

ON two small Collections of Dried Plants from Tibet. By W. BOTTING HEMSLEY, F.R.S., A.L.S.; with an Introductory Note by Lieut.-Gen. R. STRACHEY, C.S.I., F.R.S., F.L.S.* (Contributed by permission of the Director of the Royal Gardens, Kew.)

[Read 6th April, 1893.]

(PLATES IV. & V.)

CAPTAIN BOWER's expedition traversed Tibet from west to east, starting from Lé in Ladak, in latitude 34° N. and longitude 79° E., and passing into China in latitude 30° N. and longitude 100° E. His route lay on a line about 250 to 300 miles north of the main peaks of the Himalaya, and the point where he entered China, the lowest in this part of the journey, was upwards of 9000 feet above the level of the sea. The greater part of his road, however, was above 14,000 feet and the average was more, probably upwards of 15,000 feet above the sea. The expedition is the first conducted by Englishmen that has traversed Tibet throughout its length; and it is important as fully establishing the general character of the country, as being truly indicated by the Chinese maps, and as being an extremely elevated and rough plateau broken up by a multitude of mountain-ridges, among which are interspersed a vast number of lakes and pools of varying sizes, into which the surface-drainage collects, without forming streams of any magnitude. These features extend from the 80th to the 92nd meridians—to the west of the 80th meridian the drainage collecting into rivers that flow off to the Indus, and to the east of the 92nd meridian the drainage passing away to the eastward into the Bay of Bengal or the China Sea.

The climate of these parts of Tibet is very extreme. The air is very dry, and the sun's power in the rarefied and usually cloudless sky very great. The vegetation is meagre in the last degree; and in the tract that I visited, which being much nearer to the Himalaya than the region through which Capt. Bower passed is no doubt better supplied with moisture, I estimated that not one twentieth part of the surface was covered with vegetation.

* To this is appended a brief account of some plants, since received at Kew, collected by Mr. W. Woodville Rockhill on his journey in 1892 through Central Tibet, from Mongolia southward to the Tengri Nor and eastward into China.

The comparison of Mr. Thorold's collection of plants with that made by Mr. E. Winterbottom and myself in 1847 will be of considerable interest; and I append an abstract of the portion of our collection made in Tibet. The time during which we were there was little more than a month, and the area we traversed was comparatively limited; but I think the collections were fairly complete. We were, however, rather late in the year, and we may have lost some of the earlier flowering-plants. The total number of flowering-plants collected in Tibet consisted of 41 natural orders—33 exogenous and 8 endogenous; the exogenous genera being 96 with 173 species, and the endogenous genera 24 with 45 species, of which 30 were grasses and sedges. A single fern was found and three or four mosses. The lichens were obtained exclusively, I think, from rocks.

The country in which our collections were made is between the 80th and 82nd meridians, extending from Niti to Manasarowar Lake.—R. STRACHEY.

A full account of Capt. Bower's journey appeared in the 'Geographical Journal' for May 1893, with a route-map on which the altitudes are indicated. With the exception of the western part of Tibet, where General Strachey and the late Dr. Thomas Thomson botanized upwards of forty years ago, and several recent travellers have collected more or less fully, so little is known of the vegetation of the vast elevated mountainous region stretching from the Karakoram range eastward far into China, that I do not hesitate to offer the Society a few particulars concerning two small collections of dried plants presented to Kew within the past year.

SURGEON-CAPTAIN THOROLD'S COLLECTION.

The first of which I intend saying something was made by Surgeon-Captain W. G. Thorold, who accompanied Captain Bower on his memorable journey across Tibet into China. In consequence of Mr. Thorold's sudden recall to India, I am unable to give such precise information on the localities where the plants were collected as I could wish and the Society might desire. In reply to my questions on this point, Mr. Thorold wrote: "The majority of the plants were collected in Tibet west and north of Lhasa; a very few being found north-east of Lhasa, but not one in Chinese Tibet—that is, between Batang and Tachienlu." This collection is a most remarkable one, and unique of its kind; for, assuming that the altitudes given are correct, I believe I am

right in stating that no flowering-plants had previously been collected at so high a level as some of these. It is true that General Strachey long ago expressed (Journ. R. Geogr. Soc. xxi. p. 77) his conviction that flowering-plants existed up to 19,000 feet; and Hooker and Thomson ('Flora Indica,' i. p. 220) state that, "though plants may be gathered up to 19,000 feet, vegetation is excessively scanty, and only found by the margins of rills from melting snow." And they continue:—"The flora of these regions includes some plants of great interest, as *Papaver nudicaule*, *Oxygraphis glacialis*, *Ranunculus hyperboreus*, *Taraxacum officinale*, *Delphinium Brunonianum*, and *Berberis ulicina*." Then follows a list of high-level plants, with indications of those observed above 17,000 feet; but as a matter of fact I find no plant actually recorded from a greater altitude than 18,000 feet, either in the introduction or in the body of the work. At p. 227 of the same work the genera *Alsine*, *Draba*, *Androsace*, *Oxytropis*, *Sedum*, *Saxifraga*, and others are said to ascend to 18,000 feet. In the privately printed list of plants collected by Strachey and Winterbottom in Kumaon and Western Tibet, and partly reproduced here, pp. 125 and 126, only two, *Trachypodium Roylei* and *Nepeta tibetica*, are recorded from so great an altitude as 17,500 feet. Dr. T. Thomson ('Travels,' p. 149) mentions that he found an *Arenaria*, a *Stellaria*, and two cruciferous plants at the summit of Lanak Pass, an elevation of 18,100 feet.

Mr. Thorold's collection consists of about 115 species belonging to 69 genera and 28 natural orders. With few exceptions, the specimens, although often limited to a single small plant, are sufficient for identification or description. Captain Bower is reported as having stated that for a period of five months the party never encamped at a lower altitude than 15,000 feet; and throughout the country traversed during those five months not a single tree was seen. But that statement, judging from Mr. Thorold's collection, which was made at altitudes of 15,000 to 19,000 feet, gives no idea of the nature of the vegetation. Not only were there no trees, there were no shrubs, and there were no plants above a foot high, and very few above 3 inches out of the ground. Indeed, as I shall show you presently, many of the specimens are not more than an inch high. I have already mentioned that this collection is a most remarkable one. It is remarkable as representing, so far as Mr. Thorold's manifestly careful investigations went, the entire phanerogamic flora

of the region in question. In one of his letters he expressly points out that the collection includes a specimen of every flowering-plant he was able to find. The collection is remarkable, too, for its completeness in another sense. With the permission of the Director of Kew, I am able this evening to exhibit a sample of this wonderful flora; and you will perceive that each specimen is an entire plant, usually with a root very much longer than the top. The three species figured in the two Plates illustrating this paper will give an idea of the plants characteristic of this vegetation.

I will now say a few words respecting the plants generally. A very large proportion of them, probably 85 per cent., are herbaceous perennials having relatively long thick tap-roots, a rosette of leaves lying on the ground, and an inflorescence nestling close in the centre of the rosettes of leaves. Examples of this type of plant are offered by the species of *Saussurea*, *Crepis sorocephala*, and *Pleurospermum stellatum*. I may mention in this connection that *Saussurea tridactyla* is the only flowering-plant recorded from the great altitude of 19,000 feet. It is a relatively tall plant, even at this altitude being nearly six inches high; but it is protected by a very thick woolly covering. Mr. G. A. Gammie, in his report of a botanical tour in Sikkim (see 'Kew Bulletin,' no. 82, p. 313), states that this was the last plant found on the ascent to the Donkia Pass; and he adds that this and *Antennaria muscoides* are supposed by the Tibetans to be the most esteemed of their gods as incense.

There is also an annual or monocarpic element in this alpine flora, and, singularly enough, the Gentianaceæ contribute at least four annual species. I have mentioned that woody plants were almost unrepresented in the collection. *Ephedra Gerardiana* is the only truly woody plant observed. It has a strong subterranean development, but only appeared on the surface of the ground. The only other plant to which I wish to direct special attention is the *Meconopsis horridula*, from an elevation of 15,500 feet. It is a comparatively showy plant, having handsome blue flowers. It was first collected by Sir Joseph Hooker just within Tibet on the borders of Sikkim; and Mr. Franchet, to whom we are indebted for the working out of the exceedingly rich collections made by French missionaries in Eastern Mongolia and Western China, records it from Mongolia; and Mr. Rockhill found it in Central Tibet. It is difficult to

connect the very prickly capsule, as a protected fruit, with the conditions under which the plant is found at the present time.

I had almost forgotten the diminutive *Iris* which Mr. Baker has described as a new species. This and *Allium senescens*, a plant widely spread in Tibet, Siberia, and Mongolia, are the only two petaloid monocotyledons.

Let me now proceed to give a few figures in relation to the altitudes and general distribution of the plants constituting the vegetation of this elevated region, the colours of their flowers, and some other particulars.

With regard to elevation, two species are recorded from below 15,000 feet; 14 from between 15,000 and 16,000 feet; 35 from between 16,000 and 17,000 feet; 57 from between 17,000 and 18,000 feet; 5 between 18,000 and 19,000 feet; and one, *Saussurea tridactyla*, to which I have already alluded, from 19,000 feet.

So far as natural orders are concerned, there is not much to be said. With the exception of the Gnetaceæ (*Ephedra*), they are all represented in Britain, and are mostly of world-wide distribution. The predominating orders are:—Compositæ, yielding 21 species; Leguminosæ, 14 species; Gramineæ, 13 species; Cruciferæ, 11 species; and Ranunculaceæ, 8 species.

