Mountain sickness is often felt especially by untrained men during the first days of a tour even at moderate elevations (10–13,000 ft.). There is no certain cure for it known except turning back, a remedy not popular with Englishmen; but a short halt and, if possible, a doze of even five minutes will often suffice to remove the disagreeable sensations. For that sickness and diarrhœa to which some persons are liable when abroad, it is well to take of carbonate of soda twenty grains, syrup of ginger and tincture of rhubarb, of each a teaspoonful, three or four times a day for two or three days. If the diarrhœa still continue, some prepared chalk, bismuth, and charcoal (say, fifteen grains of each) should be taken as often in water; and to this again in a more obstinate case ten to thirty grains of laudanum may be added. When attacked by diarrhœa on the march I have sometimes stopped it by a longish pull at neat cognac. The brandy must be good and half a wine glass at least will be required, and may have to be repeated. Many travellers find constipation, on the other hand, to be their enemy. The great secret here is not to let the function get behindhand. To fall in arrears and then fire big guns is a very bad plan; keep things gently forwards by taking two or three grains, or less, of rhubarb with meals; and if anything more be required take in the morning a little Pullna or Hunyadi water, or a dose of Lamplough's saline or 'citrate of magnesia.'*

In conclusion, all athletes should be well aware of the dangers of going too suddenly out of training. Violent changes of the equilibrium of the body are dangerous in either direction; and as the mountaineer should slowly get into harness, so slowly must he loosen the girth of his loins and descend the delectable mountains with lingering feet.

Saxifrages. By Charles Packe, F.L.S. Part 2.

αἷμα ῥόδον τίκτει, νιφάδες δὲ τάδ' ἄνθεμα λευκά.

In a paper in the February number of this Journal, I have endeavoured to sketch the distribution in Europe of one division of Saxifrages, those whose leaves are distinguished by crustaceous pores. I propose now to go through the rest of the family whose leaves are more or less tender, and not pitted by crustaceous pores; though conscious that in a paper of this

* This latter is very useful in assuaging feverishness during hot days on the snow.—Ed.

kind, which is at most only quasi-scientific, one runs the risk of being found by some readers too serious and minute, and by others too discursive and inexact.

Engler arranges the soft-leaved Saxifrages in twelve sections; but no two botanists seem quite agreed in their classification of the different species; some attaching more importance to the structure of the hairs on the leaves, and some to the form of the capsule, and its greater or less connection with the calyx.

For the general observer, these Saxifrages, as met with in Europe, may be conveniently arranged into four groups, each more or less distinguished by the leaves. We shall then have—

1. The Trachyphyllum section, comprising also Hirculus, of which *S. aizoides* may be taken as the type. The leaves are narrow and undivided, somewhat fleshy, and often spinous. The Himalaya Mountains seem to have been the original centre of creation of this group.

2. The Dactyloid section, characterised by herbaceous leaves, with linear or lanceolate segments, often 3 or 5-partite, and sometimes palmatifid. The species of this group seem principally to have been developed in the west of Europe, and essentially to belong to the Mediterranean region. *S. muscoides* may be taken as the type.

3. The sections Boraphila and Robertsonia, with leaves mostly reniform, serrate at the edges, rather fleshy, and covered with articulate hairs. *S. stellaris* is the type of this group. Its original habitat seems to be North America, where a great number of the species are still flourishing on the Rocky Mountains.

4. The section Nephrophyllum, with the leaves membranaceous in texture, and reniform in their outline, often more or less inciso-lobed. There is a tendency in this group to produce little bulbs in the axils of the leaves. The common meadow saxifrage, *S. granulata*, may be taken for the type of the various species, which are widely spread; though apparently of Arctic origin, they are abundant in Central and Southern Europe, especially on the Spanish peninsula.

