, and nearly massive; the direction N.E. and S.W., the inclination S.E. Strata of mica-slate, with laminæ and veins of quartz, are also seen. There is a slight hollow in the ridge, covered with short Heather and Lichens. It is named Glac-Aiten, Juniper-hollow. The wind here blew so furiously, that a shower coming on, I was glad to find shelter among the little crags that projected on the next summit. All along the western side of the range, the wind roared with a noise not unlike that of the ocean in a storm, and swept over me in gusts so violent that at times I could hardly maintain my footing.

From the ridge of these hills, you look down upon the valley of Ballater, which seems a direct continuation of Glen Muic, rather than of the valley of the Dee. Over the eastern range which separates it from Glen Tannar, is now seen projecting the summit of Mount

Kcen. The granitic hills forming the western boundary of the plain of Ballater, are seen to be the faces of a range extending westward to Glen Gairn and the base of Morven, which rises over them as proudly as the more majestic Lochnagar over its own subject hills. Far down, in the north-east, behind ranges of low hills and cultivated slopes, is seen the peak of Bcinn a' chich, commonly called Benochic.

On looking around, I perceived, a little to the westward, a cairn of red crags which I hastened to inspect. I found it a mass of porphyritic felspar, about 300 yards long, and 200 feet broad, its southern extremity in a line between Birkstall and the farm house of Camlet, in Glen Girnac. Below it, on the hill-side, was a ridge of the same rock, which I found nearly in a line with a continuous red surface-band stretching from the eastern side of the top of Craiglia, the first hill of the range, along a space of half a mile. The mass mentioned above, and which is higher on the ridge, appears to be a process from it, although the connexion is not traceable.

This dyke consists of light red compact felspar, dull, with conchoidal fracture, sometimes without other minerals interspersed, but generally porphyritic, it having small pieces of darkish crystalline quartz imbedded, and in the large divergent mass, assuming the appearance of granite, being mixed with crystalline red felspar and fragments of dark quartz. The stratified rock in the immediate vicinity is hornblende slate, partly micaceous. At the southern termination of the dyke, serpentine projects, appearing as if part of it; large blocks of the

same rock also lie along its sides, as if it had burst through a mass of serpentine. Portions of the hornblende slate in this vicinity assumed the appearance of actinolite slate.

The next summit of the range, to the west, is craggy, and composed of hornblende slate. There is a small quarry near the top, on its eastern face. The rock there splits into thin slabs or thick slates. On and around this summit, which is named Meal-Chelvat, serpentine is intermixed irregularly with the hornblende-slate, which lies in all directions, and with all degrees of inclination. On the western side the whole of this range from Craighibe to Chelvat, slopes down into Glen Girnac, and, in so far as I examined it, consists of hornblende-slate and mica-slate intermixed. Contiguous to Meal-Chelvat, a lower hill, Meal-du, also of hornblende-slate, form the south-western extremity of the range at the upper end of Glen Girnac. Beyond the summit of Meal-Chelvat, is a ridge of hornblende-slate running E. and W. with the strata vertical, whereas in the quarry, they incline to E. at an angle of about 45° . The serpentine is remarkably weathered, and of a dull grey or brown colour at the surface, immediately under which, however, it appears unchanged. It contains asbestos, generally in extremely thin shining veins or laminæ.

The range has been gradually becoming higher, and continues to rise until, above the porphyry, at Glac-Aiten the vegetation was heathy, but on the hornblende slate, mixed with serpentine, and over all the rest of the range it is grassy, and of a beautiful green. Plants also appear in this part of the range which are not

found elsewhere, as will presently be particularly attended to.

A projecting craggy mass, entirely composed of serpentine, forms the next or third summit, of less elevation than the second. But to the eastward, at the distance of a quarter of a mile, is a higher somewhat conical summit, the whole of which consists of serpentine. Ascending some craggy ground to the westward, we come to rocks of serpentine, cracked and weathered, in the fissures of which are several species of alpine plants; and at length reach the highest summit of the range, also composed of the same substance, presenting a similar aspect. The serpentine has nowhere the slightest resemblance to a stratified rock, but presents much of the appearance of traptufa or some kinds of claystone. Whether it sends veins into the neighbouring strata or not, I cannot determine, they being everywhere covered. The superficial parts of it are often singularly fissured, a series of cracks running parallel in one direction, and another series crossing them. Toward the highest parts, especially in a hollow, running N.E. and S.W., is a great quantity of scattered blocks and stones of granite, lying upon the surface, and considerably decomposed.

The wind blowing almost a hurricane, and rendering it very fatiguing to make way against it, or even with it, as in the one case I had to force myself through it as it were, and in the other to lean against it, I was glad to rest awhile in the lee of the summit, where there are numerous little grassy recesses, that seem to be much frequented by the sheep. Numerous grey Hares occurred on the range, and seemed little apprehensive



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of danger, as they often allowed me to come very near, before they started ; this was perhaps owing to the high wind.

The range terminates in a high peak, called Coial, from which the declivities, nearly smooth and grassy, on the eastern side run out into a projecting ridge, but on the south-western craggy and destitute of vegetation, pass down rather abruptly into a hollow, which separates an elongated low hill of granite, somewhat craggy and green along its ridge, but stony and covered with heath in the rest of its extent. Beyond this low hill, which lies transversely to the serpentine range, rises a higher granitic hill, called Conachraig, beyond which is Lochnagar.

Having inspected the summit, and searched for plants in its crevices, I descended upon a round-backed green prolongation, terminated by little crags, and then slanting down to Glen Muic, the falls of which were scarcely a mile distant. From this ridge the view is striking. To the south-west, and bounded on one side by the Lochnagar hills, on the other by the lower broad-backed range extending from Forfarshire to Pananich, is a strath or valley, about five miles in length, the upper part of which is occupied by Loch Muic, the rest being pasture and moorland. This tract constitutes the upper portion of Glen Muic, very different in its treeless and heathy ranges, and moory strath, from the lower portion of the glen, wooded and cultivated, extending from the Linn to the manse.

The serpentine of the range inspected yesterday is massive, fissured in all directions, easily frangible, break-

ing into polyhedral fragments of various irregular forms. Its surface is disintegrated and discoloured, grey, brown, or dull ferruginous, fissured, often grooved, the grooves parallel and crossed at right angles by others. Its structure is compact, or very minutely granular, of a dull dark bluish-grey colour, but with irregularly interspersed patches of dull greenish-yellow precious serpentine. Its fracture is splintery, uneven, in the dark parts conchoidal; in the pale, angular or sealy. There are often very slender veins or laminae of shining flexible asbestos, seen on the fracture surfaces, and sometimes patches or masses of both flexible and rigid asbestos occur in it. Minute shining specks of mica are also seen in it, and often it contains small crystalline nodules of magnetic iron ore, which, not being acted on by the weather, project from the decomposed surfaces.

But it varies greatly in texture and composition. Thus:—it is compact, greyish-black, in the fracture uneven, angular, and splintery, intermixed with shining particles, and patches of pale-green tale. Or, it is greyish-green, clouded, veined, or streaked with darker, its fracture uneven, dull, or somewhat earthy, its substance easily sectile, and unctuous. Again, it is compact, dark greyish-blue, thickly interspersed with films or delicate laminae of minute shining scales of a pale-grey colour, with satiny lustre.

It disintegrates into a fine brown, powdery soil, on which festucae, poae, and other grasses, together with many ordinary pasture plants grow, while ericæ and most of the plants usually associated with them, are excluded. The pasture is so relished by the sheep that

it is kept as short as a recently mowed lawn. The influence of the fragments is seen far down the slopes.

Associated with the serpentine is hornblende-slate, sometimes actinolitic. I have not seen them graduate into each other. On the other hand, the hornblendic strata sometimes lie disrupted, and with various directions and inclinations, about the serpentine or intersecting it.

All the eastern slope of the range from near the Linn of Muic to the Castle of the Knock, is strewn with angular fragments of serpentine and hornblende-slate, among rolled fragments of granite.

From the appearances presented by this range, it is, I think, obvious that the slaty rocks existed before the serpentine, which is certainly erupted, and in all respects of the nature of trap, as it has not the slightest indication of stratification, and seems to have thrown the slate about in all directions. The porphyry has also been thrown up subsequently to the deposition of the slate, which is variously inclined in its vicinity. Whether the eruption of the serpentine and that of the porphyry were contemporaneous or not, is not apparent. The serpentine which forms the southern extremity of the lower porphyritic dyke, may have been upraised by it. I see no way of accounting for the presence of granite blocks and stones about the highest summit of the serpentine range. They might have come from the neighbouring granite hills, and been on the ground before the serpentine invaded the slate. They could scarcely have been rolled upon it subsequently to its elevation.

The serrated outline of the range, caused by its conical craggy peaks, and its beautiful verdure, render it very conspicuous. Although the elevation of the highest point is not apparently more than about a thousand feet above the plain of Ballater, it produces several species of alpine plants, not met with at even greater heights on the neighbouring hills. The season having been extremely dry, and the serpentine crags destitute of springs, the vegetation upon them was stunted and inconspicuous; so that more species of phænogamous plants may be found there than I met with. They are the following:—

Silene maritima (Sea-shore Catch-fly), plentiful.
Statice Armeria (Thrift), less common.
Cerastium alpinum (alpine Mouse-ear), in abundance.
Saxifraga hypnoides, in a few places.

Potentilla alpestris, not common.
Polypodium vulgare (common Polypody), common.
Asplenium Ruta-muraria (Wall Rue), plentiful.
Asplenium Trichomanes (common Splenwort), plentiful.
Asplenium viride, not uncommon.

The *Cerastium* grew also plentifully among the grass near the crags. By the very few rills, *Saxifraga aizoides* occurred; but I did not meet with *S. stellaris*.

From its great smoothness, and its being nearly uniformly clothed with Heather, you might suppose the long range that extends from Loch-Muic to Pananice to be composed of mica-slate, or perhaps gneiss; while a person finding at its extremity a great rock of granite, as if presenting a section of one of its mountains, might imagine the whole range to be of that rock. I had found granite as far as Braichley-Burn, at which Glen-Muic properly commences. Beyond this I could not find the rock *in*

situ, until opposite Knoek Castle, where there is a erag, with fragments lying about it. On applying the hammer, I found it extremely obdurate; but at length I determined it to be hornblende rock, generally massive, sometimes obscurely laminated, not in the least decomposed, even at the surface, which is erusted all over with liehens, many of them in great perfection. An unpraetised person might take it for trap—perhaps hornblendie, or hypersthenie. Farther up the glen the roek is seen extensively exposed in a hollow, and along the sides of an eminenee covered with trees. It appears in flattened patches, large plates, and protuberanees, liehen-crusted, but as fresh as when first formed, indestruetible by weather, and obstinately resisting the hammer. People talk of the durability of granite, which, generally, is a very disintegrable and easily frangible rock, although some varieties of it resist the action of the weather; but should a rich man, or a vain one, desire a monument to hold his name in remembrance, let him send to Glen-Muic for hornblende bloeks from the Claishes. This hollow, or series of hollows, was appropriately named by the Celts—who were famous toponymists, and never named anything amiss—Na elaisean—the Furrows—which the mixed population now name the Claishes. Of the many thousand chips which I have riven from rocks and blocks, none, I believe, were obtained with so much labour as those of this hornblendie deposit, exepting some from a mass of asbestiform aetinolite in the island of Harris. You hit adroitly in the right spot half-a-dozen times, when at last a small splinter flies off whizzing, or the edge of the stone

splits into angular fragments; and when, with much care and labour, you obtain a large slice, it is very improbable that you can fashion it into neat specimens. Six of such, however, I did obtain; but by this time it had become so dark that I was obliged to return.



CHAPTER XXVI.

SECOND VISIT TO GLEN GIRNAC.—VALLEY OF THE THREE PINES.

HAVING a lingering affection for the Serpentine Hills, and a desire to know more accurately the geology of their western sides, I entered Glen Girnac again on the 16th of September, and, proceeding along the flank of Craig-phibe, I found it comparatively even, and covered to near the base with fragments of hornblende slate, some of them containing patches of semi-crystalline white quartz.

It is very difficult, in all this tract of country, to judge of the nature of the rock composing the hills by the appearance of the detritus which covers them. I have often been deceived, insomuch that the actual inspection of even a very near spot became necessary. Granite hills are more certainly distinguishable than the others; their detritus consists of larger fragments, among which reddish streaks are often seen, indicating either granite or felspar-porphry; the latter, however, may almost always be known by its forming a straight line or ridge, as here it is always in the form of veins or dykes. The hornblende hills are comparatively even, and often to a great extent almost continuously covered with Heather

and herbage. Sometimes, however, they are in part quite covered with detritus, which is smaller and more angular than that of granite.

About two miles up the glen, a low broad ridge extends from the western range of hills to the farmhouse of Loanvay, just above which are some erags of quartzose mica-slate, in plates, readily fissile in the direction of the planes of stratification. The quartz is minutely granular, and sometimes forms layers of itself, or with very little intermixture of mica. In one place it has the appearance of white compact felspar, with conehoidal fracture, and very smooth faces to the seams. Some way farther up the glen is another farm, named Camlet, to which I went, mistaking it for Bovaglae.

The broken ridge near his house is of large grained granite, and terminates in a low eraggy eminence called Cnapeuail, the base of which is continuous with a nearly level space about a mile in extent every way, and having to the south a low hill of granite, named Meal-Gorm, which may be considered as terminating Glen-Girnae in that direction, though it passes farther up towards the south-west, to the ridge of Conaehcraig.

The uppermost of the hills forming the serpentine range is named Meall-dhuh, the Black Lump. Between it and a low granite hill, called Craig-megan, there opens into the little plain spoken of, a glen or hollow, about three miles long, leading to Glen Muie above the Linn. Turning eastward into this hollow, I passed along the base of Meall-dhuh, covered with fragments of hornblende slate, of which rock it seems to be composed. This little valley is the most dismal in the district—

destitute of wood, with little verdure, its hills of inconsiderable elevation, rugged, or cumbered with blocks; the slanting hollow between Meall-dhuh and Coial is covered with rounded blocks of granite, which could scarcely have been rolled from the opposite hill of Craigmegan, but, like those in the hollow near the summit of Coial, may have been on the ground when the serpentine eruption took place.

The Coial on this side presents a most singular appearance, it being quite bare, shattered into fragments, and of reddish-grey and brown tints confusedly intermixed with dull yellow. I can compare it to nothing else than an enormous mass of parti-coloured clay, dried and baked in the sun, and then shattered into fragments.

Three stunted trees among its rubbish have a most singular effect. One can hardly believe his eyes when they tell him they are Pines. How came they there—what is their purpose—why are there not more of them—how old are they? Very easy it is to ask questions, which nobody can answer. A fourth tree has grown there also, but it lies overthrown, unbarked, and rotting. Their bent and rugged trunks indicate poverty and old age. Many storms of wind and rain have burst upon them; the sun has blazed fiercely upon their tufted foliage, and the parched crags have sent back his rays upon their spreading branches. The snows of winter have pressed them down, and the sapless soil has refused them nourishment in summer; their kindred have perished one by one; the last of their brethren lies prostrate beside them; they are the remnants of a once numerous and prosperous race, and when they perish

there will be no monument, but this passing notice, to indicate that they once were.

Searching all along the margin of the serpentine for its junction with the other rocks—for disturbed, fractured, upheaved, fused, or indurated hornblende, mica-slate, or granite—I could find nothing but a small space, in which strata, some with straight, others with contorted laminae, presented a nearly smooth surface. They were of what might be called gneiss, for there was a little white felspar among the quartz and mica; their direction north-east and south-west, their dip south-east. This was on the south shoulder of Coial; and further on, as I had just passed northward below its large buttress that projects eastward into Glen-Muie, never imagining there could be anything but serpentine in it, something induced me suddenly to look back, and then I observed that the rounded and craggy extremity of the prominence was white; so I returned and ascended, weary as I was with turnings and windings, and found the mass to consist of gneiss, in strata, still directed north-east, but inclined the wrong way, that is to the west. In some places they had different directions, and were inclined at various angles.

I now proceeded to Linmuie, passed the little peak of the wooded hill above Birk Hall, which projects only a few feet from the line of the slope, and is about 500 paces from the farm-house, and descending into the valley soon reached its mouth. Many a time have I hailed with pleasure the beautiful Ash-tree in the manse-garden. There it stands, seventy feet high at least, and twelve feet in girth, overshadowing the little

old burying-ground. There are many other Ash-trees in the district, but I doubt if any of them are truly indigenous. All that I have seen are near houses, and some of them, from their situations, have evidently been planted. I have doubts, in like manner, respecting the Gean trees, of which there are some near Birk Hall and also here, by the old manse. It is curious to see the treatment they receive ; their branches being broken, their bark torn, and their twigs and withered leaves lying scattered around, while, beside them, the Bird-cherry bushes, untouched by the boys, or even by the thrushes, still display their beautiful but nauseous fruits thickly clustered in tempting profusion. The Birch woods, patched and streaked with yellow, indicate the approach of winter, and warn us of the necessity of preparing for other occupations.

CHAPTER XXVII.

EASTERN OR HORNBLENDE RANGE OF GLEN-MUIC.—THE CLAISHES.—HILL-RANGE
FROM BRAICHPLEY TO THE LINN.

DESCENDING from the hill-range on the eastern side of Glen Muic, a little stream, called Braichley Burn, enters the Dee, a little further down than the water of Muic. At its upper part, the rock, rarely exposed, is hornblende-slate; and below the farm house of the same name, it enters a den or hollow, beautifully wooded, and containing a great variety of plants. Numerous bushes of *Prunus Padus*, bearing ripe fruit, were intermixed with others of *Corylus avellana*, already stripped of their produce. Among them grew the Aspen, the Birch, the Alder, the Rowan, and the Sloe, as well as several Willows, some of them of considerable size, others stunted enough. A great bed of diluvium, of unknown thickness, forms a terrace, intersected by the stream, and extending towards the mouth of the Muic. As we proceed westward, there is a road ascending obliquely, and passing over the summit of the ridge. Along it the hornblende-slate is exposed in a few places, and not far from it is the crag, already spoken of, in which the obdurate rock shows but slight indications

of lamination. Below the road, and about half a mile from the mouth of the stream, commences a depression or hollow, bounded by the declivity of the hill-range, and on the south-west by a low, rounded hill, called Garlit. It is a place that might well attract the notice of even the idle stroller, and the earnest attention of those looking for geological phenomena. Numerous tumuli of a low conical form rise here and there, covered with large gray blocks, the ground between them being also strewn with fragments of the same nature. Glacier deposits, moraines, of a certainty; how else could these angular blocks have been so comfortably lodged on the surface, there being no cliffs or crags, from which they could have fallen? But let us examine them, not to support a theory, but to find the truth.

The declivity of the hill is denuded at its base. The hornblende strata protrude, cracked and fissured, all inclined to the east, at angles varying from 10° to 25° . The rock is clearly and distinctly laminated in most places, more or less intermixed with quartz, sometimes also with a little felspar. There are no large escarpments, however, from which fragments could have fallen and rolled to a distance. Yet all the blocks that cover the tumuli and their interspaces are of the same hornblende. Being often solid, and crusted with white and grey *Lecanoræ* and other Lichens, an incurious person, knowing a little of geology, might take them for trap-pean. Rock and block are one and the same.

Farther on, the strata rise to angles of from 45° to 80° , but still incline to the east, and are mostly directed from N.E. to S.W., but many incline to S.E. and S.

Following the hollow, in which the prominences have their abrupt faeces to the N. and W., we find it forming a large groove running westward by the farm-house of Rinnesleek. The strata of the hilloeks are here inclined in all directions. The groove or rut, thus filled with little mounds, is bounded to the eastward by a small hill or prominence, called Tom-a-lin-mor, and on its western side by the low wooded hill, extending to opposite Birk Hall, and named Garlit. It forms a kind of separation of this hill from the neighbouring parts, and must have been produced by convulsive movements, which fractured and dislocated the strata, and tossed the fragments around and upon the little mounds, which one might at first sight imagine to be of trap or serpentine, but which are all of the same hornblendic rock as the declivities of the hill-range around.

Proceeding westward, we find the range divided by shallow depressions into masses hardly deserving to be considered as separate hills, and presenting a continuous heath-clad surface, the rock projecting only in a few places, and never to a great extent. Having traversed this long declivity, twice transversely and several times longitudinally, I am enabled to state that it is entirely composed of hornblende-slate, varying, as might be expected, considerably in its degree of lamination, the size of its constituent crystalline parts, and the quantity of quartz intermixed. It would be of no particular interest to enumerate the successive prominences—Blaraye, Craig-o'-the-Ryloeh, Craig-veallich, Cairn-luichen, Cairn-Hillas, and so forth—as they present no special phenomena. At the distance of about five miles

from the manse, the valley seems closed by the projection of a large hornblendic hill from the eastern declivity, approaching closely to the western slope from the base of the serpentine Coial Hills. Down the narrow pass thus formed, the water of Muic descends, forming a cascade of considerable beauty, with hornblende rocks, stratified, and interlaminated with quartz, on both sides.

You may return along the wooded and partially cultivated bottom of the valley, by either side of the stream, which is margined with Alder, Birch, Willows, and other trees and shrubs; or, ascending the hill-range to its ridge, you will find it, wherever the rock can be seen, of the same hornblendic strata. What seems a ridge, however, is a space, from one to three miles in breadth, seldom rocky, often deeply covered with peat, and presenting nothing very agreeable, excepting the extensive views of the surrounding mountains, pleasant at all times of the day; but more especially just after sunset, when looking westward, as I did, on this, the 7th of September, as I and my three companions were returning from a visit to the summit of Mount Keen; you could not sufficiently admire the magnificence of the western landscape, composed of wavy ridges of purplish-blue mountains, filling the whole extent of the western hemisphere, and forming a picture such as no painter probably ever attempted, or having attempted, could realise in all its mysterious and solemn beauty.

CHAPTER XXVIII.

A RAMBLE FOR EXERCISE AND INFORMATION.

FEELING a little stiff after the sabbath rest, and finding it expedient to make a general survey of Glen Muic, I left Ballater about ten o'clock on Monday the 9th of September, and proceeded to the entrance of the valley. Two aged persons, who were sitting in the sunshine at the door of a cottage, gave me the names of a few of the places in sight, and called out a younger person to give me more authentic information. It is surprising how little local knowledge most of the people about Ballater possess. It would appear that in the agricultural state, when men cease to roam much abroad, and direct their faculties chiefly to the rearing of crops, they lose acquaintance with whatever is not in their immediate neighbourhood. The savage, and even the shepherd, have ten times the intelligence of the manufacturer, or even the farmer, in certain matters which are of importance to the practical naturalist. I have found it very difficult in this neighbourhood to obtain satisfactory answers to inquiries respecting the names of hills and streams, or plants and animals. Once only I had the good fortune to overtake a

shepherd, a real Celt, from Glen Clunie in Braemar, as he was descending from the moor in the dusk, who gave me satisfactory answers to a great number of questions respecting Glen Muic, the etymology of certain local names, and various other matters. As I proceeded up the glen, at one time strolling through the beautiful Birch woods, then skirting the stream, I made several attempts to obtain the desired information, by calling at cottages, and accosting people whom I met, but had little success. After passing from one side of the glen to the other and back again, from farm to farm, I gave it up in despair, for I had reached the upper part of the lower glen, and it was noon.

When you have got so far, and are directly opposite the highest and most southern of the Coial peaks, or hills of the serpentine range, you may, if the day be as hot as this assuredly is, after a night of frost, which has greatly added to the yellow tints of the Birch woods, rest a little by a clear brook, which comes from Craighillar, as it is called, Craig-Julliar, I suppose.

Looking down the valley, we see right opposite the smooth-topped Morven; in a line with it the Free Church, gleaming white on the wooded side of Craigan-darroch; then the Craig of the Knock, and the ruined castle of that ilk; the low, rounded hill or hillock, named Garlit, birch-clad, but partly grassy; from thence, corn fields, pastures, farm-steadings, thickets and woods, all pleasingly irregular in their disposition. On the right is the eastern bounding hill-range, smooth, destitute of wood, and formed into masses, rounded eminences, not very distinct. They are called



LOCH MUIC.

a mile from the Linn scarcely any hornblende stones are to be seen, the diluvium and detritus being of granite. In all the places where it appears *in situ*, it is large grained, but it varies in colour and the proportion of mica.

Having advanced nearly two miles, we see Loch-Muic. Just opposite the small shooting-lodge, on the other side of the glen, is obtained one of the most singular of the views of Lochnagar, its corry and rocks greatly resembling a volcanic crater. Crossing the Burn of Altarvie, coming from a break in the hills to the left, we come to the farm-steading called the Spittal of Glen-Muic.

And now the lake, which is about two miles in length and enclosed by hill-ranges, having very steep declivities singularly grooved by the torrents, the beds of which, with the detritus carried down, present the appearance of parallel red and whitish streaks, which remind me of the sides of Moffat-Dale.

As you advance, the scene improves, especially if you take the southern side, where the declivities are rapid and broken into rocks and crevices, while their lower parts are strewn with large blocks, and in part rudely ornamented with stunted trees. The farther you proceed the grander the scenery becomes; the hills on both sides assume bolder outlines and more picturesque forms.

Now we cross the brook, beyond which is placed conspicuously, on the edge of the water, a fine cubical mass of granite, black all over with *Gyrophoræ*, *Corniculariæ*, and *Usneæ*, and measuring from seven to

eight feet every way. Other blocks of granite, many still larger, cover the base of the declivity and cumber the ravine, in which there is a considerable quantity of stunted wood.

The view down the glen is singular, the land at the end of the loch being so low as to present a linear stripe, beyond which the flat bottom of the valley is no longer seen. From this extended line the hills seem to rise, and the view ends with Morven, about fifteen miles distant. Looking toward the head of the lake we have a very different scene, eminently picturesque, and making a near approach to the sublime. After contemplating it awhile we hasten onward, for the sun is fast nearing the ridge of the high mountain to the south-west of Lochnagar, of which latter no part is at present visible, unless we reckon as such those rocky declivities to the right.

The route by the lake is encumbered with blocks and stones, furrowed with numerous torrent-beds, and altogether a worthy continuation of the tract already traversed. The detritus is all of granite, and in the ruts are found fragments of quartz, sometimes crystalline.

Having at length reached the extremity of the lake, and seated ourselves on the bank of the stream that enters it, we abandon ourselves to the quiet contemplation of the scene which presents itself. At the distance of about three miles, the finely proportioned mountain of Cairn Taggart, rather dim in the gathering haze of evening, rises to a great height. A hollow at its base appears to extend northward into the bosom of Loch-



HEAD OF GLEN MUIC.

nagar, and from it pours down a steep declivity, partly formed of a flattened expanse of rocks, a stream of not inconsiderable size, occupying the middle of the valley on either side of which are high and rocky hills. Some Birch-wood is sprinkled among the protuberances at its lower part, which is continuous with a small flat space margining the lake.

Very fascinating in its quiet loveliness is this desolate rock-enclosed valley. The sun is just passing behind Cairn Taggart, of which the particular features are undistinguishable in the deep shade and surrounding glare. If we had four hours more of light we might ascend by the stream, rest on the rock-brink of the waterfall about a mile distant, follow the course of the brook, and reach the Duloch, whence we might ascend Lochnagar and enter Glen-Muic at Allt-na-Guithasach, or visiting the base of the enormous precipices of the eastern and western craigs which present magnificent ranges of shattered rocks, not surpassed by any in Braemar, return to this same spot in time to inspect the margin of the lake.

There is scarcely any vegetation in it—at least, none to attract the eye—unless in a few shallow places, of which this, at its head, is the most remarkable. Close to the shore, but covered by the water, is a considerable quantity of *Subularia aquatica*, and *Isoetes lacustris*. *Sparganium natans*, *Carex ampullacea*, and *Equisetum limosum*, form a large patch, conspicuous in contrast with the brown tints of the moor-ground.

There is one very little island in Loch-Muic. Here it is about fifty paces from the sandy shore, covered with

green herbage, partly margined with stones, and nourishing twelve, I think, small trees or bushes. But now I must proceed. The summits of the lower hills are becoming covered with a most beautiful layer of filmy white vapour, indicating increasing cold in the air, and over it is seen the pale rim of the moon.

The path leads along the base of the furrowed and stony declivities, which are of granite, coarse and reddish, like that of the opposite side. All along this passage it was very pleasant to hear the Ravens, in the craigs of the opposite side, talking to each other in a great variety of accents, one answering the call of another. Poor fellows! if the glen were mine, I would give strict orders not to molest them; for, next to the Eagle now altogether destroyed, the Raven is the greatest ornament of such a scene. They continued croaking, barking, yelping, at a great rate, until I had passed the end of the rock.

At Inchnabobart I waded through the stream, and gaining the road proceeded comfortably along, with a moderate weight of granite specimens. There being nothing to see in the dark but the stars, nor anything to be heard in the still night but the sound of the stream, I need only say of this counter-march that it ended at half-past ten. One beautiful cluster of stars I put into my vasculum among the plants. There was a bluish phosphorescent light by the road like that of a glow-worm, so I knelt down to inspect it. A little spot, about an inch in diameter, was all glowing with this light. It did not seem to belong to a single animal, for shining points shot out from the focus in straight lines and

returned. I suppose they were small Arachnidæ ; but I never saw them distinctly, and now they are lost.*

* Several terrestrial animals, as well as plants, give out a phosphorescent light. The glow-worms are a familiar instance. It has also been recorded of several other species of insects, and of some Myriapoda. Amongst plants this phenomenon has been most commonly observed in the Fungi. It is much more common in tropical than in temperate climates.—Ed.

CHAPTER XXIX.

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ALLUVIUM OF THE PLAIN OF BALLATER AND GLEN-MUIC.—FURTHER
INSPECTION OF CRAIG KNOCK.

It is a very beautiful day, the 11th of September. A thin haze arises from the whole surface of the ground after the night-frost, as the warm breezes from the south sweep over it, and the sun-rays come upon it from an unclouded sky. The river glides along, limpid as is its wont after protracted drought; a fortnight ago it was dark brown, though still clear. It is only during great floods that it becomes turbid and assumes a reddish colour. All this is in accordance with, and indicates the nature of the country which it drains. Mountains formed of primary and igneous rocks, and valleys sheathed with their detritus, when gentle rains fall upon them, allow the water to percolate quietly until it reaches the lower grooves in which it flows off. When much rain falls, the peaty soil of the upper valleys and hills is soaked, and the water dissolves and carries off part of the matter of the soil. Should the rains be heavy and protracted, they hurl the granitic detritus down the steep declivities, groove out ruts for themselves, and by carrying off the clayey and ferruginous matters, give

the brooks, the burns, and the river a reddish tint. As the Dee has a long course, and no great body of water, it often happens that although turbid in Braemar, it becomes clear before it reaches Aberdeen. But when it has rained many days, or when the snows quickly melt, the brooks from a thousand hollows fill the bed of the river to overflowing, and the stream, then assuming a strength and magnificence unknown to it in its milder moods, sweeps along, with a sullen sound, carries away portions of its banks, sometimes trees and even bridges, covers all the haugh lands with its turbid waters, and clears the long valley of filth and rubbish.

The valley of Ballater has its general direction N.E. and S.W. It joins the pass or valley by which the Dee enters it from Crathie nearly at a right angle. The river makes a wide curve in entering it, and passing amongst alluvium, has excavated a high bank on its right side. But the plain, although here intersected by the Dee, is continued in a direct course about a mile up Glen Muic, or nearly as far as Birk Hall. Glen-Gairn opens about a mile and a half farther up, and its direction at the mouth is oblique with reference to the Dee. From the mouth of the Gairn, then, to that of the Muic, and thence to Camus-o-may, an extent of about five miles, is a continuous deposit of alluvium, through which the river, varying in its course, has cut.

This alluvium is exposed on the west side of the bend of the river, which, during floods, erodes the steep bank, washing away the finer materials, and leaving the larger stones in its bed. We find the alluvium here, and all the way up to the mouth of the Gairn, and beyond it,

to be formed of rounded detritus, evidently deposited from water after being rolled in it. The materials are mostly granitic; sand, gravel, and stones of various sizes, none very large, irregularly intermixed. The bank rises from fifteen to twenty feet above the river, the bed of which is formed of stones, three-fourths of which are granite, the rest being felspar porphyry of several varieties, some dark horn-stone porphyry, granular quartz, micaceous quartz, and some mica-slate; but scarcely any hornblende or serpentine.

If the detritus, of which the alluvium consists, came down from the direction of Bracmar, it is such as might be expected, for it presents some of all the materials found in that tract, and in the proportion of their frequency combined with their durability. Hornblende in prominent masses hardly occurs farther up than Craig-phibe, which is only about two miles distant: serpentine is met with only in the immediate neighbourhood. But a great part of the western, and the whole of the eastern hill-ranges of Glen-Muic, are composed of hornblende, and if the currents which formed and deposited the diluvium, came down the valleys, we should find in the diluvium of the lower part of the plain, or all the way beyond the mouth of the Muic a large proportion of that substance, more especially as in indestructibility it equals the porphyries, and is less frangible than quartz. Now, beyond Ballater, north-eastward, along the eastern side, and especially about and beyond Tullich, and onward to the mouth of the plain, there is a great abundance of hornblende in the diluvium. This shows, that when the diluvium was

deposited, the hornblende existed, and the stream which carried off its fragments came from the west and south, and passed along the valley of Ballater.

In the western side of the plains of Glen Muic, hornblende does not occur in the diluvium, although there is abundance of it in the neighbourhood, and that too in the south-west and west. Large blocks of both it and serpentine occur abundantly on the surface, and in heaps intermixed with their own peculiar reddish earthy detritus, though not in the granitic alluvium. It therefore appears that the alluvium was formed before the eruption of the serpentine, the blocks of which have rolled down the declivities, and lie upon the previously formed alluvium.

The general level of the plain is continuous with that on which we stand. We see that the Dee, in shifting its course, has invaded it, washed away its gravel and sand, and left the stones in its bed, over a breadth in this place of nearly a quarter of a mile. As the river has receded from the opposite side, its exposed bed has been covered with Heath, Broom, Whin, and other vegetation.

On the declivities, and at the base of the hills, the detritus has a different composition and arrangement. The deposit is less water-worn. It has fallen and been washed down from the sides, the cracked and craggy prominences having given way under the action of the water. A layer, gradually becoming thicker toward the base of the slope, lies upon it, and is formed of clayey gravel, intermixed with stones of all sizes, many of them angular, others more or less rounded.

The inspection of the diluvium thus shows that in the country to the west, both the granite and the micaceous quartz-slate, which we now find there, existed, as did the dykes of porphyry which intersect the slate, and that the granite preponderated, as it does now. But it does not show whether the formation of these rocks was contemporaneous or not.

Let us suppose that the whole of this district—we need not be frightened at its extent, that being a very small matter in a general sense—was originally flat, or nearly so, and covered with a layer of mica-slate, micaceous quartz-slate, and hornblende; that it was under water; that the granite which formed the floor for the slaty strata, heaved up by forces acting from below, broke up the slate, splintered, and scattered it around; that the currents caused by the commotion, which was not sudden and of short duration, swept the hills clear of the rubbish, which was carried away in fragments by a great current from the west, to be spread over distant plains; that the up-heaving of the granite continued; and that, when the great current abated or ceased, the cracked and crumbling surface fell and was washed down the declivities, where it still lies. Subsequent movements from beneath, and atmospheric influences, when the water had passed off, removed from the rocks and hills the angular fragments which we find at their bases, and of which the layers have been rolled into the valleys, over the new surface of detritus or diluvium.

There is no need of ice, or of glaciers here, as all the phenomena can be accounted for without them.

Sometimes you see a great heap of large blocks, quite angular, lying on each other, as if they were either fragments of a mass or stratum, burst and up-heaved, or fragments deposited all together from melting ice, which had conveyed them to the place. Now, these heaps are in every variety of situation; in valleys, on hill-sides, and on hill-tops. Some of them clearly disclose their formation. The micaceous strata heaped in ruins on the Craigs at Gairnshiel, have a mass of granite beneath and amongst them. Thus, the ruins which cover the hill-side, near the limestone quarry between Crathie and Abergeldy, have directly beneath them a granite mass on whose back the slate has been raised.

Let us now ascend to the summit of this wooded hill, called Craig-knock; for, although a portion of it has been inspected, there is no saying, without actual examination, what the rest of it is made of. The first protuberance, just over the extremity of the section of the alluvium made by the Dee, is named Knock Fuar, "the cold hillock," and presents hornblende slate protruding from its north-east side, in strata, inclined to the south at an angle of 48° . On the hill to the west are seen, amidst the trees, two craggy spots, where the inspection of the rock may be made. One of these, about half a mile above Knock Castle, has already been found to present strata of mica-slate. On reaching the other, which is S. W., and scarcely 800 yards distant from Knock Fuar, we find it to be micaceous quartz-slate, very hard, breaking into angular pieces, and in strata inclining to the south, at various angles, nearly parallel to the faces of the acclivity.

Scen from this place the valley of the Muic presents a singular appearance. The meridian sun is blazing upon it, but a steady breeze moderates the heat. The air is mild, balmy, and though warm, refreshing, as a south-westerly wind generally is. All over the valley and its bounding ranges is spread a thin bluish-grey vapour, which reminds me of the haze caused by the smoke of kelp-kilns in the Outer Hebrides, and brings glimpses of long-gone days to my mind. The vapour is not dense enough to conceal the most distant hills; and so far from obscuring, it brings out most beautifully the geography of the valley. The eastern range, which in ordinary clear weather seems almost even and continuous, now presents eight perfectly distinct hills, with five lower prominences at their base. On the western side, the serpentine hills, distinct in any variety of daylight, are beautifully veiled with the transparent haze.

Passing westward, among the trees, we find, directly opposite to the mouth of Glen-Gairn, a craggy bank facing the Dec. The strata here, mostly inclined to the south, vary in their dip and direction, and are of hornblende-slate, partly micaceous, sometimes containing patches of red felspar, and often intersected and interlaminated with quartz. This rock, which is a little below the summit of the hill, has the declivity at its base covered with blocks, among which are numerous plants. A few of the more conspicuous are the following:—

Mercurialis perennis.
Rubus Idæus.
Vaccinium Vitis-idæa.
Campanula rotundifolia.

Oxalis Acetosella.
Geranium robertianum.
Aira cæspitosa.
A. flexuosa.

Festuca duriuscula.
F. ovina.
Trientalis Europæa.
Aspidium Filix-mas.
Athyrium Filix-fœmina.
Polypodium vulgare.

P. Phegopteris.
P. Dryopteris.
Prunus Cerasus.
Pyrus aucuparia.
Rosa canina.

On the summit of the hill the same rock appears in several places ; as it also does about half way down the western declivity, by which I descended to a road that, intersecting the wood, leads from Glen-Girnac to the point where I had commenced the ascent.

CHAPTER XXX.

FURTHER EXAMINATION OF THE SERPENTINE HILLS.—GENERAL DESCRIPTION OF
GLEN-MUIC, INCLUDING ITS GEOLOGY.

ONE spot satisfactorily examined suggests the propriety of clearing up doubt respecting others. There are yet many parts of the serpentine range that have not been actually inspected. We have seen that Craig-knock is composed of mica-slate, micaceous quartz, and hornblende-slate ; that this latter forms its northern base, appearing here and there about Polphollock ; and again beyond the Dee, at Gairn Bridge. I have also traversed the south-western declivity of the same hill, and found it to present numerous hillocks covered with blocks of serpentine ; and I have described its south-eastern side, partly cultivated, as having upon it similar projections. The serpentine blocks are seen in great profusion on both sides of the road, as it passes across the hollow between Craig-knock and the next hill, at the north-eastern base of Craig-lia.

I have again crossed the little plain, and now approach its western margin, which is bounded by a group of hillocks. They present no definite arrangement. At first sight many of them might seem heaps of blocks,

but amidst these blocks, all of laminated and often undulated hornblende-slate, we find here and there the solid rock projecting. The strata generally incline to the south, at various angles; but they have different directions. Some blocks of serpentine are interspersed; and it appears probable that the eruption of that rock has been the cause of all these ruins. The low wooded ascent westward is undulated; but, unless at its base, presents neither rock nor fragments.

The world is full of wonders. If we understood all its laws, and knew all its phenomena, facts, and objects, we should be very miserable. Obscurity and mystery add greatly to human happiness, as cumuli and cirri increase the beauty of a landscape. In every corner, as well as in every open place, you meet with something not understood. On leaping a wall I was suddenly arrested—not by a policeman—but by a Fungus. There it stood, not at all courting observation, on a tuft of green *Hypnum*, beside a Pine-trunk—its broad pileus, six inches in diameter, glowing with tints nowhere else to be seen in nature—carmine in the centre, shaded into orange-scarlet, the margin buff. Some pale warty scurf, the remains of the volva, still adhered to it, but did not mar its beauty. Its stalk, eight inches high, and nearly an inch thick, stood erect upon its bulb. From its upper part hung all round a delicate sheath, of a pale-yellow tint, so tender that you might blow it into shreds with a breath. Its beautiful yellowish-white lamellæ could be seen only after it was pulled. A snail had eaten a large hole into its stem. Was it formed to be devoured by *Mollusca*? What are its uses? Why

was it placed here? By its side grew an ugly brown *Boletus*, with dark cinnamon-coloured pores, and a yellow stem.

Wandering in the wood, but not at random, I ascended the little conical prominence at the eastern base of Craig-lia. It was thickly covered with Larch and Pine, among which were some Wood Pigeons. The ground was smooth, but a few blocks were scattered over it; and in two or three places, a little of the rock-hornblende was still seen projecting.

Descending from this eminence, from which, were it free of wood, Craig-phibe could be seen, I proceeded southward, among the trees, over undulated ground, and, turning a little to the westward, came upon a circular pool, in the mud of which I found, half-suffocated, an *Æshna varia*.* Several of the larvæ were also seen in it. At the upper margin was a heap of serpentine blocks, some of which seemed *in situ*.

Not far distant was the summit of the hill. It is a ridge of serpentine, covered with angular blocks of the same. A few large blocks of granite are also seen upon it. It is to the north-east of Craig-lia, and a short descent leads to the flank of that hill, which, in fact, is contiguous, with only a little hollow intervening.

On its side are seen, in several places, strata of hornblende, inclined to the south-east. Its summit, as already mentioned, is traversed by a dyke of red porphyry, rather indicated by the fragments than apparent, as only very small portions of the solid rock are

* An insect belonging to the order *Neuroptera*, and closely allied to the common Dragon-fly.—ED.

seen. Beyond this dyke, to the west, the rock is still hornblende, inclined to the east. Then appears a bed of mica-slate, of which the breadth cannot be determined; its direction is north-east.

I was now on the ridge at Glac-Aiten, already traversed, so I betook myself to the porphyry dyke, which I wished to inspect more minutely. The direction of the latter is north-east by south. It ends in a great mass on the southern declivity of the hill. Below it is the second dyke nearly parallel, and indicated by the projection of the hornblende strata, along the side of the hill, until nearly opposite the terminal mass of the upper dyke, where it forms an irregular ridge, rising many feet above the surface, and in one place thirty yards in breadth. This dyke has thrown up serpentine blocks on both sides. About a quarter of a mile northward from its extremity, is a heap of serpentine blocks, probably upheaved by it.

To the south of this heap, at the distance of half a mile, and close to the farm-house of Linmuist, is the summit of the conical wooded hill rising above Birk Hall, as seen from Ballater. I proceeded toward it, and passing through the wood, found it to be of serpentine, of which a large mass, probably an acre in extent, is exposed. It is more solid than in any of the other parts of the range, being little fissured, although broken on the north side into very large fragments. This eminence does not seem to be three hundred feet above the Muic; and yet there are upon it, in abundance, the same alpine plants as the higher peaks: *Silene maritima*, *Arabis petræa*, and *Cerastium latifolium*. *Asple-*

nium Adiantum-nigrum and *A. viride* were also plentiful. It can scarcely be considered the peak of a distinct hill, for it projects only a few feet above the gently inclined space between it and the farm-house already mentioned.

From this peak, partially covered with green herbage, and surrounded with trees, as yet young, we had a fine view of the valley extending from the base of the hill to Camus-o-may, as well as of Morven, and Culblean, with the intervening hills; the dark shadows from which had stretched across the plain, indicating the approach of sunset, as the yellow tints of the Birch wood on the opposite hill of Garlit spoke of coming winter, while the sighing of the breezes among the Larehes around came soothingly on the ear, causing a dreamy kind of feeling to creep over the mind. There was no time for dreams, however, and so, having descended the hill, I washed in the clear stream at its base, and proceeded homeward.

The banks are covered with a profusion of Alders and Bird-Cherries. Near the mill are five large Gean trees (*Cerasus Juliana*?) and many bushes of the same species. By the edge of a little haugh, near Birk Hall, was a vast quantity of *Cnicus heterophyllus*; and on a bank farther on, I found *Clinopodium vulgare* (Wild Basil) still in flower. The plump ripe heps of a thicket of *Rosa tomentosa* were so tempting, that I cleaned the seeds out of some of them and found the pulp very agreeable. Here, after crossing the stream by a plank, I looked at a section of diluvium, which presented nothing very remarkable, but consisted of a mixture

of clay and gravel, with blocks and stones of hornblende.

Having thus expended much time and labour upon the examination of Glen Muic, I find myself not unqualified to present a general description of it, derived entirely from personal observation.

On the left side of the Dee, at the head of the plains of Ballater, and about the distance of half a mile from the village of that name, there merges from a wooded valley a stream of moderate size, called the 'Traitor of Muic. It drains a large tract of land extending southward from the Dee to the southern side of Lochnagar, and in all this space flows along a valley named Glen Muic.

Between the mountains which form the eastern boundary of Glen Callater, toward its upper part, and the opposite side of Lochnagar, is an alpine valley, in which is seen a small lake, named the Duloch, "Black Lake," at the base of a range of granite precipices, irregularly fissured and of great elevation, with a vast slope of blocks and stones traversed by torrents. These precipices are named the Craigs of the Duloch. There are two ranges of them, the other being further down the glen, but of equal elevation. On them are found many of the alpine plants that gladden the heart of the vagrant botanist: *Sedum Rhodiola*, *Cochlearia officinalis*, *Cerastium alpinum*, *Luzula spicata*, *Alchemilla alpina*, *Oxyria reniformis*, *Gnaphalium supinum*, *Carex rigida*, *Poa alpina*, *Poa laxa*, *Aira alpina*, *Polygonum viviparum*, *Thalictrum alpinum*, *Hieracium Halleri*, *H. alpinum*, and many others. The brook which issues from the Duloch,

and descends over very rough ground, is, in part of its extent, rather copiously fringed with bushes of *Salix arenaria*, presenting several varieties as to the form of its leaves, and the quantity of white down with which they are covered. To the south-west is the high and rather picturesque mountain of Cairn Taggart, Cairn-t-sagairt, "Priests' Cairn." On the lower declivity, which presents a large expanse of flattened granite-surface, the stream follows a rugged fissure, and at one place forms a picturesque fall, with high walls on its sides. It then winds among rough ground, overgrown with rank heather and scattered birches, and enters Loeh Muie at the distance of about a mile and a half from its source. The sides of the valley are formed of granite crags and precipices, and are continuous with those of the lake, which, however, are less elevated.

Loeh Muie, which is about two miles in length, and half a mile in breadth, occupies the upper part of a narrow plain, bounded on the northern side by a steep, scarred bank, formed by the face of a prolongation of Loehnagar; and on the southern by a ridge, presenting a similar declivity, with a deep gap about the middle, and some precipices toward the lower end. The water of the lake is dark, though clear, and is said to contain abundance of small common trout, with some of considerable size, but none of the migratory species, they being prevented from ascending by a fall on the Muie some miles farther down the valley. On both sides of the lake, chiefly in crevices and by rills, grow several specimens of trees: the Birch, the Alder, the Aspen, the Rowan, and some Willows, especially *Salix aurita*

and *S. caprea*. As might be expected, *Saxifraga aizoides*, *S. stellaris*, *S. hypnoides*, *Alchemilla alpina*, and a few other alpine plants are to be met with, especially along the southern side. The lower end of the lake is less interesting, its shores being flat. From them extends a nearly level, moory strath, with granite hills on both sides, and entirely destitute of wood.

From the loch, the valley extends eastward about three miles, until the hills that bound it approximate so as to form a kind of craggy pass, where the stream descends a slanting rock in two currents, forming a cascade about forty feet high. It is a very pretty fall, at the bottom of which a deep, eddying pool is formed, with a rocky wall on the southern side, bearing on its shelves and in its recesses several trees and a variety of such plants as are common in like places in the glens that open upon the Dee. In the rocky part of this narrowing of the glen, which divides it into two portions, the upper and the lower, there is some native wood of the common kind: Birch, Poplar, and Alder chiefly: but a plantation of Larches, which have now attained some size, has been intended to add sylvan beauty to the cascade, though a mixture of native trees would have been more ornamental and appropriate. The rock here is hornblende-slate, which, being in some parts laminated and intersected by quartz, might be mistaken for gneiss. It is composed of grayish-black hornblende, in small, imperfect crystals, intermixed with white quartz, and sometimes scales of black mica. Laminæ and veins of white crystalline quartz intersect it, and frequently small crystals of iron pyrites are seen

in it. Here, as in other cascades in the district, the water has effected very little change on its rocky channel; but, after filling the pool beneath, it has, on emerging, worn the rocks smooth in some places.

A rounded hill of considerable size, and of the same geological structure, rises on the southern side of the fissure in which the stream flows. It is, as it were, a projection from the long broad range extending from the southern side of Loeh Muie to the mouth of the plain of Ballater, and separating Glen Muie from Glen Tannar. This range declines very gently towards the Muie, forming low broad ridges, with hollows containing small brooks, and some low prominences. It is comparatively smooth, being little encumbered with blocks, and presenting only a few craggy places, where the rock may be seen *in situ*. In all those examined, however, the same kind of hornblende rock was found. Toward the lower part of the valley, is a rather large but low hill, craggy along the side next the hill-range, and on its southern part, where there is fine pasture, while over the rest of its extent it is covered with Birch. It also is of hornblende-rock, very seldom slaty, although generally breaking under the hammer more readily in one direction than another, often almost entirely composed of imperfect crystals of hornblende, sometimes considerably intermixed with quartz, rarely with felspar. A long curved depression or hollow, intervening between this hill and the declivity of the hill-range, and extending upwards of half a mile, presents a large surface of hornblende, strewn with blocks of the same. Here and there, but at long intervals, on

the hill-sides, and upon their summits, are little escarpments fissured, and surrounded with large blocks. There the rock is generally so solid or massive as to resemble trap; but, in every instance, I have found it more or less laminated. Braichley Burn may be considered as the boundary of Glen Muic in this direction. A little beyond it, the hornblende-slate ceases, and granite succeeds.

On the left side of the glen, there is more variety, both in the geographical configuration of the ground, and in its geological structure. The granite continues from Lochnagar to the low transverse little ridge, separated by a little valley from the serpentine of Coial. Looking into the valley from the road in Glen Muic, you see three stunted trees on a bare hill-side, of which the rocks and detritus seem as if burnt by volcanic heat. From this place a picturesque range of hills passes northward to near the mouth of the glen, when it sends off a continuation to the north-west, ending at the mouth of Glen Girnac, and another to the north-east, forming the hill, or Craig of Knock. The western side of the narrow pass which separates the upper from the lower portions of Glen Muic, is partly craggy, and of the same hornblende slate as its eastern side. The steep slope at the base of the serpentine range, which commences there, is so covered with detritus and herbage, that its geological nature cannot be everywhere seen; but at its upper part, broken and confused strata of mica-slate and gneiss are met with. The serpentine mass, which forms the highest part of the hill-range, is continued about two miles, forming several nearly bare

peaks, and on the ridge is succeeded by hornblende-slate, intermixed with mica-slate. Its eastern declivity also presents prominences of serpentine, and is profusely strewn with blocks of the same, which in the hillocks extending from Birk Hall to Tom-fuar, cover or are mixed with the dislocated hornblende strata. Two dykes of porphyry project below Glac-Aiten, one of them crossing the summit of Craig-lia.