Coming to genera: about half a dozen are restricted to the Himalayan and Tibetan regions, and the rest are mostly of wide distribution. The genera most numerous in species are *Astragalus*, *Oxytropis*, *Saussurea*, *Ranunculus*, and *Gentiana*. The genera *Astragalus* and *Oxytropis* are so numerous in species, very many of which are not represented by authenticated specimens at Kew, and so difficult, that I have not attempted to work out the species in this collection beyond comparing them with those in the Kew Herbarium. The beautiful alpine genus *Saussurea*, of which there are so many species in the mountains of Northern India and Western China, is represented by no fewer than seven species, two of which I have described as new. But I wish to say with regard to the dozen or so of forms described as new species, they may, some of them at least, prove to be reduced or impoverished conditions of other species. Several that I at first took for new species I eventually referred to others, as the differences were limited to size and habit, evidently due to the local conditions.

The distribution of the species is more interesting; yet, as

comparatively little is known of the flora of Central Asia, little reliance should be placed on the figures I have to offer. So far as our present knowledge goes, 27 of the species, excluding the undetermined ones, which may or may not be new, are peculiar to Tibet; 18 are common to Tibet and the Himalayas; 22 extend eastward to Mongolia or China; 20 have a westward extension to Yarkand, Afghanistan, or the Caucasus, and a few of them even to Europe; whilst 14 are found all round the Northern Hemisphere, and two or three extend into the Southern.

With regard to the colours of the flowers of the plants inhabiting this elevated region, Mr. Thorold describes the colours of the flowers of all the plants collected, but not always in such a way as to lead to an easy classification. Leaving the grasses and sedges and a few other plants having quite inconspicuous green or yellowish flowers out of the question, I find that flowers with some infusion of red predominate. They are variously qualified as pinkish, purplish, and so on; but altogether they constitute at least 25 per cent. of the collection. Nevertheless, a deep intense red would appear to be very rare. *Sedum tibeticum* is perhaps the only plant having fully red flowers. Apart from grasses and sedges, in which there is more or less yellow, 25 species are described as having yellow flowers. Thirteen have blue flowers, and some of them of the deepest hue, and one is described as violet. Finally, there are fifteen indicated as white. It is probable, however, that colour has now very little importance in this alpine flora, which is apparently the remains of a former richer vegetation. Insect life, according to Captain Bower, is scarce, though butterflies were seen up to an altitude of 17,600 feet.

I have not had time to study and consider such biological evidence as dried plants offer; but it is clear that some of the perennials produce seed in abundance; and such monocarpic or annual plants as the Gentians maintain their place in the flora by sexual reproduction only. But apart from the evidently monocarpic plants, of which there may be about a dozen in the collection, there is no doubt that almost all of them are produced from seed. Indeed, with the exception of a very few found near streams or in marshy situations, none of the plants increase or spread by vegetative propagation. I should judge that the ground is nowhere matted with vegetation, so that there is practically no struggle, as between plant and plant, for existence; and survival is largely due to seminal productiveness. No doubt such plants as *Saussurea glanduligera*, *Allium senescens*, and many other of

the perennial plants attain a great age, witness their extraordinary root-development.

CAPTAIN H. P. PICOT'S COLLECTION.

Respecting the second collection I have little to say; but it is interesting as showing that the composition of the vegetation is very much the same in such widely distant localities as Lhasa and the Kuen-lun plains, in the extreme north-east of Kashmir or Little Tibet. Captain H. P. Picot, of the Indian Staff Corps, visited this country in 1892 and brought away a few fragments of plants screwed up in a newspaper. These were soaked, pressed, and mounted. There are 25 species, a list of which is appended to this paper. One third of the species are the same as those collected by Dr. Thorold. They were collected at altitudes between 11,500 and 17,000 feet. Excluding some fragments, concerning which no definite opinion could be formed, they are all known plants, though three or four of them had only previously been collected by Dr. Thomson upwards of forty years ago.

In conclusion my thanks are due to my colleagues at Kew for their assistance, more especially to Mr. J. G. Baker, Dr. O. Stapf, and Mr. J. F. Jeffrey. I would also call attention to Mr. C. H. Fitch's careful drawings of the plants figured.

ENUMERATION of the Plants collected by Mr. Thorold.

1. *Clematis alpina*, *Mill.*—Flowers yellow. Sheltered nooks in hills, at 16,200 ft.

Widely spread in Central Asia from the Ural to North China, near Peking.

2. *Adonis cærulea*, *Maxim.*—Flowers bluish. Wide valleys at 17,200 ft.

North-eastern Tibet and Western Kansuh.

3. *Ranunculus Cymbalariae*, *Pursh.*—Flowers yellow. Edge of streams at 17,800 ft.

Central and North Asia, eastward to North China, and North and South America.

4. *Ranunculus involucratus*, *Maxim. Fl. Tang.* i. p. 15, t. 22. ff. 7-13.—Flowers yellow. Sandy earth and gravel in valleys at 17,500 ft.

I at first took this to be an undescribed species, not being aware of the existence of Maximowicz's description and figure under the above name. Then, when I came to describe it, I arrived at the conclusion that it was a reduced state of *R. lobatus*, Jacquem. ; and I am still of that opinion, but in the absence of ripe fruit I will not presume to decide the point. Maximowicz compares his new species with the very different *Oxygraphis Shaftoana*, Aitch. et Hemsl. *, and makes no mention of *Ranunculus lobatus*.

North-eastern Tibet.

5. *Ranunculus pulchellus*, C. A. Meyer.—Flowers yellow. Near water at 17,300 ft.

Afghanistan, alpine Himalaya, Siberia, and Mongolia.

6. *Ranunculus hyperboreus*, Rottb., var. *natans*, Regel.—Flowers yellow. Streams at 16,200 ft.

Northern alpine and arctic regions.

7. *Delphinium grandiflorum*, Linn.—Flowers blue. Side of slope at 14,800 ft.

Widely spread in the mountains of Northern India, Tibet, Southern Siberia, and Western China.

8. *Delphinium cæruleum*, Jacquem.—Flowers purple. Top of pass at 17,800 ft.

Alpine region of the Himalayas from Kumaon to Sikkim.

9. *Meconopsis horridula*, Hook. f. et Thoms.—Flowers blue. Water-logged soil in valley close to marsh at 15,500 ft.

Sikkim Himalaya at 14,000 to 17,000 ft., and in Eastern Mongolia.

10. *Hypecoum leptocarpum*, Hook. f. et Thoms.—Flowers light violet. Sheltered nullahs at 15,500 ft.

Western Tibet and Sikkim Himalaya.

11. *Corydalis Boweri*, Hemsl.

Species pusilla *C. mucronifera*, Maxim. valde affinis sed differt floribus majoribus calcari quam lamina longiore.

Herba perennis, cæspitosa, vix sesquipollicaris, radice fusiformi

* Journ. Linn. Soc., Bot. xix. p. 149, t. 3.

elongata. *Folia* longiuscule petiolata, cum petiolo pollicaria, crassiuscula, ita ut bractea papillosa, semel trisecta et pinnatisecta, lobis oblongo-spathulatis apice seta longiuscula instructis. *Racemi* congesti, pauciflori, bracteis flabellato-multifidis ciliolatis flores fere æquantibus, lobis apice longe 1-setosis. *Flores* flavi, breviter pedicellati, circiter 5 lineas longi; sepala minuta, auriculiformia, paucilobulata; petalum inferius anguste cochleariforme, petala lateralia spathulata, cum superiore alte connata; calcar latum, obtusum, quam lamina longius; adelphiæ staminum infra medium subite dilatatae, ovarium amplectentes; ovarium glabrum, oblongum, 4-ovulatum, stylo stamina æ quanti, stigmatè trilobato. *Capsula* ellipsoidea, seminibus rotundato-reniformibus nigris nitidis.

Flowers yellow. Water-logged soil in valley at 15,500 ft.

In spite of the differences indicated, further specimens may prove this to be a form of *C. mucronifera*, Maxim.

12. *Corydalis Hendersonii*, Hemsl.

Ad *C. tibeticam*, Hook. f. et Thoms. accedit, differt habitu foliis trisectis, bracteis amplis flabellatis, calcar deorsum attenuato.

Herba perennis, robusta, 2-3 poll. alta, glabra, radice crassa fusiformi, caule simplici vel pauciramoso densissime foliifero basi sæpe foliis vetustis vestito. *Folia* crassiuscula, bipinnatisecta, vel semel trisecta simul bipinnatisecta, 1-1½ poll. longa, segmentis brevissimis obtusis vel minute mucroniferis; petiolus tenuis, dilatatus, laminam æquans vel superans. *Racemi* valde abbreviati, pauciflori, bracteis amplis flabellato-multifidis ciliolatis flores fere æquantibus. *Flores* flavi, breviter pedicellati, circiter 9 lineas longi; sepala minutissima, paucidenticulata, diu persistentia; petalum inferius cochleariforme, petalum superius naviculare, petala lateralia spatulata, cum superiore breviter connata, dorso longitudinaliter alata; calcar fere rectum, laminam æquans; adelphiæ staminum deorsum vix dilatatae, basi ecaudatae, ovarium glabrum, oblongum, circiter 10-ovulatum, stylo elongato stamina æ quanti. *Capsula* ignota.

Flowers yellow. Sandy gravelly soil in valleys at 17,600 ft.

This species was also collected in Yarkand by Dr. G. Henderson, after whom I have named it, in 1870. In the list of plants published in his book 'Lahore to Yarkand,' it is named *C. tibetica*, Hook. f. et Thoms., though the specimen in the Kew Herbarium is queried. It was only met with just beyond the

Karakoram watershed on the desert plains wherever there was a little shelter and moisture, on Lingzi Thang and at Lak Zung, at 17,000 ft.