As *Saxifraga aizoon* and *S. oppositifolia* represent the calcareous-leaved Saxifrages in the Arctic regions, so each of these four sections of soft-leaved Saxifrages seems to have at least one representative in the far North. The first section, Trachyphyllum, represented in the Arctic regions by the species *S. aizoides*, *Hirculus*, and *bronchialis*, on the mountains of Europe, is restricted to four species: the yellow autumn saxi-

frage, *S. aizoides*, so common along the water-courses of almost every mountain chain, but which does not descend farther south than the Pyrenees; *S. Hirculus*, which is not found either on the Alps or Pyrenees, but sparingly on marshy ground at the foot of some of the lower ranges; *S. aspera*, which with its sharp-pointed leaves seems closely allied to the Arctic form, *S. bronchialis*. In high situations the leaves are more closely set, less pointed, and curved inwards, forming a dwarf variety, *S. bryoides*, which in the Pyrenees is the more common form. On the mountains of the Port d'Oo, near Luchon, it is exceedingly abundant, and in all that region it is the only form. In the shape and arrangement of the flowers there is not the slightest difference, but the thickly-clustered compact arrangement of the leaves keeps *S. bryoides* entirely distinct from *S. aspera*; and though both are found in some localities, the former is never seen at a less elevation than 2,600 mètres. Far away in the East, on some of the mountains of Styria and Carinthia, we have a very delicate and rare species belonging to this section, *S. tenella* (Wulf.), with fine, sharp-pointed, entire leaves, and rather small, curved petals, of a clear white colour, set on very delicate stalks.

Of the third section, including Boraphila and Robertsonia, we have *S. stellaris* as the Arctic type; and of all the Saxifrages perhaps this species is the one most widely spread, being found in all quarters of the globe, and in America reaching into the southern hemisphere, on the mountains of Patagonia. It is very common on the mountains of Britain as well as Ireland, and abounds in the Alps and Pyrenees. The closely allied species, *S. leucanthemifolia* (Lap.), exists only in Europe at some Pyrenean stations. Near Cauterets it is abundant; as also on the slaty schists of some of the ranges of Malibierne. Another species, *S. nivalis*, though occurring rarely on the Scotch mountains, is nowhere found in Central Europe, and seems exclusively confined to Arctic and sub-Arctic regions.

In the group Robertsonia we have several species of Saxifrages, almost entirely confined to Western Europe, and none of them Arctic. In their spotted petals they have a considerable resemblance to those of *S. stellaris*, possibly the parent type. At all events, I do not think that the difference of the hairs being articulate or not articulate, any more than the anther filaments being flattened or subulate, can be looked upon as a well-defined distinction. In the Pyrenees there are at least three species, of which two, the common London Pride, *Saxifraga umbrosa*, and the Kidney-leaved Saxifrage, *S. geum*, are almost entirely confined to those mountains and

the west of Ireland. The third species, *S. cuneifolia*, extends much farther to the east, and this form is the only one which reaches far north, being found in Iceland. *S. Andrewsii*, the form with long saw-edged leaves often seen in gardens, and said to have been brought as a wild plant from Ireland, is evidently a hybrid, exactly intermediate both in the flower, leaves, and habit between *S. umbrosa* and *S. aizoon*.

Passing to the fourth section Nephrophyllum, with the membranaceous leaves, *S. cernua*, may be taken as the Arctic type, which also occurs, though not frequently, on some of the mountains of Tyrol and Carinthia, but in Central Europe is generally replaced by the common meadow saxifrage, *S. granulata*; just as another Arctic species of this section, *S. rivularis*, which is never found farther south than Scotland, is replaced in south Tyrol by *S. arachnoidea*, a very delicate form, almost resembling a chrysosplenium, to which this section of Saxifrages the most closely approaches.

Another very common and rather coarse-looking species of this section, the round-leaved saxifrage, *S. rotundifolia* (L.), when it gets far east, puts on an improved aspect, and appears in the very neat little form of *S. Taygetea*, whose little orbicular polished leaves resemble very much those of the Soldanella.