At the mouth of the valley is a diluvial flat space, which would be continuous with the plain of Ballater, were the river to have kept along the base of Craigan-darroeh, instead of sweeping across in a curve to the base of the eastern hills.

Glen Muic is thus, as already stated, naturally divided into two portions by the contraction, or pass, at the Linn. The upper is altogether granitic, bare, and scarcely inhabited, there being only two farm-houses in it. The lower portion, about five miles in length, expanded, and composed of hornblende and serpentine, is more or less wooded throughout, presenting thickets of Birch, and other native trees, as well as extensive plantations of Pine and Larch, intermixed with cultivated fields and pastures. Numerous farm-steadings indicate a considerable population, said to possess sufficient means of supplying the wants of life. The plantations on the western side of the valley are thriving, and many trees about Birk Hall have attained a considerable size.

The vegetation of Glen Muic, though various, as it includes nearly all the alpine plants found in the neighbouring tracts, does not differ from that of the other valleys already described. The upper part and

the eastern side of the lower are heathy ; but the influence of the serpentine rock on the western side of its lower part is conspicuous in the grassy verdure with which its summits and a great portion of its sides are invested.

There now remains only to be examined the Valley of Ballater, or more properly, of Tullich.

CHAPTER XXXI.



VALLEY OF BALLATER, AND ITS HILL-RANGES.—EXCURSION TO THE BRAES OF CROMAR.

THE alluvial plain on which the village of Ballater is placed, commences at the mouth of Glen Muie, with which it is continuous, both geologically and geographically, although the Dec, cutting through the effused detritus, separates it into two portions. From the curve of that river, the plain, about a mile in breadth, gradually but irregularly contracts, as it extends in a north-easterly direction, and at the distance of about five miles, curving eastward, terminates a little beyond Camus-o-may, where the hills on both sides approach so as to leave only a narrow passage for the river, which then passes eastward, with hilly ground on its southern, and a level alluvial moor on its northern side. This plain is formed of rolled stones of granite, felspar-porphry, micaceous quartz, hornblende, and quartz, together with gravel and sand, very little clayey matter being intermixed. At its upper part, the river, having extensively shifted its course, has left wide and shallow grooves, many feet below the general level, which, however, is far from being uniform, long ridges being

raised along the bases of the hills, especially toward the lower part, and a large rounded mound occupying a considerable space about the middle of its length. It is bounded by hill-ranges of considerable height.

Along its south-eastern side rise two steep hills, covered with planted Pine, but also bearing toward their base a considerable quantity of Birch. These hills, rather imposing when viewed from the plain, are only the faces of a portion of the hill-range forming the eastern boundary of Glen Muic, upon which they are continuously applied, forming, as it were, a facing of granite. The junction of the hornblende strata with the granite is seen by ascending to the upper part of the wood, near Braichley Burn. The strata there have various directions, generally from east and west to north-east and south-west, and various degrees of inclination, being sometimes vertical, or inclined to south-east. In one place there are strata of limestone, nearly vertical; and in several places, irregular veins of granite are seen running a short way among the strata. Frequently, the hornblende strata are undulated or tortuous. Above the hollow or slight valley which separates these two hills, and in which flows a little brook, called the Burn of Dalmochie, the junction of the granite with the hornblende strata is well seen. The strata there are variously inclined, but do not otherwise present indications of disturbance. The summit of the ridge is still of hornblende, but a little north-eastward of it the prominences are granitic.

In the hollow of the Burn of Dalmochie is a remarkable mural escarpment of the granite, which exactly resembles

the crags of Loehnagar and other projecting parts of the granite mountains, in being shattered and fissured into polygonal fragments, having the semblance of Cyclopean walls. The true nature of the fissures of these projections is, I think, rendered very obvious by this mass, which, so far from occupying a prominence, rises from a hollow. They are the result of concussions, and have subsequently been widened by disintegration, but do not necessarily indicate that granite has a structure of this kind.

On the second hill is the precipice, which I have already described; and on a broad ridge or declivity slanting northward from it, are the celebrated chalybeate Wells of Pananich, with the buildings for the accommodation of invalids, who resort to them for the cure of serofulous and other diseases. These wells, of which there are several, are said to differ in the proportions of their ingredients. They are rather more than two miles distant from Ballater, and opposite to the village of Tullieh, on the other side of the plain.

From the summit of the Pananich Hills there runs down, more to the eastward, a long broad ridge of granite, gradually lowering, and reaching the mouth of the valley. The slope included between this ridge and the declivity at Pananich is uneven, and along its base covered with ranges and heaps of alluvium, some of which, worn away by the river, present steep banks from ten to thirty feet in height.

All this hill-range, then, which is a continuation of that of Glen Muic, is composed of coarse granite, of the same nature as that forming the range that bounds

the valley on the opposite side, and now to be described.

Along the base of Morven, on its eastern and southern sides, is a large hollow, partly peaty, but to a great



extent bearing good pasturage. From it the ground rises irregularly into a range of hills, of moderate elevation, traversed by three deep grooves, and attaining its greatest height between the mountain and Loch Candor. This range, named in a general sense Culblean, is mostly of coarse granite, composed of reddish felspar, hyaline, or dusky quartz, and a very small proportion of mica. As it proceeds south-westward, it becomes lower, and presents to the plain of Ballater a rocky face, interrupted by ravines, and terminating in Craigandarroch.

That massive and rounded prominence, which rises to the west of the village, has already been described, and, being a conspicuous beacon, has frequently been mentioned. It is separated from the next hill by a deep

cleft, forming the Pass of Tullich, or of Ballater, the south side of which is to a small extent precipitous above, and presents a large slope of blocks, while the other side exhibits massive rocks, fissured and rent, with a vast collection of blocks at their base. This second hill, lower at its commencement, but gradually rising, and covered with wood on its whole steep declivity, is prolonged to the village of Tullich. On the brow of this hill there is a conspicuous broad streak of a lighter red than is presented by the other detritus. It is seen from a great distance, and would at once be taken as indicating a mass of porphyry; but the rock there I found to be only a little redder than the other granite of the hill. Near this, however, is a large vein of quartz, thirty feet in breadth, proceeding right up the face of the hill, but soon concealed by the detritus. One scarcely perceives it from the distance of a quarter of a mile or so; but it is very obvious from the Hills of Pananich, on the other side. It is profusely covered with Lichens of great beauty. *Lecanora tartarea*, in particular, was uncommonly fine, with apothecia of various forms and sizes, some of them more than a third of an inch across. Another narrow valley, with a road in it leading to the peat moor at the base of Morven, separates Cranach from the more elevated and extended mass of Culblean proper. On this hill there is a conspicuous fissure, at a considerable elevation, which is worthy of being visited. It is named Scor-an-fhidhich, "the Raven's Fissure." I found it partly filled with blocks, and having on its northern side a precipice of no great height, on which grew three trees, two of them Aspens (*Populus tremula*),

the other a species I had not previously met with in this part of the country, the Holly (*Ilex Aquifolium*). The rock was split, as usual in such places, with longitudinal and transverse fissures, and presented a fine obelisk-like mass of great size. Abundance of Lichens covered the crags and blocks. The large hill, or mountain, in which the fissure presents itself, is of an irregular lumpy form, and entirely composed of coarse granite.

From the Bridge of Tullich one has an extensive view of the valley, and especially of the Pananich Hills, with the abrupt rock on their side. It being expedient, in speaking of places, to name them, I inquired first of a herdboyc, and then of a woman at Tullich, respecting the hills and rocks on both sides of the valley, but without obtaining any other answer than a confession of utter ignorance. The miller, however, knew some of them. The Highlanders are full of local knowledge, and can readily name every hill, rock, knoll, river, rill, and pool; but the people of the Lowlands, even when Celtic, as they generally are, cease to form acquaintance with natural objects, and their descriptive powers are most miserable. Beyond Scor-an-fhidhich the mountain is separated, by a broad irregular hollow, from a hill more to the eastward, also of granite, and which terminates the valley of Ballater.

Here we may pause and look back and around us. The valley has gradually narrowed, until, at its mouth, the declivities of the hills form the banks of the river. Its floor is nearly level, from its commencement at the bend of the river beyond Ballater. It consists of stones

rounded by the waters, with a thin coating of sandy soil, yielding tolerable crops. At Tullieh, and farther down, some prominences energe upon it, and at its sides are long ranges of banks formed of stones and sand, as if the primeval floods, in rushing through the narrow pass eastward, had thrown the rubbish high on either side. There is nothing in the least accordant with glacial action, for the stones, even the obdurate hornblendes and porphyries, are all rounded and current-worn, and were never dropped into their present places from meeting ice-masses. A portion of the current swept over the low ground between the mountain and the hill mentioned, and left a multitude of small heaps of stones and gravel, which continue until we come to the plain beyond, when the detritus becomes diffused.

Passing down the valley along the course of the river, we observe that three successive terraces present themselves on its left bank; the first, or lowest, about five feet above the present ordinary level of the stream: the second about ten feet higher, its slope wooded with Alder, Birch, and other trees: the third, rising about twenty feet above the second, and having its sides covered with tall Birches. On the other side, the arrangement of the detritus is not so regular.

But, instead of passing out of the valley along with the stream, let us return to the hills, and direct our course by a "short cut" from Ballater to Logie Coldstone. Here we cross the commencement of the fissure, in which flows the Burn of the Vat, already described. On the plain beyond, at the distance of about a mile, is seen Loch Cannor; and on surmounting an eminence,

and descending to the road, we come to a smaller lake or reedy pool, called Loch Dava.

Here, seeing a man repairing the highway, I accosted him, and we sat down and talked awhile. A hill, apparently five or six miles distant, with a cairn on its summit, he said was named Molloch, after a general of the Danes, who was slain and buried there in the time of Malcolm Canmor, who resided in a castle built on a little island in Loch Ceannor. The Danes, having invaded the country, advanced as far as the moor before us, to give battle to the Scots. The King had sent in haste to the lords and chief men of the district around, for all the aid they could afford. On the morning of the day of battle twelve men only arrived. He dismissed them in anger. The Danish general superintended the arrangement of the fight from the top of the hill, where he remained while the conflict proceeded. Meanwhile, the twelve discarded men made a great circuit, and ascending the further or eastern side of the hill, came upon the poor fellow, when no one was near him, all his people having been sent off with orders, and killed him outright. The Danes were, of course, routed. The general was buried where he fell, and a cairn was raised over him. Other cairns still point out the place of the battle, and a brook in the neighbourhood is, from that day to this, called "the Bleedy Burn." So far my informant, whose edition of the tradition I have faithfully given, though without attempting his dialectic phraseology.

Passing by the road through a wood, in which numerous beautiful Dragon-flies, apparently *Æshna*

varia, were hawking for insects, I diverged by a path in the proper direction, and passing a peat marsh, found myself near the manse on a dry moor, in an airy situation. At the base of the seeming range of low hills bounding the plain I betook myself to a brook, which promised to disclose the nature of the rock composing the hill. It was of red granite, small-grained, and very different from the coarse variety to the eastward. But seeing the declivity at the base of Morven covered in part with grayish-blue detritus, and so much more verdant than the other slopes as to indicate a different formation, I proceeded about half-a-mile to the next brook, which flowed in a deeper groove. In it, at some height up the hill, the crags were found *in situ*. They were all of hornblende rock, as were the stones along the sides of the hill, over which winds a peat-road, to the hollow between Morven and Culblean. I had before found all the upper part of Morven to be composed of hornblende slate, and the discovery of this continuation of the same formation down the Braes of Cromar to the plain seemed to me as great a feat as if I had found a rare *Carex* in a new station in the Corry of Cairn Toul.

CHAPTER XXXII.

THE MOOR AND THE LOCH.

THE Braes of Cromar are situated on the verge of the Highlands of Aberdeenshire. From Morven, a low ridge extends northward, separating Strath Don from Logie Coldstone and Cromar, and then curves eastward, rising into a mountain of considerable size beyond Tarland. A semicircle is completed by a range of hill ground, extending eastward about two miles from Morven to near the Burn of the Vat. The range of hill ground thus formed bounds a tract remarkably level in a great portion of its extent, in part undulated, or covered with low eminences. This plain consists of detritus, mostly reduced to the state of gravel, sometimes of fine sand, elsewhere full of rolled stones, occasionally intermixed with a good deal of clay, and even in its lower parts having layers of that substance imposed upon the gravel. The soil which covers it is very thin, often merely a slight mixture of vegetable matter; but in the swampy hollows, peat, in which are often remains of trees. When this land is trenched and drained, it yields very good crops of oats, barley, potatoes, and turnips; and the farmers and crofters are described to me as being very

comfortable, as well as, on the whole, a moral and respectable set of people. There is a considerable portion of the plain under cultivation, not a little underwood, and a great deal waste—that is, in its natural, unimproved state.*

Next to waterfalls and hill-tops, mineral springs are great objects of regard to most people. So I was conducted to one having a Celtic name, Polldubh—"the Black Puddle"—chalybeate, as usual, and in great repute.

A moor, in the Scottish acceptance, is not a morass or swamp; nor is it necessarily formed of wet ground; it may be quite dry, insomuch that, after a week or so of sunshine, you may traverse it without moistening your shoes. It may be high or low, a range of hills, or a level plain. It is essentially a tract of land having a peaty soil, covered with heather, affording food and shelter to red grouse. But among the heather grow many plants, as eariees, rushes, grasses, and others, a list of which would be as long as the roll of a regiment.

The Braes of Cromar are in part a moor; and continuous with them, skirting the base of the granitic hills, and extending for four or five miles southward to the Dee, and six or eight miles eastward to Molloch

* The above description refers to what is called the "Braes of Cromar." The valley of Cromar, which includes the greater part of the parishes of Tarland, Coldstone, and Coul, is in the form of a Crescent or Horse-shoe, hence its name,—Cro being the Gaelic name for Horse-shoe. There is clear and decisive evidence that the valley, at some remote period, has formed an immense lake, the remains of which has only of late years been drained by the Earl of Aberdeen, the principal proprietor. The whole basin is of rich alluvial soil, yielding, under tolerable management, abundant crops. The hills forming the boundaries of the valley are chiefly gneiss and granitic.—DR. ROBERTSON.

Hill, and a group of eminences in its vicinity, is a tract of moorland, which, in some future age, will probably be a well-cultivated and fertile plain, on which there will be more human beings than would outnumber the grouse and wild-ducks with which it is at present stocked. Craggy prominences of partially disintegrated granite, crusted with lichens, and often topped with mosses, project among peaty soil, covering angular gravel, and nourishing luxuriant tufts of *Calluna vulgaris*. Heaps of detritus, which, on being cut into, present masses of rolled stones, chiefly of granite, felspar, porphyry, hornblende, and other rocks, and of various sizes and shapes, present themselves along the margin of the craggy ground. They have scarcely any soil distinct from their mass, but yet bear a continuous crop of Heather, mixed with tufts of *Erica cinerea*, patches of *Arctostaphylos Uva-ursi*, sometimes also *Vaccinium Vitis-idaea*. Between them are low spots, swampy and peaty, their black soil, often several feet deep, here and there bare, but mostly covered with *Carices*, *Eriophora*, *Drosera rotundifolia*, *Narthecium ossifragum*, and *Sphagna*. Tufts of peat project, bearing thickets of *Myrica Gale*, which also extend along the sides of the swamp. *Menyanthes trifoliata* and *Comarum palustre* are also often plentiful.

There, a more extended swampy space discloses its beauties: *Erica tetralix* (Heath), *Eriophorum angustifolium* (Common Cotton Grass), and many plants, none of them unknown to science, which has often traversed such places without either stilts or snow-shoes, are to be seen. Here and there are deep holes filled with

water. Your stiek—if you have one—will find no bottom in them; but you will see floating in this brown water, which is simply an infusion of peat, *Potamogeton natans*, *Myriophyllum spicatum*, *Sparganium natans*, and *Scirpus fluitans*. In more shallow pits are various species of Rushes and Sedges, *Utricularia minor*, and abundance of *Comarum palustre*. Elevated tufts of the peat bear Heather and Bog-myrtle, with some *Gramineæ* and *Cyperaceæ*. You may sometimes leap from one to the other. Holes have been cut, circular or elongated, and the peat removed from them has been dried and mostly carried away. The best peat is that taken from places having a sward of some kind; but there are swamps on this moor, where the brown peat forms the soil and subsoil, crumbled and eropless.

At length we reach a heap of gravel, densely coated with Heather, and continuous with it a tract of dry moor; having traversed which, we come to the swampy margin of Loch Dava—or Daway—a small sheet of water, shallow, and producing fine crops of *Carex ampullacea*, *Equisetum fluviatile*, *Scirpus lacustris* (Bull Rush), and *Phragmites communis* (Common Reed), over a great part of its extent. Toward the eastern end, however, it is deep and free of plants. *Nymphæa alba* and *Nuphar lutea* (White and Yellow Water Lilies), are in some places abundant, and *Lobelia Dortmanna* grows stragglingly along the southern shore. Large flocks of ducks, all of one species—*Anas Boschas*—are seen; and here and there a Water-hen is met with. Earlier in the season, Redshanks and Lapwings

have bred here; but now, none of them are to be seen. Traversing a long tract of meadow and swamp, we observed many old acquaintances among the vegetation; but nothing to excite our rapture, or even divert our attention, until, peering into a pool, we observe a very beautiful fish, about six inches long, elegantly formed, barred and mottled with green and brown on the back, and remarkably vigorous in its movements. By the oblong, rounded, and depressed snout, we recognise the Pike. Mr. Stewart and others had already informed me that Pike, Perch, and Eel are plentiful in this loch.

Traversing a space alternately dry and wet, mostly covered with heather, we come to Loch Ceannor, about two miles in length, beautifully fringed with Birches on its northern and eastern sides, having also a few trees, one of them a stunted Pine, on its western side, which is flat and swampy. From the elevated ground on its northern side project some peninsulas; at about the middle of its length is some cultivated land, with a farm-house; its eastern extremity runs out into several creeks, all having their margin wooded. It is ornamented with two islands, one of them of a roundish form, convex, raised apparently about fifteen feet out of the water, covered with luxuriant green grass, and having along its stony margins several stunted and bushy trees. This is Malcolm Canmor's island, about an acre in extent; said to be artificial, but seeming a natural heap of detritus. It is reported that a castle once stood upon it, which was occasionally used by his ancient majesty of the big head on his hunting expeditions.

At a considerable distance eastward from it is the other island, much smaller, less elevated, and covered with bushes.* Here, according to tradition, Maleolm's prisoners were kept. The lake is shallow in the greater part of its extent. *Phragmites vulgaris*, *Carex ampullacea*, *Equisetum limosum*, *Nymphæa alba*, *Nuphar lutea*, and *Lobelia Dortmanna* grow plentifully at its western end; *Isoetes lacustris*, in its shallower parts; and along its margin, *Radiola millegrana*. It is said to contain Trout, Pike, and Eel in abundance. Some Sticklebacks and the first Shads seen for many a day occurred in a pool at its southern side.

A little to the south of this lake is an eminence covered for the most part with Birch trees; and thence spreads out a large plain, coated with Heather, and presenting few boggy places or pools. Toward the river it is wooded, and across it passes the Burn of Dinnat, which is formed of the streams from Loch Dava and Loch Ceannor.

Red Grouse are plentiful over a great part of the ground which I have just traversed, and on it are to be met with most of the other birds of the surrounding tracts.

In winter, large flocks of Geese, it is said, frequent the lochs; but as three or four species are confounded under the name of Wild Geese, one cannot say, without seeing them, which of them it is that occurs, or whether

* That this island is artificial is beyond doubt. The black oak piles in concentric circles are distinctly visible, rising to a point. Within the circles of piles, the stones and debris of various kinds have been thrown to form the mass, whilst the piles have kept it from being worked away by the agitation of the water.—DR. ROBERTSON.

they may not all be met with. The Coot also breeds on Loch Ceannor, as does the Water-hen. *Anas Boschas* (Wild Duck) is abundant at all seasons, and *Querquedula Crecca* (Common Teal) is not very rare.

The varieties of granite seen among the blocks are numerous; but all of them have the felspar red. Birches and Oaks, with Pines on the other side of the river, Roses and a few Brambles, respecting which nothing needs be said at present, served to amuse the wanderer, as he retraced his steps from Camus-o-may to the Metropolis.

CHAPTER XXXIII.

JOURNEY HOMEWARD.—GLEN TANAR.—MONA-CHUIMHUE.

ON Wednesday, the 18th of September, my two amiable and well-beloved friends, whose gentle attentions had rendered my abode in Ballater very pleasant, left me for Aberdeen. My geological and botanical collections, which they had assisted in numbering and packing, had partly been sent off by the carrier on Monday. Note-book, hammer, and umbrella only remained. Assuming these, I crossed the river once more by the bridge, and commenced my homeward journey by ascending the eastern hill-range to its summit. In this course I made a final inspection of the Clashes, in order to satisfy myself respecting the nature of the rock exposed there, and re-examined the crags projecting in several places from the otherwise smooth side of the Craig-o'-the-Kyloeh. One escarpment, in particular, in a line with the farm-house of Braichley, and the Church of Ballater, was fissured into large masses in such a manner as greatly to resemble trap. Farther on, the hill-side was covered with rounded granite stones; but still the rock, in the few places in which it appeared, was hornblende. At the top of the wood, however, where the junction of

the granite with the stratified rock is seen, the hornblende mostly disappears, and irregular beds of quartzose mica-slate occurred.

When opposite Tullich, I cast a last glance over the mountains and valleys. Lochnagar, partially shrouded in grey vapour, Connachraig, Coial, Craig-ghi-nais, Geallaig, Glen Muic, Glen Girnac, the narrow valley of the Dee, and Glen-Gairn! Many very pleasant hours have I passed among your friendly crags and moors. So fare-ye-well. May they who dwell among you be happy, and may the foot of no foe ever trample on your heather.

Now, eastward, over the granite prominences, and adown the long broad ridge, scantily covered here and there with peaty soil, and nearly destitute of vegetation. The rock is very coarse grained, exactly resembling that of a great part of the opposite mountain of Culblean. On its eastern side runs a long range of low precipices, from the base of which the declivity passes rapidly to the bottom of the valley, which is bounded on the other side by gentle slopes, and drained by a small stream, which I soon reached.

Passing by the farm-steadings, I followed the course of the stream, along which were very beautiful thickets and woods of Birch, Oak, Hazel, Alder, and Bird-cherry. Here I met with some ripe fruits of *Rubus corylifolius*. Those of *R. fruticosus* (common Blackberry) were not yet matured. These plants attracted notice because I had searched in vain for them in Braemar, Crathic, Glen-Gairn, and Glen Muic. Numberless rose-bushes were covered with carmine, scarlet, and brown heps.

Rosa canina, *R. tomentosa*, and *R. spinosissima*, were the species seen.

There is a considerable extent of wood here for several miles, almost all natural. The Moor of Dinnat on the opposite side is seen extending far eastward. A small wooded hill, with crags at its summit, rises in the midst of it. The section made by the Dee, as it undermines the banks, appeared in some places to be from twenty to forty feet high. It presented three distinct layers: the lower of rounded granite stones, the upper of stones of various kinds, the intermediate, much larger than the others, of clay mixed with comminuted fragments of rock.

Although the aspect of the country is changed, you can hardly yet believe that you have left the Highlands. For my part, I am persuaded that I have not; and I give far more credit to the ancient Celts as physical-geographers, than to the modern generation, who have confounded everything together, and made parishes out of the most discordant materials. The extent of the parishes of Deeside are, in fact, disgraceful, as any one may see even on a small county-map, much more when he traverses them. Braemar evidently extends continuously from the upper limits of the county to the entrance of the valley of Ballater, and thence along the south side of the Dee to the Feugh, agreeably to the ancient division of the county.

To the south of the Dee, all along this tract, ranges of hills descend from the border of Forfarshire, leaving between them branching valleys, the main streams of which have a very oblique course with reference to the

river, and flow from south-west to north-east. Most of the hills have their bases covered with Birch and other trees, especially along the Dee. Those between the Pananich ridge and the mouth of Glen Tanar are chiefly of hornblende slate. Opposite the first houses on Dinnat Moor is a quarry of good limestone, by a brook, running in a narrow crack of the slate, of which the strata incline to the north, and occupy part of the bed of the river, as well as a portion of the opposite bank. At the bridge over the Tanar, the strata incline to the south; but the stratification there is indistinct.

Glen Tanar, which I visited in 1843, commences at Mount Keen, which is about eight miles east from Lochnagar, and is separated from Glen Muie and the Valley of Ballater by a range of hills, already described, becoming broader as it proceeds north-eastward, and separating into two ridges, one of which forms the Pananich Hills, while the other slants away eastward, running in part nearly parallel to the Dee. Several ranges intervene between the western bounding range, and that separating Glen Tanar from the sources of the Feugh, the glens which they form converging toward the Tanar, and pouring their brooks, the Gairney and the Allaehy, into it, below the middle of its course. All these ranges are of granite. There is little cultivated land in this traet; but a great extent of wood, both natural and planted. It was once celebrated for its forests of native pine; but these have been mostly cut down, and the trees floated to Aberdeen, or employed for various purposes. The glory of Glen Tanar was its woods, for otherwise it is not of remarkable interest, the

hills not being of great elevation, nor the streams of much beauty. The Tanar, properly so called, flows in a narrow valley, extensively wooded at its lower part, but toward its upper portion bare and stony.

On the 7th September, I crossed obliquely the western hill-range, and descended by an extremely steep declivity, covered with stones, into the narrow valley of Corryvrac—Coire-bhreach, at the upper end of Glen Tanar. The bottom of the slope was profusely covered with *Juniperus communis*, *Vaccinium Vitis-idaea*, and *Arctostaphylos Uva-ursi* (Bear's Whortleberry). Several Ring-ouzels (*Turdus torquatus*) were seen, scattered along the declivity, and apparently feeding on the berries.

Monadh-chuimhuc—Mona-chween—commonly called Month-keen, sometimes Mount-keen, or Mont-keen, by the barbarians, Goths, and others, who mangle the purest and most beautiful of languages, is a granitic hill, remarkable for its conical form, and attaining a height of about 3100 feet. Geographically it is at the head of Glen Tanar; but the parish-makers have placed it partly in Glen Muic and partly in Loch Lee. A road leads over its western shoulder, which is continuous with the somewhat table-shaped elevated land that extends to Loch Muic. On its northern side, it presents a corry, named Corlach, in which one might expect some alpine plants, but which I found to present nothing of any interest, there being no rocks of any extent in it, nor any permanent rills of any size, but merely a layer of detritus, destitute of vegetation at the upper part, and at the lower covered with Heather and other common plants. The only alpine species met with were *Luzula*

spicata, *Gnaphalium supinum*, *Alchemilla alpina*, *Saxifraga stellaris*, and *Carex rigida*. The cone above this is very steep, mostly covered with stones on the eastern and northern sides, less so on the others, and has at its summit two protuberances of the granite in the form of ruins, on the highest of which is a cairn. Having attained the summit in due time, we sat there a few minutes. The view from it is very extensive. The grandest portion of the scene lay to the west and north; but the sun was so bright, and cast shadows so dark on the hills, that we were unable to see them distinctly. On the summit we found only *Luzula spicata* and *Carex rigida*, with a few common grasses. We descended by the eastern side, then along the edge of the corry, and, being in haste, ran down the rest of the hill at such a rate, that some of the people



below having observed us, all the natives came out, children shouting, and dogs barking, to enjoy the sight.

From Monadh-chuimhue and Coire-bhreac descend the rill-sources of the water of Tanar. The mountains are all of granite, and liberally coated with stones of the same. For six miles or so, down the valley, no wood was to be seen. But below this, and onward to the bridge, there is still plenty, most of it planted. A little beyond the mouth of the Tanar, we come to the Bridge of Aboyne.

Suspension bridges are detestable—frail, rickety, trembling under the weight of an ox, and shivering as if they would go to pieces when a coach rattles along them. Persons travelling in carriages, or driving waggons or carts, also droves of cattle, are requested to move slowly and gently—cannily—such, or such like are the notices affixed to them. Here is one, “erected by George Earl of Aboyne, 1830”—“the great flood” having swept away a previously-erected bridge of the same kind, and played many other unpleasant pranks, now beginning to be forgotten.

All to the east of this is Birse.

CHAPTER XXXIV.

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CROMAR.—THE CHASE.—KINCARDINE.

THERE are no straight routes in physical geography, I am now on the north side of the Dee, on a rather tame range of granite hills, in the parish of Coull, whence we can see a good way around. Braemar has been defined. Cromar is before us. From the middle of Glen-Gairn straight eastward to Morven, which is the most conspicuous object in view, is a ridge, neither mathematical nor geometrical, but irregular, unequal, winding this way and that, which separates that valley, or, “quoad sacra,” Glen Muic, from Strath Don. A brook passing a short way north-eastward from Morven separates Strath Don from Logie Coldstone, and a ridge commencing at Morven, and then running eastward about ten miles to nearly opposite Kincardine O’Neal, encloses between it and the Dee, the greater part of the parish last mentioned; the parishes of Tarland, Coull, and Lumphanan, and a portion of Aboyne, the next and greater part of which is south of the Dee, and includes most of Glen Tanar. We have here then a large extent of lowland, not exactly a plain, for it presents numerous hills, none of them, however, rising to a considerable height.

All these hills are of granite, some of them traversed by dykes of red felspar porphyry. The low grounds are alluvial, and present in the sections that have been made in cutting drains, layers of gravel, clay and sand. In the western part of Logie Coldstone are several curious hilloeks of fine sand, which must have been formed when the whole basin was under water, as it evidently has been. It is traversed by brooks coming from the Braes of Cromar, which unite to form a sluggish brook, passing southward by Loeh Dava, and after receiving the tribute of Loeh Ceannor, entering the Dee at the Burn of Dinnat, which borders the portion of Aboyne parish north of the Dee.

The parish of Tarland, having a high hill in its northern part, but a low traet in the southern, where the soil is fertile, is traversed by a brook which, coming mostly from the so-called parish of Migvy to the west, flows south-eastward by the low ground of the parish of Coull, and enters the Dee to the east of Aboyne.

Yesterday evening, having crossed the Dee, I walked about three miles northward from Aboyne to the manse of Coull, where I found the newly appointed incumbent, Mr. Leslie, endeavouring to put things in order. Coull is of small extent, partly a plain, continuous with that of Tarland, bounded on the south-west by a granite hill, and eastward by a range, also composed of granite, and usually called the Hills of Coull. The ditches recently cut in the low ground show a thick deposit of alluvium, consisting of a layer of blue clay, covered by gravel, and lying upon a mixture of gravel and rolled stones.

On the upper part of the Coull Hills we observe, in various places, ancient fields and ridges, bearing marks of cultivation nearly obliterated by the growth of herbage and Heather. When the country was covered with forest, the higher grounds generally or comparatively free of wood, were alone capable of being cultivated without a degree of labour which would have seemed excessive. Thus, in almost all parts of the lower tracts of Aberdeenshire, we find traces of the rude husbandry of forgotten ages chiefly on eminences. The granite in these hills is various, mostly large-grained, with red felspar, hyaline quartz, and very little mica. Several masses and dykes of red porphyry are met with.

Passing over into Lumphanan, I directed my course towards Kincardine. When about a mile beyond the Loch of Achlossan, I had my attention attracted by the cries of a Lark, which I saw pursued by a Hawk. It strove incessantly to keep above its enemy, which equally endeavoured to gain the ascendancy, and sometimes succeeded. Numerous were the attempts the Hawk made to seize the little bird, which, with wonderful agility, always evaded it by turning aside and shooting abruptly upwards. A single false movement would have been fatal. The Hawk, unable to turn so quickly as the Lark, endeavoured to seize it from one side, then from the other, sometimes from beneath, and now and then from above. Whenever it attempted to ascend, the Lark strove to outdo it, and frequently succeeded. It seemed as if the Lark could not venture to shoot off, for it always kept close to the Hawk. The chase continued about fifteen minutes, attempts at seizure being made at

very short intervals all that time. Sometimes the Hawk, shooting down obliquely, the Lark however evading it, could not overcome the impetus given in time to have another clutch, but wheeled off to some distance. At length the Lark appeared almost exhausted, and seemed drawing near the end of its career. Unable to rise above its enemy, and coming nearer and nearer to the ground, it tried a rapid descent, but was instantly overtaken, and repeatedly pounced at. The birds were now for a while quite close to each other, and several very quick movements were made by the Hawk, and dexterously avoided by the Lark. They were gradually descending, when the Lark suddenly sped away towards a farm-steading about five hundred yards distant. The Hawk pursued, and both passed so near to me, as I leaned against a wall, that the grayish-blue tint of the dorsal plumage, and the black moustaches of the pursuer were distinctly visible. Rapidly shooting in between the corn-stacks, the Lark was as rapidly followed. In a little while both birds reappeared, flew round the house, and amongst the trees in the garden, then again shot in between the stacks, darted back among the trees, rose high above them, and then sped away to this side and that, the Lark all the while emitting at short intervals a low chirp, the Hawk silent. At length, the Lark suddenly dropped down among the trees and into the bushes, but so did the Hawk. It was all over I thought; but no—when the Hawk reappeared, he had nothing in his talons. He flew slowly along one side of the garden wall, then along the other, shot in among the trees, then among the stacks, flew round the house, searched the trees once

more ; but not finding what he looked for, flew off to a small tree by the road, and alighted on it.

I have seen a more protracted chase, but none so interesting. It was evident that the Lark could turn more abruptly than the Hawk, and had equal speed in a direct flight. Probably, however, it had not equal endurance, and it seemed to know that if its enemy could come down upon it, all would be lost. In an open space, at least over water, the Hawk must at length have secured it. The shelter of trees or bushes would not have availed the Lark, had its pursuer been a Sparrowhawk, which, however, could not have turned so quickly in the air. It seems surprising, after all, that there should be so little difference in the speed of two birds, one intended to capture and feed upon the other.

I was now on a regular turnpike road, in a low tract, and feeling that the spirit and buoyancy with which I traversed the hills and glens had subsided, I got on rather heavily. The burn that issues from the Loch of Achlossan passes southward, and enters a groove or rent, having a wooded hill on the east side. It is called the Burn of Dess, and about half-a-mile from its entrance into the Dee, forms a fall of considerable beauty. Craggy rocks of gneiss rise on both sides ; the bed of the stream between them is of granite, and, on the western side, a vein of red porphyry is seen in the steep bank. Below the fall, which is fifteen feet high, is a large recess in the hill, bounded by gneiss crags. This place is called the Sloc of Dess—slochd, signifying a pit. The Burn of Dess bounds the parishes of Aboyne and Kincardine O'Neal.

Although on the northern side of the Dee, the scenery is uninteresting, there are seen, on the other side, the hill-ranges of the parish of Birse, extending from a craggy granite hill opposite Aboyne, to Peter Hill beyond the bridge of Potareh. Between the mouth of the Dess and Kineardine, the walk is very pleasing; there being on the left side of the river a wooded hill and high alluvial banks; on the other side a somewhat conical hill of gneiss and mica-slate, clothed with Birch and Pine. It was named to me Balnaeraig; but as that is the name of the old mansion-house on its southern side, and signifies "Town of the Rock," it probably has had a different name. Although geographically belonging to Birse, it is in Aboyne. In fact, the distribution of the Dee-side parishes is quite Irish, and that of the churches preposterous. That of Birse, for example, is three miles distant from that of Aboyne, and the latter not two miles distant from that of Birse; and the united tracts being from twelve to fifteen miles in diameter, there are families which would have to walk six, eight, or more miles to church.

CHAPTER XXXV.

THE LAST.—FROM BIRSE EASTWARDS.

YESTERDAY, clouds from the south-west indicated the approach of rain, which is much needed, the herbage being dried up, and the turnips suffering severely from the protracted drought. In the morning it rained continuously, but did not prevent us from looking about. The bed of the river presented a great variety of stones: granite, gneiss, porphyry, hornblende, quartz, hornstone. Ordinary mica-slate does not stand the wear and tear of the Dee. We visited a rocky bank at a turn of the river, about a quarter of a mile below the town. It is of mica-slate, with veins of quartz; but as mica-slate and gneiss pass into each other, and as the hills in the neighbourhood are mostly of gneiss, the rock at the place visited may be subordinate to or part of the gneiss formation. The parish of Kincardine O'Neal extends from the Dee, northward, about seven or eight miles, with a breadth of about five, and is somewhat hilly, but well wooded and extensively cultivated. Gneiss, with dykes of porphyry, and granite are the principal rocks. Beyond it, eastward, are the parishes of Midmar and Banchory, the former

mostly sloping towards the Don, the latter, although on the north side of the Dee, belonging to the county of Kincardine.

About twelve, I proceeded to Potarch, accompanied by Dr. Coutts, who stated that the hill to the left is of gneiss in its whole extent. Large blocks of that rock and of red porphyry were numerous on its side. Having gone with the Doctor, who had a patient to visit at Woodend Cottage, I was introduced by him to Mr. Forbes, who took me to his garden to see some plants of Maize, which had grown to the height of about ten feet and were in flower. Sheltered from the north and east by a wooded hill, and with the Dee flowing past it, this is a very pleasant spot, though, to my taste, not open enough, there being a high and rather unsightly bank on the opposite side of the river, obstructing the views. The rock exposed by the river is gneiss, intermixed with hornblende.

Crossing the Dee here by a boat, I found the blocks strewn about to be of gneiss, some of them hornblendie. The hills from the Bridge of Potarch to this place are of gneiss, and thickly covered with large blocks of the same rock, so as to present a scene as rude as most of those in the upper tracts of the Dee. The place where I crossed is at the eastern extremity of the parish of Birse. Here the county of Aberdeen terminates, though Braemar, according to the ancient geography, still continues.

Entering Kincardineshire and the parish of Strachan at the same time, I also entered upon a wooded tract, with several hills of moderate elevation to the right.

Wherever exposed, the rock was still gneiss, as were the blocks. It seemed a rather dreary tract, owing to neglect, but capable of being enlivened and beautified, and certainly affording a good field to the collector of Fungi, Lichens, and Mosses. Emerging from it, I proceeded to the Bridge of Feugh, where I bid farewell to Braemar.

He who has in his mind's eye the spring-tide from the Atlantic Ocean, in stormy weather, rushing through the Sound of Harris, and dashing on the rock of Stromay, will see nothing imposing in a burn gliding among upraised gneiss strata, little elevated above its level, streaming down the crevices, and forming a little cascade, divided into several branches, with a small pool at its foot. But the Falls of the Feugh, if simply viewed, without reference to greater falls or ocean currents, are, as the Tourists' Guides say, well worthy of a visit. The bed of the stream is, as said, of gneiss, of which the nearly vertical strata are directed north-east. It is a dusky evening, however, and, as the sun is invisible, I cannot accurately determine the direction, having no other geological instrument than a hammer. Just below the bridge, the rock is granite, which has been intruded among the strata.

But it is now getting toward six o'clock, and, as my resting-place is a good way off, it is time to proceed. When I ascended the valley of the Dee, in the end of July, the woods rejoiced in the warm breezes, and spread their green foliage to the sun. Now, in the middle of September, they seem preparing for the winter: their discoloured and sapless leaves, smitten by

the night-frosts, and seared by the drought, show no gladness, but speak of decay—beautiful in its gradations, like the passage of the aged Christian to the grave, and very pleasing to the sobered and contemplative mind. I have this year seen these woods of Crathes, when their twigs bore nothing but buds, when their tender leaves were unfolding, when their foliage covered them as a mantle; and now, in passing, I observe them streaked and patched with the yellow tints of autumn. Winter will again strip them of all their vesture; but they “will hear the voice of spring, and flourish green again.” So shall we, whose life is Christ.

Dimly in the north the Hill of Fare gleams along the horizon; its extended form more imposing now than when we saw it afar from Morven. The parish of Banchory Ternan, intruded, as it were, among strangers, sends a prolongation hither, as if to secure a hold upon its own county. When we cross this little brook of Balbridie, we enter Durris, between which and the sea off the Girdleness there intervene only the parishes of Marycultir, Banchory Devenick, and Nigg. On the north side of the river are those of Eelit, Skene, Drumoak, Petereultir, and part of Banchory and Old Maehar. I have now mentioned by name at least all the parishes that belong to the geographical basin of the Dee, which narrows greatly from this to Aberdeen.

An easterly wind, not cold and penetrating, brings up the clouds successively from the Celtic sea. But scarcely any rain falls, and at intervals the moon is seen dimly defined through the grey vapour. Farmers are returning in carts and gigs from the market, it being Friday; but

otherwise the road is dull, it being much less frequented at any time than that on the north side.

Not an inn nor a shop could I find anywhere, and having neither eaten nor drunk since twelve o'clock, I resolved, on reaching Marycultir, to make application for tea and bread, the favourite food of sedentary people, and assuredly the most invigorating of all to the wearied pedestrian. How much refreshed I felt after an hour's rest and a plentiful meal, any one may understand who has an elastic temperament. The milestones which I had been counting were no longer consulted; and as little of the well-known scenery was visible under the faint light of the moon, veiled by the grey vapours, I mused on many things as I walked quickly along.

The Divine Providence has rendered my path pleasant to me in the rugged corry, in the thick wood, and in the green valley; has prepared friends to forward my views, to protect me under their hospitable roofs, and instruct me by their conversation; has restored me to health, and preserved it to me; has enabled me to accomplish the purpose of my journey, and filled me with gratitude now that I approach its termination.

The full moon shone brightly from amongst the scattered clouds as I crossed the Dee. How often, on returning from an excursion, have I hailed with delight the Castle of Edinburgh, the Calton Hill, Arthur's Seat, and Salisbury Craigs, as seen from afar, even in the moonlight. So frequent have such occasions of rejoicing been, in the course of twenty years' residence in that most beautiful of all the cities of Britain, that now, through habit, I trace the well-known features of the

Scottish metropolis, instead of looking for the not easily discernible marks of the capital of Aberdeenshire. In approaching it, I perceive nothing to excite any very pleasant, much less enthusiastic feeling. I pass the shapeless mass of Holborn Church, and the somewhat fantastic building of the Free Church College, and enter Union Street, thinking only of those whom I left at home under the protection of Him in Whom I trust, and whom I expect to find preserved by His care. It is near twelve when I enter King Street, and before the hour has struck, I am at home.

Kind reader ! it is time to bid thee " Good-night."

NATURAL HISTORY OF DEE SIDE.

THE FLORA OF BRAEMAR.

CHAPTER I.

ALPINE PLANTS OF BRAEMAR.

ALTHOUGH none of the mountains of Aberdeenshire are sufficiently elevated to reach the snow-line, some of them approach to within a thousand feet of it; and both these and others of inferior elevation, produce many of the species of plants which in other countries of Northern Europe, grow in the vicinity of perpetual snow. The greatest height attained by the Braeriach or Mona-rua group, the most elevated of the Braemar mountains is 4300 feet, which is that of Ben-na-muic-dhui. The neighbouring mountains of Braeriach and Cairntoul, rise to 4220 feet or a little more. Cairngorm, which, although continuous with Ben-na-muic-duhi, belongs to the river-system of the Spey, is 4050 feet high. Ben-na-buird and Ben-Aun, the most eastern mountains of this group are 3940 and 3920 feet. All these mountains, and others connected with them, are of granite. Being massive, and presenting extended spaces on their summits, and precipitous corries on their sides, they afford the best ground in this part of Scotland for determining the comparative elevation to which particular

species of plants ascend. It is impossible, however, to trace upon them limits of vegetation, or zones containing a certain number of species of plants; for it is found that local peculiarities or circumstances are productive of great variations in this respect. A species which, in suitable situations will grow at the height of 4000 feet, will be found, when circumstances are unfavourable, not to ascend higher than 3000 feet upon a mountain that rises to beyond any height at which it has been observed. On the other hand, a plant usually beginning to appear at the height of 3000 feet, may sometimes be seen in abundance in places not 2000 feet high. *Cerastium alpinum* grows on the upper part of the precipices of Lochnagar, at the height of about 3500 feet, and does not again appear at a lower level on that mountain, which is entirely of granite; but it occurs profusely on the crags and among the green herbage of the peaks of Coial, which are of serpentine, at an elevation of less than 2000 feet. On massive groups of mountains, plants will often be found in places much less elevated than those on which they begin to appear on isolated mountains. A peak standing far apart, may have few or no alpine plants upon it, whereas, if placed in the midst of other mountains it would produce many. Sometimes species are to be found growing at a great elevation, and again a thousand feet lower, there being none or very few in the intermediate space, which may be a dry perpendicular precipice, or a declivity covered with detritus. Sometimes, also, a mountain, on the smooth summit of which few or no alpine plants are to be seen, has a precipice or corry on its side, in which, at an elevation of not more than from 2000 to 2500 feet a great number of species grow in great luxuriance. Such circumstances cause great diversities in the distribution of plants, and in a tract not sufficiently elevated to deserve the name of alpine, render it impossible to mark out well-defined zones of vegetation. Of the plants

called alpine, we find some descending from the height of 4000 feet, along the Dee, to the height of less than a hundred feet. *Luzula arcuata*, from near the summit of Ben-na-muic-dhui, descends no farther than five hundred feet. Between these extremes are many gradations; but the limits of distribution of species cannot be determined in Braemar; and, I am persuaded, that any representation to the contrary will be found to be deceptive. But, taking a certain number of plants which grow between the upper limits of vegetation, determined by the summits of our mountains, and the height at which sylvan vegetation ceases, and calling them alpine plants, we may, in considering their distribution, be enabled to present a somewhat intelligible account of it. Were we to reduce it to formulæ,—the mere appearance without the reality of scientific precision and comprehensiveness of view—would render us liable to the charge of presumption and self-deception, if not something worse. Very limited views of the distribution of alpine plants in Braemar would produce a precision, which more extended views would soon repudiate.

By alpine plants, I understand all those which, in Scotland, grow naturally on the mountains, from their highest points, or from some lower station, down to the elevation of 2500 feet above the sea, ceasing there, or previously, unless in particular circumstances favourable to their extension. These plants might, perhaps, be divided into two series: upper alpine, growing down to 3500, and lower alpine, growing down to 2500: of such plants, I have observed on the Braemar mountains those contained in the following list, in which are also included a few observed there by other persons, and several stations besides those in which I have seen the plants myself.

There are five tracts of which I shall have to speak. The first is that of the Mona-rua or Ben-na-muic-dhui group; the second that of the mica-slate tract, extending from Scarsach

to Glen Callater; the third, the Lochnagar group; the fourth, the Morven group; the fifth, the Glen Tanar and Birse group, of which the highest summits are Mount Keen and Mount Battock.

Thalictrum alpinum.

1. Cairntoul. Ben-na-buird.
Little Craig-an-dal.
2. Corry of Loch Ceannor

Arabis petræa.

1. Cairntoul, Braeriach, Glen
Dee, Glen Lui.

Cochlearia officinalis.

1. Cairntoul. Ben-na-buird.
2. Corry of Loch Ceannor.

Silene maritima.

1. Cairntoul, Braeriach.

Silene acaulis.

1. Cairntoul, Braeriach, Ben-na-
muic-dhui, Ben-na-buird.

Stellaria cerastoides.

1. Cairntoul, Ben-na-muic-dhui,
Braeriach.

Cerastium latifolium.

1. Corry of Loch Ceannor.
2. Coial.

Cerastium alpinum.

1. Lochnagar.

Astragalus alpinus.

1. Little Craig-an-dal.

Dryas octopetala.

1. Cairntoul, Little Craig-an-dal.

Alchemilla alpina.

1. Cairntoul, Braeriach, Ben-na-
muic-dhui, Ben-na-buird, Ben-
Aun.
2. Corry of Loch Ceannor, Glen
Ey.
3. Lochnagar, Craigs of the
Duloch.
4. Morven, Culblean.
5. Mount Keen.

Sibbaldia procumbens.

1. Cairntoul, Braeriach, Ben-na-
buird.

Epilobium alpinum.

1. Cairntoul, Braeriach, Ben-na-
buird.
2. Glen Ey, Glen Callater.
3. Lochnagar.

Epilobium alsinifolium.

1. Glen Ey, Corry of Loch
Ceannor.

Sedum Rhodiola.

1. Cairntoul, Braeriach.
2. Corry of Loch Ceannor.

Saxifraga stellaris.

1. Cairntoul, Braeriach, Ben-na-
muic-duhi, Ben-na-buird, Ben
Aun.
2. Glen Ey, Corry of Loch
Ceannor.
3. Lochnagar, Head and south
side of Loch Muic.
4. Morven.
5. Mount Keen, Hills in Glen
Tanar.

Saxifraga rivularis.

1. Cairntoul, three stations, Ben-
na-buird.
3. Lochnagar.

Saxifraga caespitosa.

1. Ben-na-buird.

*Saxifraga hypnoides.**Saxifraga nivalis.*

1. Braeriach.
2. Glen Callater.

Saxifraga oppositifolia.

1. Cairntoul?
2. Corry of Loch Ceannor.

Saxifraga aizoides.

1. Cairntoul.
2. Glen Ey, Glen Callater, Mor-
rone.
3. Glen Muic.

Cornus suecica.

1. Cairntoul.

Erigeron alpinus.

1. Cairntoul.
2. Corry of Loch Ceannor.

Gnaphalium supinum.

1. Cairntoul, Braeriach, Ben-na-muic-dhui, Ben-na-buird.

Saussurea alpina.

1. Cairntoul.

Hieracium Halleri.

1. Cairntoul.

Hieracium nigrescens.

1. Braeriach, Loch Etagan.

*Hieracium alpinum.**Apargia Taraxici.**Azalea procumbens.*

1. Cairntoul, Little Craig-an-dal.

*Veronica saxatilis.**Veronica alpina.*

1. Cairntoul, Ben - na - buird, Little Craig-an-dal.

*Veronica humifusa.**Armeria maritima.*

1. Ben-na-buird, Cairntoul, Little Craig-an-dal.

Oxyria reniformis.

1. Ben-na-buird.

Polygonum viviparum.

1. Cairntoul, Ben-na-buird.

Salix herbacea.

1. Cairntoul, Braeriach, Ben-na-muic-dhui, Ben-na-buird.

Salix myrsinites.

1. Cairntoul.

*Salix arenaria.**Salix lanata.**Salix reticulata.**Juncus trifidus.*

1. Cairntoul, Braeriach, Ben-na-muic-dhui, Ben-na-buird, Ben-

Juncus triglumis. [Aun.]

1. Cairntoul, Little Craig-an-dal.
2. Corry of Loch Ceannor.

Luzula spicata.

1. Cairntoul, Braeriach, Ben-na-muic-dhui, Ben-na-buird.
2. Mountains of Glen Ey, and Glen Callater.
3. Lochnagar.
5. Mount Keen.

Luzula arcuata.

1. Cairntoul, Ben-na-muic-dhui.

Carex rupestris.

1. Little Craig-an-dal.
2. Corry of Loch Ceannor.

Carex leporina.

1. Cairntoul, Braeriach.

Carex rigida.

1. Cairntoul, Braeriach, Ben-na-muic-dhui, Ben-na-buird, Ben-Aun.
2. Mountains of Glen Ey and Glen Callater.
3. Lochnagar.
4. Morven.
5. Mount Keen.

Carex saxatilis.

1. Cairntoul.

Carex vaginata.

1. Cairntoul, Ben-na-muic-dhui.

Carex capillaris.

1. Cairntoul.

Phleum commutatum.

1. Cairntoul, Braeriach.
2. Corry of Loch Ceannor.
3. Lochnagar, in both Corries.

Alopecurus alpinus.

1. Braeriach.
2. Glen Callater.
3. Lochnagar.

Aira alpina.

1. Cairntoul.
3. Lochnagar.

Festuca vivipara.