13. *Parrya lanuginosa*, *Hook. f. et Thoms.*—Flowers purple. In water-logged stony soil at 17,600 ft.

Western Tibet, in Gugi, at an altitude of 17,500 ft.

14. *Erysimum funiculosum*, *Hook. f. et Thoms.*—Near water in valley at 17,600 ft.

Sikkim Himalaya at 14,000 to 16,000 ft.

15. *Sisymbrium humile*, *C. A. Meyer.*—Flowers white. Sandy, gravelly soil near water at 17,500 ft.

Western Tibet, Siberia, and Arctic regions of North America.

16. *Braya rosea*, *Bunge.*—Flowers purplish white. Muddy, stony soil close to streams at 17,800 ft.

Alpine Himalaya, Altai, and Arctic Siberia.

17. *Braya uniflora*, *Hook. f. et Thoms.*; *Hook. Ic. Plant. t. 2251.*—Flowers white. Sandy, gravelly soil at 17,600 ft.

Western Tibet, in Nubra, at 15,000 to 17,000 ft.

18. *Draba incompta*, *Stev.*—Flowers white. Gravelly soil in valleys at 16,500 ft.

Caucasus, Persia, and Western Tibet.

19. *Draba alpina*, *Linn.*—Flowers yellow. Valley, at 17,600 ft. Arctic and alpine regions all round the northern hemisphere.

20. *Cochlearia scapiflora*, *Hook. f. et Thoms.*—At 17,800 ft.

Sikkim and Western Tibet to Yarkand, at 15,000 to 18,000 ft.

21. *Christolea crassifolia*, *Camb.*—Flowers white. Sandy, gravelly soil in valleys at 16,800 ft.

Yarkand and Western Tibet at 12,000 to 15,000 ft.

22. *Capsella Thomsoni*, *Hook. f.*—Flowers white. Sandy, gravelly soil near water at 17,500 ft.

Western Tibet at 16,000 to 18,000 ft.

23. *Lepidium capitatum*, *Hook. f. et Thoms.*—Flowers purple with yellow centre. Stony ground close to water at 16,200 ft.

Himalayas from Kumaon to Sikkim, at 10,000 to 14,000 ft. Also collected in Ladak.

24. *Stellaria*, sp.—*S. arenariæ*, Maxim., affinis.—Flowers green. Sandy, gravelly soil near water at 17,500 ft.

25. *Arenaria*, sp.—*A. musciformi*, Wall., affinis.—Flowers white. Sandy, gravelly soil in valleys at 17,500 ft.

26. *Myricaria germanica*, Desf., var. *prostrata*, Benth. et Hook. f.—At 17,300 ft.

This very reduced form or species is restricted to the most elevated alpine regions of vegetation of Tibet and the Himalayas, but the species, as limited in the 'Flora of British India,' ranges from Western Europe to Western China.

27. *Thermopsis inflata*, Camb.—Flowers yellow. Top of pass in sand at 18,500 ft.

Tibet and Kunawar at elevations of 15,000 to 17,000 ft., and north-west to Kashgar.

28. *Astragalus Hendersonii*, Baker.—Flowers purple. Sandy, gravelly soil in valleys at 16,800 ft.

Tibet, in the upper part of the Karakash valley.

29. *Astragalus tribulifolius*, Benth.—Flowers purple. Sandy valley at 15,800 ft.

Western Tibet at 14,500 ft.

30. *Astragalus*, sp.—Flowers blue. Top of pass at 18,000 ft.

31. *Astragalus*, sp.—*A. Masenderani*, Bunge, affinis.—Flowers purplish white. Valleys in muddy stony soil at 17,600–17,800 ft.

32. *Astragalus*, sp.—Flowers purple. Sandy, gravelly soil in valleys at 17,500 ft.

33. *Astragalus*, sp.—Flowers purplish blue. Sandy, gravelly soil in valleys at 17,500 ft.

34. *Oxytropis microphylla*, DC.—Flowers purplish pink. Valleys at 17,800 ft.

Alpine regions of the Himalaya at elevations of 11,000 to 16,000 ft.

35. *Oxytropis densa*, Benth. ?—Flowers purplish red. Sandy, gravelly soil in valleys at 17,500 ft.

Western Tibet at 16,000 to 17,000 ft.

36. *Oxytropis physocarpa*, Ledeb.—Flowers purple. Sandy, gravelly sods in valleys at 17,500 ft.

Siberia.

37. *Oxytropis*, sp.—*O. Stracheyanæ*, Benth., affinis.—Flowers pinkish blue. Side of slope at 16,200 ft.

38. *Oxytropis tatarica*, Jacquem. — Flowers whitish pink. Sandy soil in wide valley at 17,500 ft.

Western Tibet at 13,000 to 17,000 ft., and in Yarkand.

39. *Oxytropis*, sp.—*O. tataricæ*, Jacquem., affinis.—Flowers purple. Sandy, gravelly soil near water in valleys at 17,500–17,800 ft.

40. *Chamærhodos sabulosa*, Bunge.—Flowers white. Sandy soil in valleys at 17,000 ft.

Western Tibet and Altai Mountains to North China.

41. *Potentilla fruticosa*, Linn., var. *pumila*, Hook. f.

An exceedingly dwarf form found at very great elevations in the Himalayas. The species inhabits cold temperate and arctic regions all round the northern hemisphere.

42. *Potentilla sericea*, Linn., var. *polychista*, Lehm.—Flowers yellow. Sandy earth and gravel in valleys at 17,500 ft.

This variety, which Boissier regarded as a distinct species, inhabits alpine regions of Persia and North India; and the species ranges all round the northern hemisphere.

43. *Sedum tibeticum*, Hook. f. et Thoms., var. *Stracheyi*, Hook. f.—Flowers red. Sandy gravelly soil close to water at 17,500 ft.

Western Himalaya and Afghanistan up to 16,000 ft. Also in Yarkand.

44. *Sedum quadrifidum*, Pall.—Flowers pink. Earthy soil close to streams in valleys at 17,000 ft.

Arctic and alpine regions of Asia.

45. *Parnassia trinervis*, Drude.—Flowers white. Marsh at 15,000 ft.

This is treated as a variety of *P. ovata*, Ledeb., in the 'Flora of British India,' a species widely spread in temperate and alpine regions of the Himalayas, and extending to the Altai mountains.

46. *Saxifraga parva*, Hemsl.

S. saginoidei simillima, a qua differt caulibus paucifoliatis,

foliis longe petiolatis, floribus dimidio majoribus, petalis latioribus enerviis.

Herba perennis, dense cæspitosa, 1-2-pollicaris, pilis paucis ferrugineis longissimis vestita, caulibus vel scapis paucifoliatis unifloris. *Folia* alterna, petiolata (radicalia longe petiolata), carnosa, lineari-spathulata, maxima vix pollicaria, integerrima, obtusa, evenia, lamina glabra, petiolo vaginanti. *Flores* flavi, folia vix superantes, 4-5 lineas diametro; calycis lobi subcarnosi, oblongi, obtusi, ciliolati, quam petala paulo breviores; petala spathulata, obtusissima, fere 2 lineas longa; stamina quam petala paulo longiora, filamentis filiformibus; styli brevissimi. *Capsula* ignota.

Flowers yellow. Sides of rivulets at 17,000 ft.

47. *Saxifraga*, sp.—*S. palpebratæ*, Hook. f. et Thoms., affinis.—Flowers yellow. Marsh at 15,000 ft.

48. *Pleurospermum stellatum*, *Benth.*, var. *Lindleyana*, *Clarke*.—Flowers white. Sandy soil in broad valley at 16,400 ft. Western Himalaya, Karakoram, and Tianschau mountains.

49. *Morina Coulteriana*, *Royle*.—Valleys at 15,500 ft. Western Himalaya.

50. *Aster tibeticus*, *Hook. f.*—Flower purple with yellow centre. Edges of warm water springs having sulphurous gas bubbling up. Calcareous soil at 17,800 ft.

Western Himalaya and Tibet at 15,000 to 16,000 ft.

51. *Aster Bowerii*, *Hemsl.*

A. flaccido forma minima similis sed caule 2-3-cephalo foliis fere linearibus.

Herba perennis, hispidulo-hirsuta, pollicaris vel sesquipollicaris, radice fusiformi. *Folia* confertissima, sessilia, ima basi dilatata, crassiuscula, linearia vel angustissime spathulata, maxima vix semipollicaris, apice obtusa vel rotundata, untrunque saltem supra medium pilis albis patentibus obsessa. *Capitula* radiata, subsessilia, circiter 1 poll. diametro; involucri bracteæ numerosæ, biseriata, hirsutæ, lineares, interiores longiores, acutiores; receptaculum alveolatum. *Flores* radii lilacini, sicci-tati involuti; flores disci flavi; pappi setæ albæ, scabridæ. *Achenia* matura non visa, parva, pubescentia.

Sandy gravelly soil on hill-sides at 18,000 ft. Flowers light purplish mauve with yellow centre.

52. *Aster molliusculus*, *Wall.*—Flowers purple. Sandy soil, sheltered nooks at 16,000 ft.

Western Himalaya and Tibet, north of Kumaon from 5000 to 15,000 ft.

53. *Anaphalis xylorrhiza*, *Sch.-Bip.*—Flowers white. Rocky outcrops at 15,500 ft.

Kumaon to Sikkim, at 8000 to 17,000 ft.

54. *Anaphalis*, sp.—Flowers green. Sandy gravelly soil near water at 17,500 ft.

55. *Tanacetum tibeticum*, *Hook. f. et Thoms.*—Flowers yellow. Close to water, among stones at 17,000 ft.