We have also in this section the little wall saxifrage, *S. tridactylites*, which is frequent on old walls and rocks, throughout Europe, from the Mediterranean to the Arctic circle. On the higher mountains it is for the most part replaced by a more compact and robust plant, *S. contraversa* (Sternberg), which in the north-east passes into a still more luxuriant form, *S. petræa Pona*, characterised by its palmate leaves, almost recalling the form of *S. rivularis*. There are several other species of this group peculiar to Spain and the western peninsula, among which may be mentioned *S. biternata* (Bois), and *S. gemmulosa*, from the mountains of Granada, and the large white-flowered *S. Cossoniana*, from the mountains of Valentia, which Wilkomm says has the largest flowers of any of the Saxifrages of Spain.

I have purposely reserved to the last, as the most interesting, the Dactyloid section—Saxifragæ Veræ, as Don calls them, and indeed they are the true Saxifrages, for while those of the Trachyphyllum and Aizoon groups approach rather to the Sedum family, the Robertsonia and Nephrophyllum sections come somewhat near to the Ribes. They are strictly Alpine, though with the exception of a single species, *S. cæspitosa* (L.), they are none of them at all Arctic. Many of the species abound in the Pyrenees and the Spanish Sierras, and a

considerable number also occur on the Alps and Carpathians, but very few reach into Asia. On the Himalaya the Saxifrages of this section seem to be altogether wanting; and although there are several species belonging to it on the lofty ranges of the Cordilleras, I believe there are none, except the one Arctic type, to be found on the Rocky Mountains.

It is singular that the one Arctic species of this group, *S. decipiens* (Ehr.), corresponding to the *S. cæspitosa* of Linnæus, which is found under the form *S. hirta* on the mountains of Kerry, descends no farther south than the Jura and Hartz ranges, and is altogether wanting in the Pyrenees, the cradle of so many of the kindred species. It would, perhaps, be rash to fix on any one parent form, but from the present distribution of the Dactyloid Saxifrages, we may safely assign the Mediterranean basin as the original home of existing species, many of them being endemic on the mountains of the western peninsula.

Starting therefore from such a centre, let us take any upland gorge of the Central Pyrenees, the well-known Port de Venasque will serve as an example, and confine our attention to the Saxifrages of the dactyloid section that we there find, tracing them upwards. The first probably that strikes our attention is *S. exarata* (Vill.), with its white petals conspicuous upon the dark green, deeply veined, trifid leaves. This saxifrage is not uncommon in the Alps, extending east as far as Styria; but the two cognate forms, *S. nervosa* and *S. intricata*, are confined entirely to the eastern Pyrenees and some of the Spanish ranges. Growing side by side with this, at the same elevation, we have the *S. muscoides* (Wulf.), not inaptly christened by Sieber *Saxifraga varians*; for so much does it vary in colour, habit and stature, in its different localities, that it is only when the plants are rigidly compared by the botanist that they are seen to belong to the same species. The flowers are usually of a yellowish tinge. In the Eastern Pyrenees, in the Vallée d'Eyne, there are several striking varieties of this plant, and one very robust form that I gathered last year below the Col de Nuria I have nowhere else seen. In the Alps, also, this is a very common species, and on some mountains in Tyrol especially, a variety, *S. atropurpurea* (Sternb.) is found with purple flowers. A little higher up the Port, at about 2,000 mètres, upon the wettest rocks, we have two curious Saxifrages, which are only found in the Central Pyrenees, *S. aquatica* (Lap.), with its large palmate leaves, and rather coarse habit, and a much more fine-cut plant, *S. ajugifolia* (L.), with the flower-stalks springing from the axils