1. Cairntoul, Braeriach, Ben-na-buird.
2. Glen Ey, Glen Callader.
3. Lochnagar.

Poa alpina.

1. Cairntoul, Ben-na-buird.
3. Lochnagar.

Poa minor.

3. Lochnagar.

Poa laxa.

3. Lochnagar.

Mulgedium alpinum.

3. Lochnagar, on the precipice of the eastern Corry.

1.—DISTRIBUTION OF PLANTS ON THE MONA-RUA.

THE species which present themselves in the highest situations on these mountains are *Luzula arcuata*, *L. spicata*, *Salix herbacea*, *Silene acaulis*, *Juncus trifidus*, *Carex rigida*, *Festuca vivipara*, *Gnaphalium supinum*, and *Armeria maritima*. These plants are almost the only species that occur on the summits of Cairntoul, Braeriach, Ben-na-muic-dhui, and (excepting *Luzula arcuata*) Ben-na-buird, where a scanty sward is sometimes formed by *Juncus trifidus*, *Luzula spicata*, *Carex rigida*, and on Ben-na-muic-dhui by *Luzula arcuata*. So stunted is the vegetation, that *Salix herbacea* scarcely rises two inches above the ground, although its stems often run from six inches to a foot beneath the surface; *Silene acaulis* scarcely attains a greater height; *Armeria maritima* is generally not higher than from two to three inches; *Luzula arcuata* from three to five, and *Luzula spicata* from four to six or eight.

From the region occupied by these plants, down to a height of about 3500 feet, the more common species are *Salix herbacea* and *Juncus trifidus* which are very abundant, and in their true native place, *Polygonum viviparum*, *Aira alpina*, *Festuca vivipara*, *Luzula spicata*, *Azalea procumbens*, *Apargia autumnalis*, *A. Taraxici*, and sometimes *Hieracium nigrescens*, besides many plants which have ascended thus far from lower situations, especially *Euphrasia officinalis* (Eye-bright), *Rumex acetosa* (Common Sorrel), and *Aira flexuosa*.

Farther down, to the height of about 3000 feet, the plants are: first, those peculiar to the situation, being in their true native place: *Cerastium latifolium*, *Alchemilla alpina*, perfect, disappearing lower down in dry places, though along the rivulets extremely common, even in the lowest valleys; *Sedum Rhodiola*, in rocky places, but generally of small size, compared with its state when on the sea-shore; *Cochlearia officinalis*, of rather rare occurrence; *Oxyria reniformis*,

Saxifraga oppositifolia, *S. rivularis*, *Aira alpina*, *Veronica alpina*, *V. humifusa*, and *Phleum commutatum*:—secondly, those of the higher region, all of which, excepting *Luzula arcuata*, *Armeria maritima*, and *Salix herbacea*, grow here also:—thirdly, those of the lower regions, which ascend thus high, and of which the most common are, *Vaccinium Myrtillus*, very stunted, and without fruit; *Juniperus alpina*, whose true place is much lower; *Empetrum nigrum*, rare and without fruit; *Calluna vulgaris*, extremely stunted and generally flowerless; *Galium saxatile*, *Polygala vulgaris*, *Geum rivale*, *Rubus Chamæmorus*, *Pinguicula vulgaris*, *Tormentilla officinalis*, *Gnaphalium dioicum*, *Luzula campestris*, *Ranunculus acris*, much diminished in size and with few flowers; *Euphrasia officinalis*, *Aira flexuosa*, *Anthoxanthum odoratum* and *Poa annua*.

By the springs and rills of this region, the following plants are the most characteristic; *Saxifraga stellaris*, *S. oppositifolia*, *S. rivularis*, *Epilobium alpinum*, *Alchemilla alpina*, *Gnaphalium supinum*, *Veronica humifusa*, *V. alpina*, *Stellaria cerastoides*, *Poa alpina*. Along with them are often seen, *Stellaria uliginosa*, *Alchemilla vulgaris*, *Caltha palustris*, *Geum urbanum*, *Ranunculus acris*, *Tofieldia palustris*.

Farther down, to the height of 2500 feet, we find *Thalictrum alpinum* in its true place. *Aira flexuosa* grows in tufts, and of large size. *Alchemilla alpina* begins to disappear in dry places. *Oxyria reniformis*, which above is small, grows here among the rocks to its greatest size. *Saxifraga stellaris* is still abundant along the streamlets; *Saxifraga cæspitosa*, found only on Ben-na-buird and Ben-Aun; *Saxifraga aizoides*, sometimes appears; *Alchemilla alpina* is plentiful, as is *Epilobium alpinum*, *Erigeron alpinus*, *Saussurea alpina*, *Alopecurus alpinus*, *Salix Myrsinites*, *S. lanata*, *Carex saxatilis*, *C. rupestris*, *C. leporina*, *C. vaginata*, *C. capillaris*, *Juncus triglumis*, and *Astragalus alpinus*, the two latter seen only at Craig-an-dal.

The plants of lower situations which have ascended into this region are: *Calluna vulgaris*, *Vaccinium Myrtillus*, still fruitless; *Vaccinium uliginosum*, occasionally; *Empetrum nigrum*; *Melica cærulea*, of small size; *Agrostis vulgaris*, *Nardus stricta*, *Viola canina*, *Campanula rotundifolia*, *Galium saxatile*, *Sagina procumbens*, *Rumex Acetosella*, *Eriophorum angustifolium*, *Cornus suecica*, *Carex binervis*, *C. pilulifera*, *C. vulgaris*, *Juncus squamosus*, *Scirpus cæspitosus*, and many other species.

Further down, where the mountains expand, we meet the plants common on the heaths of the central districts of Scotland. *Juniperus alpina*, is plentiful in many places, as is *Betula nana*. *Rubus Chamæmorus* is sometimes plentiful. *Vaccinium Myrtillus*, still seldom bears fruit. *Arctostaphylos Uva-ursi* makes its first appearance, together with *Erica Tetralix*, *Vaccinium Vitis-idaea*, *Narthecium ossifragum*, *Aira caryophyllea*, and *Drosera rotundifolia*.

The streamlets of this region afford *Gnaphalium supinum* in abundance and perfection; *Epilobium alpinum*, *E. alsinifolium*, *Alchemilla alpina*, *Stellaria uliginosa*, *Montia fontana*, and frequently *Saxifraga aizoides*, which, in some places, commences farther up, and extends much farther down.

In the lateral valleys below this elevation, which open into the valley of the Dee, the streams are margined with *Alchemilla alpina*, *A. vulgaris*, *Ranunculus Flammula*, *Caltha palustris*, *Epilobium parviflorum*, *Juncus conglomeratus*, *J. laamprocarpus*, *J. bufonius*. In their vicinity we find many plants of lower situations, as *Rubus saxatilis*, *Lotus corniculatus*, *Anthyllis vulneraria*, *Hypericum pulchrum*, *Polygala vulgaris*, *Solidago Virgaurea*, *Gnaphalium dioicum*, *Campanula rotundifolia*, *Achillæa Ptarmica*, *Scabiosa succisa*, *Digitalis purpurea*, sometimes *Tussilago Farfara*, and in a few instances *Epilobium angustifolium*.

The general aspect, however, as in most of the other uncultivated parts of Scotland, is heathy, *Calluna vulgaris*

being the predominant plant, and next to it *Erica cinerea*, while *E. Tetralix* occurs here and there in moist places. As in other tracts of a like nature, we find among this heath, *Empetrum nigrum*, whose berries here attain a much larger size than in lower situations, *Vaccinium Myrtillus*, *V. uliginosum*, and *V. Vitis-idæa*, the latter in its proper place. *Rubus Chamæmorus* is of not unfrequent occurrence. *Arctostaphylos Uva-ursi* is often seen in great profusion, as is *Myrica Gale*. In spongy or oozy ground are seen *Pinguicula vulgaris*, *Orchis maculata*, *Pedicularis sylvatica*, *Parnassia palustris*, *Narthecium ossifragum*, *Triglochin palustre*, *Scirpus cæspitosus*, *Juncus squamosus*, *J. acutiflorus*, *J. lampocarpus*, *Eriophorum vaginatum*, *E. angustifolium*, *Carex ovalis*, *C. stellulata*, *C. vulgaris*, sometimes *C. pauciflora*, together with a multitude of plants which are found in lower situations. In dry places, *Hypericum pulchrum*, *Pyrola media*, *Helianthemum vulgare*, *Thymus Serpyllum*, *Genista anglica*, *Achillæa Millefolium*, *Hypochaeris radicata*, and *Cnicus lanceolatus*, are observed, together with many of the plants common on the lower heaths, for here the aspect of the vegetation is no longer alpine.

From 1500 feet of elevation, in some of the valleys, we have passed through Birch woods, which soon become mingled with Pine. These woods, in which are also seen *Populus tremula*, *Pyrus aucuparia*, *Alnus glutinosa*, bring us to the river.

2.—DISTRIBUTION OF PLANTS IN THE MICA-SLATE TRACT OF UPPER BRAEMAR.

THE tract of country, entirely composed of mica-slate and slaty quartz alternating, and intersected by veins and stratiform dykes of red felspar porphyry, that extends from the sources of the Geaulie to Glen Callater, is mountainous or hilly, with two long and narrow valleys, Glen Ey and Glen

Clunie. The mountains are much less elevated than those of the Mona-rua, and being comparatively unencumbered with detritus, and more or less invested with peaty soil, have a more continuous vegetation, chiefly of a heathy character. They have, in consequence, attracted less the notice of observers; and, not having found such of them as I visited of much interest with reference to flowering-plants, those of Glen Callater excepted, I paid attention less to their botany than to their geology. It would, I think, be impossible to indicate zones of vegetation in this tract, as we find bare rounded hills having on their upper parts few or scarcely any alpine plants, yet presenting in rocky places, or in corries, a thousand or more feet down, many of the species which occur at greater heights on the Mona-rua mountains, than those of the most elevated summits of this tract.

Of the species mentioned in the last section, the following have not been met with in this: *Stellaria cerastoides*, *Cerastium alpinum*, *Astragalus alpinus*, *Saxifraga rivularis*, *Azalea procumbens*, *Veronica saxatilis*, *Armeria maritima*, *Carex saxatilis*, *C. vaginata*, *Poa alpina*, and *P. laxa*. Glen Callater is the most interesting portion of this tract; but as the plants found in it have already been enumerated, it need only be further mentioned that the vegetation generally is the same as that of most other upland tracts in Aberdeenshire.

3.—DISTRIBUTION OF PLANTS IN THE LOCHNAGAR GROUP.

THE magnificent mountain of Lochnagar, which is 3800 feet high, forms a connecting nucleus to all the ranges of hills that occupy the space between the Clunie and the Muic. It is composed entirely of granite, as are the other masses in its vicinity. But in part of the ridge of hills that runs down from it to the Lion's Face and other rocks opposite Invercauld, there is an intermixture of mica-slate, sometimes

having the appearance of gneiss, and sometimes of quartz-rock. The granitic mountains to the north of the Dee are scantily clothed with vegetation, owing to the disintegration of the rock, which has covered them with stones and gravel. Lochnagar, and especially the mountains around it, being of harder rock, have a considerable covering of peat, and a more luxuriant vegetation, although their summits are still exceedingly bare. The alpine plants of this mountain are disposed much in the same manner as those of Ben-na-buirid. On the bare summit are seen *Juncus trifidus*, *Luzula spicata*, *Carex rigida*, *Salix herbacea*, and *Sibbaldia procumbens*. In the northern corry, that of Lochan-eun, the craggy rocks and precipices, from a height of about 3200 feet down to 2900, produce all the plants mentioned, together with many others, but especially *Gnaphalium supinum*, *Veronica alpina*, *Saxifraga rivularis*, *S. stellaris*, *Alchemilla alpina*, and in various places *Carex leporina*, and *Phleum commutatum*. These plants, with the exception of *Carex leporina*, which occupies a nearly horizontal belt, observe no particular order as to altitudinal arrangement; and beyond the small lakes in the hollow below, and which are at heights of from 2800 to 2450 feet, the vegetation ceases to be alpine.

On the eastern side of the mountain, precipices descend from 3700 feet to 2500; the rocks being from 300 to 800 feet high, and the rest being slopes of detritus. In the ravines or crevices at the upper part, are found *Cerastium alpinum*, *Sibbaldia procumbens*, *Epilobium alpinum*, *Sedum Rhodiola*, *Saxifraga rivularis*, *S. stellaris*, *Gnaphalium supinum*, *Armeria maritima*, *Cochlearia officinalis*, *Polygonum viviparum*, *Poa minor*, and *P. laxa*, together with several others. About half way down the precipice towards its northern extremity, is *Mulgedium alpinum*. Below this, on the shelves and crags, the vegetation is more luxuriant than elsewhere, and consists of a multitude of species of lower regions, intermixed with alpine plants. *Aira alpina*, *Saxifraga stellaris*,

Apargia Taraxici, *Oxyria reniformis*, *Hieracium alpinum*, *H. Halleri*, *H. nigrescens*, *Festuca vivipara*, *Salix Myrsinites*, *S. arenaria*, and other species are found there. Farther down, on the slope, is *Phleum commutatum*; *Poa minor*, and *P. laxa* are plentiful at the mouth of one of the crevices, and *Saxifraga rivularis* near that of another. The bottom of the corry, all round the lake, presents nothing very remarkable; and beyond it the plants are only such as are common on the upland moors.

Descending from the summit on the southern side to the Duloch, we find many of the plants mentioned, but in no particular arrangement. Near the lake is abundance of *Cornus suecica*, and *Rubus Chamæmorus*, which also grows on the very summit of the mountain. The craigs of the Duloch, though their base is only at about 2200 feet of elevation, yield many of the plants found on Lochnagar. I observed on them *Thalictrum alpinum*, *Erigeron alpinus*, *Alchemilla alpina*, *Sibbaldia procumbens*, *Cochlearia officinalis*, *Saxifraga stellaris*, *Festuca vivipara*, *Epilobium alpinum*, *Hieracium Halleri*, and others. The bushes of *Salix arenaria* along the stream, differ greatly in the form and size of their leaves. On the sides of the hill-ranges that border Loch Muic, and at an elevation of not much more than 1300 feet above the sea, *Saxifraga stellaris*, *Alchemilla alpina*, and *Saxifraga hypnoides*, mingle with the ordinary vegetation of the uplands.

The alpine species that occur on the serpentine crags of Coial in the lower division of Glen Muic, have already been repeatedly mentioned; but on the hill-range of the opposite side I met with no other alpine plants than *Alchemilla alpina* and *Saxifraga stellaris*. *Saxifraga aizoides* is abundant by the streams here, as well as in most parts of the district.

4.—ALPINE PLANTS OF THE MORVEN GROUP.

FROM the base of Ben-Aun eastward, the country descends so much as to come beneath the ordinary level of most alpine plants, and, from the continuity of its heath and other circumstances, is unfavourable to them. *Luzula spicata*, *Carex rigida*, *Alchemilla alpina*, and *Saxifraga stellaris*, are still seen on the hills, and on some of them *Gnaphalium supinum* also. The hills between the mouth of Glen Gairn and Morven do not appear to yield any other species than *Gnaphalium supinum*. That mountain itself, although it attains a height of about 2900 feet, is remarkably unproductive of Alpine species; *Gnaphalium supinum*, *Saxifraga stellaris*, *Epilobium alpinum*, *Alchemilla alpina*, *Sibbaldia procumbens*, and *Carex rigida*, being all that I observed there. The granite range to the eastward, including Culblean, produces few or no species.

5, 6.—ALPINE PLANTS OF GLEN TANAR AND BIRSE.

MOUNT KEEN, which rises to 3180 feet, might be expected to yield good store of interesting plants, especially as it has a corry on its northern side, and is not very far distant from the Lochnagar group. But it is quite otherwise, and all the species that I observed in ascending it were, *Alchemilla alpina*, *Gnaphalium supinum*, *Saxifraga stellaris*, *Luzula spicata*, and *Carex rigida*. Mount Battock, which I have not visited, is said to yield none at all; and Cloch-na-ben, which I closely examined, is assuredly quite destitute of any, although it has on its summit a range of granite precipices, about 80 feet high. Its vegetable productions are similar to those of the hills intervening between it and the sea, being the common moorland plants of the district.

CHAPTER II.

VEGETATION OF THE VALLEY OF THE DEE.

THE description of the Flora of a river-district might be commenced at either of its extremities; but the Dee, having so much of an alpine character, it is more convenient to begin with the alpine part of the vegetation, and trace it until it mingles with that of the uplands, the valleys, and ultimately of the sea-coast. The alpine plants of Braemar, already spoken of, are the same as those which occur in most other tracts in Scotland, of which the mountains rise to the height of from 3000 to 4000 feet. None of them are peculiar to the district; for, notwithstanding all that has been said by botanists on the relation of plants to the rocks or soil, it does not appear that any of our alpine species are necessarily confined to a special geological formation. Some tracts are more favourable than others to the development of alpine plants, both as to number of species and growth; but the greater adaptation thus indicated is easily accounted for, on other considerations than that of the mineralogical constitution of the rocks. Canlochan, for example, which greatly excels in the variety and luxuriance of its vegetation any place of equal extent in Aberdeenshire, owes its superiority, not to the mineral or chemical nature of its slaty rocks, but to the comparatively sheltered, sunny and shaded, moist and dry, fissured, shelved, and finely soiled stations which it affords. When granite rocks, more unfavourable on account of their massiveness and solidity, are fractured and shelved so as to present varieties of station, and more or less irrigated, their vegetation shows an approximation to the

variety and luxuriance of the slaty rocks; as in the second corry of Ben-na-buirid, and that of Cairntoul.

In enumerating the alpine plants of Braemar, I had occasion to show that, in mountain tracts so undefined, so intermixed with inferior eminences, and so little elevated as not to ascend into the snow region of the atmosphere, no precise lines or zones can be determined. It were easy to present on paper a very orderly disposition of our vegetation according to altitude above the sea; but the student who should go to search for the phenomena indicated would assuredly be disappointed. I have therefore preferred the method of nature to the restrictions of art. Our alpine plants grow as if their seeds had been profusely scattered over the district, but germinated only in places favourable to their development, and then been partially carried away by the rills and torrents, to take root anew by their margins. It is clear enough, at the same time, that a certain, that is an undefined and uncertain graduation of station, does exist, somewhat similar to the arrangement of the primary stratified rocks in nature. If we ascend a hill-range, for example, we may first meet with *Saxifraga stellaris*, but certainly not with *Luzula arcuata*. But in one place, and another, and a third, we may have very different commencements and endings of alpine vegetation. Without pretending to force nature into formulæ, I have simply represented things as I found them; and, as the general vegetation of the alpine and sub-alpine tracts of the Dee has been more or less treated of in the last chapter, it may be referred to as also a commencement to this.

Of the plants which, commencing at the sea-shore, occupy the whole extent of the lowland and upland tracts, in situations favourable to their growth, ascend the sub-alpine and alpine heights, to within a few hundred feet of the greatest elevation in the district, may be mentioned the following:—*Alchemilla vulgaris*, *Euphrasia officinalis*, *Rumex acetosa*,

R. acetosella, *Cerastium viscosum*, *Tormentilla officinalis*, *Pinguicula vulgaris*, *Polygala vulgaris*, *Veronica serpyllifolia*, *Gnaphalium dioicum*, *Ranunculus acris*, *Stellaria uliginosa*, *Sagina procumbens*, *Viola palustris*, *V. canina*, *Caltha palustris*, *Arabis hirsuta*, *Lychnis dioica*, *Rhinanthus Crista-galli*, *Hieracium sylvaticum*, *Apargia autumnalis*, *Aira flexuosa*, *Anthoxanthum odoratum*, *Festuca vivipara*, *Molinia cœrulea*, and *Agrostis vulgaris*. The changes which these plants exhibit at their highest elevation are the following:—*Caltha palustris* has its curvatures lengthened, and sometimes rather sharpened; *Ranunculus acris* has become smaller, more slender, and delicate, with fewer flowers; *Euphrasia officinalis* has its flowers larger, and more deeply coloured; *Hieracium sylvaticum* has broader and shorter leaves, shorter stems and fewer flowers; and *Lychnis dioica* has acquired a longer and more copious pubescence. The other plants do not exhibit any very remarkable difference.

In exposed places, where there is little moisture, the vegetation is very stunted; but along the streamlets, and especially on wet parts of the corries and rocks, the alpine vegetation assumes a vigorous aspect, and the other plants are often quite luxuriant. The plants of the moorlands, at first stunted, gradually increase in size, and in the valleys are often as luxuriant as in the lower tracts on the Dee. The woods formerly occupied much greater space, and extended much farther up the glens than they do now. Decayed stumps and trunks of Pines are now seen at a much greater elevation than the present upper limit of the Birch; so that if one were taking the actual as the natural limit of *Pinus sylvestris*, he would err.

Leaving the now bare and desolate glens of the upper streams, we enter the valley of the Dee. Here we find the vegetation principally consisting of the plants which form the ordinary vegetation of all parts of Scotland. About the Linn, and along the sides of the hills, *Anthoxanthum odoratum*

and *Juncus bufonius* are viviparous. The meadows are in some places covered with the beautiful *Cnicus heterophyllus*. *Saxifraga aizoides* is very abundant, growing by the streams along with *Oxyria reniformis*, *Alchemilla alpina*, and *Galium boreale*. *Rubus saxatilis* and *Ligusticum Meum* are not uncommon from Inver Ey downwards; and *Trifolium medium*, of great size and beauty, seems to have entirely usurped the place of *T. pratense*.

In the pastures are seen, among many other plants, *Bellis perennis*, *Senecio Jacobæa*, *Apargia autumnalis*, *Plantago media*, *P. lanceolata*, *Achillea Millefolium*, *Prunella vulgaris*, *Gentiana campestris*, *Galium verum*, *Scabiosa succisa*, *Campanula rotundifolia*, *Centaurea nigra*, *Viola canina*, *Pimpinella Saxifraga*, *Lotus corniculatus*, *Ranunculus acris*, *R. repens*, *Linum catharticum*, *Trifolium medium*, *T. repens*, *Spiræa Ulmaria*, *Anthyllis vulneraria*, *Galium saxatile*, *Euphrasia officinalis*, *Cnicus lanceolatus*, *Hieracium Pilosella*, *Agrostis vulgaris*, *A. canina*, *Lolium perenne*, *Briza media*, *Poa annua*, *Triodia decumbens*, *Aira cristata*, *A. flexuosa*, *Festuca ovina*, *F. pratensis*, *Cynosurus cristatus*, *Phleum pratense*, *Anthoxanthum odoratum*, *Avena pubescens*, *Gnaphalium rectum*, *G. germanicum*, *G. dioicum*, *Chrysanthemum Leucanthemum*, *Cardamine pratensis*, *Orobus tuberosus*, *Viola lutea*, the purple variety, *Thymus Serpyllum*, *Veronica Chamædrys*, *Angelica sylvestris*.

In open moist places :—*Galium palustre*, *Comarum palustre*, *Rhinanthus Crista-galli*, *Pedicularis palustris*, *Cnicus palustris*, *Ranunculus Flammula*, *Juncus effusus*, *Juncus acutiflorus*, *J. lamprocarpus*, *J. bufonius*, *Poa trivialis*, *Glyceria fluitans*, *Eriophorum angustifolium*, and occasionally *Parnassia palustris*.

In the shade of woods, along the rivulets:—*Anemone nemorosa*, *Primula vulgaris*, *Geranium sylvaticum*, *Trifolium medium*, *Epilobium montanum*, *Asperula odorata*, *Trollius europæus*, *Valeriana officinalis*, *Hieracium sabaudum*, *H. syl-*

vaticum, *Oxalis Acetosella*, *Spiræa Ulmaria*, *Stellaria Holostea*, *Geum urbanum*, *Solidago Virgaurea*, *Teucrium Scorodonia*, *Mercurialis perennis*, *Aira cæspitosa*, *Chrysosplenium oppositifolium*, *C. alternifolium*, *Avena pratensis*.

By the rivulets in open places :—*Galium boreale*, *Achillæa*, *Ptarmica*, *Geum rivale*, *Tussilago Farfara*, and many others, together with the alpine plants mentioned as occurring in such places.

In cultivated fields are seen the plants usually found in such places in all parts of Scotland; as *Polygonum aviculare*, *P. Convolvulus*, *Pyrethrum inodorum*, *Viola tricolor arvensis*, *Carduus arvensis*, *Arrhenatherum avenaceum*, *Centaurea Cyanus* and *Chrysanthemum segetum* are particularly abundant along the whole course of the Dee. *Avena strigosa* is plentiful, and *A. fatua* sometimes occurs.

The plants growing in waste places and about houses, as *Urtica dioica*, *U. urens*, *Carduus arvensis*, *Triticum caninum*, are the same as elsewhere. In short, the plants which are generally prevalent in other parts of Scotland, are those which occur here, and are to be found in the whole course of the Dee to its mouth. The river itself, being rapid, and its bed pebbly, few plants occur in it. *Potamogeton natans*, *Myriophyllum spicatum*, *Sparganium natans*, *Glyceria fluitans*, *Eleocharis palustris*, *Ranunculus aquatilis*, and some others occur in small quantities.

The wood of this valley is composed principally of *Betula alba*, of which there is an almost continuous forest from Inver Ey to Banchory Ternan. There is also a large quantity of *Pinus sylvestris*, extending, but not continuously, from the Linn of Dee, chiefly on the north side to beyond Invercauld, and again in the Beallach-bhui Forest to near Balmoral. The other trees, irregularly interspersed, are *Pyrus aucuparia*, *Populus tremula*, and by the streams, *Alnus glutinosa*. There are no other native trees in Upper Braemar, excepting *Prunus Padus*, which is rare, and

Corylus Avellana, which forms a few thickets. *Fraxinus excelsior* I have nowhere seen above Castletown, and the gardener at Invercauld informed me that when it is planted the young twigs are liable to be destroyed in winter. This, however, is no proof of its being an exotic, as the Whin, and especially the Broom, which are of very rare occurrence beyond Crathie, are often injured or even destroyed by the frost. *Lonicera Periclymenum* occurs in the woods, but it is not frequent. Scarcely any bushes of *Prunus spinosa* occur above Invercauld. *Rubus Idæus* extends as far as Glen Ey and Glen Lui, and *Rubus corylifolius* occurs in a very few places below Castletown. The Willows which I observed were *Salix cinerea*, *S. aurita*, *S. prunifolia*, *S. venulosa*, and several varieties of *S. fusca*.

Quercus sessiliflora and *Fraxinus excelsior* begin to appear here and there below Castletown, and in some places form a considerable proportion of the wood. All the species mentioned are found as far as the Pass of Tullich. In Glen Muic, and other places, there is a considerable quantity of *Prunus Padus*, and some trees and shrubs of *Prunus Cerasus*. Many thickets of *Prunus spinosa* occur about Micras and elsewhere; *Corylus Avellana* is also more plentiful, and *Ilex Aquifolium* begins to appear about Ballater, but is not common anywhere on the Dee until below Banchory. *Quercus sessiliflora* gives its name to Craigandarroch, as *Pinus sylvestris* to Craig-ghiniais.

All along, from Inver Ey to the Pass of Tullich, the alluvial ground of the narrow valley, and that of several of the glens which open into it, yields good crops of Oats, Barley, Potatoes, and Turnips. I have seen a small patch of Wheat at Ballater, which is 800 feet above the sea, but independently of climate, the soil is not adapted for that plant, it being light and gravelly, or sandy. There are no extensive green pastures of soft grasses and leguminous plants, and the only tract of pure verdure to be seen in the

district is on the serpentine hills of Coial, which attract regard on that account, as well as by their peaked eminences. The plants seen in the fields and pastures are the same as in upper Braemar. *Trifolium medium* is much more numerous than *Trifolium pratense*; *Fragaria vesca* abounds in many places; *Melampyrum sylvaticum* is in some parts of the woods as plentiful as *M. pratense*. Near Strath Girnac, in a swampy spot, *Arundo Phragmites* makes its first appearance. At the Bridge of Gairn *Campanula latifolia* is met with. Of the other plants which are seen, the more remarkable are *Pyrola media*, *P. minor*, *P. secunda*, *Geranium sylvaticum*, *Gnaphalium rectum*, *Trientalis europæa*, *Asperula odorata*, *Cnicus heterophyllus*, and *Epilobium angustifolium*, which grows on rocks, not by streams only, but in very exposed places, as on Craig-ghinai and Coathes. *Saxifraga aizoides*, *Alchemilla alpina*, *Oxyria reniformis*, and *Silene maritima*, are plentiful, the first in rills and brooks, the rest by brooks and along the Dee.

There is a great profusion of Roses along the river, and some of its tributaries, all the way from Mar Lodge to the Pass of Tullich. The bushes attain a larger size than in the lower tracts of Aberdeenshire, many of them being from six to ten feet high, and when in full flower present a very beautiful appearance, as they also do in September, when covered with their scarlet and carmine fruits. The species are *Rosa canina*, several varieties, *R. inodora*, *R. villosa*, *R. tomentosa*, *R. cæsia*, *R. spinosissima*. At Tullich there are some Brambles, *Rubus fruticosus*, and *R. corylifolius*. *Rubus Idæus* is common. Ballater receives its name from the Broom, in Gaelic, Bealaidh, which occurs there. The Whin, also, begins to be pretty common. Several species of *Hieracium* are seen from Mar Lodge to Banchory, *Hieracium sylvaticum*, *H. sabaudum*, *H. prenanthoides*, *H. murorum*, and *H. Pilosella*.

At the Pass of Tullich we emerge from the Highlands,

and enter upon a large irregular plain, which continues eastwards for upwards of nine miles, passing beyond Charlestown of Aboyne, and northward about twelve miles, to beyond Tarland. Seen from the road, it appears a heath, with some Birch-wood interspersed, but towards the north it is extensively cultivated. In this district, bare as it may seem, are to be found almost all the plants already mentioned, excepting the alpine species; and in Loch Ceannor and Loch Dava, *Nymphæa alba*, *Nuphar lutea*, *Scirpus lacustris*, *Arundo Phragmites*, and *Lobelia Dortmanna*, besides other aquatic plants.

To the east of the plain of Cromar the ground is more uneven, and at length rises into the broad mass of the Hill of Fare, which is about 1800 feet high. There is little natural wood in this tract; the moors yield the ordinary species of plants; and the cultivated ground, generally gravelly, is possessed of moderate fertility. The plantations are mostly of Pine, and the native trees are of the kinds already mentioned. Broom and Whin are plentiful in all this tract, and Juniper is not uncommon.

The more remarkable plants that occur in this extended tract, from Aboyne to Banchory, are: *Trollius europæus*, *Aquilegia vulgaris*, *Nymphæa alba*, *Nuphar lutea*, *Teesdalia nudicaulis*, *Cardamine amara*, *Reseda Luteola*, *Helianthemum vulgare*, *Spergula nodosa*, *Arenaria rubra*, *Radiola millegrana*, *Parnassia palustris*, *Geranium sylvaticum*, *Spiræa Ulmaria*, *Rubus fruticosus*, *R. corylifolius*, *Comarum palustre*, *Hippuris vulgaris*, *Saxifraga aizoides*, *Sanicula europæa*, *Helosciadium inundatum*, *Pimpinella Saxifraga*, *Meum Athamanticum*, *Angelica sylvestris*, *Lonicera Periclymenum*, *Galium boreale*, *Sherardia arvensis*, *Valeriana officinalis*, *Hieracium murorum*, *H. sylvaticum*, *H. prenanthoides*, *H. boreale*, *Cnicus heterophyllus*, *Artemisia vulgaris*, *Gnaphalium uliginosum*, *Tussilago Farfara*, *Solidago Virgaurea*, *Pyrola media*, *Gentiana campestris*, *Veronica scutellata*, *Scrophularia nodosa*, *Digitalis purpurea*,

Mentha hirsuta, *M. arvensis*, *Ajuga reptans*, *Galeopsis versicolor*, *Stachys sylvatica*, *S. palustris*, *Clinopodium vulgare*, *Trientalis europæa*, *Armeria maritima*, *Littorella lacustris*, *Oxyria reniformis*, *Euphorbia Peplus*, *Salix prunifolia*, *Juniperus communis*, *Luzula sylvatica*, *Goodyera repens*, *Orchis latifolia*, *Gymnadenia conopsea*, *Iris Pseudacorus*, *Triodia decumbens*, *Briza media*, *Avena pratensis*, *Scirpus lacustris*. *Saxifraga Hirculus* is stated to have been found in the parish of Lumphanan; and, in the statistical account of Aboyne and Glen Tanar, *Sambucus Ebulus* and *Calamagrostis Epigejos* are given in Mr. A. Thomson's list of the rarer plants. I have not seen these three species in the district.

The southern tract of Glen Tanar and Birse, much more picturesque and interesting, is in many places profusely wooded. Its vegetation, however, being the same as that of the valley of the Dee at Ballater, it is unnecessary to enter into details respecting it. *Pinus sylvestris* still occurs abundantly in its native state, but does not extend so far down as the Bridge of Potarch. *Betula alba*, also very abundant, continues to beyond Banchory, as does *Alnus glutinosa*. As we approach Banchory, the wood by the river increases, there being within two miles of it a considerable quantity of *Betula alba*, *Alnus glutinosa*, *Corylus Avellana*, *Quercus sessiliflora*, *Fraxinus excelsior*, and some *Ilex Aquifolium*. It is, however, still doubtful, whether the Ash be indigenous or planted.

The Hill of Fare, which rises to the height of 1793 feet, and is a mass of reddish granite, does not appear to produce any other plants than those common on the neighbouring hills and moors. The only remarkable species I have met with on it is *Carex pauciflora*, which is not very rare in Aberdeenshire, and which I have gathered in various places there, as on Lochnagar, in Glen Tanar, and at the eastern base of Clachnaben. At the southern foot of the hill is an undulated hollow extending from the Bog Loch in the parish

of Kincardine to the Loch of Park in the parish of Drumoak, and having nearly in the middle a marshy spot, called the Loch of the Leys, producing a copious vegetation of *Scirpus lacustris*, *Phragmites communis*, *Equisetum limosum*, *Carex ampullacea*, and other aquatic plants, of which the most remarkable with reference to our district is *Bidens cernua*, found there by Dr. Adams. This lake, the resort of numerous species of aquatic birds, had been formerly of considerable extent, but was diminished by a partially successful attempt to deepen its communication with the Dee, and is now nearly drained. *Nymphæa alba* and *Nuphar lutea* occur in both the other lochs; but as the vegetation of the Loch of Park has been already described, it is inexpedient to adduce it here.

To the eastward of the Hill of Fare is a lake, called the Loch of Skene, about a mile and a half in length, nearly half a mile in breadth, and, it is said, nowhere more than twelve feet deep. At its eastern extremity, which is sandy and shallow, *Lobelia Dortmanna* grows in considerable quantity, and at the other end, where the ground is peaty and swampy, there are numerous trees of *Salix pentandra*, which also grows at Murtle, on the river's edge, along with *Salix Helix*. *Peplis Portula* is plentiful in ditches by the road, in the parish of Drumoak. Round the Loch of Skene, and between it and Aberdeen, there are extensive tracts of Peat-moor, on some parts of which *Radiola millegrana* occurs.

But returning to the Dee, at Banchory, where the scenery is very beautiful, compared with the dull moors and low rounded ground of the surrounding country, we find there several plants of considerable interest: *Calamintha Acynos*, *Calamintha Clinopodium*, *Carduus heterophyllus*, *Alliaria officinalis*, *Solanum Dulcamara*, and *Fumaria capreolata*. *Plantago maritima* is seen here and there by the road about sixteen miles from the mouth of the river, the land in the

vicinity of which resumes the dry and rather sterile character which it generally presents in the upper tracts already passed over. The stream continues to glide along on its bed of pebbles, with a few stunted Alders and Willows here and there on its banks. In some parts of Drumoak, Peter-Culter, and Mary-Culter, however, there is a good deal of wood. On the pebbly beaches *Galium boreale* is frequently met with. *Statice Armeria* and *Oxyria reniformis* are not uncommon, and often attain a large size. *Alchemilla alpina*, *Arabis petraea*, and *Epilobium alpinum* occur here and there.

As we approach the Bridge of Dee, sylvan vegetation dwindles away to a few stunted Alders and Willows, and beyond this the margins of the river are naked, with exception of a steep bank between the railway and Wellington bridges, where there are a few not very thriving trees. *Galium boreale*, *Alisma Plantago*, *Polygonum Bistorta*, *Plantago maritima*, *P. Coronopus*, *Cochlearia officinalis*, attract our notice. At the Suspension Bridge, we meet with *Malva rotundifolia*, and a little beyond it with *Ruppia rostrata*. But we have now arrived at the estuary, which is not more than a mile in length. Proceeding to its mouth, where a pier runs out to protect it from the sands, which are seen extending along the coast to beyond the mouth of the Ythan, a distance of about fifteen miles. The territory of the Dee, however, terminates at a low rounded eminence called the Broad Hill, not more than half a mile distant. The sand-hillocks are covered with *Arundo arenaria*, *Triticum junceum*, *Festuca rubra*, and many of the plants usually found in such situations. A patch of *Elymus arenarius* at Foot Dee, is in great danger of being destroyed, as *Malva moschata*, which once grew here, has been.

From the mouth of the harbour, a rocky coast extends southward to Stonehaven, the portion of which belonging to the Dee-system appears to extend as far only as Durris. Along this coast there is a considerably diversified and

sometimes luxuriant vegetation. The more remarkable plants that occur as we proceed southward are: *Cochlearia officinalis*, *Armeria maritima*, *Pyrethrum maritimum*, *Ligusticum scoticum*, *Atriplex laciniata*, *Carex vulpina*, *Steenhammera maritima*, *Astragalus Hypoglottis*, *Plantago Coronopus*, *P. maritima*, *Helianthemum vulgare*, *Primula vulgaris*, *P. veris*, *Erythræa littoralis*, *Silene maritima*, *Heracleum Sphondylium*, *Angelica sylvestris*, *Saxifraga granulata*, *Geranium sanguineum*, *G. pratense*, *Carex distans*, *Salix repens*, *Prunus spinosa*, *Eupatorium cannabinum*, *Astragalus glycyphyllos*, *Juncus compressus*, *Rosa spinosissima*, and many more.

It cannot but seem strange that, on this coast, a station for *Osmunda regalis* should occur, on a crag near the fishing village called the Cove. A delicate variety of *Cistopteris fragilis* grows in a cave a little to the south of the harbour of the place just named. A great variety of Lichens crust the rocks: *Parmelia saxatilis*, *P. omphalodes*, *P. aquila*, *P. parietina*, *Lecanora parella*, *L. glaucoma*, *Squamaria murorum*, *Urceolaria scruposa*, *Lecidea atro-alba*, *L. atrovirens*, *L. rivulosa*, *L. confluens*, *L. sulphurea*, *Verrucaria Maura*, *Ramalina scopulorum*.

But returning from our digression, and ascending an eminence on our way to the city, we see afar the dimly descried ridges of the mountains from which we have descended. Looking back upon our course, we have before us the Dee, rapid and clear, flowing in a bed of pebbles, at first enclosed by low rounded eminences, as far as Upper Banchory, where the hills are more elevated than in the intervening space; then appearing in a large irregular plain, and expanding into a broad strong channel, or wearing its way into the vast heaps of granitic diluvium, of which it often exhibits sections sixty or eighty feet high. Then comes the Pass of Tullich, by which the Lowlands and all their horny-fisted, hard-hearted, mammon-worshipping inhabitants left behind, we enter the truly mountainous district

of the river. A long and slightly tortuous valley, bounded by strong and rounded hills, and abundantly wooded with Pine and Birch, extends to near the sources of the Dee, in search of which we turn to the north, enter a desolate valley, destitute of wood, striped with rolled stones and gravel, and ascend the glen of the Garchary, in the midst of the central Grampians. On either side are precipices and corries of great magnificence, in which lie patches of snow, and among which the alpine plants have found a place best fitted for their development.

The whole course of the river is comparatively sterile. There are no deep alluvial deposits of clay or mud, nor any extensive fields of rich ground. Blocks, boulders, and pebbles of granite, gneiss, hornblende, and porphyry, form the prevailing soil. Heath, Pine, and Birch are the prevailing plants. Oats, Bear, Potatoes, Turnips, Rye-grass, and Clover, are the plants chiefly cultivated. Wheat, however, succeeds pretty well within a few miles of Aberdeen. The pastures in the mountain districts are generally richer than those of the lower tracts; but they are of small extent, and in the whole course of the river, even in its whole system of hills, and valleys, and moors, there is not a single hill-top or mountain-slope covered with verdure, excepting a part of the serpentine range of Glen Muic, and a portion of Morven.

It is a beautiful country, notwithstanding. Its people have good cause to rejoice that it has been allotted to them. They have the second highest mountain, the best granite, the finest Pine-forest, in Britain. Purer air and more limpid water one needs not, and if he did, might go far before finding.

CHAPTER III.

THE FLORA OF THE DEE, ARRANGED ACCORDING TO THE
NATURAL SYSTEM.

For the benefit of science, and the amusement of the curious, I now present a list of all the Phænogamous or Flowering Plants, and a large number of Flowerless Plants observed by me in the river-system of the Dee as already defined. A very few species observed by others, and several stations for some of those seen elsewhere by myself, are added. But the list is not a compilation, it is the result of personal observation. In 1819, I traversed the district, collecting, examining, and noting all the plants that occurred. In 1830, I visited Braemar, and noted all the species that presented themselves. From 1841 to 1850, I traversed many parts of the lower tract of the Dee, and made an excursion to Lochnagar, and in the latter year I spent six weeks in exploring the upper district of the Dee, from Ballater to Braeriach. This careful examination, if it has not enabled me to include every species that occurs in the valley of the Dee, has prevented me from introducing into the catalogue a multitude of exotic plants, such as the authors of local Floras generally introduce, apparently for the purpose of swelling their lists, but greatly to the detriment of science. Thus, in Mr. Gardiner's Flora of Forfarshire, we find the *Berberis vulgaris*, *Acer Pseudo-platanus*, *Acer campestre*, *Geranium phæum*, *Fagus sylvatica*, *Castanea vulgaris*, *Salix alba*, *S. Russelliana*, and many others, which are nowhere indigenous in Forfarshire. And thus in Dr. Dickie's "*Flora Abredonensis*" are enumerated thirty-six species, most of them,

however, marked as doubtful natives, which certainly ought to be excluded, and their places occupied by about the same number of indigenous plants known to me as occurring in the district. The lists given in the statistical account of Aberdeenshire and Kincardineshire are frequently of little use, as they contain palpable indications of inaccuracy. They are not all, however, of this character. So far from wishing to present a list respectable by its magnitude, I have endeavoured to reduce our Flora to its minimum size—rather to keep it within due bounds, by including in it only the native and naturalised plants.

The Regions indicated by the contracted words Lowl., Upl., Subalp., Alp., are,

1. The Lowland Region, from the sea to the height of 500 feet.
2. The Upland Region, from 500 to 1500 feet.
3. The Subalpine Region, from 1500 to 2500 feet.
4. The Alpine Region, from 2500 to the summits of the higher mountains.

I.—FLOWERING PLANTS.

CLASS I.—DICOTYLEDONEÆ.

SECTION I.—EXOGENÆ.

DIVISION I.—THALAMIFLORÆ.

ORDER I.—RANUNCULACEÆ.

- Thalictrum alpinum*. Subalp. Alp. Moist rocky and gravelly places. Mona-rua and Lochnagar groups.
- T. minus*. Lowl. Aberdeen Links. Sand. Not observed anywhere in the interior.
- Anemone nemorosa*. Lowl. Uplands. Subalp. Woods and pastures.
- Ranunculus aquatilis*. Lowl. Upl. Ponds, pools, and streams.
- R. hederaceus*. Lowl. Upl. Wet places, ditches, muddy margins of streams and pools.
- R. Flammula*. Lowl. Upl. Subalp. Wet places, margins of lakes, pools and streams. Var. *reptans*. By subalpine and alpine streams and pools.
- R. Lingua*. Lowl. Loch of Achlossan, in Lumphanan.
- R. Ficaria*. Lowl. Upl. Woods, shady places among blocks or stones, wet pastures.
- R. auricomus*. Lowl. Corby Den, Maryculter. Banchory, Dr. Adams.
- R. acris*. Lowl. Upl. Subalp. Meadows, pastures, thickets. Var. *pumilus*. Alp. Mona-rua.

- R. repens.* Lowl. Upl. Waste places, fields, pastures.
R. bulbosus. Lowl. Upl. Pastures.
R. sceleratus. Lowl. Wet places. Found only about Aberdeen.
Caltha palustris. Lowl. Upl. Subalp. Alp. By lakes, pools,
 and streams. Var. *minor.* On moors of the Mona-rua range.
Trollius Europæus. Lowl. Upl. Subalp. Alp. Woods, thickets,
 pastures, rocks.
Aquilegia vulgaris. Lowl. Pastures and thickets by the Dec.
 Balbridie in Banchory Ternan. Aboyne. Mr. A. Thomson.

ORDER II.—NYMPHÆACEÆ.

- Nymphæa alba.* Lowl. Upl. Loch of Park, Loch Dava, Loch
 Ceannor, and other lochs.
Nuphar lutea. Lowl. Upl. Loch of Park, Loch Dava, Loch
 Ceannor.
N. pumila. Loch Ceannor. Dr. Dickie.

ORDER III.—PAPAVERACEÆ.

- Papaver Rhæas.* Lowl. Upl. Cornfields.
P. dubium. Lowl. Upl. Cornfields.

ORDER IV.—FUMARIACEÆ.

- Corydalis claviculata.* Lowl. Upl. Bushy places in gravelly soil.
 Den of Culter; Murtle; and many other places, as far as
 Aboyne.
Fumaria capreolata. Lowl. Cultivated and waste ground.
F. officinalis. Lowl. Upl. Cultivated and waste ground.
F. Vaillantii. Lowl. Cultivated and waste ground.

ORDER V.—CRUCIFERÆ.

- Nasturtium officinale.* Lowl. Upl. Brooks, ditches, and other
 wet places.
N. palustre. Lowl. On the Inch. Dr. Dickie.
Barbarea vulgaris. Lowl. Upl. Common in waste places, and
 by walls and roads.

- Arabis hirsuta*. Glen Callater, Banchory Ternan. Rev. J. Bricchan.
- Arabis petræa*. Alp. Ben-na-muic-dhui, Cairn Toul, Braeriach, Ben-na-buird, also by streams in the subalp. upl. and even lowl. regions.
- Cardamine hirsuta*. Lowl. Upl. Subalp. Alp. Rocky and stony places. *C. sylvatica*, in shady places, in woods, or among rocks.
- C. pratensis*. Lowl. Upl. Subalp. Alp. Meadows and moist pastures.
- C. amara*. Lowl. Den of Rubislaw, Wood at Murtle, Den of Culter. Mr. James Farquharson.
- Sisymbrium officinale*. Lowl. Upl. Waste ground, by walls, and roads.
- S. Thalianum*. Lowl. Dry banks along the lower course of the Dee.
- Alliaria officinalis*. Lowl. Rubislaw Den, Den of Leggart, always near houses.
- Brassica campestris*. Lowl. Upl. Corn fields. Ballater, Abergairn.
- Sinapis arvensis*. Lowl. Upl. Cultivated ground.
- Draba verna*. Lowl. Upl. Dry barren ground, pastures, wall-tops.
- Cochlearia officinalis*. Lowl. Alp., and by the Dee in its whole length. Var. *Grænländica*, so called, growing on the highest mountains, is carried down by the streams, becomes more frequent toward the mouth of the Dee, and there blends with the maritime form.
- C. danica*. Lowl. Maritime. Estuary of the Dee, and coast of Kincardineshire, Cove. Mr. P. Macgillivray.
- Thlaspi arvense*. Lowl. Common in fields about Aberdeen and the Cove.
- Teesdalia nudicaulis*. Lowl. Upl. Gravelly and sandy places, and dry pastures.
- Lepidium Smithii*. Lowl. Common along the lower course of the Dee.
- Capsella Bursa-pastoris*. Lowl. Upl. Cultivated ground, waste places, and loose soil.
- Subularia aquatica*. Lowl. Upl. Loch of Park, Loch Muic, Loch Callater.

Cakile maritima. Lowl. Maritime. Aberdeen sands, Estuary of the Dee, Bay of Nigg.

Raphanus Raphanistrum. Lowl. Upl. Cornfields.

ORDER VI.—RESEDACEÆ.

Reseda Luteola. Lowl. Peter Culter, Aboyne, near Morison's Bridge. Mr. P. Macgillivray.

ORDER VII.—CISTINEÆ.

Helianthemum vulgare. Lowl. Upl. Subalp. Pastures, banks, and rocky places.

ORDER VIII.—VIOLACEÆ.

Viola palustris. Lowl. Upl. Subalp. Marshy places, bogs, wet pastures.

V. canina. Lowl. Upl. Subalp. Alp. Banks, thickets, pastures, rocks.

V. lutea. Upl. Spital of Glen Muic, with yellow and variegated flowers; Glen Gairn and Glen Clunie with purple flowers.

V. tricolor. Lowl. Upl. Several varieties, including *arvensis*. Sandy maritime pastures, loose soil, and cultivated ground.

ORDER IX.—DROSERACEÆ.

Drosera rotundifolia. Lowl. Upl. Subalp. Wet places, mostly in peaty soil.

D. anglica. Lowl. Upl. Peat bog in Drumoak. Glen Dee. Mr. P. Macgillivray. Glen Callater. Mr. A. Clark.

Parnassia palustris. Lowl. Upl. Subalp. Wet moors and pastures.

ORDER X.—POLYGALÆÆ.

Polygala vulgaris. Lowl. Upl. Subalp. Pastures, heaths.

ORDER XI.—ELATINEÆ.

Elatine hexandra. Lowl. East end of Loch of Park.

ORDER XII.—CARYOPHYLLÆ.

- Silene inflata*. Lowl. Only in cultivated ground or its vicinity, and not common.
- S. maritima*. Lowl. Alp. On the Mona-rua and Lochnagar groups, and the serpentine range of Coial in Glen Muic; thence along the Dee, often in great abundance, to its mouth, where the maritime individuals commence and extend along the rocky coast.
- S. acaulis*. Alp. In dense patches on the Mona-rua mountains.
- Lychnis Flos-Cuculi*. Lowl. Upl. Subalp. Marshy places, wet pastures.
- L. vespertina*. Lowl. Upl. Cultivated fields, or their vicinity, dry banks, thickets.
- L. diurna*. Lowl. Upl. Subalp. Alp. Woods, thickets, shady places among rocks or blocks, sometimes pastures.
- L. Githago*. Lowl. Upl. Cornfields, chiefly among wheat, of which there is very little in the district, and barley.
- Sagina procumbens*. Lowl. Upl. Subalp. Alp. Gravelly or sandy places.
- S. maritima*. Lowl. Moist, sandy, or gravelly places near the sea.
- S. apetala*. Lowl. About Aberdeen, and along the rocky coast.
- S. saxatilis*. Alp. Gravelly places and rocks. Ben-na-buird.
- S. subulata*. Lowl. Dry, gravelly, and rocky places.
- S. nodosa*. Lowl. Upl. Moist ground, in sand, gravel, or peat. Along the coast, and at Drumoak and several other localities.
- Spergula arvensis*. Lowl. Upl. Cultivated and waste ground, in sand, peat, or any kind of soil.
- Alsine rubra*. Lowl. Upl. Gravelly and sandy soil.
- A. marina*. Lowl. Maritime. Estuary of the Dee.
- A. peploides*. Lowl. Maritime. Sands at Aberdeen; also occasionally along the rocky coast.
- Arenaria serpyllifolia*. Lowl. Upl. Dry pastures and fields, sandy or gravelly places, wall-tops.
- Stellaria ccrastoides*. Alp. By rills, Mona-rua mountains.
- S. media*. Lowl. Upl. Cultivated and waste ground, woods.
- S. Holostca*. Lowl. Upl. Banks of streams, thickets.