Western Tibet, Parang and Lanak passes at 15,000 to 17,000 ft.

56. *Artemisia desertorum*, *Spreng.*—Flowers greenish yellow. Broad valleys at 16,000 ft,

Turkestan, North-western India, and Siberia.

57. *Artemisia*, sp.—*A. minori*, *Jacquem.*, affinis.—At 17,100 ft.

58. *Senecio arnicoides*, *Wall.*, var. *frigida*, *Hook. fl.*—Flowers yellow. Earthy, water-logged soil in wide valleys at 17,000 ft.

This variety had been previously collected in Kunawar and Western Tibet, in Nubra, Ladak, &c., at elevations of from 15,000 to 17,000 ft. The typical form extends eastward to Nepal.

59. *Cremanthodium*, sp.—*C. humili*, *Maxim.*, affine.—Flowers yellow. In water-logged stony soil at 17,600 ft.

60. *Saussurea subulata*, *C. B. Clarke.*—Flowers purple. Close to water at 17,000 ft.

Western Tibet and Yarkand at 15,000 to 18,000 ft.

61. *Saussurea pygmæa*, *Spreng.*—Flowers purple. Top of pass at 17,800 ft.

Tibet and Siberia from Altai eastward to Dahuria.

62. *Saussurea glanduligera*, *Sch.-Bip.*—Flowers purple. Sandy, stony soil in valley at 17,800 ft.

Western Tibet at 14,000 to 16,000 ft.

63. *Saussurea tridactyla*, *Sch.-Bip.*—Flowers white. Hill-side at 19,000 ft.

Sikkim Himalaya on the Tibetan frontier at 16,000 to 18,000 ft.

64. *Saussurea sorocephala*, *Hook. f. et Thoms.*—Flowers light purple. Stony soil close to water at 17,000 ft.

Kunawar and Ladak to the Altai Mountains.

65. *Saussurea Aster*, *Hemsl.* (Plate V.)

Species ex affinitate *S. sorocephalæ* foliis lineari-spathulatis glomerulum sessilem capitulorum superantibus stellatim radiantibus.

Herba monocarpica? longe sericeo-pilosa, circiter bipollicaris, radice fusiformi, caule simplici. *Folia* confertissima, sessilia, membranacea, pilosula vel demum nudiuscula et subscariosa, lineari-spathulata vel linearia, maxima vix pollicaria, obtusa, primum pilis rectis longissimis albis sericeis dense obsessa. *Capitula* circiter 40-flora, arctissime conferta, glomerulum circiter sesquipollicem diametro formantia; involucri bracteæ pauciserialæ, quam flores breviores, membranaceo-scariosæ, ovatæ, oblongæ, vel interiores lineares, acutæ extus plus minusve pilosæ; receptaculi setæ breves. *Flores* purpurei; pappi setæ circiter 10–12, biserialæ sed exteriores minores, citissimo deciduæ corollam æquantem, longe plumosæ, nigrescentes. *Achænia* matura non visa, brevia, glabra.

Sandy gravelly soil at 17,500 ft.

66. *Saussurea Thoroldi*, *Hemsl.* (Plate IV. figs. 5–9.)

S. sorocephalæ var. ? *glabrata*, *Hook. f.*, similis, sed foliis crassis setoso-aculeatis involucri bracteis glabris.

Herba monocarpica? subcaulis, glabra, radice fusiformi, caule simplici cum glomerulo capitulorum vix pollicari. *Folia* pauca, patentia, carnosa vel crasse coriacea, angusta, pinnatifida, lobis paucis deltoideis rectis vel leviter deflexis apice aculeatis instructa, obtusa. *Capitula* circiter 12-flora, arcte conferta, glomerulum circiter sesquipollicem diametro formantia; involucri bracteæ circiter 3-serialæ, quam flores fere dimidio breviores, omnino glabræ, scarioso-coriaceæ, ovatæ vel oblongæ, apice obtusæ vel rotundatæ, induratae, atro-brunnæ; receptaculi setæ brevissimæ. *Flores* purpurei; pappi setæ 2-serialæ, exteriores breviores, simplices, interiores circiter 15, longe plumosæ, quam corolla

paullo breviores. *Achænia* matura non visa, ut videtur rugulosa.

Sandy soil close to water, at 16,400 ft.

67. *Crepis sorocephala*, *Hemsl.* (Plate IV. figs. 1-4.)

Species insignis habitu *Crepidis glomeratæ*, sed differt foliis carnosis, floribus albis, achæniis oblongo-obovoideis.

Herba subcaulis, monocarpica? radice incrassata fusiformi elongata. *Vaginæ* infra folia circiter 5-7, albæ, membranaceæ, ovatæ, basi latæ. *Folia* pauca, sessilia, carnosia, oblongo-spathulata, maxima semipollicaria, obtusissima, rugosa, supra, infra medium, et subtus parce villosula. *Capitula* numerosa, arcte conferta, brevissime pedunculata, sæpissime 5-flora, bracteis paucis linearibus vel setaceis interspersa; involucri bracteæ sæpissime 5, infra medium connatæ, uniseriatæ, oblongæ vel ovato-oblongæ, circiter 4 lineas longæ, apice obtusissimæ vel rotundatæ, erectæ, extus supra medium præcipue pilis longis albis instructæ; receptaculum planum. *Flores* albi (*Thorold*), circiter semipollicares; pappi setæ numerosissimæ, obscure scabridæ, rubescentes, quam corolla tertio parte breviores. *Achænia* alba, glabra, oblongo-obovoidea, circiter semilineam longa, multistriata.

Sandy gravelly soil at 17,500 feet.

This and *Crepis glomerata*, Benth. et Hook. fil., might be separated generically on account of the uniseriate involucre of united bracts combined with the singular habit.

68. *Crepis*, sp. an var. depauperata *C. glaucæ*, Benth.?—Flowers yellow. Stony wide valleys at 17,200 ft.

69. *Taraxacum officinale*, *Wigg.*, var.?—Flowers yellow. Hillsides at 16,000 ft.

Similar forms, having almost beakless achenes, occur in the Himalayas; but I certainly think it would be more convenient to separate them specifically, though I would not risk increasing synonymy without a critical examination of all the forms referred to this species.

70. *Taraxacum officinale*, *Wigg.*, var.—Flowers yellow. Stony wide valleys at 17,200 ft.

The Dandelion is recorded in the 'Flora of British India' at localities from 1000 to 18,000 ft., and it is now generally distributed in both northern and southern temperate and cold regions.

71. *Primula tibetica*, *Watt.*—Flowers purple. Close to water at 16,200 ft.

Western Tibet north of Kumaon at 15,500 ft., and Eastern Tibet on the Sikkim frontier at 16,000 to 17,000 ft.

72. *Androsace Chamæjasme*, *Host*, var. *coronata*, *Hook. fil.*—Flowers white with yellow centre. Sandy gravelly soil in sheltered spots near water at 17,500 ft.

This variety had previously been collected in Western Tibet at altitudes of 16,000 to 17,000 ft. The species ranges all round the northern hemisphere in cold regions.

73. *Glaux maritima*, *Linn.*—At 16,200 ft.

North temperate and arctic regions in both hemispheres.

74. *Gentiana falcata*, *Turcz.*—Flowers blue. Marsh at 15,000 ft. Siberia, in the Altai and Baical mountains.

75. *Gentiana squarrosa*, *Ledeb.*—Flowers blue. Banks of dry rivulet on hill-side at 17,200 ft.

Alpine Himalaya, Dauria, and Siberia to North China.

76. *Gentiana decumbens*, *Linn.*—Flowers greenish white. Sandy soil near water at 15,400 ft.

Baltistan eastward to Lahul and through Siberia to Dauria and Mongolia.

77. *Gentiana humilis*, *Stev.*—Flowers whitish blue. Close to water at 16,200 ft.

Caucasus to North India, Eastern Siberia, and Dauria.

78. *Pleurogyne diffusa*, *Maxim.*—Flowers blue. Hill-side close to water at 16,800 ft.

North Tibet, on the northern declivity of the Burchan Budda chain, in thickets of *Myricaria* at 10,200 ft.

79. *Swertia*, sp.—*S. Davidii*, *Franch.*, affinis.—Flowers blue. Valleys at 15,000 ft.

80. *Tretocarya pratensis*, *Maxim.*—Flowers blue. Earthy stony soil close to streams at 18,000 ft.

Western Kansuh at 10,000 ft.

81. *Microula Benthami*, *C. B. Clarke*; *Hook. Ic. Plant.* t. 2257.—Flowers white. Top of pass at 18,000 ft.

Western Tibet at 15,000 to 17,000 ft.

82. *Pedicularis alaschanica*, *Maxim.*, var. *tibetica*, *Maxim.*—Flowers yellow. Broad valley at 16,000 ft.

Eastern Himalaya, Mongolia, and Western Kansuh.

83. *Pedicularis cheilanthifolia*, *Schrenk.*—Flowers purplish white. Earthy water-logged soil in wide valleys at 17,000 ft.

Himalayas, North Tibet, Soongaria, and Western Kansuh.

84. *Nepeta longibracteata*, *Benth.*—Flowers blue. Stony soil in old water-course at 17,400 ft.

Western Himalaya and Tibet at 14,000 to 17,000 ft.

85. *Dracocephalum heterophyllum*, *Benth.*?—Flowers white. Hill-sides at 17,700 ft.

This species inhabits Western Tibet and Turkestan at 13,000 to 16,000 ft., and has also been found in Eastern Mongolia.

86. *Polygonum sibiricum*, *Laxm.*—Flowers green. Salt-impregnated soil near salt lake at 16,300 ft.