of the lower leaves. Growing with these two there is a hybrid form, intermediate in every respect, *S. capitata* (L.) Higher still, near the summit, of the Port, at 2,400 mètres, we have another saxifrage entirely distinct with its spathulate leaves, which are generally undivided, *S. androsacea.* This saxifrage seems to exist, though not very abundantly, on most of the European ranges, and occasionally a form is met with trifid leaves, with the misleading name; *S. pyrenaica* (Scopol.) In Tyrol I have several times gathered this variety, but could never procure a specimen from the Pyrenees. Going higher still we have a very special form of saxifrage, *S. pubescens* (Pour.), with the dark trifid leaves set in close rosettes, from the centre of which emerge the slender pedicels, bearing two or three white flowers, streaked with three purple veins. At the highest elevation, 2,700 mètres and upwards, the leaves become smaller, the old ones persisting, and the rosettes are set so close as to form regular little columns, *S. Iratiana* (Schultz). This saxifrage passes into various forms, and seems to hybridise freely with some of the others, especially with *S. muscoides* and *S. exarata.* Besides the Pyrenees, it is only found on the highest summits of the Sierra Nevada, where I have gathered it at 3,500 mètres, on the actual summits of the Veleta and Mulhahaçen, under the form *S. Nevadensis* (Bois). The name given it by Grenier, *S. Grœnlandica* (Lap.), only tends to confuse, as it is not an Arctic plant, and entirely distinct from *S. Grœnlandica* of Linnæus. Going a little farther east in the Pyrenees, on the Pic Crabère, on the confines of Ariége, we have another saxifrage belonging to this section, *S. pentadactylis,* which has the most finely-cut segments to the leaves of all the Saxifrages. It is not very easy to separate this species from the *S. obscura* of Grenier and Godron, which grows very abundantly on the rocks on the west side of the Lac Lanoux above Ax in Ariége, at a height of 2,200 mètres. The Saxifrage on the summit of the peaks Barthèlemy and Tarbessou in the same district seem to be the genuine *S. nervosa* of Lapeyrouse, and identical with the plant I have gathered on the Sierra de Moncayo. The three forms are easily distinguishable to the eye. *S. obscura* from Lac Lanoux seems to be intermediate between *S. nervosa* and *S. pentadactylis.* In addition to these species with strictly linear segments, as we go farther east, we come upon the grand palmate-leaved Saxifrages, which make such a show with their long unguiculate milk-white petals. The *S. geranioides* (L.), the Pyrenean representative of this class, makes its first appearance on the granite rocks of the Pic de Montarto,

a little to the east of the Maladetta, and thence follows the range eastward as far as the Vallée d'Eyne, where it displays itself in the greatest profusion, hybridising freely with other forms, and among these hybrids may probably be reckoned *S. paniculata* (Cavour). Any botanist wishing to investigate these varieties will be well rewarded by a visit to the Vallée d'Eyne in the early part of July. He will find the hybrid Saxifrages on the granite boulders on the west side of the valley, about 300 mètres above the stream.

S. geranioides is special to the Pyrenees; but in the island of Madeira it is almost repeated in *S. Maderensis*, and in Spain there are several allied species with palmate leaves, pointed sepals, and unguiculate large white petals. On the limestone rocks of the central and western Pyrenees we have no species of this type; but at Pampeluna, where the granite again crops out, we find a somewhat similar saxifrage, *S. cuneata* (Wildh), with leathery and somewhat wedge-shaped leaves; and still farther to the west, on the mountains above Leon in the Asturias, we have a species of the same type, *S. trifurcata* (Schrad).

Passing farther to the east we come to the region of the Maritime Alps. Here we have no longer the geranium-leaved Saxifrage, but another kindred form, *S. pedemontana* (All.), supplies its place, differing in the form of the leaves, which are wedge-shaped instead of round, and have pointed segments, but the unguiculate petals are almost the same. To the north of these two districts, and about equally distant from both, there is a wild tract of granite in the mountains of the Cevennes, and here we find another form of the palmate-leaved saxifrage, intermediate between the two last-named species, *S. pedatifida* (Ehr.). This striking plant, with its deeply-cleft and strongly-nerved leaves, may be seen growing in great profusion on the granite boulders on the N.N.W. side of the Mont Lozére, at a height of 1,500–1,600 mètres. It might easily be missed by those who make the ascent, as it does not grow on the summit of the mountain. It is found on one or two other granite mountains, but only in that district. The Madeira species seems to be intermediate between this and *S. geranioides*.