- S. graminea*. Lowl. Upl. Grassy places, and among bushes.
S. uliginosa. Lowl. Upl. Subalp. Alp. Marshy places, bogs, and rills.
Cerastium glomeratum. Lowl. Upl. Fields, and by roads and ditches.
C. triviale. Lowl. Upl. Subalp. Fields, pastures, and by roads.
C. semidecandrum. Lowl. Maritime. In sand.
C. atrovirens. Lowl. Maritime. Aberdeen Links. At the Cove, Mr. James Farquharson.
C. tetrandrum. Lowl. Maritime. In sand, and among rocks.
C. alpinum. Subalp. Alp. Lochnagar, Coial.
C. latifolium. Subalp. Alp. Cairntoul. Ben-na-muic-dhui.
C. arvense. Lowl. Various places along the Dee, from Aberdeen to Banchory, in fields and pastures; near Bridge of Ruthrieston. Balbridie. Mary Culter. Mr. P. Macgillivray.

ORDER XIII.—HYPERICINÆ.

- Hypericum perforatum*. Rubislaw Den.
H. quadrangulum. Lowl. Upl. Wet places.
H. humifusum. Lowl. Upl. Pastures, fields, banks of ditches.
H. hirsutum. Lowl. Thickets, woods.
H. pulchrum. Lowl. Upl. Subalp. Dry gravelly places, moors, rocks.

ORDER XIV.—GERANIACEÆ.

- Geranium sylvaticum*. Lowl. Upl. Subalp. Along the Dee and its tributaries, up to Corrymulzie, Glen Ey, Corry of Lochnan-eun Ceannor.
G. pratense. Lowl. Upl. Among rocks at Port Lethen. Bræmar.
G. sanguineum. Lowl. Rocky banks on the coast.
G. pusillum. Lowl. Gravelly places and pastures, in Peter Culter. Banchory Ternan. Rev. J. Brichan.
G. dissectum. Lowl. Upl. Common in fields.
G. molle. Lowl. Upl. Fields and grassy places, also in loose sand or gravel.
G. lucidum. Lowl. The only station is in the Den of Rubislaw.

G. Robertianum. Lowl. Upl. Subalp. Woods, thickets, among rocks or stones.

Erodium cicutarium. Lowl. Mostly near the sea, in sand, sandy pastures, stony or gravelly places.

ORDER XV.—LINEÆ.

Linum catharticum. Lowl. Upl. Subalp. Alp. Pastures and heaths.

Radiola millegrana. Lowl. Upl. Wet places on moors dried in summer, margins of pools or lakes; near the Bay of Nigg, moors on the Skene road, upper margin of Loch Ceannor, Loch of Park. Mr. James Farquharson.

ORDER XVI.—OXALIDEÆ.

Oxalis Acetosella. Lowl. Upl. Subalp. Woods, thickets, shady places, by streams.

ORDER XVII.—MALVACEÆ.

Malva sylvestris. Lowl. On banks and by walls, in a few places, perhaps from gardens, it being often cultivated.

M. rotundifolia. Lowl. At the south end of Wellington Bridge, Aberdeen. Among sand at Footdee. Dr. Dickie.

DIVISION II.—CALYCIFLORÆ.

ORDER XVIII.—LEGUMINOSÆ.

Ulex europæus. Lowl. Upl. Plentiful in the lower parts of the course of the Dee, rare beyond Ballater, scarcely seen above Invercauld.

Genista anglica. Lowl. Upl. Subalp. Plentiful on dry moors, as far up as Loch Callater, Glen Ey, and the base of Benna-muic-dhui.

Sarothamnus scoparius. Lowl. Upl. Plentiful as far as Ballater, rare above Crathie.

- Ononis arvensis*. Sand hills, near the Broad Hill, Aberdeen.
Mr. James Farquharson.
- Medicago lupulina*. Lowl. Upl. Pastures, fields, and roadsides.
- Trifolium pratense*. Lowl. Upl. Pastures. Rare beyond Bal-
later.
- T. medium*. Lowl. Upl. Subalp. Common along the Dee, as
far as the Linn.
- T. repens*. Lowl. Upl. Subalp. Pastures, fields, and by roads.
- T. procumbens*. Lowl. Banks, by roads, gravelly and sandy
places.
- T. filiforme*. Lowl. Upl. Pastures, banks, gravelly places.
- Lotus corniculatus*. Lowl. Upl. Subalp. Alp. Pastures, banks,
by roads.
- L. major*. Lowl. Upl. Pastures and fields.
- Anthyllis Vulneraria*. Lowl. Upl. Pastures, sandy and gravelly
soil, and on the stony beaches of streams.
- Astragalus hypoglottis*. Lowl. Pastures, plentiful along the coast.
- A. alpinus*. Subalp. Little Craig-an-dal. Dr. Balfour.
- Vicia sylvatica*. Lowl. Rocky sea-banks. Between Findon and
the Cove.
- V. Cracca*. Lowl. Upl. Pastures, margins of fields, and by roads
and ditches.
- V. sepium*. Lowl. Upl. Pastures, thickets, and grassy banks.
- V. sativa*. Lowl. Upl. Fields and by walls.
- V. angustifolia*. Lowl. Pastures, gravelly or sandy places.
- V. lathyroides*. Lowl. Aberdeen Links.
- V. hirsuta* (*Ervum*, Sm.). Lowl. Fields and by walls.
- V. sylvatica*. Abundant. In the wood at Balmoral. Dr. Dickie.
- Lathyrus pratensis*. Lowl. Upl. Pastures, margins of fields, and
by roads and ditches.
- Orobis tuberosus*. Lowl. Upl. Subalp. Heaths, pastures, woods.

ORDER XIX.—ROSACEÆ.

- Prunus spinosa*. Lowl. Upl. Along the Dee, as far up as Cor-
rymulzie. Fruit ripens at Braichley Burn and Micras.
- P. Padus*. Lowl. Upl. Along the Dee and its larger tributaries,
up to Inver Ey.

- P. Avium.* Lowl. Upl. Along the Dee and several of its tributaries, up to Cas.
- Spiræa salicifolia.* Lowl. Damp woods and thickets. Apparently not indigenous.
- S. Ulmaria.* Lowl. Upl. By streams, pools, and ditches; often also in dry stony places.
- Dryas octopetala.* Alp. Subalp. Cairntoul. Mr. P. Macgillivray. Little Craig-an-dal.
- Geum urbanum.* Lowl. Upl. Subalp. Thickets, woods, pastures.
- G. rivale.* Lowl. Upl. Subalp. Alp. Wet places, and by streams.
- Alchemilla vulgaris.* Lowl. Upl. Subalp. By streams.
- A. alpina.* Subalp. Alp.; but by streams in the upland, and by the Dee in the lowland region also.
- A. arvensis.* Lowl. Upl. Cultivated ground, by roads, and on wall-tops.
- Sibbaldia procumbens.* Subalp. Alp. Mona-rua mountains. Not uncommon on other mountains. Dr. Dickie.
- Potentilla anserina.* Lowl. Upl. Pastures, fields, and by roads.
- P. alpestris.* Upl. Subalp. Crathie, on limestone rocks opposite Invercauld.
- P. reptans.* Lowl. Upl. Den of Rubislaw.
- P. Tormentilla.* Lowl. Upl. Subalp. Alp. Moors and pastures. Var. *procumbens*, (*T. reptans*. Linn.) Lowl. Roadside near the Old Church of Nigg.
- P. Fragariastrum.* Lowl. Upl. Thickets and pastures.
- Comarum palustre.* Lowl. Upl. Pools, streams, peat bogs, lakes.
- Fragaria vesca.* Lowl. Upl. Thickets, by streams, and on banks.
- Rubus Idæus.* Lowl. Upl. Subalp. By the Dee and its tributaries; about walls, in old quarries and pits, and among stones.
- R. nitidus.* Braemar.
- R. subcrectus.* Lowl. Upl. Braemar.
- R. discolor.* *R. fruticosus.* *R. corylifolius.* Lowl. Upl. Generally distributed.
- R. saxatilis.* Lowl. Upl. Thickets, woods, pastures.
- R. Chamæmorus.* Upl. Subalp. Alp. Among heath. Lochnagar.

- Rosa spinosissima.* Lowl. Upl. Subalp. Dry or stony ground, from the maritime cliffs to Braemar.
- R. rubella.* Banks of the Dee about Abergeldy. Anderson.
- R. Sabini.* Lowl. Upl. Thickets, stony places; along the Dee, in Braemar and Crathie.
- R. villosa.* Lowl. Upl. Thickets, stony places, pastures; from Aberdeen to Braemar.
- R. tomentosa.* Lowl. Upl. Thickets, stony places, pastures; from Aberdeen to Braemar.
- R. canina.* Lowl. Upl. Thickets, stony places, pastures; from Aberdeen to Glen Ey and Glen Lui.
- R. inodora.* Upl. Thickets, stony places, dry heaths; from Banchory to Castletown.
- R. cæsius.* Lowl. Upl. Thickets, stony places; Ballater to Castletown.
- Pyrus aucuparia.* Lowl. Upl. Subalp. Woods, rocks.

ORDER XX.—LYTHRARIÆ.

- Peplis Portula.* Lowl. Ditches by the road to Banchory, wet places on Stocket Moor, Loch of Park.

ORDER XXI.—ONAGRARIÆ.

- Epilobium angustifolium.* Lowl. Upl. Rocks, chiefly by streams; Corby Den, Mary Culter, rocks on Pananich Hills, Craig-ghinai, Fall of the Muic, Glen Candlic, Corrymulzie, Glen Ey, Glen Dee. Mr. P. Macgillivray.
- E. parviflorum.* Marsh at Findon. Mr. James Farquharson. Loch of Skene. Mr. Burnett.
- E. montanum.* Lowl. Upl. Woods and rocky places.
- E. palustre.* Lowl. Upl. Marshy places, ditches.
- E. tetragonum.* Lowl. Upl. Marshy places, ditches.
- E. alsinifolium.* Upl. Subalp. Brooks. Glen Callater.
- E. alpinum.* Upl. Subalp. Alp. Brooks and moist rocky places.
- Circæa alpina.* Lowl. Upl. Den of Rubislaw, probably not indigenous; woods in Braemar. *C. intermedia*, and approximations to *C. lutetiana* also occur; but all these forms are specifically identical.

ORDER XXII.—HALORAGÆ.

Myriophyllum spicatum. Lowl. Upl. Lakes, pools, and still water, as far up as Loch Callater.

Hippuris vulgaris. Lowl. Upl. Lakes, pools, marshy places.

Callitriche verna. Lowl. Upl. Lakes, pools, ditches.

C. platycarpa. Lowl. Upl. Ditches near Aberdeen, as at Stocket. Mr. P. Macgillivray.

C. pedunculata. Lowl. Loch Ceannor. Mr. James Farquharson.

C. autumnalis. Lowl. Upl. Subalp. Alp. Lakes, pools, Loch of Park.

ORDER XXIII.—PORTULACÆ.

Montia fontana. Lowl. Upl. Subalp. Alp. By streams and in wet places.

ORDER XXIV.—PARONYCHIACÆ.

Scleranthus annuus. Lowl. Upl. Subalp. Fields, pastures, gravelly, sandy, or rocky places.

ORDER XXV.—CRASSULACÆ.

Sedum Rhodiola. Subalp. Alp. Rocks. Lochnagar; Braeriach.

S. villosum. Lowl. Upl. Marshy places.

S. acre. Lowl. Upl. Sandy or gravelly places, wall tops, roofs of cottages.

ORDER XXVI.—SAXIFRAGÆ.

Saxifraga stellaris. Upl. Subalp. Alp. Springs, rills, moist rocks.

S. aizoides. Lowl. Upl. Subalp. By rills and brooks, and in wet places.

S. cæspitosa. Subalp. or Alp. Ben-na-buird. Mr. M'Nab, 1830. Ben-Aun. Dr. M. Barry.

S. hypnoides. Upl. Subalp. By Loch Muic, on Coial, Corry of Loch Ceannor.

S. granulata. Lowl. Cove.

- S. rivularis*. Alp. Cairntoul; Lochnagar; Ben-na-buirid.
S. nivalis. Alp. Head of Glen Callater. Braeriach. J. Backhouse.
S. oppositifolia. Upl. Subalp. Alp. Mona-rua mountains.
Chrysosplenium oppositifolium. Lowl. Upl. Subalp. Alp. Rills
 and wet places.
C. alternifolium. Lowl. Woods in Mary Culter.

ORDER XXVII.—UMBELLIFERÆ.

- Hydrocotyle vulgaris*. Lowl. Upl. Subalp. Alp. Wet places.
Sanieula europæa. Lowl. Upl. Subalp. Woods and thickets.
 Corby Den. Banchory Ternan. Rev. J. Brichtan. Coull. P. H.
 Macgillivray.
Heloseiadium inundatum. Lowl. Lakes, pools, marshes.
Ægopodium Podagraria. Lowl. Upl. Waste places.
Bunium flexuosum. Lowl. Upl. Pastures, heaths, and banks.
Pimpinella Saxifraga. Lowl. Upl. Subalp. Pastures, banks.
Ænanthe eroeata. Lowl. Farm of Ley, near the Castle of Crathie.
 Dr. Adams.
Æthusa Cynapium. Lowl. Waste places and fields. About
 Aberdeen.
Ligusticum seotieum. Lowl. Maritime. Along the rocky coast.
Meum athamantieum. Lowl. Upl. Subalp. Pastures. Rare in
 the lower, common in the upper parts, along the Dee, and its
 larger tributaries.
Angelica sylvestris. Lowl. Upl. Subalp. Watery places, woods,
 rocks; as far up as Glen Callater, Glen Ey, and Glen Dee.
Heracleum Sphondylium. Lowl. Upl. Waste places, banks, pas-
 tures, thickets.
Torilis Anthriscus. Lowl. Near the Manse of Drumoak; also
 near the New Church, Peter Culter. Mr. James Farquharson.
 In several other places along the Dee. P. Macgillivray.
Scandix Peecten. Lowl. In fields, but rarely. P. Macgillivray.
Anthriscus sylvestris. Lowl. Upl. Waste places, banks, thickets.
A. vulgaris. Lowl. Waste places. About Aberdeen.
Myrrhis odorata. Lowl. Upl. Naturalised in various places,
 mostly near houses.
Conium maculatum. Lowl. Abundant about Aberdeen.

ORDER XXVIII.—ARALIACEÆ.

- Adoxa Moschatellina.* Lowl. Shady places, in woods or thickets. On a bank near Dr. Morison's Bridge, Banchory Devenick; Corbie Den, and banks of the Dee at Kingcaussie; Banchory Ternan. Dr. Adams.
- Hedera Helix.* Lowl. Upl. Spreading on the ground, or ascending rocks, walls, or trees.

ORDER XXIX.—CORNEÆ.

- Cornus suecica.* Subalp. Alp. Wet places among heath. Lochnagar and Mona-rua groups.

DIVISION III.—COROLLIFLORÆ.

ORDER XXX.—CAPRIFOLIACEÆ.

- Viburnum Opulus.* Lowl. Banchory Ternan. Rev. J. Brichan. Ruspot, Culter. Dr. Duncan.
- Lonicera Periclymenum.* Lowl. Upl. On rocks, and in thickets.
- Linnæa borealis.* Lowl. In pine woods. Near Banchory House, Countess Wells, Kingcaussie, Durriss, Drum, Park woods of Tilahilly, Banchory Ternan. Dr. Adams. Banks of Loch Muic. Dr. Murray.

ORDER XXXI.—RUBIACEÆ.

- Sherardia arvensis.* Lowl. Upl. Fields.
- Asperula odorata.* Lowl. Upl. Thickets, woods, by streams. Corby Den; Corrymulzie. Den between Mary Culter and Durriss. P. Macgillivray.
- Galium palustre.* Lowl. Upl. Marshy places.
- G. Mollugo.* Lowl. Upl. Castletown of Braemar.
- G. verum.* Lowl. Upl. Subalp. Pastures.
- G. saxatile.* Lowl. Upl. Subalp. Pastures, woods, banks, walls.
- G. uliginosum.* Lowl. Upl. Marshy places.
- G. Aparine.* Lowl. Upl. Waste places, by fences, and in thickets.

G. boreale. Lowl. Upl. Subalp. By streams and in marshy places; abundant.

ORDER XXXII.—DIPSACEÆ.

Scabiosa suceisa. Lowl. Upl. Subalp. Alp. Pastures, thickets, woods, heaths.

Knautia arvensis. Craiglug. Mr. A Smith.

ORDER XXXIII.—VALERIANACEÆ.

Valeriana officinalis. Lowl. Upl. Banks, thickets, by streams.

Valerianella olitoria. Lowl. Fields and gravelly places, by the Dee, near Aberdeen.

ORDER XXXIV.—COMPOSITÆ.

Eupatorium cannabinum. Lowl. On the rocky coast, south of the Cove.

Petasites vulgaris. Lowl. By streams. In many places.

Tussilago Farfara. Lowl. Upl. By streams, borders of fields, and road-sides.

Aster Tripolium. Inch at Aberdeen. Dr. Dickie.

Erigeron alpinus. Subalp. Alp. Cairntoul; Corry of Loch Ceannor.

Bellis perennis. Lowl. Upl. Subalp. Pastures, and cultivated, and waste ground.

Solidago Virgaurea. Lowl. Upl. Subalp. Rocky places by streams.

Bidens cernua. Lowl. Loch of Leys, near Banchory. Dr. Adams.

Achillea Ptarmica. Lowl. Upl. Subalp. Fields, pastures, by ditches and streams.

A. Millefolium. Lowl. Upl. Subalp. Pastures and fields.

Chrysanthemum Leucanthemum. Lowl. Upl. Pastures as far up as Glen Ey.

C. segetum. Lowl. Upl. Cultivated ground.

Pyrethrum inodorum. Lowl. Upl. Cultivated ground. Var. *maritimum*. Plentifully along the rocky coast.

- Artemisia vulgaris.* Lowl. Upl. Waste places, banks, and sometimes pastures.
- Tanacetum vulgare.* Lowl. Upl. Waste places, banks, and sometimes pastures, not indigenous, but, I think, sufficiently naturalised.
- Filago germanica.* Lowl. Dry fields in Drumoak, pastures, and wall-tops.
- Filago minima.* Lowl. Upl. Dry ground and wall-tops.
- Gnaphalium uliginosum.* Lowl. Upl. Wet ground.
- G. sylvaticum.* (*G. rectum.*) Lowl. Upl. Subalp. Alp. Pastures, gravelly places, rocks; abundant in the middle and upper parts of the course of the river.
- G. supinum.* Upl. Subalp. Alp. On detritus and rocks, in open places, and by rills and brooks, descending by the streams to the lower tracts.
- Antennaria dioica.* Lowl. Upl. Subalp. Dry moors.
- Senecio vulgaris.* Lowl. Upl. Cultivated ground.
- S. sylvaticus.* Lowl. Upl. Gravelly soil, very abundant. *S. viscosus* I have never met with.
- S. Jacobæa.* Lowl. Upl. Cultivated ground; very abundant everywhere.
- S. aquaticus.* Lowl. Wet places, by streams, and marshy meadows.
- Saussurea alpina.* Subalp. Alp. Cairntoul; Corry of Loch Ceannor. Glen Callater. Lochnagar. Dr. Dickie.
- Centaurea nigra.* Lowl. Upl. Pastures, thickets.
- C. Cyanus.* Lowl. Upl. Cultivated ground.
- Arctium minus.* (*A. Lappa*, Sm.) Waste ground and pastures. Cove, and various places in Peter Culter and Drumoak.
- Carduus acanthoides.* Lowl. Waste places and banks, about Aberdeen.
- C. lanceolatus.* Lowl. Upl. Fields, pastures, waste places.
- C. arvensis.* Lowl. Upl. Fields, waste places, pastures.
- C. palustris.* Lowl. Upl. Subalp. Marshy or wet ground.
- C. heterophyllus.* Lowl. Upl. Subalp. Pastures, thickets, woods, waste ground; rare in the lower, plentiful in the upper tracts.
- Lapsana communis.* Lowl. Upl. Cultivated and waste ground.

- Arnoseris pusilla*. By the road from the Ferry at Drumoak, south side. Mr. Ronald Maekay, 1849.
- Hypochoeris radicata*. Lowl. Upl. Pastures, banks, waste ground.
- Oporinia autumnalis*. Lowl. Upl. Subalp. Alp. Pastures.
 Var. *sordida*, with hairy leaves, and shaggy involucre, occurs in upland and subalpine places in Upper Braemar. Var. *Taraxaei*, with nearly glabrous leaves, and hairy involucre, is common on the mountains.
- Tragopogon pratensis*. Lowl. Sand-hilloeks near the Broad Hill, Aberdeen.
- Taraxaeum officinale*. Lowl. Upl. Subalp. Alp. In cultivated ground and its vicinity, the form is that considered as characteristic, or with the outer scales of the involucre linear and deflexed; in moorland, when dry, the outer scales are lax or spreading; in marshy places they are adpressed, and then the plant is by some considered a distinct species, by others a variety, named *palustre*. As to the alleged differences in the fruit, I believe they are worth nothing. The truly wild form is this latter, *palustre*; all the others result from changes produced in this species.
- Crepis virens*. Lowl. Upl. Fields and banks. Scarcely indigenous, but appearing occasionally in grass fields and their neighbourhood.
- Crepis paludosa*. Lowl. Upl. Subalp. Marshy or wet ground, and by streams.
- Sonchus oleraceus*. Lowl. Upl. Cultivated ground, waste places, and road-sides. *S. asper* is nothing but a variety, and if such characters as it presents were to be taken as distinctive, several other varieties or species might be indicated. (Most English botanists regard *S. asper* as a species.—ED.)
- S. arvensis*. Lowl. Upl. Among corn.
- Mulgedium alpinum*. Alp. Corry of Lochnagar.
- Hieracium Pilosella*. Lowl. Upl. Subalp. Sand, gravel, pastures, walls, rocks.
- H. alpinum*. Alp. Lochnagar, about half-way up the precipice in the Corry. Glen Callater, most of the Braemar hills.
- H. Halleri*. Subalp. Alp. Lochnagar.

- H. rupestre.* Cairntoul. Mr. Backhouse.
- H. nigrescens.* Subalp. Alp. Braemar, Lochnagar, Ben-na-muic-dhui.
- H. murorum.* Lowl. Upl. Subalp. Alp. Rock, quarries, walls, woods.
- H. atratum.* Cairntoul.
- H. Schmidtii.* Upl. Subalp. Braemar; Glen Muic.
- H. Lawsoni.* Upl. Subalp. Lochnagar. Banks of Dee, between Ballater and Balmoral. Dr. Dickie.
- H. cerinthoides.* Braemar. P. Macgillivray.
- H. prenanthoides.* Lowl. Upl. Subalp. By streams, in thickets. Glen Clunie, Muic, Corrymulzie, and along the Dee to Peter Culter.
- H. inuloides.* Upl. Subalp. Woods and thickets.
- H. boreale.* Lowl. Upl. Thickets, by streams.
- H. villosum.* Rocks near Loch Callater. Mr. T. Drummond.
- H. vulgatum.* Lowl. Upl. Quarries, gravelly and sandy places, banks, walls, and woods.

ORDER XXXV.—CAMPANULACEÆ.

- Lobelia Dortmanna.* Lowl. Upl. Lochs of Skene, Park, Ceannor, Dava, Muic, Callater. Loch between Aboyne and Loch Ceannor, P. Macgillivray.
- Campanula latifolia.* Lowl. Upl. Rubislaw Den, Dr. Dickie. Gairn Bridge, Mr. P. Macgillivray. Corrymulzie.
- C. rotundifolia.* Lowl. Upl. Subalp. Alp. Pastures, on banks, and in rocky places.

ORDER XXXVI.—ERICACEÆ.

- Arctostaphylos Uva-ursi.* Lowl. Upl. Subalp. Alp.
- Calluna vulgaris.* Lowl. Upl. Subalp. Alp. In sand, gravel and peat.
- Erica Tetralix.* Lowl. Upl. Subalp. Wet places, generally in peaty soil.
- E. cinerea.* Lowl. Upl. Subalp. In sand, gravel, and peat.
- Azalea procumbens.* Subalp. Alp. In dry soil, among gravel, on rock, or in peaty soil. Lochnagar, Cairntoul, Ben-na-muic-dhui, Little Craig-an-dal.

- Vaccinium Myrtillus*. Lowl. Upl. Alp. Subalp. In woods and open ground, among blocks, or in soil of various kinds.
- V. uliginosum*. Upl. Subalp. Alp. Mona-rua range. Corry of Lochnagar.
- V. Vitis-idea*. Lowl. Upl. Subalp. Moors, woods, rocky stony, gravelly, or peaty ground.
- V. Oxycoccus*. Lowl. Upl. Mossy bogs and marshy places.
- Pyrola rotundifolia*. Lowl. Upl. Head of Loch Muic. Linn of Garwalt. Dr. Dickie.
- P. media*. Lowl. Upl. Subalp. Among heath, and in woods.
- P. minor*. Lowl. Upl. Among heath, and in woods.
- P. secunda*. Lowl. Upl. Woods. Rocks, Glen Callater.

ORDER XXXVII.—ILICINEÆ.

- Ilex Aquifolium*. Lowl. Upl. Banks and rocks, scattered along the Dee from Aberdeen to Castletown, Scor-an-fhidnich, Ballater. Common in Banchory Ternan and Durrus.

ORDER XXXVIII.—OLEACEÆ.

- Fraxinus excelsior*. Lowl. Upl. In the lower and middle parts of the course of the Dee. Not above Micras. A rather doubtful native.

ORDER XXXIX.—GENTIANACEÆ.

- Erythræa linariifolia*. Lowl. Coast of Kincardineshire, near the Altens.
- Gentiana campestris*. Lowl. Upl. Dry pastures.
- Menyanthes trifoliata*. Lowl. Upl. Subalp. Alp. Lakes, pools, bogs, streams.

ORDER XL.—CONVOLVULACEÆ.

- Convolvulus arvensis*. Lowl. Roadside near old Church of Nigg.

ORDER XLI.—BORAGINEÆ.

- Anchusa sempervirens*. Lowl. Apparently naturalised in many places, near houses.

- Lycopsis arvensis*. Lowl. Upl. Fields and gardens.
- Symphytum officinale*. Lowl. Waste ground and fields, of rare occurrence.
- S. tuberosum*. Lowl. Pastures, thickets, woods.
- Echium vulgare*. Lowl. Fields—accidental, I think; not permanent anywhere that I have seen. Banchory Devenick; Peter Culter. Mr. J. Farquharson.
- Steenhammaria maritima*. Lowl. Bay of Nigg.
- Lithospermum arvense*. Lowl. Upl. Fields, and loose soil, or gravel.
- Myosotis palustris*. Lowl. Upl. Subalp. Wet places.
- M. repens*. Lowl. Upl. Wet places.
- M. cæspitosa*. Lowl. Upl. Wet places.
- M. sylvatica*. Rubislaw Den. Mr. J. Farquharson. Wood at Kingcaussie. Mr. Edgeworth.
- M. arvensis*. Lowl. Upl. Sandy or other loose soil, fields, waste places.
- M. collina*. Lowl. Aberdeen Links.
- M. versicolor*. Lowl. Upl. Banks, fields, pastures.

ORDER XLII.—SOLANACEÆ.

- Solanum Dulcamara*. Lowl. Upl. By a brook near Ruthrieston, Aberdeen. Banchory Ternan. Rev. J. Brichan.

ORDER XLIII.—SCROPHULARINEÆ.

- Digitalis purpurea*. Lowl. Upl. Subalp. Banks, thickets, pastures, rocks.
- Scrophularia nodosa*. Lowl. Upl. Moist and shady places, and thickets.
- Melampyrum pratense*. Lowl. Upl. Woods, thickets, heaths, pastures.
- M. sylvaticum*. Lowl. Upl. Woods and thickets. Banchory Ternan. Dr. Adams. Ballater, Glen Muic, Micras, Corrymulzie.
- Pedicularis palustris*. Lowl. Upl. Marshy places, wet moors.
- P. sylvatica*. Lowl. Upl. Marshy places, wet moors, woods.

- Rhinanthus Crista-galli.* Lowl. Upl. Subalp. Alp. Meadows, pastures.
- Euphrasia officinalis.* Lowl. Upl. Subalp. Alp. Pastures.
- E. Odontites.* Lowl. Upl. Pastures, fields, roadsides. Midmar, Stocket.
- Veronica scutellata.* Lowl. Upl. Wet places.
- V. Beceabunga.* Lowl. Upl. Brooks, ditches.
- V. Chamædrys.* Lowl. Upl. Woods, thickets, banks, roadsides.
- V. officinalis.* Lowl. Upl. Woods, banks, quarries, rocks.
- V. alpina.* Subalp. Alp. Cairntoul, Braeriach, Ben-na-muic-dhui, Lochnagar, Glen Callater.
- V. serpyllifolia.* Lowl. Upl. Subalp. Fields, pastures, by rills and brooks. Var. *humifusa.* In alpine stations; common.
- V. arvensis.* Lowl. Upl. Cultivated ground, waste places, tops of walls.
- V. agrestis.* Lowl. Upl. Cultivated ground, waste places, tops of walls.
- V. hederifolia.* Lowl. Upl. Cultivated ground, waste places, woods.

ORDER XLIV.—LABIATÆ.

- Mentha aquatica.* Lowl. Upl. By streams, lakes, and pools, and in ditches.
- M. arvensis.* Lowl. Upl. Cultivated ground.
- Lycopus europæus.* Lowl. Banchory Ternan.
- Origanum vulgare.* Lowl. Drumoak, near the manse.
- Thymus Serpyllum.* (? *Chamædrys.*) Lowl. Upl. Subalp. Pastures.
- Calamintha Aënos.* Lowl. Banchory Ternan. Rev. Mr. Anderson. Drumoak. Dr. Smith.
- C. Clinopodium.* Lowl. Upl. Near manse of Drumoak; at Bridge of Potargh; and at Birk Hall, Glen Muic.
- Prunella vulgaris.* Lowl. Upl. Fields and pastures.
- Nepeta Glechoma.* Lowl. Upl. On banks and in woods.
- Lamium amplexicaule.* Lowl. Upl. Cultivated ground and waste places.
- L. purpureum.* Lowl. Upl. Cultivated ground and waste places.

- L. intermedium.* Lowl. Cultivated ground and waste places.
L. incisum. Lowl. Cultivated ground and waste places.
L. album. Lowl. By walls and roads, near Aberdeen.
Galeopsis Tetrahit. Lowl. Upl. Cultivated ground and waste places.
G. versicolor. Lowl. Upl. Cultivated ground and waste places.
Stachys sylvatica. Lowl. Upl. Woods, thickets, shaded stony places.
S. palustris. Lowl. Upl. Wet fields and marshy places.
S. arvensis. Lowl. Fields near Aberdeen.
Teucrium Scorodonia. Lowl. Upl. Rocky and gravelly banks, shady places, woods.
Ajuga reptans. Lowl. Upl. Woods, thickets, pastures.

ORDER XLV.—LENTIBULARIACEÆ.

- Pinguicula vulgaris.* Lowl. Upl. Subalp. Wet places, moors, meadows.
Utricularia vulgaris. Lowl. Pools and marshy places. Loch of Skene; Brediach Moss. Loch Callater. Mr. James Farquharson. Marshes above Bay of Nigg. P. Macgillivray. Loch Muic. Dr. Dickie.
U. intermedia. Lowl. Loch of Park.
U. minor. Lowl. Marsh at west end of Loch of Skene. Banchory Ternan. Rev. J. Brichan. Loch Ceannor, Loch of Park. Mr. James Farquharson.

ORDER XLVI.—PRIMULACEÆ.

- Primula vulgaris.* Lowl. Upl. Woods, thickets, pastures.
P. elatior. Lowl. Pastures; near the Cove, and in islands of the Dee in its lowest part. Glebe of Peter Culter. Mr. James Farquharson. Banchory Ternan. Rev. J. Brichan.
P. veris. Lowl. Coast of Kincardineshire. Islands of the Dee in its lower part. Banks of the Dee at Tullich. Mr. James Farquharson. Banks of the Dee, Peter Culter, and Murtle.
Lysimachia vulgaris. Lowl. Islands of the Dee opposite Kingcaussie. Perhaps not indigenous, the species being common in gardens.

- L. nemorum*. Lowl. Upl. Woods, thickets, pastures, in wet or moist ground.
- Anagallis arvensis*. Lowl. Fields above the Cove, and Bay of Nigg, Bellfield, Upper Banchory ; but rare. *A. cærulea*, said to have occurred at Ferry Hill ; but I have not seen it there or elsewhere.
- Trientalis europæa*. Lowl. Upl. Woods, thickets, heaths ; very common.
- Glaux maritima*. Lowl. Maritime.

ORDER XLVII.—PLUMBAGINEÆ.

- Armeria maritima*. Lowl. Sea coast. Along the Dee in the greater part of its course. Subalp. Alp. Lochnagar ; Ben-na-buirid ; Cairntoul ; Craig-an-dal.

ORDER XLVIII.—PLANTAGINEÆ.

- Plantago Coronopus*. Lowl. Maritime.
- P. maritima*. Lowl. Maritime, and many miles inland, as by the road in Drumoak and Banchory. Birse. Mr. James Farquharson.
- P. lanceolata*. Lowl. Upl. Pastures, waste places, fields.
- P. media*. Kingcaussie. Miss Boswell.
- P. major*. Lowl. Upl. Cultivated ground, waste places, by roads.
- Littorella lacustris*. Lowl. By lakes or pools.

DIVISION IV.—MONOCHLAMYDEÆ.

ORDER XLIX.—CHENOPODIACEÆ.

- Salsola Kali*. Lowl. Maritime sands at Aberdeen, occasionally.
- Chenopodium album*. Lowl. Upl. Cultivated ground and waste places.
- C. rubrum*. Lowl. Upl. Waste places. About Aberdeen.
- C. Bonus Henrius*. Waste places, generally near houses ; as far up as Ballater and Glen Muic.

- Atriplex littoralis*. Lowl. Maritime. Estuary of the Dee.
A. patula. Lowl. Upl. Cultivated and waste ground.
A. laciniata. Lowl. Maritime. Girdleness, Bay of Nigg, Cove.

ORDER L.—POLYGONACEÆ.

- Rumex crispus*. Lowl. Upl. Waste places, fields, pastures.
R. conglomeratus. Lowl. Several places near Aberdeen. Mr. J. Farquharson.
R. obtusifolius. Lowl. Upl. Mostly about houses. Castletown Braemar.
R. aquaticus. Lowl. Upl. Waste places.
R. acetosa. Lowl. Upl. Subalp. Alp. Fields, pastures, waste places.
R. Acetosella. Lowl. Upl. Subalp. Alp. Fields, pastures, stony and gravelly places, moors.
Oxyria reniformis. Lowl. By the Dee. Upl. By its tributaries also. Subalp. Alp. By rills and on rocks.
Polygonum Bistorta. Lowl. Upl. Den of Rubislaw. By a small stream on the south side of the Dee, a short way above the Railway Bridge. P. Macgillivray.
P. viviparum. Lowl. Upl. Subalp. Alp. Pastures, from the sea-coast, at the Cove, to near the summits of the Mona-rua mountains.
P. amphibium. Lowl. Upl. Wet pastures and fields, ditches, margins of ponds.
P. lapathifolium. Lowl. Waste and cultivated ground, near Aberdeen.
P. Persicaria. Lowl. Upl. Fields, waste places.
P. Hydropiper. Lowl. Gilcomston Dam. Den of Rubislaw. Ditch near Dr. Morison's Bridge.
P. aviculare. Lowl. Upl. Fields, waste places.
P. Convolvulus. Lowl. Upl. Fields, waste places.

ORDER LI.—EMPETREÆ.

- Empetrum nigrum*. Lowl. Upl. Subalp. Alp. On sand, gravel, peat, and rock.

ORDER LII.—EUPHORBIACEÆ.

- Euphorbia Helioscopia.* Lowl. Upl. Fields, gardens, and waste places.
E. Peplus. Lowl. Upl. Fields, gardens, and waste places.
Mercurialis perennis. Lowl. Upl. Woods and shady places among rocks, or by streams.

ORDER LIII.—URTICACEÆ.

- Urtica urens.* Lowl. Upl. Waste places, gardens, and fields.
U. dioica. Lowl. Upl. Waste places, gardens, and fields, about houses.

ORDER LIV.—AMENTACEÆ.

- Salix pentandra.* Lowl. Woods at Murtle. West end of Loch of Skene. Perhaps not indigenous.
S. Helix. Lowl. By the Dee near Murtle.
S. cinerea. Lowl. Upl. Subalp. By streams, in marshy, often in dry rocky places.
S. aurita. Lowl. Upl. Subalp. By streams, and in marshy places.
S. caprea. Lowl. Upl. In woods, by streams.
S. lanata. Subalp. Alp. Lochnagar. Glen Callater.
S. laurina. Upl. Subalp. Glen Clunie.
S. bicolor. Upl. Subalp. Glen Clunie.
S. phillyreifolia.
S. fusca. Lowl. Upl. Subalp. In sand, gravel, and peat; presenting numerous varieties.
S. Arbuscula.
S. prunifolia. Lowl. Upl. Dee side at Murtle. Mary Culter. Mr. A. Smith.
S. venulosa. Lowl. Upl.
S. arenaria. Subalp. Alp. By the stream from the Duloch of Lochnagar. Glen Callater.
S. Stuartiana. Subalp. Alp. Along with the last.
S. Myrsinites. Subalp. Alp. Lochnagar; Corry of Loch Ceannor; Cairntoul. Glen Callater.

S. reticulata. Subalp. Alp. Corry of Loch Ceannor. Glen Callater.

S. herbacea. Subalp. Alp. Lochnagar and Mona-rua groups.

Populus tremula. Lowl. Upl. Woods, rocky places, and by streams.

Myrica Gale. Lowl. Upl. Subalp. Boggy or wet ground.

Alnus glutinosa. Lowl. Upl. By streams, and in marshy ground.

Quercus sessiliflora. Lowl. Upl. Gravelly and rocky ground.

Not uncommon in some tracts along the Dee. It gives its name to Craig-an-darrach. I have not seen any large trees of this species.

Corylus Avellana. Lowl. Upl. Banks and by streams.

Betula alba. Lowl. Upl. Forming an almost continuous forest from Banchory to Inver Ey, and presenting numerous modifications of form. The weeping variety less frequent than the others.

B. nana. Upl. Subalp. Lochnagar and Mona-rua groups. Abundant and large on the hills in Glen Callater. Dr. Dickie.

SECTION II.—GYMNOGENÆ.

ORDER LV.—CONIFERÆ.

Juniperus communis. Lowl. Upl. In gravelly and sandy soil, becoming more frequent in the upper parts; at first an erect shrub, with slender leaves; but on the hills depressed. Subalp. Alp. Prostrate, with larger leaves and berries.

Pinus sylvestris. Lowl. Upl. Gravelly soil and rocky places. This species, forming woods and forests, still extensive, though much diminished, constitutes one of the most remarkable features of the district. It extends, but not continuously, from the Linn of Dee to about the middle of the parish of Birse; and the trees have in general a more healthy aspect, and attain a larger size, than in other parts of Scotland. On the left side of the Dee, from Morven to the sea, there is no native Pine.

CLASS II.—MONOCOTYLEDONEÆ.

SECTION I.—DICTYOGENÆ.

ORDER I.—TRILLIACEÆ.

Paris quadrifolia. Lowl. Corby Den, Mary Culter.

SECTION II.—ENDOGENÆ.

DIVISION I.—FLORIDEÆ.

ORDER II.—ORCHIDEÆ.

Orchis mascula. Lowl. Mary Culter; Peter Culter; Durres.

O. maculata. Lowl. Upl. Subalp. Moors and moist pastures, often in dry ground.

O. latifolia. Lowl. Upl. Wet moors, pastures, and woods.

Gymnadenia conopsea. Lowl. Upl. Moors and pastures.

Habenaria albida. Lowl. Den of Maiden Craig, four miles from Aberdeen. Mr. P. Grant. Dr. Dickie. I have seen it there in 1842; but it is now searched for in vain.

H. viridis. Lowl. Upl. Subalp. Pastures.

H. bifolia. Lowl. Upl. Heaths and moor pastures.

H. chlorantha. Lily Loeh, Mary Culter. Mr. Ronald Maekay.

Goodyera repens. Lowl. Upl. Chiefly in Pine woods, in dry soil.

Listera cordata. Lowl. Upl. On heaths, and in woods, from the sea to Glen Callater.

L. ovata. Lowl. Near Kingcaussie. Dr. Dickie, on the authority of Mr. F. Gammie. River Muie, above Ballater. Dr. Dickie.

ORDER III.—IRIDEÆ.

Iris Pseudacorus. Lowl. Upl. Wet places, ditches, pools, ponds, and lakes.

ORDER IV.—ASPARAGÆÆ.

Convallaria multiflora. Kingcaussie. Mrs. Boswell.

ORDER V.—LILIACEÆ.

Allium ursinum. Lowl. Den of Rubislaw. Wood at the Corbie Den. Dr. Dickie.

Agraphis (Endymion) nutans. Lowl. Upl. Woods and thickets.

ORDER VI.—COLCHICACEÆ.

Tofieldia palustris. Subalp. Alp. Ben-na-buird. Cairntoul. Lochnagar. Glen Callater. Dr. Dickie.

ORDER VII.—JUNCACEÆ.

Narthecium ossifragum. Lowl. Upl. Subalp. Marshy places.

Juncus compressus. Lowl. Maritime. Coast of Kincardineshire.

J. effusus. Lowl. Upl. Wet places in pastures and moors, ditches, pools.

J. conglomeratus. Lowl. Upl. Wet places. Much less frequent than the last.

J. balticus. Lowl. Loch of Park.

J. filiformis. Lowl. By the Loch of Loirston. Dr. Dickie, 1850.

J. castaneus. Subalp. Alp. Glen Callater.

J. triglumis. Subalp. Alp. Glen Callater. Little Craigandal, Lochnagar.

J. trifidus. Alp. Dry summits and shoulders of the higher mountains of the Lochnagar and Mona-rua groups. Glen Callater. Dr. Dickie.

J. acutiflorus. Lowl. Upl. Subalp. Wet places.

J. lamprocarpus. Lowl. Upl. Subalp. Wet places.

J. supinus. Lowl. Upl. Subalp. Wet places.

J. squarrosus. Lowl. Upl. Wet places and turfy moors.

J. bufonius. Lowl. Upl. Wet places.

Luzula sylvatica. Lowl. Upl. Subalp. Alp. Lochnagar.

L. pilosa. Lowl. Upl. Woods and dry moors.

L. campestris. Lowl. Upl. Subalp. Pastures.

- L. multiflora*. Lowl. Upl. Subalp. Alp. Pastures, thickets.
L. spicata. Subalp. Alp. Dry places on the higher mountains.
L. areolata. Alp. Dry gravel or detritus. Summits of the higher mountains of the Mona-rua range. Ben-na-muic-dhui, Lochnagar.

ORDER VIII.—ALISMACEÆ.

- Alisma Plantago*. Lowl. Ponds, streams, ditches. Gilcomston Dam. Loch of Park. Mary Culter. Mr. J. Farquharson.
Triglochin maritimum. Lowl. Maritime. Places overflowed by the tide.
T. palustre. Lowl. Upl. Marshy places, meadows.

ORDER IX.—AROIDEÆ.

- Sparganium ramosum*. Lowl. Upl. Streams, lakes, and pools.
S. simplex. Lowl. Upl. Streams, lakes, and pools. Loch of Skene; Loch of Achlossan. Mary Culter. Mr. J. Farquharson.
S. natans. Lowl. Upl. Lakes, pools, bogs. Loch of Loirston. Loch of Achlossan. Loch Muic. Loch Callater.
Arum maculatum. Lowl. Den of Rubislaw. Perhaps not indigenous.
Lemna minor. Lowl. Upl. On still water.

ORDER X.—POTAMOGETONEÆ.

- Potamogeton natans*. Lowl. Upl. Still water. Loch Callater. Mr. J. Farquharson.
P. rufescens. Lowl. Aberdeen Canal.
P. lanceolatus. Lowl. Lochs of Skene and Park.
P. heterophyllus. Lowl. Aberdeen Canal. Loch of Park.
P. perfoliatus. Lowl. Lochs of Skene and Park.
P. crispus. Lowl. Gilcomston Dam.
P. gramineus. Lowl. Loch of Park. Loch of Achlossan. P. Macgillivray.
P. pusillus. Lowl. Aberdeen Canal.
Ruppia rostellata. Lowl. Pools by the Dee, below Wellington Bridge, Aberdeen.

DIVISION II.—GLUMACEÆ.

ORDER XI.—CYPERACEÆ.

- Schænus nigricans*. Lowl. "In a hollow opposite Findon."
Dr. Dickie.
- Rhynchospora alba*. Glen Muic. Dr. Dickie.
- Eleocharis palustris*. Lowl. Upl. Subalp. By lakes, pools, and streams, and in marshy places.
- E. multicaulis*. Lowl. Bay of Nigg.
- Scirpus lacustris*. Lowl. Lochs of Leys, Park, Achlossan, Ceanner, and Dava.
- S. cæspitosus*. Lowl. Upl. Subalp. Wet moors and marshy places.
- S. pauciflorus*. Lowl. Upl. Wet moors.
- S. fluitans*. Lowl. Upl. Pools and marshes.
- S. setaceus*. Lowl. Marshy places.
- Blysmus rufus*. Lowl. Coast of Kincardineshire.
- Eriophorum vaginatum*. Lowl. Upl. Wet moors.
- E. polystachion*. Lowl. Upl. Subalp. Marshy places and wet moors. Var: *angustifolium*, generally distributed, and very abundant. Var: *elatius*. (Koch) South side of Hill of Fare and bogs in Kincardineshire. Mr. J. Taylor.
- Carex dioica*. Lowl. Upl. Subalp. Moors.
- C. pulicaris*. Lowl. Upl. Subalp. Moors.
- C. rupestris*. Subalp. Alp. Moors and rocks. Little Craigandal. Dr. Balfour; Corry of Loch Ceannor.
- C. pauciflora*. Upl. Subalp. Wet moors. Hill of Fare. Eastern base of Clach-na-beir, Glen Tanar; Lochnagar; Glen Callater; base of Little Craig-an-dal.
- C. incurva*. Maritime. Links at Aberdeen.
- C. arenaria*. Lowl. Maritime sands.
- C. vulpina*. Lowl. Maritime. Girdleness, and other parts of the coast.
- C. Persoonii*. Lochnagar, Dr. Balfour.
- C. muricata*. Lowl. Drumoak. Occasionally on the Kincardineshire coast.
- C. stellulata*. Lowl. Alp. Subalp. Alp. Wet moors.

- C. curta.* Lowl. Upl. Subalp. Wet moors. Var. *Persoonii*. Lochnagar. North side of Glas-mheal. P. Macgillivray.
- C. remota.* Corbie Den, Dr. Smith.
- C. leporina.* Alp. Cairntoul. Dr. Balfour. Braeriach; Lochnagar.
- C. ovalis.* Lowl. Wet moors.
- C. VahlII.* Subalp. Corry of Loch Ceannor.
- C. atrata.* Glen Callater. Drs. Greville and Balfour. Lochnagar.
- C. vulgaris.* Lowl. Alp. Subalp. Wet moors.
- C. rigida.* Subalp. Alp. Gravelly and sandy places.
- C. aquatilis.* Upl. Marsh at the head of Glen Callater.
- C. saxatilis.* Alp. Cairntoul.
- C. acuta.* Lowl. By the Dee, near the old bridge. Mr. J. Farquharson. Banks of the Dee at Banchory Ternan. Rev. J. Brichtan.
- C. flava.* Lowl. Upl. Wet moors.
- C. fulva.* Lowl. Wet moors.
- C. pallescens.* Lowl. Upl. Drumoak. Upper part of Corby Den, at Kingcaussie. Dr. Dickie. On rocks in Glen Callater; Corrymulzie. Mr. James Farquharson. Drumoak. P. Macgillivray.
- C. distans.* Lowl. Maritime. Coast of Kincardineshire.
- C. binervis.* Lowl. Upl. Subalp. Moors and woods.
- C. lævigata.* Lowl. Drumoak. Potargh. P. Macgillivray. Peters Braes, Peter Culter. Mr. J. Farquharson. Near Banchory Ternan. Rev. J. Brichtan. Countess wells. Dr. Dickie. Rubislaw Den. Mr. R. Mackay.
- C. panicea.* Lowl. Upl. Subalp. Moors.
- C. limosa.* Marshes at head of Glen Gairden. Dr. Dickie.
- C. capillaris.* Alp. Cairntoul. Glen Callater.
- C. rariflora.* Alp. Rocks at head of Glen Callater; Lochnagar.
- C. sylvatica.* Lowl. Drumoak.
- C. præcox.* Lowl. Upl. Grassy ground by the stream, above Corby Den. Glebe of Peter Culter; and Glen Callater. Mr. J. Farquharson.
- C. pilulifera.* Lowl. Upl. Subalp. Dry moors, woods, and mountains.

- C. glauca*. Lowl. Moors and wet ground.
C. filiformis. Loch Ceannor. Mr. Ronald Mackay.
C. ampullacea. Lowl. Upl. Margins of lakes and pools.
C. vesicaria. Lowl. Ditch near Dr. Morrison's Bridge, Banchory,
 Devenick.
C. vaginata. Subalp. Alp. Ben-na-muic-dhui. Dr. Balfour.
C. hirta. Lowl. Coast between Findon and Port Lethen.

ORDER XII.—GRAMINEÆ.

- Phalaris arundinacea*. Lowl. Upl. By the Dee in various
 places. Loch of Achlossan.
Anthoxanthum odoratum. Lowl. Upl. Subalp. Pastures, thickets,
 woods, heaths.
Phleum pratense. Lowl. Upl. Fields and pastures. Var. *nodosum*.
 In pastures along the coast, as well as far inland.
P. commutatum. Subalp. Alp. Lochnagar; Braeriach.
Alopecurus pratensis. Lowl. Upl. Pastures, banks, woods.
A. alpinus. Alp. Braeriach. Corry of Loch Ceannor. Dr.
 Graham.
A. geniculata. Lowl. Upl. Marshy places, ditches, and by
 streams and lakes.
Agrostis canina. Lowl. Upl. Subalp. Moors, pastures.
A. vulgaris. Lowl. Upl. Subalp. Moors, pastures, woods.
A. alba. Lowl. Upl. Moist places.
Arundo Epigejos. Lowl. Bank by the Dee, near manse of
 Drumoak. Aboyne. Beallach-Chui Forest. Dr. Dickie.
Psamma arenaria. Lowl. Sands at Aberdeen.
Phragmites communis. Lowl. Upl. Sea coast near the Cove.
 Loch of Park; Loch Ceannor; Loch Dava. Marsh near Strath
 Girnac.
Aira cæspitosa. Lowl. Upl. Subalp. Alp. Wet places,
 meadows, thickets. Var. *brevifolia*. On the higher mountains,
 as Lochnagar.
A. alpina. Subalp. Alp. Lochnagar. Cairntoul.
A. flexuosa. Lowl. Upl. Subalp. Alp. Dry heaths, gravel
 detritus.
A. caryophyllea. Lowl. Upl. Dry ground.