Western Himalaya and Tibet to Western China, and northward into Arctic Siberia.

87. *Stellera Chamæjasme*, *Linn.*—Flowers green. Sandy valleys at 15,000 ft.

Caucasus to the mountains of North India and Central Asia to Mongolia.

88. *Urtica hyperborea*, *Jacquem.*—Flowers greenish white. Rocky hill, amongst stones at 16,200 ft.

Eastern and Western Tibet at 12,000 to 17,500 ft.

89. *Ephedra Gerardiana*, *Wall.*—Flowers yellow. Salt-impregnated soil close to salt lake, at 16,500 ft.

This is united with *E. vulgaris*, *Rich.*, in the 'Flora of British India,' which thus limited extends from Europe to the mountains of North India and Central Asia.

90. *Iris* (§ *Apogon*) *Thoroldi*, *Baker.*

Ad *I. humilem*, *Bieb.*, magis accedit: differt caulibus dense cæspitosis, foliorum vetustorum reliquis copiosis valide fibrosis,

foliis firmioribus multo brevioribus, floribus minoribus sulphureis, perianthii segmentis exterioribus limbo parvo obovato ungue duplo brevioribus.

Fibri radicales multi, graciles, cylindrici. Folia viridia, anguste linearia, 2-3 poll. longa, 1 lin. lata, marginibus nervisque incrassatis. Caulis brevissimus, uniflorus. Spathæ valvæ lineares, deorsum membranaceæ, sursum herbaceæ. Perianthii tubus 14 lin. longus; limbus vix pollicaris, pallide luteus; segmenta exteriora 3 lin. lata, limbo reflexo ungue ascendente 2-3plo brevioribus; segmenta interiora oblanceolata, erecta, quam exteriora vix breviora. Styli 6-7 lin. longi, appendicibus parvis.

Top of the pass, at 17,800 ft.

A well-marked new species, belonging to the group of beardless Irises with a produced perianth-tube. Its other nearest neighbours are *I. Rossii*, Baker, of Corea and Northern China, and *I. Ludwigi*, Maxim., a plant of the Altai Mountains.

91. **Allium senescens**, *Linn.*, var.—Flowers pink. Rocky hill among stones at 16,200 ft.

Southern European Russia through Siberia to Dahuria and Eastern Mongolia.

92. **Juncus membranaceus**, *Royle*.—Flowers white. Close to water, at 16,200 ft.

Himalayas from Kashmir to Sikhim at 6000 to 13,000 ft.

93. **Triglochin palustre**, *Linn.*—Close to water at 16,200 ft.

Western Europe and North Africa to India and China, and in North America.

94. **Carex stenophylla**, *Wahlenb.*—Close to water, at 16,200 ft. South-eastern Europe to Dahuria and North China.

95. **Carex Moorcroftii**, *Falconer*.—Sandy gravelly soil at 17,600 ft.

Tibet at 14,000 to 17,000 ft.

96. **Trisetum subspicatum**, *Beauv.*—At 16,500 ft.

Very widely spread in temperate and polar regions both in the northern and southern hemispheres.

97. **Poa nemoralis**, *Linn.*—Sheltered valley at 17,000 ft.

All round the northern hemisphere.

98. *Poa alpina*, *Linn.*—Close to water at 16,200 ft.
All round the northern hemisphere.

99. *Poa alpina*, *Linn.*, forma *nana*.—In sandy gravelly soil, at 18,000 ft. (no. 26), at 16,400 ft. (no. 103).

100. *Elymus sibiricus*, *Linn.*—Close to water at 16,200 ft.
North India, Central and Northern Asia, eastward to the Sitka Islands.

101. *Elymus dasystachys*, *Trin.*—Sandy plain at 16,000 ft., and valleys at 17,000 ft.

Siberia, chiefly in the Altai and Baical mountains, and eastward to Mongolia and North China.

102. *Pennisetum flaccidum*, *Griseb.*

Afghanistan, North-west India, and Tibet to Mongolia and North China.

103. *Stipa purpurea*, *Griseb. Gesamm. Abhandl., Gram. Hochasiens*, p. 300.—Syn. *Lasiagrostis tremula*, *Ruprecht, Sert. Thianschan*, p. 35.—16,500 ft.

Distributed from the Thianshan Mts. and South-east Kashmir to East Tibet: Lake Rupshu, at 15,000 feet, *Lance!*; "Tibet. occ.," probably near the Lanak Pass, between 15,000 and 17,000 feet, *T. Thomson!*; province of Gnari Khorsum, at Poti, 17,000 feet, *Schlagintweit*, Cat. 7016!; Bhomtso Mt., up to nearly 18,000 feet, *J. D. Hooker!*; Thianshan, S.E. of Chatyr-Kul, between 11,000 and 12,000 feet, *Osten-Sacken!*

104. *Stipa* (§ *Lasiagrostis*) *Hookeri*, *Stapf.*

Affinis *S. splendenti*, *Trin.* (*Lasiagrostis splendens*, *Kunth*), sed robustior, spiculis majoribus, glumis fertilibus longe bifidis, antheris nudis.

Gramen perenne. *Rhizoma* ut turiones cataphyllis ovatis obtusis firmis prominenter striatis imbricatim vestitum. *Culmus* floriferus ac innovationes basi vaginis vetustis firmis vestitus, glaberimus, lævis, strictus, cum panicula 1–1½ ped. altus. *Folia innovationum* vagina lævissima, primo arcte involuta, demum plus minusve aperta, ligula brevissima graciliter denseque fimbriata, lamina convoluta longe setaceo-attenuata, glauca, stricta, 4–10 poll. longa, dorso ecarinata, tenuiter striata, asperula vel

lævi, facie profunde et multi-sulcata in costulis asperula; *caulina* longe vaginata, summum fere ad paniculæ basin, vagina lævi striata, in infimis laxa, lamina abbreviata, summi panicula brevior, cæterum ut in innovationibus. *Panicula* angusta subcontracta, 4-6 poll. longa, ramulis pedicellisque brevissimis vel ad 1 lin. longis asperulis. *Glumæ vacuæ* subæquilongæ, lanceolatæ, acutæ, tenues, 3-3½ lin. longæ, glabræ; *fertilis* lanceolata, vix 3 lin. longa, apice ad ½ bifida, lobis setaceo-acuminatis, inter eos aristata, 7-nervis, tota longe et patule pilosa, arista vix torta, geniculata, asperula, 4-5 lin. longa. *Palea* lanceolata, gluma fertili paulo brevior, ut ea longe et patule pilosa. *Antheræ* apice nudæ. *Lodiculæ* 3, oblique ovato-lanceolatæ, liberæ. *Styli* subnulli. *Stigmata* ovario æquilonga.

Sheltered nullahs near water, 14,800 feet (no. 124).

The same plant was collected by Sir Joseph Hooker in Eastern Tibet, at 16,000 feet.

105. ***Calamagrostis holciformis***, *Jaub. et Spach.*

Tibet and Sikkim at great elevations.

106. ***Diplachne Thoroldi***, *Stapf.*

Affinis *Diplachnæ serotinæ*, Link, foliis caulinis paucioribus, minus distincte distiche patentibus, in vaginis superne vel in ore quidem longiuscule pilosis, glumis florentibus exaristatis pilosis.

Rhizoma repens ut turiones dense cataphyllis stramineis ovatis brevibus prominenter striatis vel eorum residuis vestitum. *Culmus* erectus cum panicula 12-16 poll. altus, lævis, ad ½ vaginatus. *Folia* circa 5-6 cum quoque culmo, 3 basalia vaginis laxè et fere ad eandem altitudinem (1-2 poll.) vaginantibus, sequens magis remotum, summum vagina longissima ad 2-4 poll. vel tota longitudine exserta, vaginis inferioribus patule pilosis, demum glabratis, superioribus in ore et in marginibus superne tantum pilosis; ligula ½ lin. longa, truncata, lacerato-ciliata; lamina glauca, in foliis infimis et in summo brevi 1-1½ poll. longa, rarius longiore, in intermediis 1½-4½ poll. longa, e basi 1-1½ lin. lata longissime attenuata, apice fere setacea, in infimis plana, in cæteris involuta, utrinque tenuiter multistriata, glabra vel in infimis sparse pilosa. *Panicula* angusta, 2-4 poll. longa, ramis ad 1-1½ lin. vel infimo remoto ad 3 lin. nudis primo rachin adpressis, deinde patulis vel subreflexis, spiculis brevissime pedicellatis, pedicellis lævibus, 3-floris, flore 4 imperfecto addito, 3-4 lin. longis. *Glumæ vacuæ* tenues, pallidæ vel violaceæ,

inferior $1\frac{1}{2}$ lin. longa, oblongo-lanceolata, obtusiuscula, uninervis, superior 2 lin. longa obtusa vel erosula, trinervis, sparse pilis longis patulis obsita; *florens* oblongo-lanceolata, 2 lin. longa, saturate glauco-violacea, apice obtusiuscula minute denticulata et ciliolata, trinervis, nervo medio haud vel brevissime excurrente, patule pilosa. *Palea* vix brevior acuta, sparse pilosa. *Lodicula* truncatæ, obtuse lobulatæ. *Antheræ* 1 lin. longæ. *Ovarium* glabrum, stylis paulo brevioribus, stigmatibus aspergilliformibus.

Sandy soil in valleys, 15,800 ft. (no. 120).

D. serotina has been referred by Mertens and Koch, Grisebach and others to *Molinia*, and although it does not answer exactly to the type on which the genus *Diplachne* was founded by Beauvois, i. e. *D. fascicularis*, Beauv., a North-American species, I prefer to leave it in that genus following the authority of the authors of the 'Genera Plantarum,' of Parlatores and of Hackel, and consequently I also refer the new species to the same genus.