North of the Cevennes, in the mountains of the Cantal and Auvergne, we have another saxifrage, *S. hypnoides* (L.), which from its wide dispersion, being scattered over France and Spain, and extending to the far north of Britain, and even Iceland, may be taken as a parent form of many of the species. Its special characteristic is having the leaves crowded together

into spindle-shaped buds, which are covered with white hairs, a feature which is exaggerated in some of the Spanish endemic species, notably in the *S. conifera* of the province of the Leon, and in the *S. globulifera* of Granada. Perhaps to the same origin may be traced *S. Sponhemica* (Gmel.), a very neat and pretty plant, with its flowers of a creamy white, and fine-cut, mucronate, 3 or 5-partite leaves, which shows itself to great advantage on the dark basalt ledges of the Puy de la Goutte, north of Clermont Ferrand.

Of the small yellow-flowered, cut-leaved Saxifrages all through the Pyrenees and the western Alps, *S. muscoides* (Wulf.) is the prevailing form. The leaves of this species are generally trifid; but in the eastern Pyrenees, below the Col de Nuria, we find a dwarf form with all the leaves entire, *var. pygmæa* (Haw.). Gradually, as we go farther east, we are introduced to several species of entire-leaved Dactyloid Saxifrages, of which *S. androsacea* is the only representative in the Pyrenees. First, in the neighbourhood of Mont Cenis, we have *S. planifolia* (Lap.), very closely resembling the entire-leaved variety of *S. muscoides*, but distinguished from it by the obtuse round-headed leaves, which persist, when dead, taking a hue of light ashy brown. This species, though nowhere abundant, extends far to the east in Tyrol and Carinthia, but I consider Lapeyrouse is mistaken in placing it in the Pyrenees. In different years I have carefully searched for it in the Vallée d'Eyne, the place indicated by him, without discovering a trace. A rare variety of this saxifrage with purple flowers, *S. Facchinii* (Koch), is found on the Plattkofel, and on the northern rocks of the Rosengarten. I may mention that the rocks on the Mahlknecht Pass, N. of the Rosengarten, are very rich in rare saxifrages, many of them apparently hybrids. One specimen that I gathered there was especially remarkable, with the flowers of *S. Facchinii* and the trifid leaves of *S. muscoides*. Very near to *S. planifolia* comes *S. glabella* of the Apennines and the Abruzzi, a saxifrage with spathulate leaves, apparently intermediate between *S. androsacea* and *S. sedoides*. *S. Seguieri* is another diminutive saxifrage, with spathulate rather pointed leaves. Like the last, it would seem to be an intermediate form, but has less the character of *S. androsacea*, and partakes more of *S. sedoides*.

The *Saxifraga sedoides* (L.), the typical species of this section in the Eastern Alps, as *S. muscoides* is in the Western, though found here and there in the Swiss Alps, seem to abound most in south Tyrol. I much question whether it occurs in the Eastern Pyrenees, where it has been indicated by Lapeyrouse.

Possibly the dwarf entire-leaved form of *S. muscoides* has been mistaken for it; but *S. sedoides* is entirely distinct, with the leaves and sepals sharp, and even mucronate, and the flower-stalks, which are usually without leaves, spring from the lateral axils, and not from the centre of the rosette. In Carinthia and eastern Tyrol a variety is found with the flower-stalks more or less clothed with leaves, *S. Hohenwartii*; and in the canton of the Grisons, in the neighbourhood of the Albula Pass, there is another dwarf species, *S. stenopetala*, distinguished by its very narrow linear petals, and which, as the leaves are mostly trifid, seems nearer allied to *S. muscoides*.

I am aware that I have not at all done justice to this interesting group of Saxifrages, but I have made the paper more than long enough for this Journal. To sum up, we may state generally, that of the Dactyloid Saxifrages, those with undivided or little-divided leaves, are found principally in the eastern and central Alps; those with many-divided stiff shining leaves, in the Pyrenees and Spanish mountains; and those with palmate leaves, in the eastern Pyrenees and western Alps.