- A. præcox.* Lowl. Upl. Sand, gravel, dry pastures.
- Trisetum flaveseens.* Lowl. South base of Broad Hill, Aberdeen, and Peter Culter. Mr. J. Farquharson. Rubislaw Den. Mr. R. Mackay.
- Avena fatua.* Lowl. Upl. Among corn, uncommon.
- A. strigosa.* Lowl. Upl. Among corn, especially oats, very common.
- A. pratensis.* Lowl. Upl. Subalp. Pastures, banks, thickets.
- A. alpina.* Upl. Subalp. Thickets, pastures. Glen Clunie.
- A. pubescens.* Lowl. Upl. Thickets, pastures.
- Arrhenatherum avenaceum.* Lowl. Upl. Fields, waste places very common.
- Holeus lanatus.* Lowl. Upl. Subalp. Fields, pastures.
- H. mollis.* Lowl. Upl. Thickets, woods, fields.
- Triodia decumbens.* Lowl. Upl. Subalp. Pastures, heaths.
- Kæleria cristata.* Lowl. Upl. Subalp. Pastures.
- Melica uniflora.* Lowl. Upl. Corrymulzie.
- M. nutans.* Lowl. Upl. Corrymulzie. Corbie Den; Craig-andarroch. Dr. Dickie. Banchory Ternan. Murray in Northern Flora.
- Molinia cærulea.* Lowl. Upl. Subalp. Alp. Pastures, heaths. Common in the upper tracts; rare in the lower.
- Poa annua.* Lowl. Upl. Subalp. Alp. Fields, pastures, waste places, bye-roads.
- P. minor.* Alp. Lochnagar.
- P. laxa?* Alp. Lochnagar.
- P. Balfourii.* Lochnagar.
- P. alpina.* Alp. Cairntoul. Ben-na-buird. Lochnagar.
- P. nemoralis.* Lowl. Upl. Subalp. Woods and moorland.
- P. trivialis.* Lowl. Upl. Wet or moist ground, meadows, pastures.
- P. pratensis.* Lowl. Upl. Meadows, pastures.
- Glyceria fluitans.* Lowl. Upl. Subalp. Lakes, pools, streams, ditches.
- G. aquatica.* Lowl. In a pond in the wood, a little west of Castle of Drum. Dr. Dickie.
- Sclerochloa maritima.* Lowl. Maritime. Girdleness.

- Briza media*. Lowl. Upl. Subalp. Dry pastures, from Peter Culter to Glen Ey and Glen Dee.
- Cynosurus cristatus*. Lowl. Upl. Subalp. Pastures.
- Dactylis glomerata*. Lowl. Upl. Cultivated ground, waste places, road sides, thickets, pastures.
- Festuca bromoides*. Lowl. Fields, wet places, dry ditches.
- F. ovina*. Lowl. Upl. Subalp. Dry pastures.
- F. rubra*. Lowl. Upl. Pastures.
- F. arundinacea*. Lowl. Occasionally on the Kincardineshire coast. Peter's Braes; Peter Culter. Mr. James Farquharson. Banchory Ternan. Rev. J. Brichan.
- Bromus sterilis*. Lowl. Near old church of Nigg and Holburn Church.
- Serrafalcus mollis*. Lowl. Upl. Fields, waste places, pastures.
- S. commutatus*. Peter Culter. Mr. James Farquharson.
- S. racemosus*. Lowl. Upl. Fields.
- Brachypodium sylvaticum*. Lowl. Upl. Coast from the Cove southward, and Lower Deeside.
- Triticum caninum*. Lowl. Upl. Cultivated ground and waste places.
- T. repens*. Lowl. Upl. Cultivated ground and waste places.
- T. junceum*. Lowl. Maritime sand.
- Lolium perenne*. Lowl. Upl. Pastures and road sides.
- Elymus arenarius*. Lowl. Marit. The only station at Foot Dee.
- Nardus stricta*. Lowl. Upl. Subalp. Dry pastures.

There are usually enumerated on such occasions plants which having escaped from cultivation, or been accidentally or purposely introduced, have grown and spread more or less in various localities, mostly near houses, but which can scarcely be considered as properly belonging to the Flora of the district. There are others which having been planted, remain simply as individuals, without propagating. Such plants, it is obvious, have no claim upon our consideration, although they are often used by the compilers of local Floras, for the purpose of extending their lists. Of this latter kind, with reference to our district are: *Tilia europæa*, *Cratægus Oxyacantha*, *Pyrus Aria*, *Ulmus montana*,

Fagus sylvatica, *Quercus Robur*, *Salix Russelliana*, *S. alba*, *S. purpurca*, *S. viminalis*, *S. Smithiana*, *S. vitellina*, and several other species.

Those of the first-mentioned series are :—

Helleborus fœtidus. Den of Rubislaw.

Aconitum Napellus. Pebbly beaches of the Dee in its lower tract.

Chelidonium majus. Waste places near houses.

Hesperis matronalis. Waste places about old buildings or gardens.

Sinapis alba. Sometimes seen in fields and waste places.

Camelina sativa. Oeeasionally seen in fields.

Saponaria officinalis. Several places in the lower course of the Dee, but always near houses.

Geranium Phœum. Wood near Kingeaussie House.

Cratægus Oxyacantha. Bushes oeeur in several places.

Sanguisorba officinalis. In fields, very rarely.

Sempervivum tectorum. On gables and roofs of cottages, and garden walls, planted.

Ribes Grossularia. Waste places, near houses.

R. nigrum. Waste places, near houses.

R. rubrum. Waste places, near houses.

Smyrniium Olusatrum. Waste places, or about gardens, rarely.

Entrance to the Corbie Den. P. Maegillivray. Peter Culter.
Mr. James Farquharson.

Apium graveolens. Craiglug, near Aberdeen.

Carum Carui. About farm steadings and cottages, oeeasionally.

Coriandrum sativum. On the Ineh opposite the doekyards. Dr. Dickie.

Senecio saracenicus. Den of Rubislaw. Manse of Mary Culter.

Anthemis arvensis. Oeeasionally in fields about Aberdeen.

Pyrethrum Parthenium. Waste places and by walls, near gardens or houses.

Doronicum Pardalianches. Lowl. Upl. On banks, by walls, or in woods, near houses.

Silybum marianum. Lowl. Among rubbish and in waste ground near Aberdeen.

Cichorium Intybus. Lowl. Sometimes seen in fields.

- Verbascum Thapsus*. Lowl. In various places along the Dee.
- Polemonium cæruleum*. Occasionally near houses. Rubislaw Den. P. Macgillivray.
- Linaria Cymbalaria*. Den of Rubislaw.
- L. vulgaris*. Several places near Aberdeen.
- Plantago media*. I have seen it in grass fields, rarely.
- Linum usitatissimum*. Occasionally seen in cultivated ground.
- Vinca minor*. In woods and on banks, where it spreads extensively. Den of Rubislaw.
- Borago officinalis*. On banks, and in waste places, near houses.
- Ligustrum vulgare*. In plantations and ornamented grounds.
- Phalaris canariensis*. Occasionally near houses, often in fields manured with the refuse of the town.

II.—FLOWERLESS PLANTS.

ALLIANCE I.—FILICALES. (LINDLEY.)

ORDER I.—OPHIOGLOSSACEÆ.

Botrychium Lunaria. Lowl. Upl. Subalp. In pastures, from the sea to Glen Ey.

ORDER II.—POLYPODIACEÆ.

SUB-ORDER.—OSMUNDEÆ.

Osmunda regalis. Lowl. On a rocky sea-bank near the Cove, and by the stream from the Loch of Park.

SUB-ORDER.—POLYPODIEÆ.

Allosorus crispus. Alp. Rocks of the Corry of Lochnagar. Ben-na-buid. Cairntoul. P. Macgillivray. Corry of Loch Ceannor.

Polypodium vulgare. Lowl. Upl. Subalp. Alp. Rocks, stones, walls, banks.

P. Phegopteris. Lowl. Upl. Subalp. Among blocks, in rocky places, and by streams.

P. Dryopteris. Lowl. Upl. Subalp. Thickets, woods, among stones, and in crevices of rocks.

P. alpestre. Alp.

SUB-ORDER.—ASPIDIEÆ.

Lastrea Oreopteris. Lowl. Upl. In wet places, rare. Glen Callater. Mr. James Farquharson. Den of Midmar. Mr. J. Mackay.

- L. Filix-mas.* Lowl. Upl. Subalp. Alp. Woods, thickets, banks, by walls and streams, among blocks, and on rocks.
- L. spinulosa.* Lowl. Upl. Subalp. Chiefly in shaded places or on banks.
- L. dilatata.* Lowl. Upl. Subalp. Chiefly in exposed places.
- Polystichum Lonchitis.* Glen Callater. Mr. J. Farquharson. Glas-mheal.
- P. aculeatum.* *Aspidium lobatum*, Smith. Corby Den, Mary Culter.
- Cystopteris fragilis.* Lowl. Upl. Subalp. Alp. Among blocks in crevices of rocks, and in other shady places. *Var. dentata.* Among blocks and stones, on Lochnagar, Ben-na-buirid, and other mountains. *Var. fragilis.* In caves and crevices on the coast, in walls, and among rocks, varying in delicacy according to the degree of exposure.

SUB-ORDER.—ASPLENIEÆ.

- Athyrium Filix-fœmina.* Lowl. Upl. Subalp. In rather moist places.
- Asplenium Adiantum-nigrum.* On granite near Ballater. Serpentine and hornblende in Glen Muic. Rocks along the coast, as near the Cove and Muchals.
- A. Trichomanes.* On limestone at Craig-ini. Coull. P. H. Macgillivray. Rocks in Glen Muic. Dr. Dickie.
- A. viride.* On serpentine in the range between Glen Muic and Glen Girnac; on quartzose mica-slate, at Corrymulzie. Glen Callater.
- A. marinum.* Lowl. Marit. Crevices of rocks along the coast.
- A. Ruta-muraria.* Lowl. Bridge of Ruthrieston. Kingcaussie. Dr. Dickie.

SUB-ORDER.—ADIANTARIÆ.

- Blechnum boreale.* Lowl. Upl. Subalp. Alp. Heaths, woods, and among stones and rocks.
- Pteris aquilina.* Lowl. Upl. Subalp. Woods, heaths, pastures.

ALLIANCE II.—LYCOPODALES.

ORDER I.—LYCOPODIACEÆ.

- Lycopodium clavatum.* Lowl. Upl. Subalp. Moors, among heath or moss, or in woods.
- L. annotinum.* Subalp. Alp. Moors, peaty, gravelly, or stony ground. Mona-rua and Lochnagar mountains. Glen Callater.
- L. alpinum.* Lowl. Upl. Subalp. Alp. Moors and hill-ground, from the higher mountains to near the sea.
- L. selaginoides.* Lowl. Upl. Subalp. Alp. Wet or damp places.
- L. Selago.* Lowl. Upl. Subalp. Alp. Moors and hill-ground, from the summits of the highest mountains to near the sea.

ORDER II.—MARSILEACEÆ.

- Pilularia globulifera.* Lowl. Loch of Park.
- Isoetes lacustris.* Upl. Subalp. Loch of Park. Loch Ceannor. Loch Muic.

ORDER III.—EQUISETACEÆ.

- Equisetum arvense.* Lowl. Upl. In fields, pastures, and waste places.
- E. umbrosum.* Upl.
- E. sylvaticum.* Lowl. Upl. In moist places, in woods.
- E. limosum.* Lowl. Upl. In lakes, pools, and ditches.
- E. palustre.* Lowl. Upl. In marshy ground.
- E. Mackaii.* Lowl. By the Dee at Banchory.
- E. variegatum.* Lowl. By the Dee at the Railway Bridge, Aberdeen. Mr. James Farquharson. By the Dee, near Park House.
- E. hyemale.* Lowl. By the Dee, near Park House.
- E. fluviatile.* Lowl. Upl. Bay of Nigg. Aboyne. Mr. A. Thomson.

ALLIANCE III.—MUSCALES.

(NO LIST OF MOSSES IS GIVEN.)

ALLIANCE IV.—LICHENALES.

TRIBE I.—CLADONIEÆ.

- Cladonia rangiferina*. Lowl. Upl. Subalp. Alp. On peaty soil among moss and heath; much larger and more branched in woods.
- C. turgida*. (*Cenomyce parecha*) Ach. Lowl. Upl. Subalp. On peaty ground, among moss and heath.
- C. uncialis*. Lowl. Upl. Subalp. Alp. On peaty ground among moss.
- C. furcata*. Lowl. Upl. Subalp. Alp. On moors, in woods, and on stones.
- C. subulata*. Lowl. Upl. Subalp. Alp. On peaty, sandy, or gravelly soil.
- C. vermicularis*. Subalp. Alp. On peaty or gravelly ground or detritus. Lochnagar; Ben-na-muic-dhui, and other mountains.
- Scyphophorus pyxidatus*. Lowl. Upl. Subalp. Alp. On heaths, old walls, stones, and in woods.
- S. fimbriatus*. Lowl. Upl. Subalp. Alp. In the same situations as the last, often intermixed with it. Intermediate gradations render it impracticable to define them as species.
- S. alcicornis*. Lowl. Upl. Subalp. On heaths.
- S. anomæus*. Lowl. Upl. Alp. On heaths.
- S. endivæfolius*. Lowl. Upl. On the ground, in peaty soil.
- S. cervicornis*. Upl. Subalp. On the ground, and on moist rocks.
- S. gracilis*. Lowl. Upl. Subalp. On moors.
- S. sparassus*. Lowl. Upl. In tufts, on the decayed stumps of trees.
- S. deformis*. Lowl. Upl. On heaths, and in woods.
- S. filiformis*. Lowl. Upl. On dry heaths.

- S. eocciferus*. Lowl. Upl. Subalp. Alp. On the ground in peaty soil, on banks, and the stumps of trees, and on gravel or rock detritus.
- S. digitatus*. Lowl. Upl. Subalp. On heaths, and in woods, on the ground, or on large stones, among moss, or about the roots of old trees.
- S. bellidiflorus*. Lowl. Upl. Subalp. Alp. On the ground, in peaty soil. This and the last two species appear to pass into each other.

TRIBE II.—SPHÆROPHORÆ.

- Isidium corallinum*. Lowl. Upl. Subalp. Alp. On rocks, blocks, and stones.
- I. paradoxum*. Upl. On slaty, quartz rock. Braemar.
- Sphærophoron coralloides*. Lowl. Upl. Subalp. Alp. On stones, rocks, and the ground, in dense roundish irregular tufts.
- S. fragile*. Lowl. Upl. Subalp. Alp. On stones, rocks, and the ground, in very dense, convex tufts.
- Stereocaulon paschale*. Lowl. Upl. On rocks and stones.

TRIBE III.—USNEINÆ.

- Usnea hirta*. (*Lichen hirtus* and *L. plicatus*, L.) Lowl. Upl. Common on Pine, Larch, and other trees.
- U. barbata*. Lowl. Upl. On Pine and other trees.
- Alectoria jubata*. Lowl. Upl. On trunks of trees, especially of *Pinus sylvestris*.
- A. capillaris*. (*Parmelia jubata*, var. *capillaris*, Ach. Meth. 732.) On trees, especially *Pinus sylvestris* and *Betula alba*.
- A. sarmentosa*. Subalp. Alp. Among moss in stony places, on the higher mountains of the Mona-rua range.
- Cornicularia aculeata*. Lowl. Upl. Subalp. Alp. On dry heathy ground.
- C. hispidus*. Lowl. Upl. Subalp. Alp. (*Lichen hispidus*, Lightf.) On heathy ground.
- C. tristis*. Upl. Subalp. Alp. On rocks and stones. Abundant in the upper tracts.

- C. bicolor*. Subalp. Alp. On rocks and stones, among moss.
Head of Glen Candlic, Ben-na-buird, and Morne. Mr. Gardiner.
- C. lanata*. Upl. Subalp. Alp. On rocks and stones, in the
Mona-rua, Lochnagar, and other tracts.

TRIBE IV.—RAMALINEÆ.

- Cetraria glauca*. Lowl. Upl. Subalp. Alp. On the ground,
among heath, on stones, and rocks, and on the trunks of old
trees.
- C. sepincola*. Lowl. Upl. On stones and trees.
- C. islandica*. Lowl. Upl. Subalp. Alp. Among heath and
moss, on Ben-na-muic-dhui, Ben-na-buird, Lochnagar, Mount-
keen, many other mountains, and even as far down as elevated
moors near Aberdeen. I have never met with it in fruit.
(Sir W. J. Hooker says he has gathered it plentifully in fruit
on Ben-na-buird. Ed.)
- C. nivalis*. Subalp. Alp. Among heath and moss, on Ben-na-
muic-dhui, Ben-na-buird, Lochnagar, and other high mountains.
Never found in fruit.
- Evernia Prunastri*. Lowl. Upl. Common on trees, especially
Larch and Pine.
- Ramalina fraxinea*. Lowl. Upl. On trunks and branches of
trees.
- R. scopulorum*. Lowl. On rocks and walls: very abundant
along the rocky coast.
- R. farinacea*. Lowl. Upl. On trees, rocks, and sometimes walls.
- R. fastigiata*. Lowl. Upl. On trunks and branches of trees.

TRIBE V.—UMBILICARIÆ.

- Umbilicaria pustulata*.
- Gyrophora polyphylla*. Upl. Subalp. Alp. On granite and
other rocks and blocks, in the upper tracts.
- G. proboscidea*. Upl. Subalp. Alp. On granite and other
rocks and blocks in the upper tracts.
- G. deusta*. Upl. Subalp. Alp. On rocks and blocks in the
upper tracts.

- G. erosa.* Upl. Subalp. Alp. On rocks and blocks in the upper tracts.
- G. cylindrica.* Upl. Subalp. Alp. On rocks and blocks in the upper tracts.
- G. pellita.* Upl. Subalp. On rocks and blocks. Glen Gairn.

TRIBE VI.—PELTIDEINÆ.

- Peltidea canina.* Lowl. Upl. Subalp. On the ground, on banks, by walls, and about the roots of trees.
- P. polydactyla.* Lowl. Upl. On the ground, on banks, and on walls.
- P. venosa.* Upl. Subalp. On the ground, or on rocks.
- P. aphthosa.* Upl. Subalp. On rocks, in shady places, about Castletown.
- Solorina crocea.* Alp. On the ground, on mosses, among rocks, toward the summits of the higher mountains of the Mona-rua and Lochnagar groups.
- S. saccata.* Upl. I have not met with it; but Mr. Gardiner mentions it as occurring in shady crevices of Craig Choinnich, near Castletown.
- Nephroma resupinata.* Upl. Subalp. Rocks and trees, in upper Braemar.

TRIBE VII.—COLLEMATEÆ.

- Collema nigrum.* Lowl. Upl. On rocks and blocks, in shady places.
- C. spongiosum.* Upl. Subalp. On the ground, among mosses.
- C. lacerum.* Lowl. Upl. On rocks, among mosses, in shady places.

TRIBE VIII.—PARMELIÆ.

- Sticta pulmonaria.* Upl. Trunks of trees, upper Braemar.
- S. scrobiculata.* Upl. Trunks of trees, upper Braemar.
- S. sylvatica.* Trunks and roots of trees, upper Braemar.
- Parmelia saxatilis.* Lowl. Upl. Subalp. Alp. On rocks, stones, and trees.

- P. omphalodes*. Lowl. Upl. Subalp. Alp. On rocks and stones.
P. perlata. Lowl. Upl. On trees.
P. olivacea. Lowl. Upl. On trees, rocks, stones, and walls.
P. aquila. Lowl. Upl. Subalp. On rocks and stones; very abundant along the coast.
P. Fahlunensis. Subalp. Alp. On rocks and blocks, in upper Braemar.
P. stygia. Subalp. Alp. On rocks, toward the summits of the higher mountains.
P. parietina. Lowl. Upl. Subalp. On rocks, walls, and trees.
P. stellaris. Lowl. Upl. On trees, common.
P. physodes. Lowl. Upl. On trees, common.
Borrera ciliaris. Lowl. Upl. On trunks of trees, common.
B. tenella. Lowl. Upl. On trees, sometimes on rocks, stones, or walls, common.

TRIBE IX.—SQUAMARIÆ.

- Squamaria affinis*. Lowl. Upl. On trees in the hilly tracts.
S. candalaria. Lowl. On stones.
S. murorum. Lowl. Upl. On rocks and walls, abundant.
S. elegans. Lowl. On rocks along the coast.
Placodium plumbeum. Lowl. Upl. On trees.

TRIBE X.—LECANOREÆ.

- Lecanora atra*. Lowl. Upl. Subalp. Alp. On rocks and stones.
L. argopholis. Lowl. Upl. On stones in walls, and on moors, also on trees.
L. coarctata. Lowl. On granite, gneiss, and other rocks, in the north-west of Kincardineshire, as well as on bricks and tiles. It seems to be only a state or variety of *L. atra*, as is probably also *L. argopholis*.
L. glaucoma. Lowl. Upl. Subalp. On rocks, blocks, and stones.
L. ventosa. Lowl. Upl. Subalp. Alp. On rocks, blocks, and stones: very abundant in the upper tracts.
L. Hæmatomma. Lowl. Upl. On rocks, about Ballater, rare.
L. cæσιο-rufa. Lowl. Upl. Subalp. On rocks and stones.

- L. cerina*. Lowl. Upl. On Beech and other trees, in Banchory and Durris.
- L. vitellina*. Lowl. Upl. On stones and pales.
- L. Parella*. Lowl. Upl. Subalp. Alp. On trees, rocks, and stones.
- L. albella*. Lowl. On the smooth bark of the Beech and of young trees or branches.
- L. tartarea*. Lowl. Upl. Subalp. Of rare occurrence along the coast or in the lower tracts; plentiful in some parts of the interior, as about Culbleen. Var. *upsaliensis*; frequent, enveloping mosses, heather, and other plants on the mountains.
- Urceolaria calcarea*. Lowl. Upl. On granite, gneiss, limestone, and other rocks, not common. Bridge of Feugh.
- U. scruposa*. Lowl. Upl. On rocks and stones, and on the ground on moors, common.
- Lecidca atrata*. Subalp. Alp. On granite and micaceous quartz rock, in Glen Clunie, Glen Callater, and other parts of upper Braemar.
- L. atro-alba*. Lowl. Upl. Subalp. Common on granite, gneiss, and other hard rocks and stones.
- L. fusco-atra*. Lowl. Upl. Subalp. Alp. On the smooth surface of rocks and stones. *L. dendritica*, Ach. is the same species on quartz.
- L. conflucns*. Lowl. Upl. Subalp. On rocks and stones of granite, gneiss, and mica slate, hornblende, and other substances. The crust varies from greyish-white to leaden-grey, or even dark bluish-grey. *L. atro-cinerea*, Sm. is, I think, the same species.
- L. rivulosa*. Lowl. Upl. Subalp. Alp. On rocks and stones of various kinds.
- L. sanguinaria*. Lowl. Upl. Subalp. On rocks and stones. More frequently without than with "a bright red stratum" in the apothecia.
- L. parasema*. (*L. parasema* and *L. elæochroma*, Ach.) Lowl. Upl. On trees.
- L. pinicola*. Lowl. Upl. On the scaly bark of *Pinus sylvestris*.
- L. scabrosa*. Lowl. On tiles, near Aberdeen.

- L. muscorum.* Lowl. On moors in Banchory Ternan, Nigg, and Durris.
- L. ferruginea.* Lowl. On granite. Nigg.
- L. silacea*, (including *L. Æderi*). Lowl. Upl. Subalp. On rocks and stones.
- L. simplex.* Upl. Subalp. Alp. On mica slate, in Glen Ey : on hornblende slate, on Morven.
- L. cachumena.*
- L. atro-virens.* Lowl. Upl. Subalp. Alp. Very common on rocks and stones of quartz, gneiss, mica slate, hornblende, and granite. Var. *alpina*, Wahl, with scattered yellow areolæ. Common on the higher mountains.
- L. expallens.* Lowl. Upl. Subalp. On shady rocks, in Glen Ey, and opposite Invercauld ; on stones in walls, at the Bay of Nigg.
- L. vernalis.* Lowl. Upl. On the Ash, Sycamore, Elm, Willows, and other trees.
- L. icmadophila.* Upl. Subalp. Alp. On the ground, on peat soil, or mosses ; common on the higher mountains. *
- L. erythrella.* Upl. On rocks and stones, in the upper tracts.

TRIBE XI.—VARIOLARIEÆ.

- Variolaria faginea.* Lowl. Upl. Common on old Beech, Sycamore, and other trees, in damp places.
- V. discoidea.* Lowl. Upl. Common on old trees, also on damp or shady rocks.

TRIBE XII.—LEPRARIEÆ.

- Lepraria alba.* Lowl. Upl. On trunks of trees.
- L. cinerea.* Lowl. Upl.
- L. sulphurea.* Lowl. Upl. On the bark of old Pines.
- L. flava.* Lowl. Upl. On the rugged bark of trees and pales.
- L. viridis.* Lowl. Upl. On trees, walls, and pales.

TRIBE XIII.—GRAPHIDEÆ.

- Arthonia Swartziana*. Lowl. Upl. On the smooth bark of trees.
Opegrapha atra. Lowl. Upl. On the smooth bark of trees.
O. epipasta. Lowl. Upl. On the smooth bark of trees.
O. astroidea. Ach. Lowl. Upl. On the smooth branches of the Beech, Mountain-ash, and other trees.
O. siderella. Ach. Lowl. Upl. On the smooth bark of the branches of various trees.
O. scripta. Lowl. Upl. On the smooth bark of trees, especially the Hazel.

TRIBE XIV.—VERRUCARIÆ.

- Verrucaria epipolæa*. Upl. On rocks at Abergairn.
V. nigrescens. Lowl. Upl. On rocks and walls.
V. maura. Lowl. Very abundant along the coast of Kincardineshire, spreading on granite, gneiss, and other rocks, about and a little beyond tide-mark.
Endocarpon miniatum. On stones at Gilcomston Dam, Aberdeen, where I was first directed to it by Dr. Dickie.
Pertusaria communis. Lowl. Upl. Common on the trunks of old trees.
P. fallax. Lowl. On the beech, Corby Den, Mary Culter.
Thelotrema lepadinum. Lowl. Upl. On the trunks of trees.

TRIBE XV.—BÆOMYCEÆ.

- Bæomyces rufus*. Lowl. On rocks and on the ground.
B. roseus. On the ground, on heaths.
B. placophyllus. On the ground, and on wall-tops.

TRIBE XVI.—CALICIOIDEÆ.

- Calicium sessile*. On the crust of *Pertusaria communis*.

Many other Lichens occur in the district. I have in my collection several species which I have not had time to determine, and which, in a place destitute of the necessary means, and not

containing a single individual known to me, who has the slightest knowledge of the subject, excepting two or three pupils, it would be almost impossible to name with accuracy. The specific characters and descriptions given in our Floras are so imperfect, and have so little reference to the varieties of form presented by the species of this very interesting tribe of plants, that, in general, the student will have very little satisfaction in comparing his specimens with them. We have, however, an excellent field of observation, our district being very profusely supplied with Lichens, often of luxuriant growth, and many of them improving in development, as we recede from the sea; so that even on the bare summits of the highest mountains of the interior, we find in the most beautiful state of fructification numerous species which had presented themselves in a comparatively poor condition as we traversed the lower tracts. The granite rocks, and especially the fragments that cover the sides and corries of Ben-na-muic-dhui, Cairntoul, and the other high mountains, places supposed to be destitute of vegetation, and indeed, so represented by some geological writers, we have been agreeably surprised to find often profusely covered with *Gyrophoræ*, *Cornicæulariæ*, and some others, which, scarcely less than the phœnogamous alpine plants, give a peculiar interest to those desolate tracts.

CHAPTER IV.

THE FAUNA OF BRAEMAR.



FIRST DIVISION.—VERTEBRATA.

CLASS I.—MAMMALS.

ORDER I.—CHEIROPTERA.

FAMILY I.—VESPERTILIONINA.

1. *Vespertilio Pipistrellus*. Pipistrelle Bat. I have not met with so much as a single bat of any species in the district; but several persons have informed me that they have seen bats repeatedly. Mr. Richard M'Queen, for instance, has observed them at Castletown of Braemar, and my daughter Isabella at Ballater. Dr. Adams states that this species is common about Banchory.
2. *Plecotus auritus*. Common Long-eared Bat. A prepared specimen, obtained at Abergeldie. It is not uncommon in the lower parts of Birse. Banchory. Dr. Adams.

ORDER II.—INSECTIVORA.

FAMILY I.—ERINACEINA.

3. *Erinaceus europæus*. Common Hedgehog. Not uncommon in Braemar and along the Dee, to the lower limit of the district, as well as in Glen Muic and Glen Gairn; but not higher than the woods.

FAMILY II.—SORICINA.

4. *Sorex tetragonurus*. Square-tailed Shrew. This and the next species being distinguishable only by careful observation

and comparison, I am unable to specify localities for them.

5. *Sorex rusticus*. Field Shrew. Apparently not uncommon. I have found it at Ballater.
6. *Hydrosorex fodiens*. White-breasted Water Shrew. Seen only in the lower part of Birse.

FAMILY III.—TALPINA.

7. *Talpa europæa*. Common Mole. Generally distributed, in cultivated land and in pastures, as far up as Glen Lui and Glen Ey. Moles must sometimes travel to great distances, for they are found in isolated places, several miles distant from other ground inhabited by them.

ORDER III.—CARNIVORA.

FAMILY I.—MUSTELINA.

8. *Meles Taxus*. Common Badger. Generally distributed, in woods and thickets; but very scarce in most parts—in the game tracts almost extirpated.
9. *Mustela Putorius*. Fourmart Weasel. Generally distributed, in the woods, among blocks and stones, sometimes on the hills at a considerable elevation. Destructive to grouse, rabbits, and hares. Not uncommon. [A gamekeeper informed Dr. Adams it was remarkably destructive of grouse, but Sir W. Jardine says he is not aware of the fact.]
10. *Mustela Erminea*. Ermine Weasel. Generally distributed, in thickets and stony places. Not common.
11. *Mustela vulgaris*. Common Weasel. Generally distributed. Common in many of the lower tracts; among detritus, about walls, and in thickets.
12. *Lutra vulgaris*. Common Otter. On the Dee and all its larger tributaries; but rare—very seldom seen above Castletown. Two otters, Mr. M'Gregor informed me, were recently killed on Loch Callater. [Dr. Adams says

they are very destructive of Salmon, and are far from being extirpated.]

13. *Martes Foina*. Common Martin. Generally distributed; but very rare; chiefly in the pine and birch forests; also on the hills in rough ground. It climbs trees occasionally; but its ordinary habits resemble those of the Foumart. Young individuals have the throat yellow, sometimes spotted with dusky. Old individuals also when the pile is just renewed, have the white of the throat tinged with yellow, but ultimately it becomes white; hence the belief with some zoologists in two species. In Braemar the two alleged species are considered one and the same, and certainly, in my opinion, are so.

FAMILY .II—FELINA.

14. *Felis Catus*. Wild Cat. Generally distributed; at one time very common, but now extremely rare; in thickets and among blocks and cairns.

FAMILY III.—CANINA.

15. *Vulpes vulgaris*. Common Fox. The larger variety, or Hill Fox. Generally distributed; pretty frequent.

ORDER IV.—RODENTIA.

FAMILY .I—MURINA.

16. *Mus decumanus*. Brown or Norway Rat. Generally distributed; always in or about houses. As far up as Mar Lodge and Gairnshiel; but not common.
17. *Mus Rattus*. Black rat. Not uncommon; in and about houses, even the most remote. [Dr. Adams says it is becoming rare since the introduction of the former species, which, in many districts, has only recently been introduced.]
18. *Mus domesticus*. Generally distributed; common.
19. *Mus sylvaticus*. In the lower tracts, and in the glens, as far as cultivation and thickets or woods extend; seldom seen above Castletown.

FAMILY II.—ARVICOLINA.

20. *Hypudæus ater*. Black Vole. Black Dog or Water Dog. Generally distributed; but local; not frequent along the Dee; mostly on grassy banks of the larger tributaries; pretty numerous in Braemar, in several places along the Dee, and the Clunie.
21. *Arvicola agrestis*. Common Brown Arvicole. Generally distributed; not uncommon; in thickets, grassy banks, and on heaths.

FAMILY III.—LEPORINA.

22. *Lepus timidus*. Common Hare. Red Hare. Generally distributed; in the cultivated tracts, and in pastures; seldom far up on hilly ground; of late years becoming rare in Braemar. [Dr. Adams says it is believed they are more numerous now than at the beginning of the century.]
23. *Lepus variabilis*. Changing Hare. Grey Hare. White Hare. Generally distributed, from Scarsach and Cairntoul to Mount Battock; in summer frequenting the higher grounds, and even the summits of the loftiest mountains; in winter betaking itself to the valleys, and often feeding on the turnips, which, however, are not very plentiful in the upper tracts. Of late years it has become much more numerous in Braemar. This species is continually shedding its hair, excepting for about four months in winter and spring; so that specimens in good condition for stuffing are not usually to be had. In summer, the head is reddish-brown, the lips and chin brownish-white, the ears dusky, anteriorly edged with red, the upper part of the body dusky-grey, intermixed with reddish, the forepart of the neck dusky-grey, the limbs reddish-grey. In autumn, the head is brownish-red, the eyes circled with whitish, the lips light-red, the chin grey, the ears anteriorly reddish, greyish-white behind; the upper parts of the body reddish-brown, posteriorly tinged with bluish-grey, the forepart of the neck brownish-grey, the limbs yellowish-red. In

winter and spring, the fur white, excepting the tips of the ears, which are edged with black at all seasons, and some long hairs scattered over the body. It appears to me, that in this species of Hare, the pile is, like the plumage of the Ptarmigan, always changing, not in colour merely, but by the substitution of new for old hairs. At every season, the hairs have so little hold of the skin, that they may be pulled out as if from a semiputrid skin. In the beginning of summer, there is a general shedding of the white hairs, which are substituted by grey and brown;—but the autumnal colours being different from the summer tints, chiefly red in place of grey, must we suppose that the increasing heat of July and August tinges the grey hairs brown? In short, having examined individuals at different periods of the year, I find that the fur is constantly moulting, as well as changing its colour; that in winter it is of an entirely different texture, being much denser, finer, and softer, and with less gloss, than in autumn; and am thus, from observation, convinced that, as in the case of the Ermine and Ptarmigan, the change of colour from dusky-grey to reddish-brown, and then to white, cannot be attributed to the action of cold upon already-formed parts, as most people naturally enough suppose. Mr. Brown, of Micras, and other persons, practically acquainted with this species, are of the same opinion.

24. *Lepus Cuniculus*. Rabbit. The Rev. Dr. Skene Keith, in 1811, states that “there are no rabbits raised for sale; and only a few for amusement—not a hundred in the whole county.” Much more than that in the town of Aberdeen itself. However, there were no rabbits in Braemar until very recently, and they have increased there, as elsewhere in the county, so as to be a nuisance. Besides eating a great quantity of herbage, they burrow in the corn-fields. In Glen Callater, great numbers live on a steep, rocky, and stony hill, bearing a profusion of Heather, and there burrow among the stones. They are also extremely abundant on Craig Choimnach, and along the north side

of the river towards Alan-a-cuaich, where Mr. Cuming is endeavouring to thin their numbers by means of ferrets. There probably is not now a parish in Aberdeenshire in which wild rabbits are not plentiful. In some cases they may be beneficial ; but they increase so rapidly, and destroy so much herbage, that there is a general outcry against them. Foxes have better feeding now than formerly, and thus are not so destructive to lambs and poultry. [The tenant is in most cases allowed to destroy them.]

ORDER V.—RUMINANTIA.

25. *Cervus Elaphus*. Red Deer. The habits and general history of this interesting species being well-known, I need say nothing here respecting them. Extensive tracts in Braemar have been set apart exclusively for them, and there they are carefully protected from unlicensed persons. The Duke of Atholl's great deer-range being continuous with those of the Earl of Fife, Mr. Farquharson of Invercauld, and the Duke of Richmond, the deer often roam from the one to the other. It is supposed that there are about ten thousand of them in the Braemar tract, or from Atholl to Loch Muic ; but there cannot be any certainty as to their numbers. It appears that they had been degenerating considerably of late years, the forests having been overstocked ; but that very recently they have shown symptoms of improvement. Of course, deer, like cattle and men, depend greatly on good feeding for their good looks, and the deer are quite fastidious when they have a large range and a variety of food, preferring always the most tender and nutritious, whence it is that they often inflict injury on the farmer. About three hundred, I am told, are annually killed in Braemar alone. The Red Deer roam in the woods as well as on the hills. During the summer the stags usually keep apart, in little herds, on the higher grounds, while the does and young keep in the valleys and woods. Large herds may sometimes be seen by the wandering naturalist. I once saw about five hundred

together in Glen Tilt, and about two hundred on the Little Craigandal hill. (See Appendix.)

26. *Capreolus Dorcas*. Common Roe Deer. This species frequents the thickets and woods, in small parties, or single families. The female produces two, frequently three, and sometimes four, young ones; that of the Red Deer having only one. It is common in almost all parts of Braemar suitable for its inhabitation, and is distributed all along the hill tract to the south of the Dee, even as far as Lower Banchory; as well as on the northern side, to the parishes of Skene and Newhills. Great numbers are killed every year; but it is less an object of pursuit than the Red Deer.

These are all the Mammalia that I have ascertained to reside in Braemar. There are probably a few more, of the genera *Mus*, *Arvicola*, *Sorex*, and *Hydrosorex*. It having been stated that the Squirrel occurs in Braemar, I not only looked for it, but made inquiries respecting it of persons qualified to give correct information. Mr. Cuning had never seen nor heard of it; nor had any other individual of whom I asked. If introduced, it would no doubt thrive, in the whole extent of Deeside, as it is plentiful in the Atholl district, and occurs even on the Spey. [Sir William Jardine says it also occurs on the Don.]

The species of Mammalia in Braemar cannot vary much in a century; but their proportional numbers must fluctuate from various influences. The Badger and Wild Cat, for instance, have been nearly extirpated. The Red Hare is greatly diminished, and the Grey Hare increased in numbers. It does not appear that any species has been extirpated since the commencement of the present century. One, the Rabbit, has been introduced, and by its numbers and habits, has had a great influence, it being in many tracts the species most frequently seen.

Very few quadrupeds meet the eye of the naturalist as he traverses the hills and glens. The Grey Hare he meets with on every high hill; the Red Deer not unfrequently attracts his regard, on the moors as well as in the woods: the Roe is often seen in the thickets and woods; the Rabbit occurs plentifully in many places; and sometimes, but rarely, a common Hare is started.

But one may wander for weeks without seeing any other quadruped, unless he carefully search for this class of animals.

CLASS II.—BIRDS.

ORDER I.—RAPTORES.

FAMILY I.—AQUILINÆ.

1. *Haliæetus albicilla*. White-tailed Sea Eagle. Although this species of Eagle is not exclusively maritime, there is no evidence of its ever having bred in Braemar. Individuals, however, may occur anywhere in Scotland; and have actually been seen in almost every county. Mr. Brown has a good specimen, a young bird, caught several years ago with a trap affixed to one of its feet; the trap was found on inquiry not to belong to any of the gamekeepers of the district. [Dr. Adams says it formerly bred on Clochnaben and Glenock, and may also have had its nest in Braemar.]
2. *Aquila chrysaetos*. Golden Eagle. This species, which formerly existed in considerable numbers in Braemar, and bred in the precipices of the wilder glens, is now very seldom to be seen there. Shepherds and gamekeepers have effected its almost entire destruction, insomuch that it is doubtful if even a single breeding-place remains occupied. In the course of six weeks' excursions among the mountains, I saw only two individuals, one at Craigandal, the other in Glen Ey—after all, it might have been only one individual twice seen. Mr. Cuming has a preserved specimen, which was obtained upwards of twenty years ago. Mr. Brown, at Micras, who has others, has frequently had individuals sent him to be preserved. Mr. McGregor informed me that it is occasionally, though rarely, seen in Glen Callater; and Mr. Stewart has sometimes seen it over and about Ben Aun, and in the upper part of Glen Gairn. Several persons

have mentioned its occasional occurrence in the tract between Castletown and Glen Tanar; but farther down the country it is scarcely ever to be seen. My friend, Mr. Thomas Jamieson, who has favoured me with ornithological observations made by him in Braemar, in July, 1846, mentions having seen an Eagle near Balmoral. The gamekeeper at Beallach-bhui Cottage, informed him that eighteen years ago there was an Eagle's nest near the Garvalt, on a tree, but that it was now forsaken. He also stated that a great many years ago, Eagles had bred on a neighbouring hill called Craig-an-dain. Braemar is thus evidently not the place for studying the habits of Eagles.

3. *Buteo vulgaris*. Common Buzzard. Gled. Not common, but occurs in all the tracts from Glen Lui downwards. I have seen several specimens, and its occurrence in Braemar, Crathie, Glen Muic, and Glen Gairn, has been stated to me by creditable persons.

It is probable that *Buteo lagopus* also occurs, but I have no evidence respecting it.

4. *Pernis apivora*. Honey Buzzard. The Rev. J. M. Brown informed me that he "once found a nest of the Honey Buzzard in the woods of Abergeldie. It was built on a tree, and resembled that of the Common Buzzard. There were three eggs, of a whitish colour, spotted with light and dark brown. The male was shot." It is possible that another individual may not have visited the district since, although I am aware of two having been shot near Aberdeen.

5. *Milvus regalis*. Common Kite. Fork-tailed Gled. Not very uncommon in the upper tracts. It nestles there in trees. Extremely rare to the east of Glen Muic.

FAMILY II.—FALCONINÆ.

6. *Falco peregrinus*. Peregrine Falcon. Hunting Hawk. Goshawk. Of not very rare occurrence. I saw an individual at Craig-ghobham, close to Balmoral; and Mr. Jamieson

says, he was informed it breeds on Creac-an-Fritheach, nearly opposite Mar Lodge.

7. *Falco Æsalon*. Merlin Falcon. More common than any of the species hitherto mentioned, and found in all parts of the district.
8. *Falco Tinnunculus*. Kestrel Falcon. Sparrow Hawk. Still more common, and, from its peculiar habits, attracting more notice than the others. It breeds in rocks, generally in the wooded tracts, and is frequently seen about Creac-an-Fritheach, Creac-choinnich, the Lion's Face, and the rocks from thence to Invercauld Bridge. I have seen it hovering far up on the moors, as well as in the glens, and even on Cairntonl and Ben-na-muic-dhui.
9. *Accipiter nisus*. Sparrow Hawk. Not common in the upper wooded tracts, but less scarce in the lower. I have no evidence of the occurrence of the Goshawk, *Astur palumbarius*, in any part of Braemar of late years. Many persons give this name to the Peregrine Falcon, as they give that of Sparrow Hawk to the Kestrel; and thus mistakes are apt to be made.
10. *Circus cyaneus*. Ring-tailed Harrier. Not so rare as the Buzzard, but not common. It keeps more to the moors than the other species of *Falconinæ*. [Dr. Adams says that he has seen *C. æruginosus*, the Marsh Harrier, in the neighbourhood of Banchory Ternan.]

FAMILY III.—STRIGINÆ.

I have never met with an owl in any part of the district, although I have seen there preserved specimens of the Barn Owl, Long-eared Owl, and Tawny Owl. What I have to state, with reference to this family, is on the authority of Mr. Brown of Micras, and Mr. Stewart.

11. *Ulula Aluco*. Tawny Hooting Owl. Wood Owl. In the woods of Braemar and Crathie. Not common.
12. *Strix flammca*. Common Screech Owl. Barn Owl. White Owl. When Braemar Castle was uninhabited, it bred in

considerable numbers in it. About the Lion's Face, and the other rocks in that vicinity, it still occurs, but is rare. Along the valley of the Dee, from Balmoral to Camus-o-May, there are several places where it is met with. It also occurs in Glen Gairn.

13. *Otus vulgaris*. Common or Long-eared Tufted Owl. Long-eared Owl. Generally distributed; but very rare.
14. *Otus brachyotos*. Short-eared Tufted Owl. Short-eared Owl. Mr. Brown has obtained it in his district, and Mr. Stewart in Glen Gairn.

The fostering of game causes a great destruction of the predaceous birds, which are thus of rare occurrence in the district; but it does not appear that this has induced an undue increase of any other species.

ORDER II.—VOLITATORIÆ.

FAMILY I.—CYPSELINÆ.

15. *Cypselus apus*. Black Swift. Common Swift. Black Martin. Generally distributed; arriving in the beginning of May, and departing by the end of August. It is not very common even in the low tracts, and does not occur far up the glens, but is seen at Invercauld, and in small numbers about Castletown, as well as half way up Glen Gairn.

FAMILY II.—CAPRIMULGINÆ.

16. *Caprimulgus Europæus*. Common Goatsucker. Night Hawk. In the lower parts of Birse, by the river, arriving about the 20th of May. I had not heard of its occurring above Ballater.

ORDER III.—CLAMATORIÆ.

FAMILY I.—CUCULINÆ.

17. *Cuculus canorus*. Common Cuckoo. Generally distributed, and not uncommon; arriving early in May, and disappearing about the end of July, the young remaining until

the end of September. It extends into the upper valleys, although it seems to prefer the wooded tracts.

FAMILY II.—PICINÆ.

18. *Dendrocopus major*. Greater Spotted Woodpecker. Resident in the woods; it occurs, but very rarely, in all parts of the district, from Banchory to Glen Lui. In Mar Forest and the Invercauld woods it is less frequent than it was some years ago. I have seen specimens obtained in various parts of the district.

Many persons have asserted the occurrence of *Picus viridis*, the Green Woodpecker; but no evidence of its ever having been seen along the Dee has been obtained by me; and on questioning some individuals respecting it, I found that their statements had reference to the Common Creeper, *Certhia familiaris*, which—being a woodpecker in fact, and of a greenish or yellowish-brown tint—they had considered as the Green Woodpecker of naturalists.

ORDER IV.—MODULATORIÆ.

SECTION I.—EXCURSORIÆ.

FAMILY I.—LANIINÆ.

19. *Lanius Excubitor*. Great Cinereous Shrike. Several individuals of this species have been shot in various parts of the district. Mr. Brown obtained two in his neighbourhood; and Mr. Stewart informs me that some have been shot in Glen Gairn.

FAMILY II.—MYIOTHERINÆ.

20. *Muscicapa grisola*. Spotted Grey Flycatcher. Although seldom noticed, it appears to be extensively distributed in Aberdeenshire. I have seen it near Aberdeen, and in the Corby Den in Mary Culter; but, with reference to the Braemar district, I can adduce only two instances. Mr. Thomas Jamieson states: "At Corrymulzie, where I got

a nest with young ; and near the remains of the Old Castle.”

FAMILY III.—HIRUNDININÆ.

21. *Hirundo urbana*. Window Martin. Extends as far up the Dee as Castletown, where it nestles below the caves of Clark's Inn. In the windows of the farmhouse of Achalater, also, I saw many nests. Mr. Stewart informs me that it breeds in a few houses in Glen Gairn.
22. *Hirundo rustica*. Chimney Swallow. This species also extends as far as Castletown, but is less frequent than the last.
23. *Hirundo riparia*. Common Sand Martin. More frequent than the other species, and occurring as far up as Mar Lodge ; also in Glen Gairn, but rare there.

FAMILY IV.—AMPELINÆ.

24. *Bombycilla garrula*. Black-throated Waxwing. Bohemian Chatterer. Mr. Stewart states that it has been once shot in Glen Gairn.

SECTION II.—VAGATORIÆ.

FAMILY I.—CORVINÆ.

25. *Corvus corax*. Raven. This most sagacious bird, which, next to the Eagle, ought to be esteemed the greatest ornament to a wild tract of country, is now of very rare occurrence, and leads a very precarious life, owing to the unremitting persecution of gamekeepers. It is only in very solitary rocky places that it now makes its abode ; and it is seldom that the naturalist meets with it on the hills. Mr. Cunningham informs me that, during the game season, considerable numbers make their appearance in Braemar, apparently coming from the west, and attracted by the offal left on the moors when deer are killed. This may seem a little strange ; but, knowing the habits of this bird, from having observed them in districts where it was very common, I was not at all surprised at the statement.

26. *Corvus cornix*. Hooded Crow. Grey Crow. Generally distributed, and not uncommon; it frequents the open moors as well as the valleys. Being destructive to eggs and young birds, it is persecuted like the Raven.
27. *Corvus corone*. Carrion Crow. I have never seen it in Braemar, or anywhere down to Glen Muic; nor did Mr. Brown or Mr. Stewart mention its occurrence about Abergeldie or in Glen Gairn. But it has several times been observed by me in the lower tracts, and Dr. Adams states that about Banchory it has been seen paired with the Hooded Crow.
28. *Corvus frugilegus*. Rook. Crow or Craw. Generally distributed, in the wooded and cultivated tracts, from Banchory to Mar Lodge. Abundant about Ballater and Crathie. It makes long excursions into the upper glens, and I have seen it frequently on the higher mountains. In Glen Gairn it is a daily visitant—in the upper parts from Crathie, and in the lower from Glen Muic and Ballater.
29. *Corvus monedula*. Jackdaw. Apparently rare. I have seen considerable numbers about Ballater.
30. *Pica caudata*. Common Magpie. Although subject to persecution on account of its destructive habits, it is not at all uncommon along the Dee, from Birse to Inver Ey. It occurs also in Glen Tanar, Glen Muic, and Glen Gairn; but is never seen very far from woods and cultivated places.

FAMILY II.—GRACULINÆ.

31. *Sturnus vulgaris*. Common Starling. Small flocks of Starlings have occasionally been seen in Braemar, Crathie, and Glen Tanar, by Mr. Cuming, Mr. Brown, and Mr. Stewart; but it does not appear that this species is permanently resident, or breeds, in any part of the district.

SECTION III.—CANTATORIÆ.

FAMILY I.—ALAUDINÆ.

32. *Alauda arvensis*. Sky Lark. Generally distributed in the cultivated tracts and their vicinity. The Larks mostly

disappear from Braemar and Crathie early in autumn. I found great numbers of them in Coull in September.

33. *Anthus pratensis*. Meadow Pipit. Generally distributed; and in the lowest, highest, and all intermediate stations; in pastures, and on moors. I have seen it on the summits of Braeriach, Ben-na-muic-dhui, Lochnagar, and other high mountains. In the end of autumn they mostly leave the higher tracts.

FAMILY II.—MOTACILLINÆ.

34. *Motacilla Yarellii*. Pied Wagtail. White Wagtail. Common in all the valleys from the Feugh to the Linn of Dee, and far up the glens. It continues all the year at Castletown, in winter in diminished numbers.
35. *Motacilla boarula*. Grey Wagtail. Yellow Wagtail. Not uncommon in all the lower tracts from the Feugh to the Linn of Dee, and sometimes far up the glens. A few individuals remain in mild winters. Many persons, naturally enough, call this the Yellow Wagtail. The species properly so called (*Budytes Rayi*, Prince Bonaparte, *Motacilla flava*, Penn) I have not met with. [Dr. Adams says it is not uncommon in the district.]

FAMILY III.—SAXICOLINÆ.

36. *Ruticilla Phœnicurus*. (*Sylvia Phœnicurus*). White-fronted Redstart. In the lower tracts, but rare; about Banchory not very uncommon. Mr. Thomas Jamieson, in July, 1846, "saw it only at one locality, by the road on the south side of the Clunie, amongst some birken bushes by the side of a stone wall."
37. *Saxicola rubetra*. Whin Chat. Not common, but occurs in all the tracts; in Birse, Glen Tanar, Crathie, Glen Gairn, and Braemar, in stony places and thickets.
38. *Saxicola rubicola*. Stone Chat. Very uncommon, but generally distributed, in thickets, or in heathy places.
39. *Saxicola Œnanthe*. Wheat Ear. Steen Chackart. Fallow Chat. Clacharan. Generally distributed; common in the lower

tracts, as well as far up the glens ; in stony places, and by dykes. It arrives about the middle of April, and disappears about the end of September.

FAMILY IV.—CINCLINÆ.