107. *Atropis distans*, Griseb. in *Ledeb. Fl. Ross.* iv. p. 388, forma *nana*.

Wide valleys, 17,000 ft. (no. 78); close to water, 16,200 ft. (no. 88), 16,500 ft. (no. 111).

Var. *convoluta*, Trautv. in *Act. Hort. Petrop.* i. p. 282.—Syn. *A. convoluta*, Griseb. in *Ledeb. Fl. Ross.* iv. p. 389, forma *nana*.

Close to water, 16,200 ft.

The first form differs from the typical *Atropis distans*, as we usually find it in Europe, only by its dwarfness, the smaller specimens being 2–3 inches high with panicles $\frac{1}{2}$ inch long and broad. The variety *convoluta* is likewise represented by dwarf specimens about 4 inches high, but they agree otherwise perfectly with the form of *Atropis distans* which prevails in the North-western Himalaya and which is identical with the plant described by Grisebach under the name of *A. convoluta*. This variety extends from Tibet to the Altai and westward to South Russia.

108. *Festuca ovina*, Linn., var. *valesiaca*, Koch; cf. Hackel in Boissier, *Fl. Orient.* v. p. 618.

At 16,500 ft. (no. 110).

A common grass in the higher parts of the Himalaya from the Afghanistan frontier to Sikkim, here from 12,000 ft. ascending to 17,000 ft. (Donkiah Pass, *J. D. Hooker*).

109. *Agropyrum Thoroldianum*, *Oliver in Hook. Ic. Pl. t. 2262.*
 —At 16,500 ft.
 Not previously represented in the Kew Herbarium.

ENUMERATION of the Plants collected on the Kuen-lun Plains
 at about 17,000 feet by Captain H. P. Picot*.

Clematis orientalis, *Linn.*, var. *tangutica*, *Maxim.*
 Persia to Mandsburia and North China.

Berberis ulicina, *Hook. f. et Thoms.*
 Previously collected by Dr. Thomson only in Nubra, at 14,000
 to 16,000 ft.

Christolea crassifolia, *Camb.* *
 Western Tibet to Lhasa.

Malcolmia africana, *Linn.*
 Mediterranean region to North-west India.

Myricaria germanica, *Linn.* *
 Europe to Western China.

Astragalus, sp.

Potentilla Salessowii, *Steph.*
 North-west India and Siberia.

Potentilla fruticosa, *Linn.* *
 Cold temperate and arctic regions all round the northern
 hemisphere.

Potentilla bifurca, *Linn.*
 Caucasus and Taurus to Siberia and Mongolia.

Potentilla sericea, *Linn.* *
 All round the northern hemisphere.

Sedum crenulatum, *Hook. f. et Thoms.*
 Kumaon and Sikkim at 12,000 to 18,000 ft.

Chrysanthemum Richteria, *Benth.*
 Tibet and Scoungaria.

* Those followed by a star were also collected by Mr. Thorold.

Tanacetum tibeticum, *Hook. f. et Thoms.* *

Western Tibet at 15,000 to 17,000 ft. Previously collected only by Dr. T. Thomson and Mr. Thorold.

Artemisia, sp. ?

Taraxacum officinale, *Wigg.* *

Generally dispersed in temperate and cold regions.

Statice, sp.—insufficient for determination.

Primula sibirica, *Jacq.*

North India, Siberia, and China.

Androsace Chamæjasme, *Linn.* *

Cold regions all round the northern hemisphere.

Lindelofia Benthami, *Hook. f.*

Kashmir and Western Tibet, at 11,000 to 15,000 ft.

Pedicularis dolichorrhiza, *Schrenk.*

Turkestan and North India to Mongolia.

Allium blandum, *Wall.*

Kumaon to Nepal, at 13,000 to 17,000 ft.

Allium, sp.—*A. Jacquemontii*, Reg., affinis.

Triglochin maritimum, *Linn.*

Sea-coasts and salt marshes all round the northern hemisphere.

Kobresia Royleana, *Boeck.*

Kumaon to Sikkim.

Elymus sibiricus, *Linn.* *

North India, Central and Northern Asia eastward to the Sitka Islands.

Elymus dasystachys, *Trin.*, forma *tomentella*.*

Siberia, Mongolia, and China.

ABSTRACT of Tibetan portion of Collection of Plants made
by T. E. Winterbottom and R. Strachey in 1847.

EXOGENÆ.

Genera.	Species.	Genera.	Species.
1. Ranunculaceæ.		9. Rosaceæ.	
1. Clematis	1	1. Potentilla	7
2. Anemone	3	2. Chamærhodos	1
3. Thalictrum	2		— 8
4. Adonis	1	10. Saxifragæ.	
5. Ranunculus	6	1. Saxifraga	5
6. Isopyrum	1	2. Parnassia... ..	1
7. Delphinium	2		— 6
8. Aconitum	1	11. Crassulaceæ.	
	—17	1. Sedum	5
2. Fumariaceæ.		2. Sempervivum	1
1. Corydalis	3		— 6
	— 3	12. Haloragæ.	
3. Cruciferae.		1. Hippuris	1
1. Parrya	2		— 1
2. Cheiranthus	1	13. Onagraceæ.	
3. Arabis	1	1. Epilobium	2
4. Alyssum	1		— 2
5. Draba	4	14. Umbelliferae.	
6. Cochlearia	1	1. Trachydium	1
7. Sisymbrium	2	2. Pleurospermum	1
8. Erysimum	1		— 2
9. Christolea	1	15. Caprifoliaceæ.	
10. Braya	1	1. Lonicera	1
11. Lepidium	1		— 1
12. Thlaspi	1	16. Compositæ.	
13. Iberidella	1	1. Aster	2
14. Crambe	1	2. Erigeron	1
15. Chorispora	1	3. Leontopodium	1
	—20	4. Anaphalis	2
4. Violaceæ.		5. Allardia	2
1. Viola	1	6. Tanacetum	3
	— 1	7. Artemisia	4
5. Caryophyllæ.		8. Senecio	3
1. Silene	1	9. Werneria	1
2. Lychnis	2	10. Saussurea	5
3. Stellaria	1	11. Crepis	1
4. Arenaria	3	12. Taraxacum	1
5. Thylacospermum	1	13. Lactuca	1
	— 8		—27
6. Tamariscineæ.		17. Campanulaceæ.	
1. Myricaria	2	1. Campanula	1
	— 2		— 1
7. Geraniaceæ.		18. Primulaceæ.	
1. Biebersteinia	1	1. Primula	5
2. Geranium	1	2. Androsace	1
	— 2		— 6
8. Leguminosæ.		19. Gentianaceæ.	
1. Thermopsis	1	1. Gentiana	6
2. Caragana	2	2. Pleurogyne	1
3. Gueldenstædtia	1		— 7
4. Astragalus	3	20. Boragineæ.	
5. Oxytropis	4	1. Lindelofia	1
6. Stracheya	1	2. Eritrichium	2
7. Cicer	1	3. Microula	1
	—13	4. Onosma	1
			— 5

Genera.	Species.	Genera.	Species.
21. <i>Solanaceæ</i> .		26. <i>Polygonaceæ</i> .	
1. <i>Physochlaina</i>	1	1. <i>Polygonum</i>	4
	— 1	2. <i>Rheum</i>	1
22. <i>Scrophularinææ</i> .			— 5
1. <i>Veronica</i>	1	27. <i>Elæagnaceæ</i> .	
2. <i>Pedicularis</i>	4	1. <i>Hippophaë</i>	1
	— 5		— 1
23. <i>Selagineæ</i> .		28. <i>Euphorbiaceæ</i> .	
1. <i>Lagotis</i>	1	1. <i>Euphorbia</i>	2
	— 1		— 2
24. <i>Labiataæ</i> .		29. <i>Urticaceæ</i> .	
1. <i>Elsholtzia</i>	1	1. <i>Urtica</i>	1
2. <i>Thymus</i>	1		— 1
3. <i>Nepeta</i>	4	30. <i>Cupuliferæ</i> .	
4. <i>Dracocephalum</i>	1	1. <i>Betula</i>	1
5. <i>Marrubium</i>	1		— 1
6. <i>Lamium</i>	1	31. <i>Salicinææ</i> .	
	— 9	1. <i>Salix</i>	1
25. <i>Chenopodiaceæ</i> .			— 1
1. <i>Eurotia</i>	1	32. <i>Gnetaceæ</i> .	
2. <i>Axyris</i>	1	1. <i>Ephedra</i>	1
3. <i>Microgynæcium</i>	1		— 1
4. <i>Salsola</i>	1	33. <i>Coniferæ</i> .	
	— 4	1. <i>Juniperus</i>	3
			— 3

ENDOGENÆ.

1. <i>Hæmodoraceæ</i> .		7. <i>Cyperaceæ</i> .	
1. <i>Aletris</i>	1	1. <i>Blysmus</i>	1
	— 1	2. <i>Elyna</i>	1
2. <i>Irideæ</i> .		3. <i>Trilepis</i>	1
1. <i>Iris</i>	1	4. <i>Carex</i>	6
	— 1		— 9
3. <i>Liliaceæ</i> .		8. <i>Gramineæ</i> .	
1. <i>Polygonatum</i>	1	1. <i>Piptatherum</i>	2
2. <i>Allium</i>	4	2. <i>Lasiagrostis</i>	1
3. <i>Lloydia</i>	1	3. <i>Stipa</i>	1
	— 6	4. <i>Deyeuxia</i>	1
4. <i>Juncaceæ</i> .		5. <i>Deschampsia</i>	1
1. <i>Juncus</i>	3	6. <i>Trisetum</i>	2
	— 3	7. <i>Poa</i>	4
5. <i>Alismaceæ</i> .		8. <i>Schænodorus</i>	1
1. <i>Triglochin</i>	2	9. <i>Festuca</i>	2
	— 2	10. <i>Agropyrum</i>	2
6. <i>Naiadaceæ</i> .		11. <i>Elymus</i>	2
1. <i>Potamogeton</i>	2	12. <i>Hordeum</i>	2
	— 2		— 21

CRYPTOGAMÆ.