There is scarcely any family of plants that hybridise more readily; and from this fact, as well as from the great variety of the natural species, of all Alpine plants the Saxifrages are the most interesting to cultivate. The large-leaved rather coarse plant with pink flowers, seen in old-fashioned gardens, is not a true Saxifrage, having three styles instead of two, and is now distinguished by the name of *Bergenia*. Another species, with hanging viviparous stolons and round leathery leaves, *S. sarmentosa*, from China, is often seen cultivated in pots, as also is a little golden-flowered Saxifrage, *S. orientalis*, from Asia. These two, and varieties of *S. umbrosa* and *S. hirta*, from the mountains of Kerry, are pretty nearly the only species that we see usually cultivated.

In my former paper I have endeavoured to stimulate botanical ardour to a certain extent only, but those members of the Club who have a garden will, I hope, not rest content with amassing treasures for the herbarium. A visit to the garden of Mr. Backhouse, of York, or Mr. Maw, at Benthall, or Mr. Ellacombe, at Bristol, will show them what may be done in making Alpine plants not only grow but thrive, away from their native mountains. The chief trouble of cultivation is getting the plants home alive, and in good condition; but then with patience, and a little attention to repress the native weeds, which are too apt to assert their rights as the dominant species, and bearing in mind that plants require three things—

water, good drainage and a little sunshine, the admirer of Alpine nature will be able to gather together many, though not all, of his favourites round his own door.

To him I need not, I am sure, point out how much more interesting are these children of the snows than the ribbon-streaked rows of half-bred geraniums and calceolarias associated with the system of bedding-out.

A PLEA FOR NORWAY. By Lord Garvagh.

A good deal has been said lately about the exhaustion of the Alps, and it has even been suggested that its work being complete nothing is left for our Alpine Club but to lay itself down quietly and die. In the recent discussion on this subject, a mountain-country almost as near to us as the Alps has been, it seems to me, too little taken into account. To those who have done Switzerland, made all the proper ascents, and tried, perhaps, some of the improper ones, I venture to suggest a new field for their exertions.

It is comparatively but seldom that any article appears relating to the unfrequented ranges of the Norwegian Peninsula, which form as it were the bulwark of Northern Europe against any encroachment on the part of the Atlantic. Yet these mountains are scarcely to be surpassed for wild gleaming beauties and vivid grandeur by any other region of the whole globe. Such, at least, is my experience after living many months among them at different periods. Even after Switzerland, I find that I return to Norway with increased attachment, as to a home and country which though comparatively tame and familiar, never ceases to be fresh and invigorating.

In Switzerland there is a limit to the wild mountain districts one is accustomed to traverse; but in Norway the pleasures of a mountain life are inexhaustible, and the territories that one is at perfect liberty to dwell upon, in hut or tent, are often bounded only by the sea, and present, with their snow and ice-fields, a for ever-changing variety of scenery.

Whether we try the Fille Fjeld, Dovre Fjeld, Sogne Fjeld, or any of the other ranges that compose the backbone of the Scandinavian Peninsula, with Galdhoppigen, Gausta, or Sulitelma, as points visible from far on the horizon, to make for in their several districts; or the different glaciers between Hallingdal and Hardanger, where my observations have been chiefly made—such as Ornsbrœen, Vargebrœen, Hardanger Yokulen, Stor Skavlen, with Vosseskavlen, and Hallingskarven (names more familiar to my ears than Snowdon, Plinlimmon, or any other mountain in England), we find from their summits the same unlimited expanse, infinity of wild grandeur, and apparently everlasting succession of other distant ranges, rising one beyond another, in the cærulean blue of distance, like waves of some gigantic onward-moving sea. Amongst glaciers, I ought to mention that of Justedal upon the Sogni Fjord, perhaps the largest; and that of Folgefond on the Hardanger