40. *Cinclus aquaticus*. European Dipper. Water Ouzel. Water Crow. On the Dec, and most of its tributaries. I have seen it on Loch Muic and on the little lake in the eastern corry of Cairntoul. It is not, however, so common as one might expect to find it in such a district. On the Tweed and its tributaries, I have seen ten times more in the course of a fortnight, than on the Dee and its tributaries in a month. Few birds attract the notice of the naturalist more readily than this, and there are none which it is more pleasant to meet in the desolate glens.
41. *Turdus torquatus*. Mountain Thrush. Ring Ouzel. Aiten Chackart. In its habits this bird is allied to the Rock Thrushes. It arrives at the end of April, and is found in summer dispersed over the whole district, from the Feugh to the uppermost limits of the county. Cairns of detritus, heaps of blocks, rough places in corries, and stony hill-sides, are the places in which it then occurs. Although it is never numerous in any particular place, a pair or a family only being seen here and there at long distances ; yet the number in the district must be great, for in September, when the berries of the Rowan-tree begin to ripen, flocks are seen feeding upon them. In some places they are also destructive to Gooseberries and Cherries. They all disappear by the middle of October. [Dr. Adams says they occasionally remain during the whole winter.]
42. *Turdus merula*. Black Thrush or Blackbird. Generally distributed, from the lower tracts of Birse to Invercauld, Castletown, and Corrymulzie. This species is not numerous, excepting in a few localities, about gardens, or ornamented grounds. It is seldom to be seen in the wild woods, and never far up the glens.
43. *Turdus pilaris*. Chestnut-backed Thrush. Fieldfare. In

winter and spring occasionally in flocks, in all parts of the district, except the higher hills; from the Feugh to Glen Gairn and Mar Lodge.

44. *Turdus viscivorus*. Missel Thrush. This species, the largest of its genus, is often mistaken for the Fieldfare, from which it differs in its mode of flying, in its cries and notes, and in being resident. It occurs in all the lower tracts and wooded parts of valleys, and is not uncommon about Ballater, and all the way up to Mar Lodge. I have seen flocks of it in September eating the berries of the Rowan-trees.
45. *Turdus musicus*. Song Thrush. Mavis. Generally distributed, and not uncommon, preferring the vicinity of cultivated tracts, and very seldom seen far up the glens.
46. *Turdus iliacus*. Redwing Thrush. In winter and spring occasionally in flocks, in all parts of the district, except the higher hills, from the Feugh to Glen Gairn and Mar Lodge.
47. *Erithacus rubecula*. Robin Redbreast. Generally distributed; in October resorts to the neighbourhood of houses, and until April continues there; in summer in thickets or woods, or retired burn-sides, never seen on the open moors, or high on the hills.
48. *Accentor modularis*. Hedge Chanter. Hedge Sparrow. In summer and early autumn one might suppose there were none of this species in the district, but in winter and spring it is to be found about almost all the farm-steadings, and in gardens and villages, up to Castletown.

FAMILY V.—SYLVIINÆ.

49. *Phyllopneuste Trochilus*. (*Sylvia Trochilus*). Willow Wood-Wren. Willow Warbler. Willow Wren. Ground Wren. Hay Bird. Huckmuck. Willie Muftie. Very common, arriving early in May, in August collecting into flocks, which often accompany the Kinglets and Titmice in the woods. I have met with it as far up as Corrymulzie and Mar Lodge.

50. *Phyllopneuste hippolais*. The Chiff-chaff. Lesser Pettychaps. Least Willow Wren. Mr. Brown states that it occurs along the Dee, in his neighbourhood (Abergeldie and Mieras), but is very rare. I saw one individual at Corrymulzie.
51. *Sylvia (Curruca) atricapilla*. Black-cap Warbler. In the neighbourhood of Banchory, and about Ballater. On the 3rd September, 1850, I found in a bush of *Prunus Padus* by Braichley Burn, a nest with four eggs, which had long been deserted.
52. *Regulus cristatus*. Gold-crowned Kinglet. Golden-crested Wren. Generally distributed in all the wooded tracts, from Banchory to Glen Lui; especially plentiful about Ballater, Abergeldie, Invercauld, and Corrymulzie. From August to April it moves about through the woods, diligently searching the trees for food, along with the Coletit, Tit, and the Blue Tit. The Willow Wren often joins the flocks, but departs in September. It is pleasant to watch the movements of the little creatures while they are thus employed, and when they are perpetually shifting from one twig to another. On the 31st of August, I met with a very large company of *Parus ater* and *Regulus cristatus*, feeding and gambolling on the Spruce-trees by the road between Ballater and Pananich. It was evening-tide, and they had begun to intermit their labours. They frequently chased each other in sport, some alighted now and then on the dusty road, apparently to pick up insects; and others occasionally betook themselves to a small rill, in which they washed and fluttered.

FAMILY VI.—TROGLODYTINÆ.

53. *Troglodytes Europæus*. Common Wren. In winter about villages, and farm-steadings; but in summer and autumn widely dispersed, and sometimes met with in the most remote parts of the glens and moors. It is generally distributed, but can scarcely be called common.

FAMILY VII.—PARINÆ.

54. *Parus major*. Greater Tit. Along the Dee and the larger streams, as far up as Mar Lodge; but not common.
55. *Parus cæruleus*. Blue Tit. Generally distributed. In summer and autumn residing in the woods and thickets, in winter and spring, often seen about houses. Many pairs, however, nestle in gardens; and multitudes keep to the woods all winter, along with the Kinglets and Cole Tits.
56. *Parus ater*. Cole Tit. Generally distributed, in all the wooded tracts, from Banchory to Glen Lui; especially abundant about Ballater, Abergeldie, Invercauld, and Corrymulzie. Its habits are very similar to those of its frequent associate, the Golden-crowned Kinglet.
57. *Mecistura caudata*. Long-tailed Mufflin. Long-tailed Tit. Bottle Tit. Generally distributed, but comparatively rare. It is seen, however, in Glen Gairn, and as far up as Mar Lodge.

SECTION IV.—REPTATORIÆ.

FAMILY I.—CERTHIINÆ.

58. *Certhia familiaris*. The Common Creeper. Generally distributed; occurring in all the wooded tracts; but not in great numbers. A few individuals usually accompany the flocks of Tits and Kinglets.

ORDER V.—DEGLUBITORIÆ.

FAMILY I.—EMBERIZINÆ.

59. *Emberiza miliaria*. Corn Bunting. Generally distributed in the cultivated tracts; rare in Glen Muic, Glen Gairn, and above Invercauld, and generally departing in autumn.
60. *E. citrinella*. Yellow Bunting. Generally distributed; abundant in all the cultivated and wooded tracts, as far as the Linn of Dee.
61. *Plectrophanes nivalis*. Common Snow Bunting. Snowflake. I have met with this species early in August, in the corry

and on the summit of Lochnagar; on the Glas-mheal; in the western corry of Cairn Toul, on the summit of Ben-namuic-dhui, and in several other localities. Mr. Cumming and Mr. Brown inform me that it resides there all summer, and breeds. In winter it frequents the valleys, from Castletown to Ballater, in small flocks. Several persons stated that formerly very large flocks were seen in stormy weather, in winter and spring, but that now comparatively few individuals are observed. According to Mr. Stewart, it breeds on Ben-Aun, and in winter appears in the glen in flocks.

FAMILY II.—LOXIINÆ.

62. *Pyrrhula vulgaris*. Common Bullfinch. In the lower wooded tracts, but very uncommon. Ballater, Abergeldie, Glen Gairn, Castletown.
63. *Corythus enucleator*. The Pine Grosbeak. Common Hawfinch. Pennant mentions having met with this beautiful bird early in August, in the Pine forest of Invercauld, and supposed that it bred there. On the 20th August, 1850, I and my son saw a bird at Corrymulzie, which attracted our notice by the red colour of its breast, and which, I think, was this species.
64. *Loxia curvirostra*. European Crossbill. This remarkable bird occurs in rambling flocks in the Pine woods at all seasons, but at uncertain periods, as it seems to be nowhere stationary. Its occurrence in Braemar proper, Crathie, Glen Gairn, and Glen Muic, is authenticated by Mr. Cuming, Mr. McRae, Mr. Brown, the Rev. Mr. Brown, and Mr. Stewart.

FAMILY III.—FRINGILLINÆ.

65. *Pyrgita domestica*. Domestic Sparrow. House Sparrow. Not uncommon in some of the lower tracts, but beyond Ballater rare. Some breed among the ivy on the remains of the old bridge at the mouth of Glen Gairn. A few also breed in the bridge at Castletown.

66. *Fringilla cœlebs*. Chaffinch. Very abundant in the cultivated and wooded tracts of the whole district.
67. *Fringilla montifringilla*. Mountain Finch. Brambling. I saw a specimen of this bird with Mr. Brown, who says it is sometimes, but rarely, met with in flocks in winter.
68. *Chlorospiza (Coccothraustes) chloris*. Common Greenfinch. Green Linnet. Common in the lower wooded and cultivated tracts, becoming rare beyond Ballater; not uncommon in Glen Muic and Glen Gairn.
69. *Linota cannabina*. Greater Redpole. Linnet. Generally distributed; common in the lower tracts.
70. *Linota montium*. Mountain Linnet. In the lower tracts not common.
71. *Linota linaria*. Lesser Redpole Linnet. Mr. Thomas Jamieson says he "saw at any rate one Redpole near Castletown, and also several times observed small birds, which by their notes were thought to be Redpoles."
72. *Carduelis elegans*. Common Goldfinch. Mr. Brown has found it, but rarely, in Crathie.
73. *Carduelis spinus*. Siskin. Not uncommon along the Dee, from Aberdeen to the Linn. On the 31st August 1850, I saw, near Pananich, two Siskins, which were very sedately but busily employed in picking the cones of the Birch. I watched them for some time, and could see them very distinctly, as they were not at all shy. Mr. Thomas Jamieson saw it in July 1846, several times near Castletown, and down the river side.

ORDER VI.—GEMITORÆ.

FAMILY I.—COLUMBINÆ.

74. *Columba palumbus*. Ring Dove. Generally distributed; abundant in the lower tracts, not common in the upper, roosting in the woods, but frequenting the open fields.

ORDER VII.—RASORIÆ.

FAMILY I.—PERDICINÆ.

75. *Perdix cinerea*. Common Partridge. Generally distributed

in the cultivated tracts; less common beyond Ballater, but not rare even above Castletown.

FAMILY II.—TETRAONINÆ.

76. *Tetrao tetrix*. Black Grouse. Generally distributed in the wooded tracts, but not common anywhere.
77. *Lagopus scoticus*. Red Ptarmigan. Red Grouse. Muirfowl. Very abundant on almost all the moors, and up to the height of more than 2000 feet above the sea.
78. *L. mutus*. Gray Ptarmigan. On all the high hills, from Scarsach and Ben Vrotan down to Mount Keen and Morven. Abundant in the Braeriach range especially, as well as on Lochnagar. The occurrence of flocks of this beautiful species on the stony summits and in the wild corries of these mountains never fails to arrest the attention and excite the admiration of the naturalist, whatever his special object may be in visiting these most interesting localities. I have minutely described the changes of plumage which it undergoes, and have shown that these changes are presented by the new feathers even before they are fully developed. The hypothesis of their taking place in the developed feather which is supposed to change from brown, red, and gray, to white, from the action of the weather, is not supported by a single correctly observed fact. (*Zool. Trans.*, vol. xxxiii. p. 17.) Mr. Brown, of Micras, who has had good opportunities of examining Ptarmigans at all seasons, and who has particularly attended to their changes of plumage, corroborates the statements I have made. In December, January, and February, the birds, he says, are white; in March, gray feathers appear, and become numerous in April; in summer, the plumage is barred red and dusky; in September it becomes gray, and so continues until November or December. Mr. Cuming and Mr. McGregor have observed the same facts, and inform me that all the gamekeepers in Braemar are of one mind in this matter.

ORDER VIII.—CURSITORIÆ.

FAMILY I.—PLUVIALINÆ.

79. *Charadrius (Pluvialis) aurea*. Golden Plover. Breeds on the higher moors, but is not common. I saw a flock at the head of Glen Callater.
80. *Charadrius (Eudromias) morinellus*. Common Dotterel. I met with three individuals of this species on the summit of the Glas-mheal, on the 9th August, and with one on Lochnagar. Mr. McGregor has often seen them in summer and autumn on the high hills about the head of Glen Callater. Mr. Stewart informs me they occur also in the upper parts of Glen Gairn. Mr. Cuming says they were formerly common on the summits of the mountains, but are now rarely to be seen there, and only in very small numbers.
81. *Charadrius hiaticula*. Ringed Sand Plover. Breeds along the Dee, in very small numbers, as far up as Ballater.
82. *Vanellus cristatus*. Crested Lapwing. Peewit. Not common in the district; but breeds in small numbers in Glen Clunie, a few other places in Braemar, in Glen Gairn, and about the base of Morven; more numerous about Loeh Dava and Loch Ceannor,—also in many parts of Birse.
83. *Hæmatopus ostralegus*. Pied Oyster-catcher. Ascends the Dee in summer as far as the Linn of Dee, and breeds here and there on the pebbly beaches.

ORDER IX.—TENTATORIÆ.

FAMILY I.—TRINGINÆ.

84. *Numenius arquata*. Common Curlew. Breeds on the remote moors in small numbers. It is said to be becoming more numerous of late years.

FAMILY II.—TOTANINÆ.

85. *Totanus calidris*. Red-shank Tattler. The Common Red-

shank. A few breed about Loch Dava and Loch Ceannor, which are on the border of the district.

86. *Totanus (Actitis) hypoleucos*. The Common Sand Piper. White-breasted Weet-weet. Generally distributed, in summer, along the Dee, and its larger tributaries.

FAMILY III.—SCOLOPACINÆ.

87. *Scolopax gallinago*. Bleater. Common Snipe. Generally distributed.
88. *Scolopax gallinula*. Jack Snipe.
89. *Scolopax (Rusticola) sylvestris*. Common Woodcock. Not uncommon in the wooded tracts in winter and spring; but, besides the migratory individuals, there are some which are resident, and breed in the district. I met with one in Glen Muic early in September.

ORDER X.—LATITORIÆ.

FAMILY I.—GALLINULINÆ.

90. *Crex pratensis*. Corn Crake. Common and generally distributed in the cultivated tracts, as far up as the Linn of Dee.
91. *Gallinula chloropus*. Common Gallinule. Of rare occurrence, but seen here and there on the Dee, in marshy ground near Mar Lodge. It is rather numerous, and breeds on Lochs Dava and Ceannor.
92. *Fulica atra*. Black Coot.

ORDER XI.—AUCUPATORIÆ.

FAMILY I.—ARDEINÆ.

93. *Ardea cinerea*. The Gray Heron. The Common Heron. It is seen occasionally along the whole course of the Dee, from the Linn downwards, as well as by the Lui, the Clunie, the Gairn, the Muic, and some of the other tributaries. [Dr Adams says the Bittern (*Botaurus stellaris*) has been shot at Banchory and other localities.]

ORDER XII.—CRIBRATORIÆ.

FAMILY I.—ANSERINÆ.

94. *Anser segetum*. Bean Goose.

Other species of Geese frequent Lochs Dava and Ceannor during the cold season. [Dr. Adams says *Anser palustris*, the Grey Leg Goose, and *A. leucopsis*, the Bernicle Goose, occur on the Lochs on Dee side.]

FAMILY II.—CYGNINÆ.

95. *Cygnus musicus*. Whooping Swan. Swans sometimes resort to Lochs Dava and Ceannor in winter.

FAMILY III.—ANATINÆ.

96. *Anas boschas*. Mallard, or Wild Duck. Although the district, generally, is not favourable to aquatic birds, this species occurs in considerable numbers, in marshy ground near Mar Lodge, in Glen Clunie, in Glen Gairn, in Upper Glen Muic, in various parts of Glen Tanar and Birse, and plentifully on Lochs Dava and Ceannor.

97. *Querquedula crecca*. Common Teal. [To these species of *Anatinæ* Dr. Adams adds the following :—*Mareca Penelope*, the Widgeon; *Clangula chrysophthalmos*, the Gowdy Duck, or Golden Eye; *Tadorna vulpanser*, the Shieldrake, or Shelduck; and *Mergus Castor*, the Goosander.]

ORDER XIII.—URINATORIÆ.

98. *Colymbus glacialis*. Great Northern Diver.

ORDER XIV.—MERSATORIÆ.

FAMILY I.—LARINÆ.

99. *Larus argentatus*. Herring Gull. This species is occasionally seen along the river and in the larger glens at all seasons, although it does not appear to breed anywhere in the district.

100. *L. canus*. Common Gull. Mr. Brown informs me that he has seen this species also in the Crathie district.
101. *Xema ridibundus*. Black-headed Mew. Tarrock. This species is said to breed on the little island near the head of Loch Muic. I did not see any there, however, in July 1842, or in August 1830, or September 1850. A few breed on Loch Callater. Loch-an-eun, in the north corry of Lochnagar, is named from its having formerly bred there in great numbers.

For an inland mountainous tract, in which there are very few lakes, and scarcely any marshes, a hundred species out of the three hundred and forty which have been found in Great Britain make a fair enough proportion. No doubt a few more species than those enumerated exist in the district—probably a Grebe or two, the Dunlin in summer, the Water-rail, the Chiffchaff, and two or three species of Duck. But, including even the rarest stragglers, it is not at all likely that the number amounts to a hundred and twenty.

Among the most interesting of these birds are the Snow-bunting and the Dotterel—the former being now proved to be permanently resident, and the latter a regular summer visitant. Besides the facts stated respecting the Dotterel, I may mention that I have seen a large flock in the parish of Towie, on the Don, and that in the *Statistical Account* of the parish of Strathdon it is stated, that “the dotterel’s (*C. Morinellus*) nest is found in the more sequestered hills.”

CLASS III.—REPTILES.

ORDER I.—SAURIA.

FAMILY I.—LACERTINA.

Zootoca vivipara. Viviparous Lizard. Common Lizard. *Lacerta agilis*, of many authors. Not uncommon in many parts of the tract from the Linn of Dee to Ballater. I caught an

individual in the upper part of Glen Muic, on the 5th, and one in the upper part of Glen Clunie, on the 9th of August. It is chiefly in stony places exposed to the sun, and on dry heaths that it occurs. Although quite harmless, it is an object of dread to most of the natives. In Glen Tanar and Birse it is reported to be at least as common as in the upper tracts. [Dr. Adams says he once saw an instance in which the bite of this lizard was followed by considerable swelling and pain.]

ORDER II.—SAUROPHIDIA.

Anguis fragilis. Brittle Snake. Slow Worm. The only specimen I have seen was caught by Mr. Alexander Murray on the hill of Craigandarroeh near Ballater, where it is said to be frequent. Mr. Richard M'Queen informs me that he has seen it near Castletown. Various individuals have reported it as not uncommon in the upper tracts. Generally, however, it is not distinguished by the people from the Viper. [Dr. Adams says he saw several in various localities, basking in the sun, in the summer of 1853.]

ORDER III.—OPHIDIA.

FAMILY I.—VIPERINA.

Peluis berus. Common Adder. Viper. Adders are common in many parts of the district, but especially numerous on dry moors, and in Birch, and sometimes Pine woods. They vary considerably in colour, some being brown above with a row of black rhomboidal spots, others brownish-red, with the spots brown. I have not seen any exceeding two feet in length; but Mr. Gruar, at Castletown, informed me that, in the Birch wood between the base of Morrone and the Dee, he killed one that measured three feet; and that a few years ago, when some people were burning heather in a place in Glen Candlic, which he pointed out to me, an enormous serpent came out from among the fire, and in attempting to escape, divided the heather so as to render

its course through it quite apparent. It was killed with a stick by one of the men, and it being of extraordinary thickness as well as length was opened, and found to contain nine young ones, which the men were surprised to find coiled up in a corresponding number of bags united in a series, and which they at first took for masses of tallow. This account corresponds perfectly with the mode of gestation of the Viper, and tends to give credibility to the assertion that the individual alluded to was four feet long. Mr. M'Gregor, Achallater, informed me that Adders were very numerous and often of very large size in Glen Callater, but are now unfrequent there. Some old men had assured him they had often seen serpents four feet long. Mr. Richard M'Queen, in the beginning of August, 1850, killed one at Carower, on the Beallach Dearg road, which he supposed to be three feet long. He once saw one opened, which had three mice in its stomach. It is frequent in some parts of the Lochnagar range also. I have met with it in the upper part of Glen Gelder. In Glen Gairn I saw a fine specimen killed by Mr. Reid there. In Glen Tanar and Birse it is also frequent in many places. I have not, however, heard of any injury inflicted by it on persons traversing the hills; although cattle and dogs, it is said, are sometimes bitten. I apprehend the largest size is about thirty inches.

[Dr. Adams says, "this reptile is by no means uncommon, often growing to the size of two feet. Although upon the whole I disapprove of vivisection, I think it right to admit that on several occasions I have dissected living Adders in order to observe the actions of the heart and the other internal viscera. I have also dissected some females with young, and found the appearance pretty much as described in the text. The young are enclosed in separate sacs, quite unconnected with the mother. Some well-informed gentlemen of the district are impressed with the conviction, that there is, or at least that there was, forty or fifty years ago, another snake of a different genus, which grew to a larger

size than the Adder. Whether this be really true, or whether the snakes they saw were individuals of great age which had attained a larger size than usual, I shall not take it upon me to decide."

"About twelve years ago, I published in the *Edinburgh Medical Journal* the history of the case of a woman who had been stung by an Adder near the middle of the leg. The whole limb swelled rapidly, and became livid, but in the course of a few days all the bad symptoms went away."]

ORDER IV.—BATRACHIA.

FAMILY I.—RANINA.

Rana temporaria, var. *scotica*. Scottish Frog. Common Frog. Not uncommon in the lower tracts, as far up as Ballater.

Rana Ericctorum. Heath Frog. In the glens and on the hills up to the height of three thousand feet above the sea.

This species, when compared with the common frog, shows the following differences. The head is not quite so broad in proportion to its length; the gibbosity of the back is more prominent; its second fore-toe is proportionally longer; all the hind part of the back beyond the gibbosity, and the upper or outer side of the thighs, legs, and feet, is covered with small hemispherical tubercles, these parts being destitute of tubercles in the other species, which has the hind part of the back rugose, and the hind limbs scrobiculate.

FAMILY II.—BUFONINA.

Bufo vulgaris. The Common Toad. Every where abundant.

[*Bufo calamita*. The Natter Jack, or Running Toad. It has been observed in Scotland by Sir William Jardine.]

FAMILY III.—SALAMANDRINA.

[Dr. Adams and Mr. P. H. Macgillivray both speak of a Water-Lizard, which is probably *Lissotriton punctatus*, the Smooth Newt, Eft, or Evet, as being common in ponds on Dec-side.]

CLASS IV.—FISHES.



ORDER I.—ACANTHOPTERYGII.

FAMILY I.—PERCINI.

1. *Perca fluviatilis*. Common Perch. The Perch is not more indigenous in this part of Scotland than the Rabbit. I have been informed that it exists in Loch Dava and Loch Ceannor.

FAMILY II.—LORICATI.

2. *Gasterosteus aculeatus*. Common Stickleback. In pools and brooks. Loch Ceannor. Not observed above Ballater.

ORDER II.—MALACOPTERYGII.

FAMILY I.—CYPRININI.

3. *Leuciscus phoxinus*. Common Minnow. This pretty little fish exists in the Dee, everywhere in suitable places, from Banchory Devenick to near Mar Lodge. Between Invercauld bridge and the mouth of the Clunie it is very plentiful in quiet pools of the river, often occurring in large shoals. Specimens caught there were given me by Mr. Richard M'Queen. It is generally most abundant in places frequented by Pike.

FAMILY II.—ESOCINI.

4. *Esox Lucius*. Common Pike. Ged. In the Dee, everywhere in suitable places, from its mouth to near Mar Lodge. Rapid as that river is, it yet sometimes forms pools, adapted for this handsome and vigorous fish. When I was at Castletown, Mr. Richard M'Queen brought me a pike caught by him in the Dee. It was two feet three inches long, and about four pounds weight. He had caught the same day an individual two feet six inches long, and

weighing five and a half pounds. One taken a few days previously by David Aitkin, was two feet nine inches long, and weighed about six pounds. It occurs of much greater size, and some weeks before, a very large individual was speared which had swallowed a salmon, the tail of which protruded from its mouth. About Castletown it inhabits quiet pools of the Dee, especially such as have herbage growing in them, and is plentiful in such places from Invercauld to near the bridge at Mar Lodge. In the Clunie there are a few in pools, as far up as Castletown. In Loch Callater, Pikes are numerous, and many of them of very large size. There is no prohibition of Pike-fishing on the Dee in Braemar, and they are taken there both with the line and the rod, the bait used being a bit of flesh, a frog, or a mouse. [Dr. Adams states that he once saw a Pike which was caught in Loch Achlossan which measured four feet in length.]

FAMILY III.—SALMONINI.

Salmo salar. Salmon. Salmon ascend the Dee so as to arrive in Braemar from June to October. Grilse begin to appear there in August. The largest Salmon usually weigh from ten to twelve pounds. In the beginning of November they ascend the small streams, to deposit their spawn. Great numbers are found in Loch Callater, where eighteen have been taken at one haul, and thirty-five in one day. They pass through the Linn of Dee, and are speared in the river above it in October. Fifty or sixty are taken every year in the Clunie. Salmon-fishing is prohibited on the Invercauld estate, and on the Earl of Fife's, above Duff Cottage; but between it and the mouth of the Clunie there is no prohibition. In this space about a hundred and fifty are taken annually by anglers. Salmon ascend the Muic, as far as the Fall, the Gairn, and several of the other streams. [Dr. Robertson says Salmon arrive in March and April; Grilse, in June and July. He has killed Salmon with the rod in Braemar weighing twenty-eight pounds.]

Salmo trutta. Salmon Trout. This species also ascends the Dee, in July, August, and September, and in the two following months makes its way up the tributary streams to spawn. It is frequent in the Gairn.

Salmo eriox. Sea Trout. Bull Trout. This and the last, though easily distinguishable, are by many confounded under the common name of Sea Trout. Although it has the head much larger than that species, the name of Bull Trout is not at all appropriate, and many give it to the larger varieties of the common Trout.

Salmo fario. Common Trout. The Trout is plentiful in the Dee and its tributaries. In the former there are many varieties; but generally they are of moderate size, or small, light-coloured, and beautifully spotted. In the Muic they are mostly small, and rather dusky, especially above the fall. In Loch Muic they are numerous, generally small, and not remarkable for beauty. In the Clunie they are clear, with large dusky spots, mixed with white. In the stream of Glenbadach, which enters the Clunie about five miles up, are very beautiful Trout. In the streams entering the Dee on its north side—the Gairn, the Lui, and others, the Trout are brightly coloured, and spotted with red. In Loch Pharuaic, a small lake high up on the hills near the mouth of Glen Callater, where there were no Trout originally, but into which some common Trout from the Clunie were introduced many years ago, they are very large, yellow beneath, spotted with black on the sides, and have pink-coloured flesh. The ordinary weight is from three to four pounds; but William Stewart, gamekeeper, caught one about twelve pounds. In Loch Protachan there are very thick, short Trout, weighing fourteen or fifteen pounds. They resemble the Loch Pharuaic Trout, but are much thicker in proportion to their length. Both lochs are very muddy. In Loch Ceannor, of which the water is very clear, are Trout, some of three or four pounds weight, but slender, very poor, and with white flesh. In many of the upper streams, and in the pools

and lakes of the corries, there are no Trout, they being unable to ascend the waterfalls. There are none in Loch-an-eun, Lochnagar, or the Duloch. Mr. Richard M'Queen is answerable for all these facts.

Salmo salvelinus. The Charr. Dr. Adams says he believes this fish to have been introduced into the Loch of Dunn, and other lakes on Dee-side.

FAMILY IV.—ANGUILLINI.

Anguilla acutirostris. Sharp-nosed Eel. Common in the Dee and some of its tributaries; also in Lochs Dava and Ceannor. Individuals from three to four feet long are met with.

ORDER III.—CYCLOSTOMI.

Petromyzon fluviatilis. River Lamprey. It appears in Braemar in the middle of summer, and is seen to the end of September. Mr. Richard M'Queen states that he has seen one two feet long.

The above lists of animals refer exclusively to Braemar—that is, to the mountainous tract extending from the sources of the Dee to the influx of the Feugh. Were the whole basin of the Dee included, the number of species would be greatly increased.

SECOND DIVISION.—INVERTEBRATA.

SUB-DIVISION.—MOLLUSCA.

THE following list, including the land and freshwater mollusca only, was drawn up by the late Professor E. Forbes, from Dr. Macgillivray's "History of the Molluscous Animals of the Counties of Aberdeen, Kincardine, and Banff," with additions from his MSS. notes, and revised in accordance with the nomenclature of the recently-published "History of British Mollusca," by Professor E. Forbes and Mr. Hanley.

ACEPHALA LAMELLIBRANCHIATA.

FAMILY.—CYCLADIDÆ.

Cyclas cornea (*C. flavescens*, Macgillivray). Along the shores and on the sandy bottom of the Loch of Skene, ten miles to the west of Aberdeen. Equally abundant, and of larger size, in the Loch of Park. The form noticed by Professor Macgillivray is only a variety of the common species.

Pisidium obtusale. Knæckleith, Auchterless.

P. pulchellum (*P. pulchellum*, *P. Jenynsii* and *P. Joannis* of Macgillivray). Widely distributed in Aberdeenshire; inhabiting both still and running water.

P. nitidum. In a millpond near the new bridge of Don.

P. pusillum. With the last.

P. amnicum. Found in the summer of 1841, in the Inverury Canal.

FAMILY.—UNIONIDÆ.

Anodonta cygnea. St. Fergus canal and near Fraserburgh, Loch of Strathbeg, and near Banff.

Unio margaritifera. The Pearl Mussel. Common in the Dee, the Don, the Ythan, the Ugie and the Doveran, in muddy and gravelly places. Pearls of various sizes, forms, and colours are found in this species: spherical, hemispherical, binate, roundish, oblong; from a twelfth or less to half an inch in diameter; white, bluish, pink or dusky.

GASTEROPODA PROSOBRANCHIATA.

FAMILY.—NERITIDÆ.

Neritina fluviatilis. "A perfect shell, but without the animal, was found by me on the 1st of July, 1842, among shell sand on the beach, between the mouth of the Dee and the Don; and, in September, another was picked up by my son Paul." —Macgillivray. These specimens may have been derived from ballast.

FAMILY.—PALUDINIDÆ.

- Paludina Listeri* (*Paludina vivipara* of the "Mollusc. Aberd.")
Dead shells found on the beach near the mouth of the Don,
probably derived from ballast.
- Bythinia tentaculata*. In the same situation and equally doubtful
with the last.
- Valvata piscinalis*. Loch of Skene; first found, in the end of
July, 1843, by Dr. Dickie.
- V. cristata*. A single specimen found, in February, 1844, among
minute shells gathered on the beach at the mouth of the Dee.

GASTEROPODA PULMONIFERA.

FAMILY.—LIMACIDÆ.

- Arion empiricorum* (*A. ater* of Macgillivray). The Common Slug.
Generally distributed. One of the largest, handsomest, com-
monest, and most variable of slugs.
- A. hortensis*. Found, in September, 1843, among decayed leaves
in the midst of tufts of *Aira cæspitosa*, in a wood near the Old
Bridge of Don.
- Limax cinereus*. Not common. Plentiful in some places about
old bridge of Don. At Torry, on the south side of the harbour
of Aberdeen. About Stonehaven. Plentiful in the parish of
Auchterless. Near Inverugie Castle.
- L. agrestis*. Abundant. The common small grey slug.
- L. arborum* (*L. marginatus* of Macgillivray). Common in many
places about Old Aberdeen.
- L. flavus* (*L. variegatus* of Macgillivray). In cellars and damp
places.

FAMILY.—HELICIDÆ.

- Vitrina pellucida*. Very common among moss, in the shelter of
whins or broom and under stones, in dry as well as moist
places. It extends far into the Highland valleys, being found,
for example, in Glen Tanar and Glen Muic.
- Zonites cellarius*. Common in damp shady places, by walls and

hedges and among stones, chiefly near the sea coast. Not observed far in the interior.

Z. alliarius. Very abundant; on banks among moss, in woods, thickets, among herbage, decayed leaves, and under stones.

Z. nitidulus. Not uncommon among herbage close to the foot of walls, or under stones. It extends from the sea coast far into the interior, being found, for example, among the ruins of Dunottar castle and among those of Corse Castle.

Z. purus. In Seaton Park, and some other localities, about stumps of felled trees in moist places.

Z. radiatulus. Near Seaton House, and other localities, in damp places under decayed leaves.

Z. nitidus (*Z. lucidus* of Macgillivray). In Seaton Haugh and at Don Bridge, &c. It inhabits moist places among the herbage.

Z. excavatus. Seaton Park.

Z. crystallinus. In Seaton Haugh, and other localities, among moss and grass, and around the stumps of felled trees in moist places.

Helix aspersa. Common Snail. Chiefly along the coast in gardens; about old walls and on hedge banks.

H. arbustorum. Generally dispersed in the lower districts.

H. nemoralis. Var. *hortensis*. Very common in pastures along the coast, as well as by walls, and on banks in the interior, but not in the Highland districts. Var. *hybrida*. Bay of Peterhead, among *Elymus arenarius* and *Ammophila arundinacea*. Also on the steep bank below the preventive station at Collieston.

H. eaperata. On an old granite wall, near the brick kilns, at Old Aberdeen; the only spot in which it has been noticed hereabouts.

H. hispida. Ruins of Dunottar Castle.

H. lamellata. Den of Rubislaw.

H. aculeata. With the last.

H. fulva (*H. trochilus* of Macgillivray). Links near Don mouth, and other localities.

H. fusea (*Zonites fuseus* of Macgillivray). On a bank near old Machar Cathedral, and in the Den of Auchmeddin.

- H. pulchella*. Under stones in various places along the coast, as well as far inland.
- H. rotundata* (*Zonites rotundatus* of Macgillivray). Very abundant under stones, &c., both along the coast and in the interior as far as the Highland valleys.
- H. pygmæus* (*Zonites pygmæus* of Macgillivray). Ugie mouth; a single specimen.
- Bulimus obscurus*. Ruins of Dunottar Castle.
- Pupa umbilicata*. Very common both along the coast and in the interior.
- P. muscorum* (*P. marginata* of Macgillivray). Sandy places near the coast; on rocks, and under stones, and among moss.
- P. edentula* (*Vertigo edentula* of Macgillivray). At Potterton, parish of Belhelvie, six miles from Aberdeen, on serpentine. Also near Inverury, and in the Den of Auchmeddin; rare.
- P. substriata*. A single specimen found in the Den of Rubislaw in July, 1843.
- Balca fragilis* (*B. perversa* of Macgillivray). Old Machar Cathedral, and among the ruins of Dunottar Castle. At Thornyhive.
- Clausilia nigricans* (*C. perversa* of Macgillivray). In various localities.
- Zua lubrica* (*Bulimus lubricus* of Macgillivray). Common among moss and fine grass, or under stones, more especially along the coast, but also extending into the interior, as far as the Highland glens.
- Succinea putris*. In wet and marshy places, on plants and stones.

FAMILY.—LIMNÆADÆ.

- Physa fontinalis*. In the Loch of Skene, the Don, and the Dee.
- Planorbis vortex*. In a ditch filled with stagnant and rather putrid water, in the hollow between Aberdeen and the Spital.
- P. spirorbis*. In a ditch at Banner mill, near Aberdeen. In a ditch at the Loch of Strathbeg.
- P. contortus*. Generally distributed in the lower tracts.
- P. nitidus*. A single specimen found among minute shells

gathered at the mouth of the Dee, close to the pier, in January, 1844.

P. albus. On *Potamogeton* in the Aberdeen canal.

P. nautilus? There is some doubt as to whether the *P. imbricatus* mentioned by Professor Macgillivray be this shell.

(In the MS. considered as *P. glaber*.)

Linnæus pereger. Common and general.

L. truncatulus. Generally distributed, and abundant in pools, rivers, brooks and rills, from the coast far into the interior.

L. palustris. In pools, lakes, marshy places, and streams; in the maritime and lower inland tracts.

Ancylus fluviatilis. Abundant in brooks and rivers; on stones and plants, especially *Potamogetons*.

FAMILY.—AURICULIDÆ.

Carychium minimum. Among wet moss by a spring at Thorny-hive. Banks of the Don above the Old Bridge. Abundant among moss and decayed leaves, under trees, in the Den of Rubislaw. Den of Midmar. Dr. Dickie.

SUB-DIVISION.—ANNULOSA.

CLASS.—INSECTS.

ORDER I.—COLEOPTERA.

—◆—

THE following list of *Coleoptera* has been drawn up by Mr. A. Murray, of Edinburgh.

SECTION.—ADEPHAGA.

TRIBE.—GEODEPHAGA.

FAMILY.—CICINDELINA.

Cicindcla campestris (Lin.). On the moor near the Church of Nigg, Kincardineshire; Scotstown, near Aberdeen. Mr. Clark. Moor on the Echt road, about eight miles from

Aberdeen, Dr. Dickie. Banchory Ternan, and in many places along the Dee, as far up as Ballater, Forfarshire.

FAMILY.—BRACHININA.

Lebia chlorocephala (Ent. Heft). Not uncommon, especially in the lower tracts.

Tarus vaporariorum (Lin.). Found near Aberdeen by Dr. Dickie. Also on the tops of the Forfarshire mountains.

FAMILY.—SCARITIDINA.

Clivina fossor (Lin.). Common in the lower tracts.

C. collaris (Herbst). Forfarshire.

Dyschirius globosus (Herbst.). Occasional.

FAMILY.—CARABINA.

Cychrus rostratus (Lin.). Generally distributed, from the sea-shore to the higher mountain-valleys of the interior.

Carabus nitens (Lin.). Found near Aberdeen by Dr. Dickie. Also found in Perthshire, Forfarshire, and Sutherlandshire.

C. clathratus (Fab.). Found near Aberdeen by Mr. John Macgillivray.

C. catenulatus (Fab.). Generally distributed.

C. arvensis (Fab.). Kincardineshire. Dr. Dickie. Aberdeen-shire. Mr. Clark. Scotstown, near Aberdeen. Mr. P. H. Macgillivray.

C. granulatus (Fab.). Found near Aberdeen. Mr. John Macgillivray.

C. nemoralis (Müller). Common in the lower tracts.

C. violaceus (Lin.). Not uncommon in the mountainous and hilly tracts, or even on moors in the lower district.

C. glabratus (Fab.). Not very uncommon in the mountainous tracts of the interior. Clova mountains, and about Loch Dee and Loch Callater. Mr. Wilson.

Nebria brevicollis (Fab.). Common.

N. nivalis (Payk). Generally distributed; extending from the coast to the valleys of the interior, and occasionally found on the highest mountains.

- Leistus fulvibarbis* (Hoffm.). Near Aberdeen. Dr. Dickie and Mr. John Macgillivray.
L. rufescens (Fab.). Extensively distributed.

FAMILY.—HARPALINA.

- Loricera pilicornis* (Fab.). Common.
Chlœnius nigricornis (Fab.). Perthshire.
Badister bipustulatus (Fab.). Occasional.
Pristonychus terricola (Ill.). Near Aberdeen. Dr. Dickie.
Anchomenus junceus (Scop.). Not uncommon.
A. dorsalis (Müller). Common.
A. pallipes (Fab.). Common. Perthshire; Highlands.
A. marginatus (Lin.). Not very uncommon.
A. lævis (Müller). Common.
A. viduus (Gyll.). Near Aberdeen. Dr. Dickie.
A. mæstus (Duft.). Occasional.
A. piceus (Lin.). Perthshire; not rare.
Synuchus vivalis (Ill.). Near Aberdeen. Dr. Dickie.
Olisthopus rotundatus (Payk). Not uncommon.
Calathus piceus (Marsh). Generally distributed in the more inland parts of Forfar, Kincardine, Aberdeen, and Banff.
C. cisteloides (Ill.). Common; occurring equally in the highland valleys and in the lower tracts.
C. fuscus (Fab.). Occasional.
C. melanocephalus (Lin.). Very common in the lower tracts, and also met with in the highland valleys.
C. micropterus (Duft.). Not uncommon in the inland parts.
C. mollis (Marsh). Common on the sea-coast.
Argutor strenuus (Panz.). Not uncommon.
A. erythropus (Marsh). Not uncommon.
Pterostichus cupreus (Lin.). Generally distributed, occurring in the lower and upper tracts alike.
 — var. *versicolor* (Sturm). Generally distributed, but not so common as the last.
P. orinomus (Leach). Not uncommon; occurring from the coast to the higher valleys.

- P. Striola* (Fab.). Perthshire, Forfarshire, &c.
P. niger (Fab.). Common.
P. melanarius (Ill.). Not uncommon; occurring both in the higher and lower tracts.
P. nigrita (Fab.). Common.
P. madidus (Fab.). Common.
Miscodera arctica (Pk.). Forfarshire, Perthshire, and generally on tops of high hills throughout Scotland.
Brosicus cephalotes (Lin.). Common along the sea-shore.
Patrobis excavatus (Payk.). Not uncommon in most parts of the three counties.
P. septentrionis (Dej.). Sparingly on some of the Highland mountains.
Amara acuminata (Payk.). Common.
A. similata (Gyll.). Occasional.
A. familiaris (Duft.). Common.
A. trivialis (Gyll.). Common.
A. communis (Dej.). Common.
A. vulgaris (Lin.). Generally distributed.
A. patricia (Creutz). Top of Catlaw in Forfarshire.
A. oricalceica (Müll.). Forfarshire.
A. ferrugineus (Lin.). Common.
A. apricarius (Fab.). Generally distributed.
A. consularis (Duft.). Near Aberdeen. Dr. Dickie.
A. fulva (Duft.). Sandy coasts.
A. spinipes (Lin.). Generally distributed.
A. convexiusculus (Marsh). Near Aberdeen. Mr. John Macgillivray.
Harpalus ruficornis (Fab.). Common.
H. æneus (Fab.). Common.
H. rubripes (Duft.). Perthshire.
H. fulvipes (Fab.). Common.
H. tardus (Panz.). Common.
H. punctatulus (Duft.). Generally distributed.
H. puncticollis (Payk.). Found by Mr. John Macgillivray at Dee Mouth.
H. pubescens (Payk.). Near Aberdeen. Dr. Dickie.

- Bradycellus cognatus* (Gyll.). About Aberdeen, among grass.
 Dr. Dickie.
B. fulvus (Steph.). Rather common.
T. minutus (Fab.). Common.
T. rubens (Fab.). Grampian Hills.

FAMILY.—BEMBIDIINA.

- Bembidium obtusum* (Sturm.). Generally distributed.
B. littorale (Oliv.). Very abundant.
 — var. *tetraspilotum* (Steph.). A single specimen sent in
 November, 1847, from Delgaty, by Mr. Ledingham.
B. Bruxellense (Wesm.). Occasional.
B. femoratum (Sturm.). A specimen sent from Delgaty, by Mr.
 Ledingham, in November, 1847.
B. tibiale (Duft.). Common.
B. decorum (Steph.). Near Aberdeen. Mr. John Macgillivray.
B. lampros (Herbst.). Common.
B. bipunctatum (Fab.). Near Aberdeen. Mr. John Macgillivray.
B. velox (Lin.). Perthshire.

FAMILY.—ELAPHRINA.

- Notiophilus aquaticus* (Lin.). Common.
N. semipunctatus (Fab.). Common.
Elaphrus cupreus (Duft.). Generally distributed.
E. riparius (Fab.). Near Aberdeen. Mr. John Macgillivray.
E. lapponicus (Gyll., Steph.). Catlaw and Clova mountains in
 Forfarshire, running among the grass in boggy places. Miss
 Lyell.
Blethisa multipunctata (Lin.). Near Aberdeen. Dr. Dickie.
 Banchory Ternan. Mr. W. Ewan.
Pelophila borealis (Fab.). Taken in the Mainland of Orkney in
 considerable numbers. Mr. J. T. Syme.

TRIBE.—HYDRADEPHAGA.

FAMILY.—DYTISCINA.

- Haliphus subnubilus* (Bab.). Near Aberdeen. Mr. John Macgillivray.
- H. ferrugineus* (Gyll.). Near Aberdeen. Mr. John Macgillivray.
- H. lineato-collis* (Marsh). Generally distributed.
- H. ruficollis* (Erich.). Generally distributed.
- Hydroporus depressus* (Aubé). In the Ythan, at Methlic.
- H. duodecim-pustulatus* (Fab.). Near Aberdeen. Mr. John Macgillivray.
- H. septentrionalis* (Gyll.). Generally distributed.
- H. rivalis* (Gyll.). Common in running streams.
- H. nigrita* (Fab.). Not uncommon.
- H. palustris* (Lin.). Generally distributed.
- H. pubescens* (Gyll.). Generally distributed.
- H. erythrocephalus* (Lin.). Generally distributed.
- H. vittula* (Erich.). Perthshire.
- H. planus* (Fab.). Generally distributed.
- H. lepidus* (Oliv.). Not rare; Aberdeenshire, &c.
- H. inequalis* (Fab.). Perthshire.
- Colymbetes striatus* (Lin.). Generally distributed.
- C. notatus* (Fab.). Near Aberdeen. Mr. John Macgillivray.
- C. exoletus* (Fab.). Near Aberdeen, common. Mr. John Macgillivray.
- C. conspersus* (Gyll.). Forfarshire. Rev. W. Little.
- Agabus guttatus* (Payk). In streamlets and ditches.
- A. fontinalis* (Steph.). Generally distributed.
- A. ehaleonotus* (Panz.). Near Aberdeen. Mr. John Macgillivray.
- A. uliginosus* (Lin.). Rare; Aberdeenshire.
- A. maculatus* (Lin.). Generally distributed.
- A. paludosus* (Fab.). Common.
- A. nebulosus* (Forst.). Generally distributed.
- A. sturmii* (Schön.). Near Aberdeen. Dr. Dickie.
- A. bipustulatus* (Lin.). Common.
- Ilybius fuliginosus* (Fab.). Near Aberdeen. Mr. John Macgillivray and Dr. Dickie.

- I. ater* (De Geer). Common in pools about Aberdeen.
I. obscurus (Marsh). Common in pools about Aberdeen.
Dytiscus marginalis (Lin.). Plentiful in the pools of old quarries at Rubislaw and Hilton, near Aberdeen.
D. punctulatus (Fab.). Near Aberdeen. Dr. Dickie and Mr. W. Grant. Banchory Ternan. Mr. W. Ewan.
Acilius sulcatus (Lin.). Common in pools and ponds.

FAMILY.—GYRININA.

- Gyrinus marinus* (Gyll.). Near Aberdeen. Mr. John Macgillivray and Dr. Dickie.
G. minutus (Fab.). About Aberdeen. Mr. John Macgillivray and Dr. Dickie.
G. natator (Lin.). Generally distributed.

SECTION.—RHYPOPHAGA.

TRIBE.—PHILHYDRIDA.

FAMILY.—LIMNINIINA.

- Elmis volkmari* (Lat.). In shallow pools by the Dee and Don.
E. variabilis (Leach). By the Dee.

FAMILY.—HELOPHORINA.

- Helophorus aquaticus* (Lin.). Common.
H. granularis (Lin.). Common.
H. fennicus (Payk). Pools near Aberdeen. Dr. Dickie.
H. nubilus (Fab.). Pools near Aberdeen. Mr. John Macgillivray.
Hydræna riparia (Kug.). In pools of the Dee and Don.
Hydrochus brevis (Herbst). Perthshire.
Octhebius exculptus (Müll). Not rare.

FAMILY.—HYDROPHILINA.

- Limnebius nigrinus* (Marsh). Pools near Aberdeen.

- Hydrobius fuscipes* (Lin.). Generally distributed.
H. globulus (Payk.). Common.
Philhydrus testaceus (Fab.). Near Aberdeen; Dr. Dickie.
Laeobius minutus (Lin.). Generally distributed.
L. marshami. Powis Bidon, near Aberdeen.

FAMILY.—SPHÆRIDINA.

- Cercyon obsoletum* (Gyll.). Occasional.
C. littorale (Gyll.). All along the east coast of Scotland, common. Mr. John Macgillivray and Dr. Dickie.
C. laterale (Marsh). Not uncommon.
C. melanocephalum. Very common in recent cow-dung, along with other species and Aphodii.
C. quisquilius (Lin.). Generally distributed.
C. unipunctatum (Lin.). Common with the preceding.
C. hæmorrhoidale (Fab.). Common.
C. centrimaculatum (Sturm). Common.
C. pygmaeum (Illig.). Perthshire and Aberdeen.
C. flavipes (Fab.). Common.
C. minutum (Fab.). Perthshire; not common.
C. anale (Payk.). Aberdeenshire.
Megasternum boletophagum (Erich.). Common.
Cryptopleurum atomarium (Fab.). Common.
Sphæridium scarabæoides (Linn.). Aberdeen. Mr. John Macgillivray.
S. bipustulatum (Fab.). Generally distributed, but not common.

FAMILY.—PARNINA.

- Parnus prolifericornis* (Fab.). Not rare; Perthshire.
P. auriculatus (Ill.). Not rare; Perthshire.

FAMILY.—ANISTOMINA.

- Leiodes humeralis* (Kug.). On mushrooms. Near Aberdeen.
 Dr. Dickie.
A. ovalis (Schmidt). Perthshire.
A. dubra (Ill.). Perthshire.

- A. polita* (Marsh). Perthshire.
Anisotoma ferruginea (Gyll.). On grass, in woods. Near
 Aberdeen. Dr. Dickie.
Agathidium nanum (Steph.). Near Aberdeen.
A. seminulum (Lin.). Aberdeenshire.

TRIBE.—NECROPHAGA.

FAMILY.—SCAPHIDIINA.

- Ptomaphagus fumatus* (Spence). Near Aberdeen; Dr. Dickie.
P. truneatus (Illig.). Common.
Choleva angustata (Fab.). Not very uncommon.
Catops fornicatus (Steph.). Banchory Ternan. Mr. W. Ewan.
C. tristis (Panz.). Aberdeenshire.
C. velox (Spence). Perthshire.

FAMILY.—SILPHINA.

- Necrophorus humator* (Fab.). Not uncommon in carcasses, often
 along with the next species.
N. vespillo (Lin.). Not common.
N. vestigator (Steph.). Very common.
N. mortuorum (Fab.). Less common than the last, but generally
 distributed.
Neerodes littoralis (Lin.). Not common, but occasionally found
 along the shores of the sea and rivers, under decaying animal
 substances and plants.
Oiceoptoma rugosa (Lin.). Common.
Silpha obseura (Lin.). Not uncommon.
S. tristis (Illig.). Near Aberdeen. Dr. Dickie.
S. nigrita (Creutz). Not uncommon.
S. opaea (Lin.). Not common.
S. quadripunctata (Lin.). Killecrankie, Perthshire.
Phosphuga atrata (Lin.). Not common.

FAMILY.—PTILINA.

- Triehopteryx fascicularis* (Herbst). In putrid Fungi, &c.

FAMILY.—PHALACRINA.

- Olibrus æneus* (Illiger). Generally distributed.
C. corticalis (Schön.). Perthshire.

FAMILY.—NITIDULINA.

- Meligethes æneus* (Fab.). Common; on flowers of *Raphanus*
Raphanistrum, *Leontodon Taraxacum*, and other plants.
M. viridescens (Fab.). On flowers. Aberdeen.
Catcretes urticæ (Fab.). Abundant on *Urtica dioica*.
Epuræa æstiva (Lin.). Aberdeenshire.
E. oblonga (Herbst.). Occasional.
E. pusilla (Illig.). In woods near Kirriemuir, Forfarshire.
Nitidula bipustulata (Lin.). Generally distributed, but in no
great numbers.
Omosita depressa (Lin.). On bones, Perthshire.
O. colon (Lin.). Not rare.
O. discoidea (Fab.). Not rare.
Ips quadripunctata (Herbst.). In woods, Kirriemuir, Forfarshire.
I. ferruginea (Lin.). Forfarshire.
Rhyzophagus ferrugineus (Payk). Near Aberdeen. Dr. Dickie.
R. dispar (Payk). Common.
R. depressus (Fab.). Aberdeenshire.
R. cylindricus (Steph.). Aberdeenshire.