1. <i>Equisetaceæ</i> .		4. <i>Lichenes</i> .	
1. <i>Equisetum</i>	1	1. <i>Lecidea</i>	4
	— 1	2. <i>Cladonia</i>	1
2. <i>Filices</i> .		3. <i>Urceolaria</i>	1
1. <i>Cystopteris</i>	1	4. <i>Parmelia</i>	10
	— 1	5. <i>Cetraria</i>	1
3. <i>Musci</i> .		6. <i>Evernia</i>	1
1. <i>Distichium</i>	1		— 18
2. <i>Bryum</i>	2		
3. <i>Hypnum</i>	1		
	— 4		

THOROLD'S TIBET PLANTS.

Siberia.		Tibet only.	Tibet and N. India.	East- ward.	West- ward.	Wide, in- cluding America.
	<i>Ranunculaceæ.</i>					
*	<i>Clematis alpina</i> .....	...	...	China	Ural	
	<i>Adonis cærulea</i> .....	...	...	China		
*	<i>Ranunculus Cymbalariae</i> ...	...	...	...	...	*
	" <i>involutus</i> ...	*				
*	" <i>pulchellus</i> .....	...	...	Mongolia	Afgh.	
*	" <i>hyperboreus</i> .....	...	...	...	...	*
*	<i>Delphinium grandiflorum</i> ...	...	*	China		
	" <i>cæruleum</i> .....	...	*		
	8					
	<i>Papaveraceæ.</i>					
	<i>Meconopsis horridula</i> .....	...	*	Mongolia		
	<i>Hypecoum leptocarpum</i> .....	...	*		
	2					
	<i>Fumariaceæ.</i>					
	<i>Corydalis Boweri</i>	*				
	" <i>Hendersonii</i> .....	...	...	...	Yarkand	
	2					
	<i>Cruciferae.</i>					
	<i>Parrya lanuginosa</i>	*				
	<i>Erysimum funiculosum</i> .....	...	*		
*	<i>Sisymbrium humile</i> .....	...	...	...	...	*
*	<i>Braya rosea</i> .....	...	...	*	*
	" <i>uniflora</i>	*				
	<i>Draba incompta</i> .....	...	...	...	Caucasus	
*	" <i>alpina</i> .....	...	...	...	...	*
	<i>Cochlearia scapiflora</i> .....	...	*	...	Yarkand	
	<i>Christolea crassifolia</i> .....	...	...	...	Yarkand	
	<i>Capsella Thomsoni</i>	*				
	<i>Lepidium capitatum</i> .....	...	*		
	11					
	<i>Caryophylleæ.</i>					
	<i>Stellaria</i> sp. ....	...			
	<i>Arenaria</i> sp. ....	...			
	2					
	<i>Tamariscineæ.</i>					
	<i>Myricaria germanica</i> .....	...	...	China	Europe	
	1					
	<i>Leguminosæ.</i>					
	<i>Thermopsis inflata</i>	*				
	<i>Astragalus Hendersonii</i>	*				
	" <i>tribulifolius</i>	*				
	" sp.					
	" sp.					
	" sp.					
	" sp.					
	" sp.					
	8	8	7			4

THOROLD'S TIBET PLANTS (*continued*).

Siberia.		Tibet only.	Tibet and N. India.	Eastward.	Westward.	Wide, including America.
8	<i>Leguminosæ</i> (cont.)	8	7	7	8	4
	<i>Oxytropis microphylla</i> ... ..	...	*		
	" <i>densa</i>	*				
*	" <i>physocarpa</i>					
	" sp.					
	" <i>tatarica</i> .....	...	...	...	Yarkand	
	" sp.					
14	<i>Rosaceæ.</i>					
*	<i>Chamærhodos sabulosa</i> .....	...	...	China		
	<i>Potentilla fruticosa</i> .....	...	...	...	...	*
	" <i>sericea</i> .....	...	...	...	...	*
3	<i>Crassulaceæ.</i>					
	<i>Sedum tibeticum</i> .....	...	...	...	{ Yarkand	
*	" <i>quadrifidum</i> .....	...	*		{ Afgh.	
2	<i>Saxifragaceæ.</i>					
*	<i>Parnassia trinervis</i> .....	...	*		
	<i>Saxifraga parva</i>	*				
	" sp.					
3	<i>Umbelliferae.</i>					
	<i>Pleurospermum stellatum</i> ...	*				
1	<i>Dipsacaceæ.</i>					
	<i>Morina Coulteriana</i> .....	...	...	...	W. Himal.	
1	<i>Compositæ.</i>					
	<i>Aster tibeticus</i> .....	...	*		
	" <i>Thoroldii</i>	*				
	" <i>molliusculus</i> .....	...	*		
	<i>Erigeron</i> sp. ....	...			
	<i>Anaphalis xylorrhiza</i> .....	...	*		
	" sp. ....	...			
	<i>Tanacetum tibeticum</i>	*				
*	<i>Artemisia desertorum</i> .....	...	*		
	" sp. ....	...			
	<i>Senecio arnicoides</i> .....	...	*		
	<i>Cremanthodium</i> sp. ....	...			
	<i>Saussurea subulata</i> .....	...	...	...	Yarkand	
*	" <i>pygmaea</i> .....	...	...	Dahuria		
	" <i>glanduligera</i>	*				
	" <i>tridactyla</i> .....	...	*		
*	" <i>sorocephala</i> .....	...			
	" <i>Aster</i>	*				
	" <i>Thoroldi</i>	*				
	<i>Crepis sorocephala</i>	*				
	" sp. ....	...			
	<i>Taraxacum officinale</i> .....	...	...	...	...	*
15	21	17	16	9	12	7

THOROLD'S TIBET PLANTS (*continued*).

Siberia.		Tibet only.	Tibet and N. India.	Eastward.	Westward.	Wide, including America.
15	<i>Primulaceæ.</i>	17	16	9	12	7
	Primula tibetica	*				
	Androsace Chamæjasme .....	...	...	...	...	*
	Glaux maritima .....	...	...	...	...	*
	3					
	<i>Gentianaceæ.</i>					
*	Gentiana falcata					
	" squarrosa .....	...	...	China		
	" decumbens .....	...	...	Mongolia	Baltistan	
	" humilis.....	...	...	Daburia	Caucasus	
	Pleurogyne diffusa	*				
	Swertia sp.					
	6					
	<i>Boragineæ.</i>					
	Tretocarya pratensis .....	...	...	China		
	Microula Benthami	*				
	2					
	<i>Scrophularineæ.</i>					
	Pedicularis cheilanthifolia ...	...	...	China		
	" alaschanica .....	...	...	China		
	2					
	<i>Labiatae.</i>					
	Nepeta longibracteata	*				
	Dracocephalum heterophyllum .....	...	...	Mongolia		
	2					
	<i>Polygoneæ.</i>					
*	Polygonum sibiricum .....	...	...	China		
	1					
	<i>Thymelæaceæ.</i>					
	Stellera Chamæjasme .....	...	...	...	Caucasus	
	1					
	<i>Urticaceæ.</i>					
	Urtica hyperborea	*				
	1					
	<i>Gnetaceæ.</i>					
*	Ephedra Gerardiana .....	...	...	...	Europe	
	1					
	<i>Irideæ.</i>					
	Iris Thoroldi	*				
	1					
	<i>Liliaceæ.</i>					
	Allium senescens .....	...	...	Mongolia	E. Europe	
	1					
18		23	16	18	17	9

THOROLD'S TIBET PLANTS (*continued*).

Siberia.		Tibet only.	Tibet and N. India.	Eastward.	Westward.	Wide, including America.
18	<i>Juncaceæ.</i>	23	16	18	17	9
	<i>Juncus membranaceus</i>.....	...	*		
1	<i>Alismaceæ.</i>					
	<i>Triglochin palustre</i> .....	...	...	...	...	*
1	<i>Cyperaceæ.</i>					
	<i>Carex stenophylla</i> .....	...	...	China	Europe	
2	" <i>Moorecroftii</i>	*				
	<i>Gramineæ.</i>					
	<i>Trisetum subspicatum</i> .....	...	...	...	...	*
	<i>Poa nemoralis</i> .....	...	...	...	...	*
	" <i>alpina</i> .....	...	...	...	...	*
	<i>Elymus sibiricus</i> .....	...	...	Sitka		
*	" <i>dasystachys</i>.....	...	...	China		
	<i>Pennisetum flaccidum</i> .....	...	...	China	Afgh.	
*	<i>Stipa purpurea</i>.....	...	...	
	" <i>Hookeri</i>	*				
	<i>Calamagrostis holciformis</i> ...	...	*		
	<i>Diplachne Thoroldi</i>	*				
*	<i>Atropis distans</i> .....	...	...	...	E. Europe	
	<i>Festuca ovina</i> .....	...	...	...	...	*
	<i>Agropyrum Thoroldianum</i> ...	*				
21	13	27	18	22	20	14