FAMILY.—MYCETOPHAGA.

- Latridius poreatus* (Herbst.). Near Aberdeen. Dr. Dickie.
L. transversus (Oliv.). Wall-tops; common.
L. lardarius (Steph.). Wall tops.
Corticaria pubescens (Illig.). Old walls, outhouses, &c.
C. gibbosa (Herbst). Common.
Monotoma picipes (Herbst). Common.

FAMILY.—CUCUJINA.

- Dendrophagus ercnatus* (Payk). Black Forest, Rannoch. Mr.
Weaver.

FAMILY.—ENGINA.

- Cryptophagus cellaris* (Fab.). In houses. Aberdeen. Dr. Dickie.
C. fumatus (Gyll.). Occasional.
Anthrophagus pallens. Mr. Wilson has observed it among the
 Clova mountains.
Paramccosoma abietis (Payk). Common.
Atomaria rufa (Chevrier). Common.
Ephistemus globulus (Payk). Aberdeenshire.

FAMILY.—DERMESTINA.

- Byturus tomentosus* (Fab.). Common.
Dermestes lardarius (Lin. Steph.). Occasional.

TRIBE.—BRACHELYTRA.

FAMILY.—TACHYPORINA.

- Autalia impressa* (Oliv.). Perthshire.
Ocalea picata (Kirby). Aberdeenshire.
Tachyusa umbratica (Erich.). Aberdeenshire. Mr. Hardy.
T. frontalis (Kirby). Banks of streams. Aberdeenshire.
Homalota graminicola (Grav.). Aberdeenshire.
H. vicina (Kirby). Perthshire.
H. circumcellaris (Grav.). Beneath stones on moors, &c. Common.
H. rufescens (Kirby). Not common; under bark, and in *Polyperi*,
 Aberdeenshire.
H. socialis (Payk). In fungi, &c.; Common.
H. autumnalis (Erich.). Moist places; Peterhead.
H. analis (Grav.). Under stones on heaths, &c.; Common.
H. longicornis (Grav.). Not common; Aberdeenshire.
H. hygrophila (Hardy). Aberdeenshire.
Oxypoda umbrata (Gyll.). Perthshire.
O. alternans (Grav.). Perthshire.
Alcochara concolor (Kirby). Common.
A. lanuginosa (Grav.). Common.
A. obscurcella (Grav.). Beneath sea-weed; frequent.

- A. nitida* (Grav.). Common.
- Myllæna gracilis* (Heer). Aberdeenshire. Mr. Hardy.
- Hypocyrtus longicornis* (Payk). In fungi, &c. Common.
- Tachyporus hypnorum* (Fab.). Not uncommon; about Aberdeen.
- T. chrysomelinus* (Lin.). About Aberdeen; not common.
- T. obtusus* (Lin.). Common.
- T. ruficollis* (Grav.). Aberdeenshire.
- T. brunneus* (Fab.). Somewhat scarce. Perthshire.
- Tachinus subterraneus* (Linn.). Generally distributed.
- T. rufipes* (Erich.). Common.
- T. cinctus* (Marsh). Near Aberdeen.
- T. collaris* (Grav.). Common.
- T. marginellus* (Fab.). Common.
- T. silphoides* (Lin.). Not uncommon.
- Boletobius analis* (Payk). Perthshire.
- B. atricapillus* (Fab.). In agarics. Not unfrequent.
- B. angularis* (Steph.). Aberdeenshire.
- B. pygmaeus* (Fab.). In Fungi. Common.
- Mycetoporus splendidus* (Grav.). Scarce. Aberdeenshire.

FAMILY. STAPHYLININA.

- Crocophilus maxillosus* (Lin.). Common.
- Trichoderma nebulosum* (Fab.). A single specimen found in the Links of Old Aberdeen, in September 1847.
- T. pubescens* (Erich.). About putrid animals and vegetable matter; occasionally in gravel-pits and on roads.
- T. nurinum* (Fab.). Not rare. Sutherlandshire.
- Staphylinus erythropterus* (Fab.). Not uncommon.
- S. castanopterus* (Grav.). Common.
- S. stercorarius* (Oliv.). Rare. Sutherlandshire.
- S. latebricola* (Grav.). Sutherlandshire. Mr. James Wilson.
- Ocytus æneocephalus* (Steph.). Common.
- O. brunnipes* (Fab.). Not common.
- O. similis* (Steph.). Common.
- Goërius oleus* (Müll.). Common.
- Microsaurus lateralis* (Grav.). Perthshire.

- Quedius tristis* (Steph.). Common.
- Q. hæmopterus* (Kirby). Cruden. Mr. Alexander Murray.
- Q. impressus* (Payk). About Aberdeen.
- Q. molochinus* (Grav.). Generally distributed.
- Q. ruficollis* (Steph.). Aberdeenshire.
- Raphirus nitipennis* (Steph.). About Aberdeen.
- Philonthus laminatus* (Creutz.). Common.
- P. splendens* (Fab.). Common.
- P. æneus* (Rossi). About Aberdeen; common.
- P. intermedius* (Lacord). Var. *ætatus* (Kirby). About Aberdeen.
- P. scutatus* (Erich.). Perthshire.
- P. decorus* (Grav.). Not uncommon.
- P. marginatus* (Fab.). Common.
- P. umbratilis* (Grav.). Perthshire.
- P. varius* (Gyll.). Common.
- P. xantholoma* (Grav.) Beneath sea-weed. Abundant.
- P. cephalotes* (Grav.). Rare. Aberdeenshire.
- P. fimetarius* (Grav.). Common.
- P. varians* (Payk). Common.
- var. *lituratus*. About Aberdeen.
- P. ventralis* (Grav.). Aberdeenshire.
- P. parumpunctatus* (Erich.). Perthshire.
- P. discoideus* (Grav.). Aberdeenshire.
- Othius fulvipennis* (Fab.). Generally distributed.
- O. scoticus* (Kirby). “Found in the north of Scotland by Mr. MacLeay.” — *Steph. : Illust.*
- Xantholinus glabratus* (Grav.). Near Aberdeen. Dr. Dickie.
- X. linearis* (Oliv.). Generally distributed.
- X. punctulatus* (Payk). Common.
- Leptacinus parumpunctatus* (Gyll.). Aberdeenshire.
- L. batychnus* (Knoch). Aberdeenshire.
- Lathrobium elongatum* (Lin.). About Aberdeen, common. Dr. Dickie.
- L. quadratum* (Payk). Perthshire.
- L. brunnipes* (Grav.). Methlic, common. Mr. A. Beaton.
- L. fulvipenne* (Grav.). Common.
- L. quadratum* (Payk.). Perthshire.

Lithocharis ochracea (Grav.). Aberdeenshire.

FAMILY.—STENINA.

Sunius angustatus (Fab.). Perthshire.

Stenus bimaculatus (Gyll.). In damp places, about Aberdeen.

S. junco (Fab.) Wet places. Common.

S. nanus (Steph.). Common. Aberdeenshire and Perthshire.

S. boops (Gyll.). Common.

S. picipes (Kirby). Aberdeenshire.

S. nitidiuseulus (Kirby) Sides of streams and wet marshes.
Aberdeenshire.

S. impressus (Germ.). Common. Aberdeenshire, &c.

S. eicindeloides (Steph.). About Aberdeen.

S. oculatus (Gyll.). Generally distributed.

S. brunnipes (Kirby). Common.

S. proboscideus (Gyll.). Marshes. Perthshire.

FAMILY.—OXYTELINA.

Oxytelus rugosus (Fab.). Generally distributed.

O. sculpturatus (Grav.). Common.

O. nitidulus (Grav.). Aberdeenshire.

O. depressus (Grav.). Common.

Platysthetus morsitans (Payk). Very common.

Trogophlæus bilineatus (Kirby). Aberdeenshire.

T. pusillus (Grav.). Aberdeenshire.

FAMILY.—OMALIINA.

Coprophilus striatulus (Fab.). Aberdeenshire. Scarce.

Anthophagus caraboides (Lin.). Aberdeenshire.

Geodromus plagiatus (Fab.) Perthshire.

Lesteva impressa (Kirby). Swamps. Aberdeenshire. Forfar-
shire.

L. bicolor (Fab.). Banks of streams.

Acidota erenata (Fab.). Rare. Caithness; the Grampians.

Olophrum piceum (Gyll.). Marshes. Aberdeenshire.

Lathrimæum atrocephalum (Gyll.). Aberdeenshire, &c.

- Omalium excavatum* (Kirby). Common about Aberdeen.
O. rivulare (Payk). Common.
O. florale (Payk). Perthshire.
O. fossulatum (Erich). Not frequent. Aberdeenshire.
Phlæonomus iopterus (Kirby). Beneath bark. Aberdeenshire.
P. pusillus (Gyll.). Under bark of Scotch Pine. Aberdeenshire.
Anthobium sorbi (Gyll.). Frequent.
Proteinus brachypterus (Fab.). Common.
Megarthrus depressus (Payk). Aberdeenshire.
M. sinuatocollis (Dej.). Aberdeenshire.
M. denticollis (Beck.). Aberdeenshire.
Phlæobium clypeatum (Müller). Aberdeenshire.
Micropeplus porcatus (Fab.). Common.
M. staphylinoides (Marsh). Less frequent. Aberdeenshire.

SECTION.—VARICORNIA.

TRIBE.—HELOCERA.

FAMILY.—BYRRHINA.

- Simplocaria semistriata* (Fab.). Occasional.
Byrrhus pilula (Lin.). Not uncommon. Often on the summits of high hills.
B. fasciatus (Lin.). Not uncommon.
B. dorsalis (Fab.). Forfarshire; Grampians.
B. sericeus (Steph.). Generally distributed.
Morychus æneus (Fab.). On the sandy links of Aberdeen.

FAMILY.—HISTRINA.

- Hister unicolor* (Lin.). Near Aberdeen.
H. cadaverinus (Ent. Heft.). Dung-pits near Old Aberdeen.
H. neglectus (Germ.). In Forfarshire. Misses Lyell.
H. carbonarius (Ent. Heft.) Occasional.
H. purpurascens (Payk). Near Aberdeen. Mr. John Macgillivray.
Saprinus nitidulus (Fab.). About Aberdeen. Dr. Dickie.
S. æneus (Fab.). Abundant in Aberdeenshire.

Onthophilus striatus (Fab.). Occasional.

Abræus globosus (Ent. Heft.). Near Peterhead.

TRIBE.—LAMELLICORNIA.

FAMILY.—LUCANINA.

Platyceerus caraboides (Lin.). “Aberdeenshire. Ent. Edin.”

Sinodendron cylindricum (Lin.). Black Forest, Perthshire. Dr. Nelson.

FAMILY.—GEOTRUPEDINA.

Typhæus vulgaris (Lin.). “Forfarshire. Misses Lyell.”

Geotrupes stereorarius (Lin.). Not uncommon.

G. vernalis (Lin.). Sutherlandshire.

G. sylvaticus (Panz.). Common.

— var. *puncticollis* (Steph.). Near Aberdeen. Mr. Clark.

— var. *punctatostratus* (Kirby). “Dollar and Aberdeenshire. Mr. J. T. Syme.”

FAMILY.—APHODIINA.

Aphodius fossor (Lin.). Generally distributed.

A. fimetarius (Lin.). Very common.

A. scybalarius (Fab.). Not uncommon.

A. lapponum (Schön. Gyll.). Forfarshire; Perthshire.

A. uliginosus (Hardy). Berwickshire; Grampians in Forfarshire.

A. merdarius (Fab.). Common.

A. terrestris (Fab.). Common.

A. inquinatus (Herbst). Generally distributed.

A. tessulatus (Creutz). Common about Aberdeen.

A. rufipes (Lin.). Common.

A. nigripes (Schön.). Common about Aberdeen and in Buchan.

— var. *luridus* (Fab.). Generally distributed.

A. depressus (Kugel. Steph.). Plentiful in Orkney; rare elsewhere.

A. contaminatus. Generally distributed. Very abundant in autumn.

A. prodromus (Brahm.). Very plentiful in spring and summer.

FAMILY.—TROGINA.

Ægialia globosa. On the shore, near Aberdeen. Mr. John Macgillivray.

FAMILY.—MELOLONTHINA.

Melolontha vulgaris (Fab.). Perthshire; rare.

Anomala frischii (Fab.). Sea-shore, near Montrose.

Phyllopertha horticola (Lin.). Aberdeenshire, Sutherland.

— var. *suturalis* (Newm.). Sutherland. Mr. James Wilson.

Serica brunnea. Generally distributed; not uncommon.

FAMILY.—CETONIINA.

Trichius fasciatus. Two individuals caught at Banchory Ternan, on Roses, in June 1850, by Mr. W. Ewan. Also taken in Perthshire, Inverness, and in great abundance on Thistles along the Caledonian Canal, by Mr. Hepburn.

Cetonia obscura (Dej.). Black Forest, Rannoch in Perthshire; also near Fort Augustus.

TRIBE.—STERNOXI.

FAMILY.—ELATERINA.

Adrastus limbatus (Fab.). Common.

Dolopius marginatus (Lin. Steph.). Occasional.

Agriotes obscurus (Lin.). Common.

A. pilosus (Fab.). Near Aberdeen. Mr. Clark.

Sericosomus brunneus (Lin.). Rare. Black Forest, in Perthshire.

Lacon murinus (Lin.). Not rare.

Elater tristis (Lin.). Black Forest, Rannoch. Mr. Weaver.

Hypolithus riparius (Fab.). Common.

H. (Cryptohypnus) quadripustulatus (Fab.). Near Aberdeen. Dr. Dickie.

H. (C.) dermestoides (Herbst). Not unfrequent under stones on the banks of streams. Perthshire.

- Melanotus rufipes* (Herbst). Black Forest, Perthshire.
Cteniceerus pectinicornis (Lin.). Not uncommon.
C. eupreus (Fab.). Common.
C. tessellatus (Lin.). Glen Clova. Mr. Wilson. Perthshire.
Diaecanthus holosericeus (Fab.). Occasional.
Selatosomus æneus (Lin.). Girdleness. Mr. John Macgillivray.
Athous niger (Steph.). Near Aberdeen. Mr. Grant.
A. elongatus (Marsh.). Near Aberdeen. Mr. Grant.
A. hæmorrhoidalis (Fab.). Common.

TRIBE.—MALACODERMA.

FAMILY.—CEBRIONINA.

- Atopa cervina* (Fab.). Near Aberdeen. Dr. Dickie. Forfarshire.
Cyphon grisea (Fab.). Generally distributed.
C. variabilis (Thun.). Forfarshire.

FAMILY.—TELEPHORINA.

- Dietyopterus aurora* (Fab.). Rannoch in Perthshire.
Telephorus rusticus (Gyll.). Not very common.
T. dispar (Fab.). Common.
T. pellucidus (Fab.). Common.
T. cyanipennis (Zieg.). Forfarshire.
T. nigricans (Fab.). Common.
T. obscurus (Lin.). Near Aberdeen. Mr. John Macgillivray.
T. bicolor (Fab.) On plants, near the Old Bridge of Don.
T. flavilabris (Gyll.). Not very uncommon, on plants; about Aberdeen.
T. pulicarius (Fab.). Forfarshire.
T. lividus (Fab.). Occasional.
Ragonycha testacea (Lin.). Near Aberdeen. Mr. John Macgillivray.
R. melanura (Fab.). Common in autumn.
R. pallida (Fab.). Common.
R. atra (Lin.). Kingussie; Aberdeenshire. Mr. J. T. Syme.
Malthinus biguttulus (Payk.). Generally distributed.
M. biguttatus (Lin.). Generally distributed.

FAMILY.—CLERINA.

Thanasimus formicarius (Fab.). Near Aberdeen. Dr. Dickie and Mr. Grant. Plentiful in woods near Kirriemuir, Forfarshire. Perthshire.

Neerobia violacea (Lat.). Plentiful about Aberdeen.

N. ruficollis (Fab.). Near Aberdeen; not so common as the last.

FAMILY.—PTININA.

Ptinus erenatus (Fab.). Generally distributed.

P. fur (Lin.). Generally distributed.

FAMILY.—ANOBIINA.

Anobium striatum (Illig.). Common on old timber.

A. abietis (Fab.). Aberdeenshire.

A. molle (Fab.). Forfarshire.

Cis boleti (Scop.). Generally distributed.

FAMILY.—LYMEXYLONINA.

Hylecætus dermestoides (Fab.). Black Forest, Rannoch. Mr R. Weaver.

FAMILY.—BOSTRICHINA.

Tomieus bidens (Fab.). Perthshire.

SECTION.—PSEUDOTETRAMERA.

TRIBE.—RHYNCHOPHORA.

FAMILY.—SCOLYTINA.

Hylesinus varius (Fab.). Occasional.

Dendroctonus piniperda (Lin.). In Fir woods, attacking the young shoots of the *Pinus sylvestris*.

Hylastes ater (Payk, Steph.). Common in Fir woods.

H. rhododactylus (Marsh). Perthshire.

FAMILY.—CURCULIONINA.

- Cionus scrophulariæ* (Lin.). Generally distributed.
- Rhinonchus castor* (Fab. Steph.). Perthshire.
- R. pericarpus* (Fab. Steph.). Generally distributed.
- Nedys contractus* (Marsh.). Generally distributed.
- N. assimilis* (Payk.). Generally distributed.
- N. erysimi* (Fab. Panz. Steph.). Occasional.
- N. floralis* (Payk.). Occasional.
- N. litura* (Fab.). Occasional.
- N. pollinaris* (Schön. Steph.). Very common.
- N. sulcicollis* (Gyll. Steph.). Common.
- Ceutorhynchus didymus*. Common about Aberdeen, on the Nettle.
- Orchestes fagi* (Lin.). Common.
- Pachyrhinus quadrinodosus* (Gyll.). On Nettles, about Aberdeen.
- Tachyerges saliceti* (Fab.). On Willows, near Aberdeen. Mr. John Macgillivray.
- Anthonomus ater* (Marsh.). Near Aberdeen. Dr. Dickie. Perthshire.
- Grypidius equiseti* (Fab.). Occasional.
- Notaris acridulus* (Lin.). Generally distributed.
- Magdalinus carbonarius* (Fab.). Rannoch; Perthshire.
- Pissodes pini* (Lin.). In Pine woods, in Braemar, and along the Dee generally; in abundance near Kirriemuir, Forfarshire.
- P. fabricii* (Leach). Near Aberdeen, and Banks of North Esk, near Montrose.
- Hypera punctata* (Fab.). Banchory. Mr. W. Ewan.
- H. polygoni* (Lin.). Generally distributed.
- H. Rumicis* (Lin.). On Docks, Forfarshire.
- H. nigrirostris* (Fab.). Common everywhere.
- H. variabilis* (Herbst). Occasional.
- Tropiphorus mercurialis* (Fab.). Occasional.
- Leiosomus ovatulus* (Clair). Occasional.
- Hylobius abietis* (Lin.). In Fir woods and plantations, the larvæ living in the wood of *Pinus sylvestris*. The perfect insect appears in June and July, and is met with in the open fields and on roads.

- Merionus obscurus* (Fab.). Generally distributed.
- Otiorhynchus notatus* (Bon.). Common.
- O. ovatus* (Lin.). Generally distributed.
- O. atroapterus* (Gyll.). Along the coast near Aberdeen.
- O. scabrosus* (Marsh). Near Aberdeen. Mr. John Macgillivray.
- O. monticola* (Dej.). Generally distributed; occurring along the coast, and in the higher tracts. Summit of Ben-na-muic-dhui. Mr. H. C. Watson, Sutherlandshire.
- O. rugifrons* (Gyll. Steph.). Generally distributed.
- O. maurus* (Gyll.). Catlaw in Forfarshire.
- Omius brunnipes* (Oliv.). Occasional.
- Philopeton geminatus* (Fab.). Abundant along the sandy coast among *Anmophila arundinacea*.
- Alophus triguttatus* (Fab.) Not common; but generally distributed.
- Leiopterus nubilus* (Fab.). In the lower parts of Forfarshire.
- var. *maurus* (Marsh). “Forfarshire; Misses Lyell.”
- Phyllobius pyri* (Illig.). Generally distributed.
- P. alneti* (Fab.). Generally distributed.
- P. argentatus* (Lin.). Not uncommon.
- P. maculicornis* (Germ. Steph.) Occasional.
- P. vespertinus* (Fab.) Common, and generally distributed.
- P. uniformis* (Marsh). Common.
- P. pomonæ* (Oliv.). Near Aberdeen. Mr. John Macgillivray. Common.
- Polydrusus pterygomalis* (Schön.). Common.
- P. cervinus* (Lin.). Perthshire.
- Sitona sulcifrons* (Schön.). Common.
- S. griseus* (Fab.). Forfarshire. Steph., Illust.
- S. regentsteinensis* (Herbst). Aberdeen, Perthshire.
- S. lineatus* (Lin.). Very common.
- S. flavescens* (Marsh). Common.
- S. hispidulus* (Fab.). Perthshire.
- S. tibialis* (Herbst). Common.
- Strophosomus coryli* (Fab.). Very common on Hazel and Fir.
- S. limbatus* (Steph.). Not uncommon.

FAMILY.—ATTELABINA.

- Apion radiolus* (Kirby). Common.
A. apricans (Herbst). Very common.
A. flavipes (Fab.). Generally distributed.
A. frumentarium (Lin.). Generally distributed.
A. ononis (Kirby). On *Ononis arvensis*. Forfarshire.
A. vorax (Sahlb.). Common.
A. pisi (Fab.). Common and generally distributed.
A. humile (Germ.). Perthshire.
A. violaccum (Kirby). Generally distributed.
A. betulæ (Chev.). Forfarshire.
A. marchicum (Herbst). Perthshire.
Rhinomaccr attelaboides (Fab.) Scarce. Rannoch in Perthshire.

TRIBE.—LONGICORNIA.

FAMILY.—CERAMBYCINA.

- Asemum striatum* (Lin.). Not scarce near Kirriemuir.
Astynomus ædilis (Lin.). Occasionally on timber in Aberdeen.
 Not rare at Rannoch in Perthshire.
Lamia textor (Lin.). Rannoch.
Anærea carcharias (Lin.). Sutherlandshire.
Saperda scalaris (Lin. Steph.). Rannoch, in Perthshire.

FAMILY.—LEPTURINA.

- Rhagium bifasciatum* (Fab.). Near Aberdeen. Dr. Dickie. Deeside. Mr. Alexander Smith.
R. indagator (Fab.). Rannoch.
R. inquisitor (Lin.). Rannoch.
Strangalia quadrifasciata (Lin.). Rannoch.

TRIBE.—EUPODA.

FAMILY.—DONACIINA.

- Donacia proteus* (Steph.). About Aberdeen, on aquatic plants.
 Mr. John Macgillivray, Forfarshire.

D. cincta (Germ.). Near Aberdeen. Dr. Dickie.

D. linearis (Hoppe). Common on reedy lakes and ponds.

Hæmonia zosteræ (Fab.). Loch of Forfar. Dr. Gilbert McNab.

FAMILY.—CRIOCERINA.

Crioceris melanopa (Lin.). Specimens sent by Mr. Ledingham, from near Turriff, in the autumn of 1847.

C. cyanella (Fab.). Occasional throughout Scotland.

TRIBE.—CYCLICA.

FAMILY.—CASSIDINA.

Cassida equestris (Fab.). Near Aberdeen. Mr. Grant.

C. rubiginosa (Illig.). Perthshire.

FAMILY.—GALERUCINA.

Galeruca capreæ (Lin.). About Aberdeen. Plentiful among Heather in autumn.

G. tanacetii (Fab.). Near Aberdeen. Dr. Dickie. Perthshire, Forfarshire.

Luperus rufipes (Fab.). Occasional.

L. flavipes (Lin.). Occasional.

Haltica nemorum (Lin.). Common.

H. ferruginea (Steph.). Common.

H. flava (Lin.). Not uncommon.

H. helxines (Fab.). Perthshire.

H. oleracea (Fab.). Generally distributed.

H. pseudacon (Marsh). Perthshire.

H. rustica (Lin.). Occasional.

Thyamis atricilla (Lin.). Not uncommon.

T. ochroleuca (Marsh). Not uncommon.

T. suturalis (Marsh). Occasional.

T. thoracica (Kirby). Not unfrequent.

T. tabida (Fab.). Common on *Senecio Jacobea* in autumn.

T. lurida (Gyll.). Delgaty. Mr. Ledingham. Common in autumn.

- Macrocnema napi* (Steph.). Common.
M. picicornis (Kirby.). Found abundantly among Turnips, in a garden in Old Aberdeen, in August, 1847.
Plectroscelis aridella (Payk). Not rare. Perthshire, Forfarshire.
Argopus testaceus (Fab.). Occasional.

FAMILY.—CHRYSOMELINA.

- Chrysomela varians* (Fab.). Don Banks, Aberdeen, on *Hypericum hirsutum*, and other plants.
C. fulgida (Fab.). Kirktown of Clova, Forfarshire. Mr. Wilson.
C. polita (Lin.). Common.
C. staphylæa (Lin.). Common.
C. marginalis (Duft. var.). First found in the Orkney Islands by Professor Edward Forbes; afterwards in great plenty, by Mr. J. T. Syme.
C. marginata (Lin.). Near Aberdeen. Dr. Dickie.
C. fastuosa (Lin.). On the *Lamium album*. Common all over Scotland.
Gonioctena litura (Fab.) In the southern and middle districts. Plentiful in some places near Aberdeen.
G. pallida (Fab.). In the summer of 1847, found in abundance near Seaton House, Old Aberdeen, on Broom.
Phædon vitellinæ (Lin.). Very common.
P. polygoni (Lin.). Generally distributed.
P. raphani (Fab.). Generally distributed.
P. cochleariæ (Fab.). Found at Aberdeen, in 1841, by Mr. John Macgillivray.
P. tumidula (Kirby.). About Aberdeen.
Helodes phellandrii. On aquatic plants, near Aberdeen. Mr. John Macgillivray.
H. violacea (Fab.). Perthshire.
H. marginella (Lin.). Not uncommon.
H. aucta (Fab.). Aberdeenshire.
Clythra læviuscula (Ratz.). Black Forest, Rannoch.
Cryptocephalus moræi (Lin.). Sutherlandshire. Mr. James Wilson.
C. lincola (Fab.). Rannoch. Dr. Nelson.

SECTION.—PSEUDOTRIMERA.

FAMILY.—COCCINELLINA.

- Exochomus quadripustulatus* (Lin.) Kinordy, Forfarshire.
Anisosticta novemdecimpunctata (Lin.) Found near Aberdeen.
Scymnus nigrinus (Kug.) Perthshire.
Rhyzobius litura (Fab. Steph.) Occasional.
Cacicula rufa (Herbst.) Occasional.
Coccinella quatuordecimguttata (Lin.) Near Aberdeen. Mr. Grant.
C. oblongoguttata (Lin.) Common.
C. ocellata (Lin.) Kingussie, in Aberdeenshire. Mr. J. T. Syme.
C. septempunctata (Lin.) Common.
C. quinquepunctata (Lin.) Common.
C. undecimpunctata (Lin.) Not uncommon.
C. dispar (Illig.) Common.
C. variabilis (Illig.) On trees, Old Aberdeen.
C. hieroglyphica (Lin.) Occasional.

SECTION.—HETEROMERA.

FAMILY.—BLAPSINA.

- Blaps mortisaga* (Lin.) Not very uncommon about outhouses and cellars, or among leaves, straw or stones near houses.

FAMILY.—OPATRINA.

- Bolitophagus reticulatus* (Lin.) Black Forest, Rannoch. Mr. R. Weaver.

FAMILY.—TENEBRIONINA.

- Tenebrio Molitor* (Lin.) Occasional.

FAMILY.—CISTELINA.

- Cistela murina* (Fab.) Common.

FAMILY.—SERROPALPINA.

Pytho depressus (Lin.). Black Forest, Rannoch, Perthshire.

Dircæa discolor (Fab.). Black Forest, Rannoch, Perthshire.

FAMILY.—MORDELLINA.

Anaspis maculata (Geoff.). Common in summer.

A. frontalis (Lin.). Perthshire.

FAMILY.—RHINOSIMINA.

Rhinosimus roboris (Fab.). Scarce; Aberdeenshire.

R. planirostris (Fab.). Occasional.

FAMILY.—ANTHICINA.

Anthicus floralis (Fab.). Forfarshire.

A. ater (Panz.). Aberdeenshire. Mr. A. Blake.

FAMILY.—SCYDMÆNINA.

Scydmanus pusillus (Müll). Generally distributed.

The following evidently imperfect list of insects, has been drawn up by Mr. P. H. Macgillivray, and principally extracted from a manuscript account of the Insects of the north-east of Scotland, by Dr. Macgillivray.

ORDER II.—DERMAPTERA.

FAMILY.—FORFICULINA.

Forficula auricularia. The Earwig. Abundant.

ORDER III.—ORTHOPTERA.

FAMILY.—ACHETINA.

Acheta domestica. The House Cricket.

FAMILY.—LOCUSTINA.

Locusta migratoria. In August and September 1846, many Locusts were noticed in various parts along the coast of Aberdeen and Kincardine.

ORDER IV.—NEUROPTERA.

SECTION.—LIBELLULÆA.

FAMILY.—LIBELLULINA.

Æshna varia. Common.

Æ. grandis. Much less frequent than the last.

Cordulegaster annulatus.

Gomphius vulgatissimus.

Libellula depressa. Not uncommon.

L. quadrimaculata. Not uncommon.

L. conspurcata. Not uncommon.

L. scotica. Common.

FAMILY.—AGRIONINA.

Agrion Puella. Common.

A. sanguinea. Common.

Calepteryx Virgo. Generally distributed.

SECTION.—HEMEROBIA.

FAMILY.—HEMEROBIIINA.

Chrysopa Perla. Not uncommon.

ORDER V.—TRICHOPTERA.

FAMILY.—PHRYGANEINA.

Phryganea ctriata. Common.

P. grandis. Not uncommon.

P. varia. Common.

Limnephilus rhombicus. Common.

ORDER VI.—HYMENOPTERA.

SECTION.—DIURNA.

FAMILY.—TENTHREDININA.

Lophyrus Pini. Lower Banchory. Mr. Thomson. Haddo House.
Dr. Dickie.

FAMILY.—FORMICINA.

Manica rubra.

Formica rufa.

F. nigra.

F. fusca.

FAMILY.—APINA.

Bombus terrestris. Common.

B. lapidarius. Common.

B. muscorum. Generally distributed.

FAMILY.—CHRYSIDINA.

Chrysis ignita. Not uncommon, on walls.

ORDER VII.—LEPIDOPTERA.

SECTION.—DIURNA.

FAMILY.—PAPILIONINA.

Pontia Brassicæ. Plentiful in gardens and fields.

P. Rapæ. Common.

P. Napi. Common.

P. Sabellicæ. Not uncommon along the Dee and the Don, in
May and June.

Mancipium Cardamines. Generally distributed, but local.

FAMILY.—NYMPHALINA.

Melitæa Euphrosyne. Not very uncommon.

M. Selene.

Argynnis Aglaia. Found by Mr. Chalmers in Fyvie.

Vanessa Atalanta. Not uncommon.

V. Urticæ. Very common.

V. Io. Mouymusk, Aberdeenshire; a specimen found by Mr. Grant, near Aberdeen, in 1847.

Cynthia Cardui. Found by Mr. Chalmers in Fyvie.

Hipparchia Janira. Of rare occurrence.

H. Hyperanthus. Not uncommon.

H. Semele.

H. Pamphilus. Not uncommon.

FAMILY.—LYCÆNINA.

Lycæna Phlæas. Rather common.

Polyommatus Alexis. Common.

FAMILY.—HESPERIDINA.

Thymele Tages.

SECTION.—CREPUSCULARIA.

FAMILY.—ZYGÆNINA.

Anthrocera Filipendulæ. Local, and not common.

FAMILY.—SPHINGINA.

Sphinx Convolvuli. Not common.

Smerinthus Populi. Not common.

Acherontia Atropos. A single specimen found in the parish of Cruden.

SECTION.—NOCTURNA.

FAMILY.—HEPIALINA.

Hepialus Humuli. Common.

FAMILY.—NOTODONTINA.

Cerura vinula. Two specimens found near Aberdeen.

FAMILY.—BOMBYCINA.

Saturnia pavonia-minor. Apparently rare.

Lasioeampa Quercûs. Apparently rare.

L. Rubi. Not common.

FAMILY.—ARCTIINA.

Leucoma Salicis. Not uncommon.

Arctia Caja. Not uncommon.

Nemeophila plantaginis. Not common.

Phragmatobia fuliginosa. Found in Fyvie by Mr. Chalmers.

FAMILY.—NOCTUINA.

Triphæna pronuba. Common.

Cerapteryx Graminis. Generally distributed, but uncommon.

Calocampa exoleta. Near Aberdeen; Mr. Clark.

Heliophobus popularis. Near Aberdeen; Mr. Clark.

Polia Chi. Not uncommon.

Plusia Gamma. Common.

P. pereontationis. Common.

P. interrogationis. Near Aberdeen. Mr. Mitchell.

P. Festucæ. Cruden. Mr. A. Murray.

P. Iota. Not common.

FAMILY.—GEOMETRINA.

Fidonia atomaria. Near Aberdeen. Mr. Clark.

Bupalus piniaria. Near Aberdeen. Mr. Clark. Fyvie. Mr. Chalmers.

- Himera pennaria*. Aberdeen. Mr. Clark.
Rumia cratægata. Generally distributed.
Phalæna margaritata. Fyvie. Mr. Chalmers.
Grammatophora vanaria. Common in gardens.
Harpalyce ocellata. Common.
H. unilobata. Near Aberdeen. Mr. Clark.
Abraxas grossulariata. Common in gardens.
Athalia miata. Near Aberdeen. Mr. Clark.
Minoa chærophyllata. Not uncommon.

FAMILY.—TINEINA.

- Tinea tapatzella*. Not common.
T. destructor. Common in houses.

ORDER VIII.—DIPTERA.

FAMILY.—CULICINA.

- Culex annulatus*. Common.

FAMILY.—TIPULINA.

- Tipula oleracea*. Common.
Trichocera hiemalis. Generally distributed.
T. reglotionis. Generally distributed.

FAMILY.—TABANINA.

- Tabanas bovinus*.
T. tropicus. Generally distributed.
Hæmatopota pluvialis.
Chrysops cæcutiens.

FAMILY.—STRATIOMYINA.

- Stratiomys Chamæleon*.
Sargus cuprarius. Not uncommon.

FAMILY.—SYRPHINA.

- Scæva Ribcsii*. Common.

Syrphus lucorum. Generally distributed, but apparently not common.

Helophilus pendulus. Common.

Volucella pellucens. Near Aberdeen; Mr. Clark.

FAMILY.—MUSCINA.

Musea Cæsar. Common.

M. vomitoria. Very common.

M. domestica. Plentiful.

Sarcophaga carnaria. Not uncommon.

ORDER IX.—APHANIPTERA.

FAMILY.—PULICINA.

Pulex irritans.

P. Canis.

P. Bovis.

P. Talpæ.

P. Erinacei.

P. Leporis.

P. Vespertilionis.

P. Columbæ.

P. Hirundinis.

ORDER X.—APTERA.

FAMILY.—PEDICULINA.

Pediculus cervicalis.

P. humanus.

Phthirius inguinalis.

ORDER XI.—HEMIPTERA.

SECTION.—TERRESTRIA.

FAMILY.—HYDROMETRINA.

Hydrometra stagnorum.

Velia rivulorum.

V. currens. Common.

Gerris paludum. Generally distributed.
G. rufo-scutulata.

SECTION.—AQUATICA.

FAMILY.—NEPINA.

Nepa cinerea. Common.

FAMILY.—NOTONECTINA.

Notonecta furcata. Common.

ORDER XII.—HOMOPTERA.

FAMILY.—CERCOPINA.

Jassus viridis. Near Aberdeen; Dr. Dickie.

FAMILY.—APHIDINA.

Aphis Ulmi. Generally distributed.

A. Urticæ. Generally distributed.

A. Avenæ. Very abundant in the summer of 1850.

A. Fabæ. Old Aberdeen, July, 1847.

CHAPTER V.

THE MINERALS OF BRAEMAR.

THE following list of the Minerals of Braemar and the connected mountains has been drawn up by Professor Nicol, of Aberdeen, arranged in the order of his "Manual of Mineralogy."

Quartz. Common Quartz occurs everywhere as a rock constituent, and fine crystallised varieties, or Rock Crystal, is abundant in drusy cavities in the Granite mountains. The Cairn-gorm, or smoke-brown and yellow varieties, are common in the detritus of the Granite of Cairn-gorm, Ben-na-muic-dhui, and Ben Aun. One crystal was cut into nearly 400*l.* worth of jewellery by an Edinburgh lapidary. Black and Rose-quartz, the latter compact and slightly opalescent, are found on Ben-na-muic-dhui. Amethyst crystals also occur on these mountains and near Pannanich with Jasper.

Felspar. *Orthoclase* is the most common constituent of the Granite Rocks, and forms large masses in Rubislaw quarries, near Aberdeen. Good crystals occasionally one inch broad are found in druses of the Granite on Bennachieh. *Albite* is less common, but occurs in the Granite near Peterhead, and in distinct crystals on Callievar Hill, near Alford. *Oligoclase* in rolled blocks near Aberdeen, and blue-coloured Felspar in loose blocks near Invercauld.

Prehnite. In Limestone, on the Gairn. By Mr. Morgan.

Stilbite. In Trap near Stonehaven.

Mica. Both the potash Mica and magnesian Mica as common constituents of the Granite and Gneiss rocks. It occurs in large irregular crystals in the Rubislaw Granite, and in Ben-y-gloe.

- Chlorite.* Crystallised in Ben-y-gloe.
- Talc.* On the Green Hill, Strathdon, at Portsoy, and other localities, with Serpentine.
- Serpentine.* On Coial Hills, Glen Muic, Castletown of Braemar.
- Noble Serpentine* in limestone of Glen Tilt, also at Premnay, Leslie, Rhyynie, the Green Hill of Strathdon, and other places in Aberdeenshire. In Banffshire at Portsoy, where it was long wrought as an ornamental stone, and even exported to France.
- Schillerspar.* In the Serpentine of Coial Hills, and of several other localities.
- Hornblende.* Constituent of Hornblende rocks near Ballater and other places. In crystals, in Rubislaw Granite, and finely fibrous in the Clayslate of Boharm, Banffshire.
- Sahlite, Tremolite, and Asbestus.* In the Limestones of Glen Tilt.
- Asbestus* and *Mountain Cork.* In the Serpentine of Glen Muic, Portsoy, and Towanreep.
- Actinolite.* In the Gneiss of Glen Tilt and of Aberdeenshire.
- Augite.* Common in the Trap rocks.
- Hypersthene.* In loose blocks of unknown origin in Banffshire.
- Bronzite.* On the Deveron, near Huntly Lodge.
- Wollastonite.* In the Limestones near Gairdenheil. Mr. Morgan.
- Garnet.* Abundant in the Mica-slates on the south of the Grampians. In pentagonal dodecahedrons, single or maced in the Granite of Rubislaw.
- Cinnamonstone.* In the Limestones near Gairdenheil. Mr. Morgan.
- Idocrase* or *Vesuvian.* In Limestone on Gairn. Mr. Morgan.
- Cyanite.* Near Boharm in Banffshire, where this mineral was first discovered. Also near Botriphny, in Gneiss at Girdleness, and on Cairn Lia.
- Andalusite.* At Botriphny in Gneiss, in Tyrie parish, and near Kildrummy.
- Chiastolite.* Near Boharm.
- Topaz.* Blue, white, and brown crystals, in the decomposing Granite of Ben-na-muic-dhui and Cairn-gorm mountains. One crystal weighed half-a-pound, another nineteen ounces,

and a third was estimated when whole to have been nearly eight pounds weight. Some crystals from this place are of a sky-blue colour, except on the acute edges of the prism, which are pale brown.

Beryl. In the Granite of Ben-na-muic-dhui, one crystal being more than one inch across. Coarse Beryl, or *Davidsonite*, large imperfect crystals in the Granite of Rubislaw.

Tourmaline. The black variety, or Schorl, is common in the Granite of Rubislaw, Portsoy, and many other localities.

Fluor Spar. Though rare in Scotland, occurs in many places in this vicinity, as in the Limestones at Balmoral, Monaltrie, and east of Abergeldie. In the Granite of Glen Aun, above Pomantoul, and at Alt-tre-chaochan. Also in Ben-y-gloe.

Magnetite. Frequent in grains and scales in the Quartz rock of Braemar; from this source has probably been derived the magnetic Iron-sand (*Irite?*) found in the Don, and forming dark streaks in the sand on the shore north of Aberdeen.

Chromite. In Serpentine of Portsoy.

Manganite. In irregular veins in Gneiss, near Old Aberdeen.

Galena. In Granite, near Monaltrie, and with Fluor-spar, near Abergeldie. Mr. Morgan.

Graphite. Near the Spittal of Glenshee, and in Gneiss in hills on the north of Dee.

APPENDIX.

NOTES ON THE DEER OF SCOTLAND.

AMONGST the native animals of Great Britain, none has excited more interest than the Red-Deer. This has arisen not only from its being one of the largest and handsomest of our wild animals, but from the jealous care with which it has been preserved, and the pleasure which its chase affords to the sportsman.

The history of few of the indigenous animals of Great Britain has been more copiously written, from the fragments of its bones deposited in the tertiary clays and sands of our valleys, through the Acts of Parliament which have been made for its protection, to the classical pages of Scrope, the Stuarts, and St. John.

The remains of this animal found in the strata of Great Britain indicate that it was an inhabitant of these islands at the same time with the great Irish Elk, the Spelæan Hyæna, the Tichorine Rhinoceros, and the Mammoth. Whatever may have been the influences which terminated the race of these creatures on the earth, the Red Deer has survived them, and is one of the few remaining species that connects the Present with a Past in which man had not yet begun to play his part in creation.

The lowest stratum in which the remains of the Red-Deer are found is the Red Crag, in which they have been discovered at Newbourn, in Suffolk. Above the Red Crag they have been found in the newer fresh-water pliocene, in the mammoth silt of ossiferous caves, and in peat bogs of comparatively modern origin. Parts of this animal, more especially the horns, have been found in the

counties of Norfolk, Suffolk, Essex, Cambridgeshire, Lancashire, Yorkshire, Derbyshire, Worcestershire, and Sussex. Dr. Buckland, in his account of the fossils obtained from the Hyæna cave at Kirkdale, states that several broken portions of horn were clearly referable to the Stag. Similar remains of Stags' horns have been found in Kent's Hole at Torquay, where, as in the previous case, they had been dragged by the Hyæna to serve as food. In Yorkshire, the remains of the Deer have been dug up with those of the Megaceros, or Irish Elk, and in Ireland, the bones of these two animals are found associated. An antler, now in the possession of Sir Philip Egerton, from Lough Tobbars-keenovan, county Sligo, measures thirty inches in length, and sends off fifteen snags of secondary branches.

Remains of the Red-Deer have also been found in the morasses and lacustrine marls beneath the peat-mosses of Scotland; so that the evidence is complete of the existence of this animal in the British Islands, from the period of the pliocene tertiary deposit to the present time.

Fossil remains, undoubtedly those of the Red-Deer, have been discovered in France, and described by Cuvier in his "*Ossemens Fossiles*," as those of a "*Cerf semblable au Cerf ordinaire*." They have also been found in formations of the same age as those of France and Great Britain, in Germany and other parts of Europe.

We have no record of the arrival of man in these islands, but we find that the earliest inhabitants were devoted to the chase, and that the Red-Deer was one of its most cherished objects. When the Saxons had established themselves in the Heptarchy, each sovereign reserved the right of hunting Deer for himself. From this time date the various laws in the English statute-book which have reference to this animal. In the time of the Saxons, however, no attempt was made to preserve the Deer at the expense of the population of the country. The Norman conquerors of England were not less devoted to the chase than their predecessors, and as the population increased, they had no hesitation in making waste places for the habitation of their favourite game.

In the time of William Rufus and Henry I., the crime of killing a Stag was more severely punished than that of killing a man.

The New Forest, in Hampshire, is an existing memorial of this period and its game laws, although the object for which it was formed is no longer there, and the last Red Deer has long since perished beneath the shade of its aged oaks. During the reign of Henry II., the laws relating to the preservation of Deer were relaxed. From this time the barons occupied limited tracts, especially in Scotland, over which they claimed the right of chasing the Deer. Although they were very jealous of any encroachments on their own grounds, they were not equally scrupulous in entering their neighbour's territory; hence arose numerous feuds, leading to such terrible encounters as have found a fitting epos in the ballad of Chevy Chase. As the population of the country has increased, and man has gradually made the rude earth to yield him his food, its former denizens have been obliged to retire. Gradually the hunting grounds of the barons have been reduced, and where the wild Deer had his undisturbed range, are now to be seen fields waving with corn, and towns and villages teeming with human life and happiness. Gradually the Deer forests of England have been contracted into parks, and at the present moment the Red-Deer, with the exception of some on Dartmoor, can hardly be said to be wild in England at all. But the Highlands of Scotland still bid defiance to the advancing wave of human civilisation, and offer to the Red-Deer a last home in the British Isles. Here still the Deer-stalker can pursue his favourite sport, and the Deer-hound is trained for the chase of this noble animal.

The Red-Deer belongs to the family *Cervidæ*, and the order *Ruminantia*. The family *Cervidæ* embraces a large number of forms, and is divided by Dr. J. E. Gray into those Deer which inhabit snowy regions, and those which inhabit warm or temperate regions. The Deer of the cold regions are the Elk (*Alces Malchis*) and the Rein-Deer (*Tarandus Rangifer*). The Deer of temperate or warm regions embrace three principal forms:—

1. The ELAPHINE DEER, represented by the Red-Deer (*Cervus*

Elaphus) and its immediate allies; the Wapiti (*C. Canadensis*); the Barbary Deer (*C. Barbarus*); the Bara Singa (*C. Walliehi*); the Saul-Forest Stag (*C. affinis*); the Sika (*C. Sika*); and the Fallow-Deer (*Dama vulgaris*).

2. The **RUSINE DEER**, including the Sungnai (*Panolia Eldii*); the Bahrainga (*Rucervus Duvancellii*); the Samboo (*Rusa Aristotelis*); the Spotted Rusa (*R. Dimorphe*); the Mijangan Banjoe (*R. Hippelaphus*); the Smaller Rusa (*R. Peronii*); the Philippine Rusa (*R. Philippinus*); the Sundevall Rusa (*R. lepida*); the Axis (*Axis maculata*); the Spotted Axis (*A. pseudaxis*); the Lugna Para (*Hyelaphus porcinus*); the Muntjac (*Cervulus vaginalis*); the Kejan (*C. mosehatus*); the Chinese Muntjac (*C. Reevesii*).

3. The **CAPREOLINE DEER**, including the Roebuck (*Capreolus Capræa*); the Ahu (*C. pygargus*); the Guazupuco (*Blastocercus paludosus*); the Mazame (*B. campestris*); the Tarush (*Fweifer Antisiensis*); the Guemul (*F. Huamel*); the American Deer (*Cariacus Virginianus*); the Mexican Deer (*C. Mexicanus*); the White-Tailed Deer (*C. leucurus*); the Californian Roe (*C. punctulatus*); the Black-Tailed Deer (*C. Lewisii*); the Mule Deer (*C. maerotis*).

The **ELAPHINE DEER** are distinguished by their horns possessing a distinct anterior nasal snag close on the crown; the muffle being broad and shallow, and separated from the upper lip by a hairy band with only a narrow interruption in front; the external metatarsal gland being placed above the middle of the bone, and the skull having a large deep suborbital pit.

The genus *Cervus* has the horns round, erect, with an anterior nasal snag, a median anterior snag, with the apex divided into one or more branches, according to the age of the animal; the crumen is well developed; the hoofs narrow, triangular, compressed, covered with brittle opaque hair; the rump is generally ornamented with a pale mark; the skull has a large deep suborbital pit; the horns have one or two branches on the middle of the front of the beam.

Cervus Elaphus, the Stag, is distinguished by its brown colour, with a pale spot on the rump, extending rather above the upper surface of the base of the tail.

The following synonyms are given in the catalogue of the specimens of *Mammalia* in the Collection of the British Museum :

Cervus Elaphus, Linn. S. N. i. 93 ; Gmelin, S. N. i. 176 ; Erxl. Syst. 301 ; Scrob. Saugh. 996. t. 247 A, B, C, D, E ; Desm. Mam. 434 ; Ency. Méth. t. 57. f. 3, 4 ; F. Cuvier, Mam. Lithog. t. ; Blyth, J. Asiat. Soc. Beng. x. 750. t. . f. 10, 11 (12 ?) ; Sundeval, Pecora, 55 ; Gray, List Mamm. B. M. 177 ; Cat. Osteol. B. M. 65 ; Knowsley Menag. ; Proc. Zool. Soc. 1850.

Cervus vulgaris, Linn. Mus. Ad. Frid. i. 11.

Elaphus communis, J. Brookes, Cat. Mus. 61, 1828.

Cervus nobilis, Klein, Quad. 23.

Cervus, Plinii Hist. Nat. viii. c. 32 ; Gesner, Quad. 354. fig. ; Agricola, Des Hirschen, &c. 1603 ; Aldrov. Bisulc. 769. fig. 774 ; Grabæ Elaphographiæ, 1667 ; Hill, Animal. 577. t. 28 ; Brisson, R. A. 86.

Ελαφος, Aristot. Hist. Anim. ii. c. 7. n. 37 ; Ælian, Anim. vi. c. 11, 15 ; Oppian, Cyneg. ii. 176.

Stag or Red Deer, Penn. Brit. Zool. i. 34 ; Syn. 49 ; Quad. i. 114 ; Shaw, Zool. ii. 276. t. 117.

Biche, Buffon, H. N. vi. t. 10.

Faon du Cerf, Buffon, H. N. vi. t. 12.

Cerf, Buffon, H. N. vi. 65. t. 9.

Cerf Commun, Cuvier, R. A. i. 255 ; Oss. Foss. iv. 24. t. 3. f. 1—12 ; F. Cuv. Mam. Lith. t.

Hirsch, Riding, Jagdb. Th. t. 4, 5 ; Meyer, Thiere, i. t. 22 ; Wildunger, Taschenb. 1794. i. t. l. f. 2, 3 ; Schrank, Faun. Boic. i. 41.

Rothhirsch, Bechstein, Naturg. Deutschl. 453.

Cervus Elaphus Hippelaphus, Erxl. Syst. 304 ; Fischer, Syn. 447 (Old male. Neck rather maned).

C. Elaphus β, Gmelin, S. N. i. 176.

Cervus Germanicus, Brisson, R. A. 87.

Tragelaphus, Gesner, Quad. 296 c. fig.

Hippelaphus, Jonston, Quad. t. 35.

Brandhirsch, Gesner, Thier. 119. fig.

Pferdhirsch, Gesner, Thier, 210. fig.

Cerf d'Ardenne, French Authors.

Many varieties of this animal have been elevated to the dignity of species. One of these is the Corsican Stag, which has been called by Prince Bonaparte, *Cervus Corsicanus*, by De Blainville, *Cervus Mediterraneus*, and in the Catalogue of Brookes's Museum, *Elaphus Corsicanus*. It seems distinguishable in little else than its small size. Buffon, however, states that he believes the size to depend on the scarcity of nourishment, for when moved to better pastures, in four years they become higher, larger, and stouter than the common Stag. (Hist. Nat. vi. 95.) This statement of Buffon is borne out by what is witnessed in the Highlands of Scotland, where it is well known that an impoverished diet tends to render the Deer much smaller, and gives them generally a different aspect. In 1851, there was living in the Jardin des Plantes, in Paris, a variety of the common Stag brought from Algeria. It had large horns, and the disc at the base of the tail was of a pale-brown colour. A large variety of the Red-Deer is found in the forests of Hungary, and another has been described from the Assyrian mountains.

The most striking feature in the organisation of the Red-Deer is undoubtedly the horns or antlers of the male or Stag. A discussion has taken place as to the use of these organs. There is no doubt they are used in combat as both offensive and defensive weapons, but at certain seasons of the year they fall off, and the Stag is thus bereft of any advantage he may derive from their presence. That their production is dependent upon conditions connected with the sexual function, is proved by the fact that they are not produced in castrated Stags. It would appear as though the antlers were the result of that general condition of nutritive activity, which is produced by the development of the reproductive powers of the system. If we may admit ornament and beauty as one amongst the final causes of the forms of created beings, it must be admitted that few animal structures are more beautiful or ornamental. The French call them "bois," and French naturalists have traced an analogy between these organs and the trunk and branches of a tree. They have even gone farther, and supposed that the materials which compose the antlers and those of the trunk and branches of a tree, are the

same; so that some have even imagined that the skull of the Deer was one of the spots in nature from whence we might pass by imperceptible gradation from the animal to the vegetable kingdom.

The antlers of the deer tribe differ somewhat in their character from the horns of the other *Ruminantia*. In the Ox, Sheep, Goats, and Antelopes, the part that is called the horn is hollow, and is formed on the two or four bony prominences which are an out-growth from the frontal bones. These horns are permanent. The antlers of the Deer grow from the same part of the skull, but instead of horn are covered with a soft skin, termed the "velvet." This skin is covered with hair, but does not permanently remain enveloping the osseous part below. It has therefore been concluded that the velvet is like the conical part of the horn in the ox and the sheep, an extension of the skin and a part of the tegumentary system, whilst the antler itself has been regarded as a part of the osseous system or internal skeleton. The exuviation, however, of the antlers is a fact that seems to connect these organs with those parts of the skin, such as hairs, nails, feathers, and scales, which are subject to this process. In fact, the antlers, like the teeth, seem to connect the two great systems of organs together, which are comprehended under the term skin and skeleton, and which in the *Chelonia* and some other animals are remarkably blended.

The antlers generally commence their growth in the spring. A little protuberance is first observed on the frontal bone, which gradually increases in size. The blood-vessels which supply the bone and skin at this part enlarge, and as the horn becomes developed the carotid artery is observed to become larger. The horn is at first so vascular that the slightest prick or scratch causes it to bleed profusely. At this early stage it is nearly cylindrical. Gradually the antlers or branches are protruded, first those which are nearest the base, and subsequently those that are at the top. As the horn grows, the lower part or base expands, forming what is called the "burr." This is surrounded by a number of osseous tubercles, which grow faster than the velvet which covers them. It has been supposed, that in

consequence of this growth of the burr, the blood-vessels of the velvet were pressed upon, and the supply of blood to this external covering was mechanically cut off. But the diminution and disappearance of the vessels of the horns depend on the same constitutional law which called them into existence. When the antlers have completed their growth, the vessels at the base of the velvet are entirely destroyed, and it begins to shrivel and peel off. In this state the antlers sometimes present a remarkable appearance as the portions of velvet are seen flying from the horns like streamers. It appears that this drying process is attended with a degree of irritation, which the animal attempts to relieve by rubbing its horns against the trunks and branches of trees. This process is technically called "burnishing," and the tree against which a Stag rubs its horns is called a "fraying post." As the older the Stag the larger the tree he chooses to rub his horns against, there is an old forest proverb which says "the greater the Deer the larger his fraying post."

The horns begin to appear when the young Stag is a twelve-month old, and generally make their appearance in May and June. The horn has completed its growth in the month of August, and this is the time the "burnishing" occurs. They remain upon the head till the following February or March. The circulation through the substance of the antlers being at an end, and the parts dead, the living body seeks to free itself from them, and a process of absorption of the matter between the head and the horn goes on till at last it falls off.

The question has been asked what becomes of Stags' horns after they are cast, and there is a very prevalent notion that the Deer eat them. This has arisen from the few which are found compared with the numbers which are known to be thrown off. That both Stags and Hinds occasionally gnaw the horns is beyond doubt; and Mr. Hudson, of Rudd Hall, says that he once found a Hind dead with a horn in her gullet. Mr. Hudson suggests that the yearning for a supply of phosphate of lime is the inducement to partake of this kind of food. This seems not to be improbable, for Mr. Robertson states that not only do the Deer eat horns, but all the bones they meet with in the forest. It

is rather curious that the majority of observers should implicate the Hind in this practice more frequently than the Stag. In reference to this habit being a source of supply of phosphate of lime to the system, it would be interesting to ascertain if it occurred more frequently at one season than another. The Hind would be more likely to require this substance when with young; the Stag, whilst his horns were growing with the greatest rapidity. It may also be added that where Deer are, there are generally other animals, to whose welfare phosphate of lime is necessary, and who would assist in the same way in the destruction of the fallen antlers. In the case of the horns of the Red-Deer before alluded to, found in the ossiferous caves of Great Britain, there can be little doubt from their number that the horns alone were brought in by the carnivorous animals as food, as they all gave indications of having been gnawed. The horns are also often dug out of bogs and morasses, where they have been deposited by the Stags, who, often to allay the excitement and irritability attendant upon the loosening of the horn, thrust their heads into any soft ground they may be near. This practice seems to have given origin to the name of a small lake near Fort William, which is called Loch-chabar, or the Lake of the Horns, from the number found in the soft black moss by which the lake is surrounded. In cases where the horns are dropped in the woods or on open ground exposed to atmospheric influences, they would soon begin to decompose, and in the course of three or four years they would entirely disappear.

The number of tiers or branches of the horn varies according to the age of the animal. The first that is shed is straight and single, like a small thrust-sword or dagger (fig. 1),* whence the young male is called a "daguet" by the French; at the beginning of this period it is called in Britain a "knobber;" at the end of the year it is called a "brocket." The primary branch of the horn is called the "beam." The second horn that appears has usually but one antler; this antler, which is nearest the base, is called the brow-antler (fig. 2). The animal is now called a "spayad." It some-

* These figures illustrate the article "Cervidæ" in the English Cyclopædia, and have been kindly lent by Mr. Charles Knight.

times happens that two and even three antlers appear with the second horn (figs. 3, 4). The second antler is called, in the language of "Vénerie," the "bez-antler;" the third is called the "royal," the subsequent eight the "sur-royal." The third horn



has three or four antlers, and sometimes as many as five or six (figs. 5, 6). When the bez-antler appears, which is usually in the fourth year, the young Stag is called a "staggard." The fourth pair of horns do not usually exceed in the number of their branches those of the third. When the third antler appears, which is called the royal, the animal is usually in its fifth year, when it is called a "Stag." The fifth horn bears five or six antlers (figs. 6, 7, 8). These form part of the sur-royal, and the animal



now becomes a "Hart." The sixth horn which the Stag sheds in its seventh year has usually a larger number of branches than that of the preceding year. The Stag is now said to be "croched," "palmed," or "crowned." In French it is a "Cerf de dix cours," in English a "Stag of ten," "twelve," or any other number of branches the horn possesses (figs. 9, 10, 11, 12). When the number of

branches reaches sixteen, the Stag is called a "Great Hart," and the head is said to be "summed of its points." Should an increase take place on this number, he is said to be "summed of eighteen," "twenty," or any other number of points to which he may attain. At the present day, the oldest Stags in Scotland seldom present more than ten or twelve points. At the same time, many living sportsmen have killed Stags with thirteen, fourteen, fifteen, and sixteen points. Mr. Peter Robertson, forester to the Marquis of Breadalbane, states that he had seen a Stag killed with eighteen points. "The three great heads of Gordon Castle, Innis House, and Cromarty, of which the first two, killed in Glen-Fidich and Innis, bear seventeen points; and the last killed in the forest of the Earl of Cromarty, in Ross, and recently in the possession of the present Cromarty, has twenty-two—the greatest number known on any modern head in Scotland."* In other parts of Europe, Stags have been killed with a very much larger number of points than any recorded in Scotland. There is a head still preserved at Mauritzberg, which presents the enormous number of sixty-six points; it was killed by the first King of Prussia, and presented by that monarch to Augustus, Elector of Saxony and King of Poland. In the collection at the Château of Wohrad, the hunting residence of the Lordship of Frauenberg, there are one hundred and nine Stags' heads, of which only seventeen are under fourteen points. In the same collection there are nineteen specimens of eccentric or deformed heads of various kinds.

The size and the number of points developed, depend in some measure on external circumstances. Where the animal is in good condition, and has abundance of food, and is free from disturbance and external annoyance, there the horns will develop to their utmost. Where animals have but indifferent pasturage and are driven to exist where food is scarce, there the horns diminish in size and produce fewer points. It is on this account

* "Lays of the Deer Forest," vol. ii. p. 113. Sir Philip Egerton refers to the last head mentioned in this quotation as presented to Lord Londonderry by Mr. Hay Mackenzie, and says that it possesses twenty-five points; but he adds, that the animal in this case appears to have been diseased.

that in Scotland those Deer have the finest heads that are confined to the forests ; as it is a general rule, though not without exception, that the best pasturage is found in woods or their neighbourhood.

There is no question that the horns of the Stag of the present day are not so fine as they were fifty or a hundred years ago. This seems to arise from the Deer being driven into districts where the pasturage is less abundant, and where the materials, especially the phosphate of lime, for the growth of the horns, are much less abundant than in the grounds they formerly occupied. It should, however, be observed, that this degeneration is not universal, and that on some estates, where great care is paid to the pasturage of the Deer, not only has no diminution in the size of the horns been observed, but an actual increase. On this subject Lord Selkirk observes :—

“There are fewer very large heads to be seen now than formerly, which is to be ascribed to two causes.—First, the overstock of most of the forests, and second, the activity and perseverance with which large heads are sought for, and the best Harts singled out. The great improvement in rifles and in shooting helps all this. Old wounds often affect the horns, and serve to cause most of the monstrous shapes that are found. I have seen, I think, as many as four or five deer with a single horn only ; all these, I believe, to have been formerly wounded or lamed. Any wound in the hind quarter will, I think, affect the growth of the horn. One of these single-horned Deer seemed merely to have lost his hind foot in a foot-trap, but of this I could not be certain, for I did not succeed in killing him.”

The horns of the Stag are often injured during their growth by catching in trees, fighting, and other causes. If any injury occurs to the blood-vessels on one side, and not on the other, thus diminishing the supply of blood, the horn on the injured side is invariably less than the other. An instance of the influence of external circumstances on the growth of horns is seen in figs. 13 and 14, which show the difference between the horns of the same Stag in two successive years' growth. Mr. Peter Robertson says he has seen some with horns bending downwards

like those of a Sheep, and without points. He describes a horn with seven points, and another peculiar one jutting out right above the ear, close to, and at the same time horizontal to the skull, forming a right angle with the double brow-antler. He has also seen a Deer with four or five points on one horn, while at the same time the other had none at all. The points very often differ in number on the two horns. Another departure from the usual form is seen in the greater or less distance of the horns from each other at the top. Sometimes they nearly touch, whilst at other times they are a yard apart. Sometimes one horn will grow upright, whilst the other will be curved over the brow. Mr. Campbell states that an unusual number of varieties in the form of the horns are found among the Deer in the Island of Jura.



As before stated, the form of the horns differs at different ages; but it is not easy to tell the age of a Stag by its horns. Up to the eighth or ninth year the density of the horns increases, and from that to the twelfth year the horns are in greatest perfection. When Stags become fat, their horns have been observed to diminish in size, and in the number of their points. As they become older they get thinner, and the general deficiency of nutrition acts upon the horns. When the Stags are young, the points of the horns are softer and more spongy than when older, and the number and softness of the points are a tolerable criterion of age up to the eighth year. After this period the degree of sharpness of the points indicates the age of a Stag.

There is a very prevalent belief that the horns of Deer differ in form in different forests. This difference, however, does not appear to have been reduced to any fixed law. It is probable that the only real difference depends upon the character of the food to which the animals have access, and which we have already seen is capable of affecting their size by limiting or increasing the supply of the materials out of which the horns are formed.

The colour of horns differs somewhat. In old Stags they are

generally darkest, and differ in colour in different forests. This has been supposed to arise from their getting stained by the trees on which they rub off the velvet. This, however, is doubtful. Whatever be the colour of the rest of the horn, the points are always white and smooth as though they had been polished.

The width between the two horns appears to differ in different herds. This does not seem to have been anywhere reduced to measurement. It is not, however, at all inconsistent with what we know of other animals, even in their wild state, that there should be differences of this kind. Individuals of every species develop peculiarities which are capable of transmission, and it is the knowledge of this fact that has enabled man to propagate the large number of varieties of the Dog, Pig, Ox, and Sheep, which we know to exist.

One of the circumstances which exercises most influence on the growth of the Stag's horns is castration. If a Stag is castrated when his head is bare of horns, they are never produced, and if he is castrated after his horns are perfected, he never sheds them. If the operation, however, is imperfectly performed at the time that the Stag is bare, Mr. Robertson states that small horns will grow, but these are never cast, and the velvet which covers them retains its freshness to the last.* When castration has been performed whilst the horns are growing, they sometimes present an abnormal appearance. In the Museum of the Royal College of Surgeons is a very singular instance of the influence of this operation on the horns of a Fallow-Deer (*Cervus Dama*), fig. 15. The effect of castration is not only seen in the horns but in the animal generally, which has a much greater tendency to become fat. The animals which have been thus treated are called "heaviers," or "humbled harts." They are always observed to be remarkably wild, which may be attributed to the absence of any sexual propensities to distract them. Mr. Robertson thinks it is due to the fright they have undergone in the operations of castration and marking.

* The author is indebted to Professor Owen for looking over the proof of this article. He adds the following note:—If a young Fallow-Deer, bare of horns, be castrated, small antlers are developed, and are retained longer than usual; if a Buck with horns be castrated, they are shed sooner than usual.

Sometimes a Stag makes his appearance in a herd without a horn, which has not been intentionally castrated. The causes of such a defect are due to injury of the arteries which supply the horns with blood, and also to accidental castration. Instances of this kind have never been met with by many sportsmen and



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foresters; but Mr. Hudson states, that it will occur in the proportion of one in a herd of fifteen hundred, and Lord Selkirk has seen an entire animal without horns.

The horns of the stag are thrown off in April or May. This process is technically called "mewing." This process does not depend on the formation of the new horns, which begin to make their appearance from eight to ten days after the former horns are cast. The older the Stag is, the earlier he begins to cast his horns, so that in some instances they are lost as early as February, and sometimes as late as May. The velvet disappears in August or the beginning of September, just previous to the commencement of the rutting season. These periods appear to be affected by the food; for as a rule, the best fed and pastured animals

produce their horns, have them in perfection, and east them sooner than those which are deficiently fed or nourished.

There are not wanting many instances in the animal kingdom of the female assuming male attire; and amongst the Deer the female of the Rein-deer is supplied with horns equally with the males, but in no one instance does it appear that the Hind of the Red-Deer was ever observed to have horns.

The teeth of the Red-Deer have the same general characters as those of the *Ruminantia*. In these animals the upper jaw is destitute of incisor teeth, but in the lower jaw there are eight. The Stag has small canines in the upper jaw, and the two outer incisors of the lower jaw answer to the canines in the horse and camel. There are six molars on each side of both jaws, making in all thirty-four teeth. Of the molars six are true and six are false. Up to the fourth year the age of the Deer may be judged of by their teeth, but after that period they are no longer decisively indicative of age. As the Deer grows older, the teeth become more and more worn; at last they loosen, and in some old Stags they have been found almost entirely absent.

Although this species of *Cervus* is generally known in this country by the name of the "Red" Deer, this is certainly an unusual colour with them. They usually exhibit various shades of brown. In winter they are generally of a warm brown, but in summer those in best condition are of a fine iron grey, called in the forest "blue." There are many brown, red, fallow, and dun, the last colour almost approaching a dirty white. Fallow, in old hunting craft, signified "a sandy colour, like half-burned bricks," and Harts of that tint "were the least esteemed, having long, slender, ill-grown heads, without either courage or force."* Harts of a pure white have been occasionally seen amongst Red-Deer, and both Aristotle and Buffon refer to this as a well-known fact. They have been occasionally noted as occurring in France before the curtailment of the forests in that country during the great revolution. That they were occasionally seen in England and attracted attention is probable from the commonness of the White Hart as the sign of public-houses in England.

* "Lays of the Deer Forest," vol. ii. p. 147.

As the maintenance of Deer in Scotland is every day becoming more artificial, it is an object of considerable interest to ascertain the exact nature of their food. The following passage from the "Lays of the Deer Forest," conveys some definite information on this point:—"In winter or when the hills are covered with storms and famine, they descend to the woods for subsistence and shelter, seeking the green springs and sylvan vegetation, the young wheat or turnips which may be found on the skirts of the forest; and when the frost and snow have left nothing better, to peel the young trees and scrape for the woodland mosses. In the droughts of summer, when the mountains are parched and barren, the moist valleys and verdant thickets are equally their resource; and even when not pressed by want, they have many varieties and indulgences which improve their enjoyment and condition. In spring they like to browse upon the catkins of aspens, marsh willows and hazels, and where they may be found, the buds and flowers of cornel trees. In autumn they love shoots of green shrubs, the tops of heather, and the leaves of brambles, which provide them with foliage when all the rest is fallen. In summer they resort to the hills for the short sweet grass of the shealings, which is then much more salubrious than the rank coarse herbage of the thickets; and in the low country forests, they rejoice among the peas, vetches, and young corn, of which, while in the grass, they prefer rye to all others, but after the ear has shot, they avoid the bearded grains. They are also very fond of sea ware, or dulse, and when attainable, it is their general resource in winter when the hill pasture fails. It is not, however, from necessity only that they resort to the sea. Like cattle they are passionately fond of salt—the propensity for which is so great among the domestic beasts, that cows, and oxen, and sheep, will greedily lick a ball of rock-salt; and those accustomed to receive it from the herdsman will not only follow him like household animals, but crowd about him, and thrust their noses into his hands and pockets to search for their treat. The Deer participate so much in this propensity, that when within their range, they frequent the sea-coast, not only in spring and winter, but in the heat of summer, and will even seek

it from such a distance, that they sometimes descend to the shores of Aberdeenshire from Braemar and Invercauld. While there were any Red-Deer left in the woods of Altyre and Tarn-away, they visited every year the sands between Nairn and Burghead, and not unfrequently at sunrise were met by the fishermen swimming the mouth of the Findhorn below the bay. In the same manner the Deer of Gordon Castle resorted to the low woods of Innis, to feed upon the beach between the Lossie and the Spey. On the coasts of Sutherland, Ross, Skye, and Arran, they are equally familiar, and with the same boldness and independence with which they range great districts of country, for their internal changes, they swim to an extraordinary distance for their marine haunts. It is common for them to cross the straits of Mull and Skye, and between Jura and Isla, where the current of the channel is so strong that it carries down the swimmer in a diagonal of four miles, before he lands. The fishermen of the west coast report still longer voyages, and we know that a stag has been taken in Kilbrannan Sound, four miles at sea, between Kintyre and Arran, and apparently swimming boldly for that island, which is twelve miles distant from the mainland."

All who have attended to the food of the Deer, agree as to the fondness of these animals for the wild grasses of their natural haunts. When these fail, they have recourse to the various planted crops which may be within their reach, and consume almost indiscriminately Clover, Oats, Turnips, and other crops. When these fail at the latter part of the year, they have recourse to the Heather, and the "fog" or moss which grows in the bogs and damp places on the hill sides. At all seasons they are fond of the young leaves and shoots of our native trees, as the Ash, Mountain-ash, Oak, and Birch. In the winter they fare worst, and it is at this season of the year they have been most frequently observed to have recourse to the Dulse and Tangle of the sea-shore, although from the reason alluded to in the passage above quoted, they will eat it at any season of the year when they can conveniently obtain it.

The effects of good feeding on the growth and development of the horns has been before spoken of, and there can be no doubt

that it has the same effect on the development of the whole animal. The small Corsican Deer is so because of the poverty of its food. When fed well, and on rich food, it speedily becomes bigger. The Deer of the German forests are larger than those of the Highlands of Scotland, because, in the autumn and winter, they have an abundant supply of nutritious food in the acorns that are the produce of the Oak in those forests. Deer thrive and become large according to the same rule as sheep and oxen; rich grasses, containing the carbonaceous, nitrogenous, and inorganic constituents of food in the largest quantities, are those on which Deer flourish most in Scotland; and these are always found abundant where the Deer are remarkable for the size of their horns and bodies. Although in all cases it is not a rule that the size of the horns and the quantity of flesh go together, yet it is sufficient generally to lead to the conclusion that in exceptional cases there may be a redundant supply of materials for the horns, as phosphate of lime, and not so large a proportion of flesh-forming matter in the food.

Although particular kinds of food may be most nutritious, of course it is necessary that the Deer have a sufficient supply; and the best pastures may be overstocked. It is necessary they should have plenty of food. Even plenty of one kind of food, and that the richest, is not best. Deer, like other animals, are the better for variety. In spring they do well on the grass of the lowlands, but they improve by removing to the pasture afforded by the high hills in the summer; whilst after this the shelter of the forest and the vegetation protected from the destruction of the cold, are most conducive to their welfare in winter. The presence of springs is a necessary condition of good pasture for Deer at all seasons of the year, not perhaps to afford them drink so much as to ensure the growth and tenderness of the herbage on which they feed.

The question of the deterioration of the present race of Deer in Scotland is one of great interest to those on whose estates these noble animals yet run wild. Although in individual cases the herds have improved within the last twenty years, the general impression is that they are deteriorating. The causes of this

deterioration are not very evident when close inquiry comes to be made, and a variety of theories have been proposed to account for the generally admitted fact.

The most prevalent notion on the subject is that the Deer districts are overstocked; that there are more Deer on a given quantity of ground than can find good and nourishing food. The causes assigned for this are two. First, that there is an absolute overstocking, arising from the anxiety to possess a large number of Deer. Second, that this overstocking is only relative, arising out of the cultivation of the better lands, which, being attended with a reduction in the number of Deer, whilst leaving to them an area as large as before, yet does not produce a sufficient supply of food for their most robust growth.

Another view is that expressed in a communication from Mr. Butler, who states that generally the Deer in Scotland have plenty of food. He attributes the falling off in the size of the Deer to a want of fresh blood. It is a well-known fact that where limited numbers of animals breed together that this is attended with deterioration. The laws, however, of the degradation of animals from this cause are very imperfectly understood, and, without further investigation, it would be premature to arrive at this conclusion. The subject is one well worthy of further inquiry.

The only other explanation that we need allude to here appears to be a very probable cause of deterioration, and that is the relative increase of Hinds and decrease of Stags. The cause of this is to be attributed to the great increase of deer-stalking. This method of pursuing the Deer invariably leads to the destruction of the finest Stags, and this deprives the herd of those individuals who, from their strength and size, are best fitted to become the parents of a strong and healthy progeny. This is the conviction of all the foresters, and many of the sportsmen with whom we have corresponded on this point. *A priori*, there is nothing to be urged against the probability of this being a sufficient cause. Amongst our domesticated animals it is well known that the breed can only be kept up by paying the greatest possible attention to the health and desired conditions of the male

parent. If then it be true that the finest, healthiest, and noblest Stags are selected by deer-stalkers for slaughter, of which there can be little doubt after the confessions of Mr. Scrope, Mr. St. John, and the authors of the "Lays of the Deer Forest," we feel, after examining the evidence in favour of other causes, that no better one exists than this to account for the present admitted deterioration of the Deer forests of Scotland.

The size or weight of Deer may be properly spoken of in connection with their deterioration. Unfortunately this is a point which cannot be very accurately determined. The relative size of Deer can be judged of by the eye, and it is a well-known fact that the Deer in some forests are larger than others. Whilst in one forest they seldom reach a greater weight than twelve stones, in others they are said to weigh from eighteen to twenty-two stones. The difficulty in ascertaining absolute weights arises from the very unequal merits of scales and weights in the Highlands. The weights given are mostly deduced from the weight of the quarter. In other cases the weight is stated after the animal is "gralloched," as the process of evisceration, which is usually practised on the field after the destruction of the Deer, is called. Reports also that pass from mouth to mouth can seldom be relied on. Mr. John Hall has seen a Deer killed which weighed thirty-two stones as it fell. Sir Philip Egerton records one which weighed twenty-nine stones after its paunch and intestines were removed. Mr. Robertson refers to one that weighed twenty-three stones nine pounds (sixteen pounds to the stone) after the animal was "gralloched." Mr. Butler has seen one killed weighing twenty-nine stones. The largest Mr. John Grant had known killed weighed nineteen stones. Mr. Campbell has known one to weigh twenty stones five pounds (fourteen pounds to the stone) after cleaning. The usual weight of a large Stag is about sixteen stones. In parks they often attain a weight of from twenty-five to thirty stones.

The age attained by the Red-Deer is a subject of much discussion. On the one hand it is the impression of sportsmen that they live to a hundred years, whilst, on the other side, Aristotle and Buffon assert that they live but forty years. In both cases

it is a matter of opinion. In Scotland the notion that they attain a great age has been supported by the marks, of certain foresters who had died a century or more before, having been found upon Deer. This evidence is at best but vague. Two foresters could mark alike, and no evidence has been brought forward to demonstrate its impossibility. The authors of the "Lays of the Deer Forest" refer to one "mighty hart," whose life had been "vainly attempted by the most noble Eggs, Mantons, and Purdies," for forty years. The late Lord Derby, in the magnificently illustrated description of the Knowsley menagerie, gives an account of a Deer that was born in 1819 and died in 1845; this of course was tame. It is, however, one of the best authenticated facts with regard to the age of Deer we have met with. The negative evidence is certainly curious, as no sportsmen or foresters seem ever to have known or heard of a wild Deer dying from old age. Such evidence, however, would be as much in favour of the assertion at which Buffon recoiled, that Stags lived a thousand years, as that they lived to any less period. There is a vague impression that Stags live longer than Hinds.

On this subject we are indebted to Lord Selkirk for the following note:—

"The nature of the animal is so much changed by the rich food and confinement of a paddock, that one cannot well reason from the tame to the wild Deer, or to those which live in the forest. I have seen a Deer which I was told was in its third year (that is, about thirty months old) in a paddock at Blair in Athol, which had ten points to its horns, being three at the top, and two below on each, and very thick horns they were. There never have been any good experiments carried out as to the age of Deer, but it seems probable that their maturity is much prolonged. In the forest of Rhidorach the large Deer were mostly well known, and one which was named Bo by the late Mr. Hay Mackenzie, was known for thirteen seasons from the time the forest was cleared to carry a royal head each season—in the fourteenth season he was said to have had a thirteenth point, but the horns were then getting long, and somewhat thinner. A demand for venison from Dunrobin Castle, however, put an end

to old Bo's life, and the experiment together. This forest had once the largest Deer in Scotland."

"The age of Deer may be known from the manner of their feeding. A young Deer '*nibs*' the grass closely by a short sharp upward cut of the fore-teeth; a middle-aged Deer *pulls* it more gently; and an old Deer who has lost his teeth does not touch the grass, but with his lips and gums plucks gently the tops of the long heath. In extreme old age the Deer is almost starved, from his inability to feed." *

The age at which Deer are in their prime, and are prime for the table, are questions of more practical importance. Most persons intimate with the habits and character of the Deer, are of opinion that they attain their greatest size and fullest development from eight to twelve years. Food seems to have much to do with the development of the bulk of the Deer, as well as maintaining it in its prime. But the time when the Deer is in its prime and most beautiful to look upon, appears to be somewhat different from the time when he is fittest to be fed upon. Sportsmen and foresters all agree that at six years of age a Stag is good venison, and that he does not improve, in fact rather falls off, after he is eight years old. It would thus appear that the anxiety to kill the finest Stags is not prompted by the desire to secure the best venison. Or it may be that it is not so well understood as it ought to be that the finest Stags do not make the finest venison.

The Red-Deer does not afford good venison all the year round. The season of rutting, which comes on sometimes in September, is the period at which they begin to lose condition. From this time through the winter and spring, the Deer do not recover their flavour, and it is not till the end of August or the beginning of September that venison is in greatest perfection. It then continues good till the end of September or the beginning of October. Whatever difference of opinion there may be as to the time when venison begins to be in its best condition, or how long it may last, all agree in all seasons, and under all circumstances, it is in perfection in the middle of September.

* "Lays of the Deer Forest," vol. ii. p. 149.

Deer are remarkable for the facility with which they recover from severe wounds. They have been seen in the herd with three legs. Mr. Hudson once cut up a Deer in which a ball was found lodged in the muscular parietes of the heart, and as the orifice of the wound where the ball had entered was quite healed up, it had evidently been there some time. Lord Selkirk records an instance of a stag which was shot quite through the stomach and recovered. They have been known to run upwards of a hundred yards after being shot quite through the heart. In fact, the only parts of the body in which they can be hit to be killed are the brain, spinal cord, and heart. All sportsmen, however, aim for the heart, as the position of this organ is most accessible.

When a Deer is wounded he avoids the herd, and when he is even disposed to join his companions, which is not often, they exhibit no wish for his company, and have been known to drive a wounded Deer away from them. They also avoid one that is being hunted. The instinct that prompts this conduct is evidently self-preservation; and as it is common in the animal kingdom, it is not improbable that the race is to some extent kept from deterioration by this conduct. Lord Selkirk says, that an individual Hind will sometimes encourage a wounded Hart. Such actions, however, take place away from the herd.

Wild Deer seem subject to few or no diseases, or if they are, little is known of them. The greatest sufferings they have to submit to seem to arise from starvation, and what diseases follow in its train are not well known. Deer in paddocks, like other domesticated animals, suffer from roup, disease in the liver, and other animal ailments.

“In genial climates and abundant districts the season of the rut commences in September and terminates at the end of October; but the period, like that of the mewing, depends upon the age and condition of the Stag, the year, the climate, and the district which he inhabits. Hence in cold regions, or high sterile mountains, it is later than in the fertile forests of a mild luxuriant country; and in warm prolific lands it is proportionally accelerated, so that in Greece it commences in the beginning of August. In Scotland its beginning is often as late as October; but in France and Ger-

many, with strong and well-fed Harts, it is common in the early part of September, and terminates in the end of the same month. With stags of five and six years, it is near a fortnight later; for those still younger, it is about ten days retarded, and towards the end of October, it is only continued amongst the broachers." * This passage records so well all that is known on the season of rutting, that there is scarcely necessity to add anything further. In mild seasons the rut commences amongst the older Stags in September, in less genial seasons it is delayed, and is continued amongst the younger Stags, in whom the rut commences later, even to the beginning or middle of September. The circumstances which most notably influence this period are food and frost. Good food and a good condition are favourable to its development, whilst bad feeding and disease retard it. Frost also hastens it. Although difficult to explain, all observers agree in this, that if the weather sets in frosty earlier than usual, the rutting commences earlier. Damp, moist, rainy weather, however mild, retards rutting.

The commencement of the rutting season is announced in various ways. Changes, physical and mental, come over the Stag. His neck swells, he becomes restless, gets thin, looks dirty, and out of condition, and has a strong tendency to fight with his fellow-stags. This tendency ends in a despotism, one Stag becoming by his prowess in battle the acknowledged head of the herd. The Hinds even at this season are pugnacious, and collect together in herds. They usually arrange themselves around the successful Stag, whilst those Stags which have been beaten, or are too young to venture an encounter with the monarch, keep at a respectful distance beyond the Hinds on all sides. The young Stags begin to go with the Hinds in their second year. The Hinds begin to breed in their second or third year; more frequently perhaps in their third, and not uncommonly when in good condition in their second year.

The Hind is supposed to carry her young various periods, from seven to nine months, but Professor Owen states, that the true period is eight months and a few days. If this be correct

* "Lays of the Deer Forest," p. 137.

then, dating from the rutting season, the Hind would part with her young in May and June, which corresponds with the observations of Mr. Hall, Mr. Grant, Mr. Robertson, and other foresters on this point. Mr. McLaggan and Mr. Grant name the 9th and 10th of June as the two days on which most calves are produced in a herd.

The calves are suckled by the Hinds for eight or nine months, or until the commencement of the next rutting season. Should the Hind, however, continue barren, the young calf goes on sucking for eighteen months, or until the second rutting season after its birth. As a rule the Hinds suckle longer in poor than in rich pastures. At the same time, the Hinds in poor pastures sometimes lose their milk before the next rutting season. Hinds continue to produce young for a great many years. The difficulty of marking a wild Hind from year to year is considerable, and definite information is wanted; but the general impression of those accustomed to watch these animals is that they produce young till they are twenty or twenty-five years of age. The occurrence of twins is not uncommon; it is calculated that one Hind in a hundred will drop twins. This result cannot be procured by treatment; but, as a rule, the better the Hinds are fed the more calves they produce.

The affection of the Hinds for their young is very strong, and they will boldly resist the attacks of other animals upon them. Mr. Hudson relates an instance of a Hind breaking the back of a fox which was imprudent enough to attempt to make a meal of a young calf. The Stags do not appear to care much about the calves. They generally keep away from the Hinds during the suckling season. They are never known to injure the calves, and in some instances have been observed to assist the Hinds in protecting them.

It is sometimes a matter of importance to be able to distinguish between the foot-marks of Stags and Hinds; and it appears that a practised eye can easily do this. The foot of the Stag is rounder, broader, larger, and its mark deeper than that of the Hind. The feet, however, differ, according to the ground on which the Deer are bred. They are larger in Wood-deer than in Hill-deer, and

smaller in Deer that live on hard, than in those that live on soft ground. Mr. Robertson says that one of the hoofs of the fore-feet of Hinds is longer than the other, while those of Stags are of the same length.

Deer are often tamed. When calves have not been suckled by the Hind, they will follow any one who allows them to suck their fingers. Calves are not unfrequently brought up by hand, and become quite tame and attached to those who feed them. Their temper is, however, always uncertain, and they are very troublesome to those who take the pains to domesticate them. Stags are, in fact, dangerous, and will sometimes gore their best friends.

Amongst the answers to the queries which were circulated for the purpose of obtaining materials for this note on the Red-Deer, Mr. McLaggan states that Deer are particularly fond of music, especially that of the bagpipe.

Other information than that made use of has been kindly imparted, but has been omitted either from its having been before published, or not coming within the scope of the object of this paper. In addition to the information thus obtained, the writer has consulted the following works:—

Traité de Vénerie et de Chasses. Paris, 1769.

Buffon. Histoire Naturelle, vol. vi. Paris, 1749.

Dictionnaire Raisonné d'Histoire Naturelle, article Cerf. Paris, 1791.

Scrope. Art of Deer Stalking. London, 1839.

John Sobieski and Charles Edward Stuart. Lays of the Deer Forest, vol. ii. London, 1848.

English Cyclopædia, article Cervidæ.

St. John. Sketches of the Wild Sports and Natural History of the Highlands. London, 1846.

Bell. History of British Quadrupeds. London, 1842.

Pennant. British Zoology, vol. i. London, 1812.

Owen. History of British Fossil Mammals and Birds. London, 1846.

Another member of the family *Cervidæ* is found in the Highlands of Scotland,—the Roebuck.

The genus *Capreolus*, to which it belongs, is the type of the Capreoline Deer, and is thus defined by Dr. J. E. Gray.

Horns nearly erect, small, cylindrical, slightly branched, with a very short peduncle. Tail none, but a large white anal disc. Crumen very indistinct. Hoofs narrow, triangular. The tuft on the hind-legs rather above the middle of the metatarsus. Fur of thick brittle hair in winter, and thinner and more flexible hair in the summer. The adults are not spotted, and have a black spot at the angle of the mouth. The skull has a very small shallow, sub-orbital pit. Intermaxillary nearly to the nasal. Infra-orbital impression very slight, rather deeper in the middle. Nasal not dilated behind. Two central lower cutting-teeth dilated above, outermost very narrow.

Capreolus Capræa, the Roebuck, is distinguished by the inside of its ears being fulvous, and the chin white, with a black spot below the angle of the mouth. The following synonymy is given by Dr. Gray:—

Capræa, Pliny, Hist. Nat. viii. c. 55; Gesner, Quad. 324. fig.; Jonston, Quad. 77. t. 31, 35.

C. Plinii, Ray, Syn. Quad. 89.

Capreolus, Brisson, R. A. 89.

Cervus minimus, Klein, Quad. 24.

Cervus capreolus, Linn. S. N. i. 94; Gmelin, S. N. i. 180; Erxl. Syst. 313; Schreb. Saugth. 1104. t. 212 A, B; Pallas, Zool. Ross. A. i. 219; Brandt, Bull. Acad. Petersb. iii. 280; Desm. Mamm. 439; F. Cuv. Mam. Lith. t.; Fischer, Syn. 450, 619; H. Smith, G. A. K. iv. 124. t. v. 790.

Capreolus Capræa, Gray, List. Mamm. B. M. 176; Cat. Osteol. B. M. 64.

Capreolus Europeus, J. Brookes, Mus. Cat. 62, 1828; Sundevall, Pecora, 61. 184.

Roe, Penn. Syn. Quad. 53; Quad. 108; Shaw, Zool. ii. 291.

Roebuck, Penn. Brit. Zool. 18; Knight, M. A. N. f. 615; Bell. Brit. Quad. fig.

Chevreuil et Chevette, Buffon, H. N. vi. 198. t. 32, 33.

Chevreuil d'Europe, Cuvier, Reg. Anim. i. 257; Oss. Foss. iv. 47. t. 1. f. 37—40.

Rehbock, *Riding, Jagd.* Th. t. 9; Meyer, *Thier.* ii. 677. 74; *Wildung, Taschenb.* 1797. i. t. 1. 2.

The following description of this animal is given by Pennant in his "British Zoology."

"This is one of the least of the Deer kind, being only three feet nine inches long, two feet three inches high before, and two feet seven behind; the weight is from fifty to sixty pounds. The horns are from eight to nine inches long—upright, round, and divided into only three branches; their lower part is sulcated lengthways, and extremely rugged; of this part is made handles for couteaus, knives, &c. The horns of a young Buck in its second year are quite plain, in its third year a branch appears, in the fourth its head is complete. The body is covered during winter with very long hair, well adapted to the rigour of the Highland air; the lower part of each hair is ash-coloured; near the end is a narrow bar of black, and the points are yellow. The hairs on the face are black, tipped with ash colour; the ears are long, their insides of a pale yellow, and covered with long hair; the spaces bordering on the eyes and mouth are black. During summer its coat has a very different appearance, being very short and smooth, and of a bright reddish colour. The chest, belly, and legs, and the inside of the thighs, are of a yellowish-white, the rump is of a pure white, the tail is very short. On the outside of the hind leg, below the point, is a tuft of long hair. The make of the Roebuck is very elegant, and formed for agility."

Like the Red-Deer, the Roebuck inhabited the British Islands before we have any indications of the existence of man. Like the Red-Deer also, though now almost entirely confined to the north of the Forth in Scotland, its remains have been found in the southern counties of England. In the cervine remains of the Cave at Paviland, Dr. Buckland speaks of an antler approaching to that of the Roe, and Professor Owen states that he has received remains of the Roebuck from the ossiferous caves in Pembrokeshire: from a fissure of a limestone rock in Caldy Island, off Tenby, in South Wales. In this locality they were associated with the remains of the Tichorine Rhinoceros. Fossil antlers and bones of the

Roebuck have been found in the limestone caverns of Stoke-upon-Trent, in the limestone formation of Bacton, in Norfolk, and in the same kind of formation at Newbury, in Berkshire. The editor of the last edition of Pennant's Zoology, also states that seven or eight specimens of the bones of the Roebuck were dug up in the peat-beds near Romsey, in Hampshire. It would thus appear that the Roebuck was once wild in the south as well as in the north of Great Britain. Pennant says that according to Dr. Mouffett, it was found in Wales as late as the reign of Queen Elizabeth, and according to Leland in great plenty in the Cheviot Hills in the reign of Henry VIII. The Roe seems to be unknown in Ireland. They are frequent in France, and are found in Italy, Sweden, Norway, and Siberia. They are also found wild in the north of Asia.

The Roe does not form herds as is the case with the Red-Deer, but they congregate in families of from eight to ten, and are found in the lower coverts and less wild woods. The female carry their young five months, and produce, in April or May, two fawns, generally male and female, at a birth. These she conceals from the Buck, on account of his tendency to injure them. It is generally killed in the covert or by the sportsman, who waits outside whilst the copse or wood is driven. It is easily knocked over even by very small shot. As soon as it is down, it is usual to cut its throat, and to hang it up by the hind legs to the fork of some tree to bleed.

The Roe, like the Deer, seems to require a variety of food. They do not, however, like the Red-Deer, ascend to the heights, but are more generally found amongst the "braes," coverts, and lower pastures. In fine dry weather they lie out in the Heather like Hares. They feed from dawn till the sun grows hot, and from sunset until night. In the middle of the day they ruminate or sleep in the covert, or stand in the open woods and thickets. In summer their food is herbage and the young shoots of underwood. They are said to be very fond of the *Rubus saxatilis*, hence this plant is called in the Highlands the Roebuck-berry. In winter, when the ground is covered with snow, they browse on the tender branches of the Fir and Birch.

“On naked or short-clothed ground they always scrape for their bed, laying it bare to the fresh mould. This they will do several times during the night, so that the numbers of a family cannot be judged by their beds, for each will often make three or four in one night. The Roe do not wallow in pools like Red-Deer, but in hot weather, when fretted by flies, to brush them from their heads and flanks they stand by a bush, and run round it so continually that they soon beat a circle, like the lunging ring of a horse. In July and August, these circuits are often found in bushy woods, and as they occur in the weaning season, when the kids are seen pursuing their dams for milk, by those ignorant of their habits, their circuitous runs have been thought an exercise to wean the young.”*

The Roe is exceedingly attached to its young, and although feeble and naturally timid, when under the inspiration of this feeling they will attack animals and even men.

The rutting season commences at the end of October, and continues for about a fortnight, and is generally over by the end of November. This season is not attended with those encounters amongst the males which render it so remarkable in the Red-Deer. The Buck generally sheds his horns in December. They are covered at first with “velvet,” as in the Red-Deer. The velvet begins to peel off and the process of “burnishing” goes on in April. The horn begins to bud when the Buck is six months old. “In his second year he bears only two little ‘pricks,’ or young stems; in his third he acquires two ‘spurs,’ or small tines, on each ‘spine;’ and in France, Germany, and other continental countries, these are sometimes augmented to three; for his fourth year in the same regions, he carries three or four; and in his fifth four or five, and sometimes even a greater number; making with the extremities of the stems an entire ‘head’ of eight or ten points, and upwards. In Scotland, however, it is extremely rare for the two spurs to bear more than six points, including their own extremities, and the position of the spurs is generally as invariable. The first, to the front, at about one-third or one-fourth the length of the horn, and with an elevated inclination; the second to the

* “Lays of the Deer Forest,” vol. ii. p. 150.

rear, nearly the same distance from the point, often at a right angle to the spine, and sometimes at an obtuse angle with its extremity, which has most frequently a slight direction upwards from the root of the second spur. As the Buck increases in years, his horns, like those of the Stag, diminish in the size of their growth and the number of their points, till, at an advanced age, he has sometimes only two wasted short spines without any spurs ; or a stunted and distorted head, of which the stems are gross and gouty, and the points withered and eccentric. In an old Buck, as in an old Stag, the surest sign of his age is when the ' burrs ' are thick, large, and strongly pearled, and set close to the os frontal."*

E. L.

* "Lays of the Deer Forest," vol. ii. p. 157.

NOTE

ON THE GEOLOGICAL MAP AND SECTION,

By JAMES NICOL,

Regius Professor of Natural History in Marischal College and University of Aberdeen.

—◆—

THE accompanying Map of the Valley of the Dee is on the same scale with Arrowsmith's Map of Scotland, geologically coloured by Dr. MacCulloch—or, four miles to one inch. The topographical part has been very carefully revised by Mr. A. K. Johnston, who has corrected it from the positions ascertained by the Trigonometrical Survey, from the Coast Surveys published by the Admiralty, the County Maps, and from various local plans and surveys; in particular those of the Invercauld Estate, obligingly furnished by James Farquharson, Esq., for this purpose. It may thus be confidently asserted to be more accurate than any map of the district hitherto published. In engraving the mountains, also, it has been endeavoured to represent more faithfully the direction of the chains and their relative elevation than would appear to have been done in any previous Map.

The geological features are principally taken from Dr. MacCulloch's Map, which, as far as our observations have gone, is tolerably accurate. In a few instances only have we thought it necessary to alter the outline of the formations as laid down by that distinguished geologist. The more important points are, the greater extension of the Quartz-rock, near Castletown; some additional bands of Limestone; the Serpentine Rocks near Ballater; the large mass of Trap in the Red Sandstone near Dunotter; and the patches of the latter rock at Aberdeen, and on

the coast to the south. The section below the map is drawn from the coast near Katerline Harbour, to the Ben Aun or Ben-na-muic-dhui mountains, the loftiest and most considerable granite mass not only in the district, but in Scotland. It cuts the chain of the Grampians south of the Dee obliquely, crossing that river at Balmoral, and is intended to show the general succession of the formations constituting the country. The horizontal scale is four miles to the inch, or the same with that of the map; the vertical scale is about 4000 feet to half an inch, or rather more than twice the vertical scale. This amount of exaggeration has been thought necessary to give some idea of the general outline of the country, which on a true scale of heights and distances would have been hardly perceptible.

The geological features of the district have been so minutely described in the preceding pages, that very few additional remarks are necessary. The map and section prove how large a portion of the country is occupied by the Granite—generally the normal variety, composed of Felspar (generally Orthoclase: occasionally also Albite, or Oligoclase), Quartz, and Mica, but sometimes graduating into compounds, in which Hornblende forms an essential part. On this, Gneiss generally rests; in the valley of the Dee, as in most parts of Aberdeenshire, either a mere thin film spread over the surface, or highly contorted and broken fragments crushed up between the enormous Granite masses. Overlying the Gneiss, as in one point in the north-west of the section, or apparently more often alternating with it, or replacing it, as in the vicinity of Castletown, comes the Quartz rock, normally almost a pure granular Quartz, but often containing scales of Mica, or perhaps more frequently grains and scales of Magnetite.

On the southern declivity of the Grampians, on the right-hand side of the section, the more regular succession of the crystalline strata is well seen. There the Gneiss is followed by Mica-slate, and this in its turn by Clay-slate—all dipping south from the granite in highly inclined strata. Where crossed by the line of section, these beds have a very small extent, but spread out far more widely further west in Forfarshire and Perthshire. These

crystalline slates we have elsewhere endeavoured to show are the metamorphosed equivalents of the silurian strata of the south of Scotland.* On these slates the old Red Sandstone rests in beds, which, though often inclined at a very high angle, are yet unconformable to the older strata. In the portion shown in the Map and Section, the predominant rock is a very coarse conglomerate, well seen in the lofty precipitous cliffs along the Kincardineshire coast, south of Stonehaven. It alternates with thinner courses of finer grained Red Sandstone, and the unequal wasting of the rocks forms those ledges on which the innumerable flocks of sea-fowl that frequent these shores build their nests, often in the hollow left by the displacement of some large boulder. As the strata recede from the mountains they are less inclined, or often nearly horizontal.

Besides the Granite, other rocks of igneous origin occur. One of the most interesting of these is the Serpentine, shown in the section in the hills on the west side of Glen Muic. Hornblendic trap connected with this rock is seen in the low ground near Knock Castle, and we think extends across the Dee towards Gairn Bridge. The occurrence of this igneous rock is remarkable for the change in the character of the Gneiss, which becomes a very beautiful compound of Hornblende, the veined structure of the rock being finely exhibited by the variable decomposition of the constituent minerals. It seems also connected with the singular rents which traverse the granite rocks, well seen on the face of the hill on the north side of the Dee below Ballater (near Tullich), and in the narrow rocky gorge, cutting off the Craig of Ballater from the main mass on the north, and forming the deep defile through which the road passes.

Veins of red quartzose Felspar-porphry, are very common in this part of the Grampians, and a fine specimen may be seen at the Bridge of Potarch, worn into smooth rounded surfaces by the passage of the river. A very large mass of a dark coloured porphyritic trap, containing thin, broad crystals of glassy Felspar, or nodules of green earth, and masses of Red Zeolite (Heulandite), is seen beyond Dunotter. It comes close to the shore in two

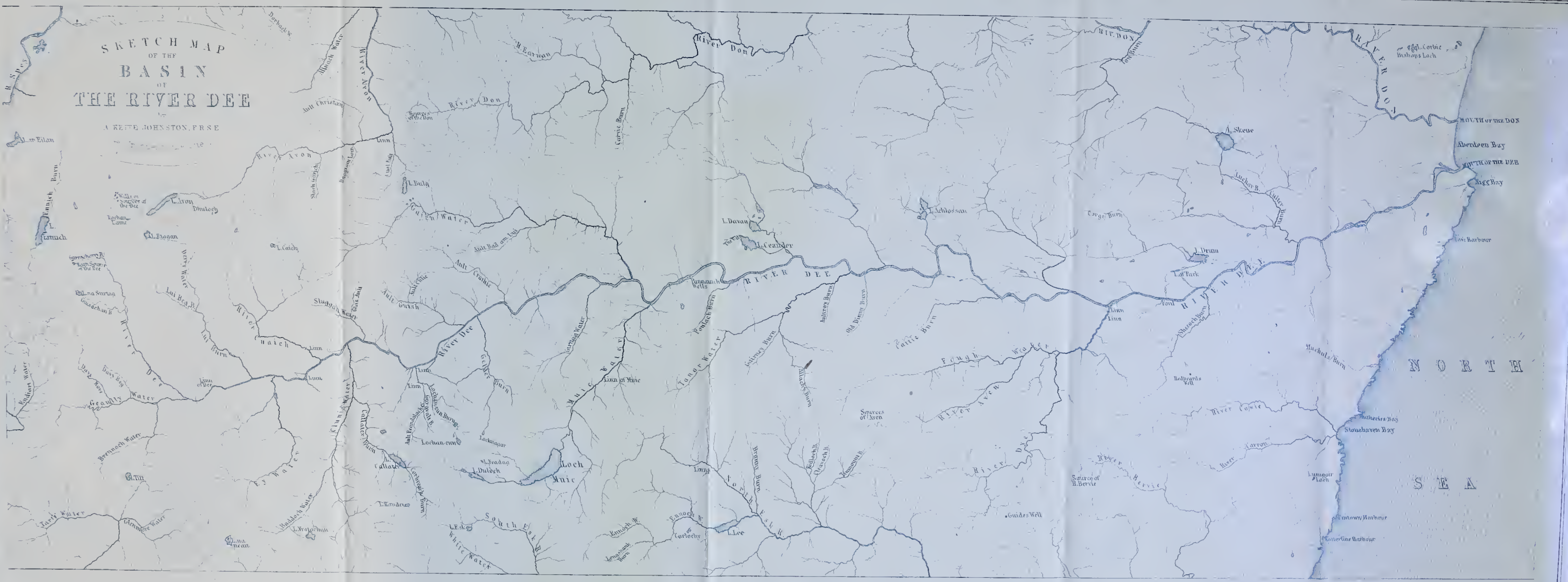
* In this view Sir R. I. Murchison coincides. See *Siluria*, p. 163.

places, as shown in the Map, and has produced some curious metamorphic effects on the conglomerate.

The drift or detrital accumulations are not shown in the Map or Sections. In the Valley of the Dee at least two groups of these deposits, besides the recent alluvial formations, may readily be distinguished. Grooved, striated, and polished surfaces, ascribed to glacial action, are also commonly seen where the surface of the rocks is recently uncovered, and many of the large travelled stones or boulders are marked in a similar manner.

SKETCH MAP
OF THE
BASIN
OF
THE RIVER DEE

A. KETTE JOHNSTON, FRSE



N O R T H

S E A

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