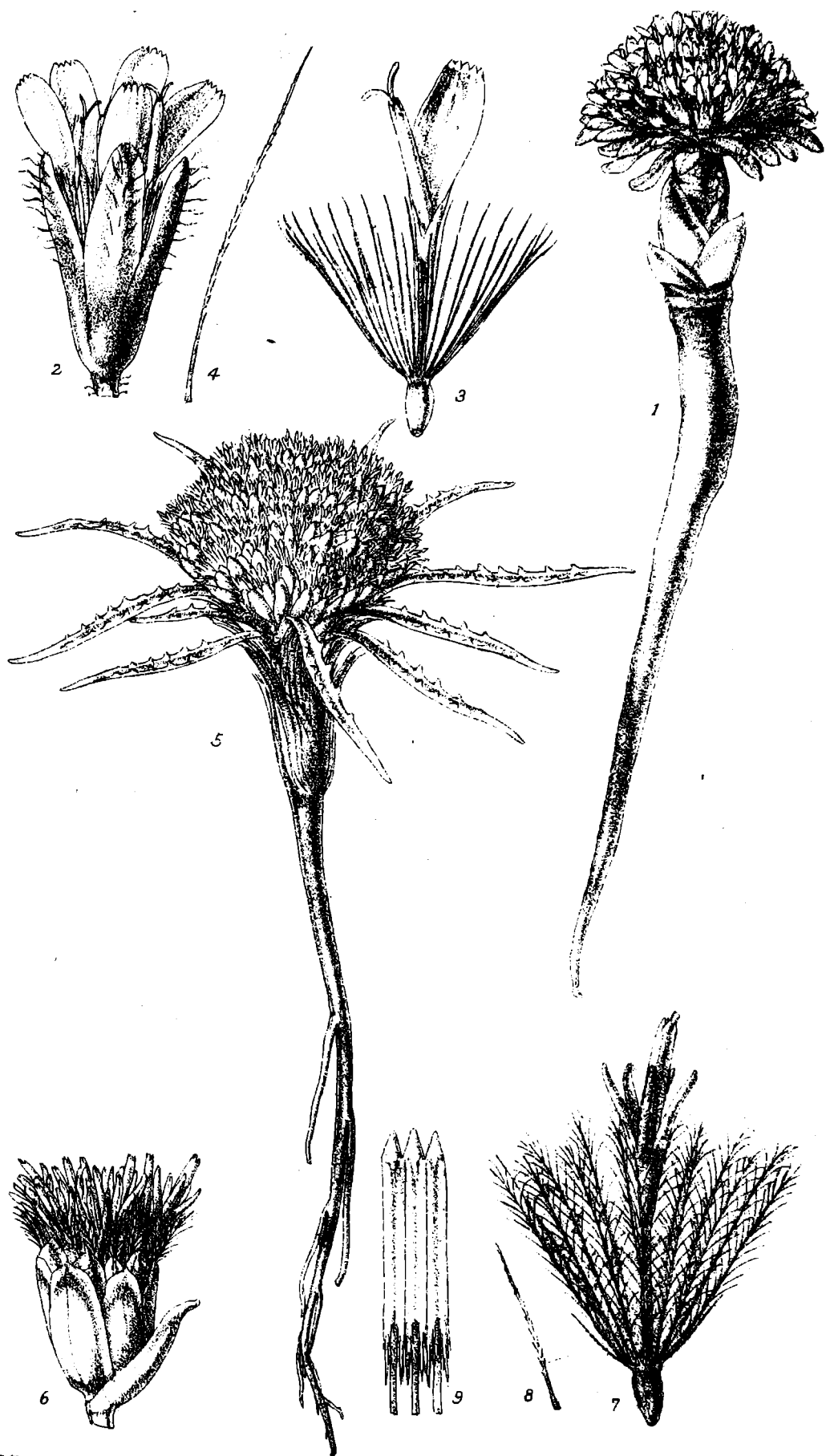
EXPLANATION OF THE PLATES.

PLATE IV,

Fig. 1. A plant of *Crepis sorocephala*, Hemsl., natural size ; 2, a capitulum from the cluster of capitula ; 3, a flower ; 4, a bristle of the pappus. 5, a plant of *Saussurea Thoroldii*, Hemsl., natural size, also having densely clustered capitula ; 6, a capitulum ; 7, a flower ; 8, one of the outer shorter bristles of the pappus ; 9, stamens. All enlarged.

PLATE V.

Fig. 1. A plant of *Saussurea Aster*, Hemsl., natural size, having densely clustered capitula ; 2, a leaf ; 3, a flower ; 4, stamens ; 5, stigma and upper portion of style. All enlarged.

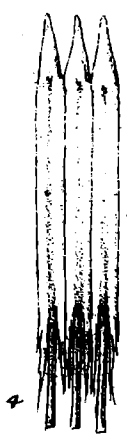
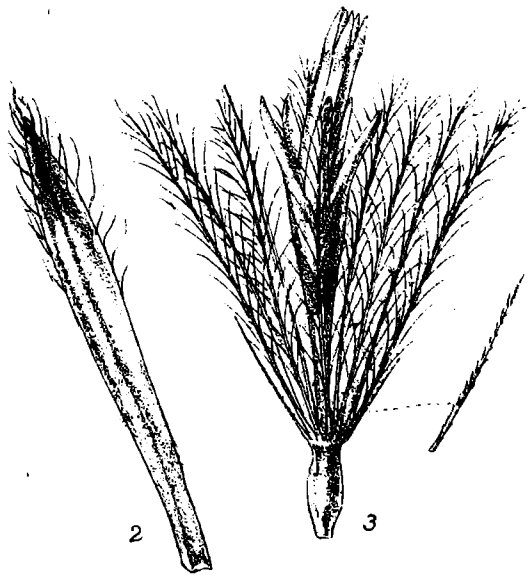


C.H.Fitch del et lith.

J.N.Fitch imp

1-4 *CREPIS SOROCEPHALA*, *Hemsl.*

5-9 *SAUSSUREA THOROLDII*, *Hemsl.*



C.H.Fitch del et lith.

J.N.Fitch imp.

SAUSSUREA ASTER, *Hemsl.ley.*

MR. WOODVILLE ROCKHILL'S CENTRAL TIBET PLANTS.

Collected in 1892.

SINCE the foregoing paper on Dr. Thorold's Tibet plants and Captain Picot's Kuen-lun plants was read, the Kew Herbarium has been enriched, through the kindness of Professor C. S. Sargent, Director of the Arnold Arboretum, Harvard University, U.S.A., by the collection of dried plants made by Mr. W. W. Rockhill on his last journey in Tibet, in 1892. It is unnecessary to say much concerning this gentleman's travels in China, Mongolia, and Tibet. His first journey is described and illustrated in his 'Land of the Lamas,' published in 1891; and his last journey, on which the plants enumerated below were collected, is the subject of a work already, I believe, in the printer's hands. It will be remembered that Mr. Rockhill was last year (1893) awarded the Patron's or Victoria Medal of the Royal Geographical Society. I had prepared a brief outline of Mr. Rockhill's route from a condensed report of his account of his journey read before the Royal Geographical Society in March of the past year; but on the very day of going to press I have received a prefatory note from him, which is much more to the purpose, and may follow here:—

“The object I had in view when making the little collection of plants, which, through Professor Ch. S. Sargent's kindness, has been examined and classified by Mr. Hemsley, of the Royal Gardens at Kew, was to give some idea of the flora of the country between the Kuen-lun range to the north and the inhabited regions of Tibet adjacent to the Tengri Nor on the south. This region has an average altitude of 15,000 feet above sea-level along the route followed by me in 1892, and had not, prior to my visit, been explored.

“The route followed in 1879 by Col. Przewalsky, when travelling towards Lhasa, which was nearly parallel to the last that I took, differed considerably as regards the configuration of the country from mine; and consequently I anticipated that notable differences in the flora along the two roads would be discovered.

“I traversed this country in the months of May, June, July, and part of August, and heavy snowstorms and nearly daily frosts occurred during this period, though the thermometer rose more than once to 70° F., and even 83° on one occasion in the shade at 2 P.M. The mean temperature from the 17th of May,

when we entered the mountainous region to the south of the Ts'aidan, to the 11th of August, when we descended to below the Timber line (13,500 feet above sea-level) on the Ramachú, where I ceased collecting plants, except such as the natives pointed out to me as being used by them either as food or medicinally, is shown in the following table :—

1892.	7 A.M.	2 P.M.	7 P.M.
May 17 to 31 ...	+37°·5 F.	+54°·6 F.	+37°·3 F.
June	+35°·7	+55°·9	+38°·3
July	+43°·0	+54°·6	+44°·2
Aug. 1 to 11 ...	+40°·6	+61°·5	+47°·3

“Nearly the whole of the region traversed in this interval was of sandstone formation, the predominating colour of which was bright red. The water was invariably brackish, and in many cases undrinkable; the soil everywhere sandy, or covered with a rather fine gravel, and occasionally a little clay. The grasses grew in bunches, nowhere forming a sod, except around the rare pools of pure water fed by the melting snows we occasionally passed.

“I was careful to collect all the flowering plants I saw along my route, and the barrenness of this region may be judged by the very small number I have brought home with me.

“The only edible plant we found in this country was a species of onion (*Allium senescens*)*, which grew in the sand in great quantities at altitudes higher than 15,000 ft. above sea-level, though we looked for it in vain below this level.

“I may here remark that the rhubarb plant, which I found growing in enormous quantities on the north and north-eastern slopes of mountains on the Ich'u, Lench'u, and other feeders of the Jyama-nu ch'u, thrived at an altitude above sea-level ranging from 12,000 to 13,500 ft. I note this fact as Col. Przewalsky (Mongolia, ii. p. 84) says that this plant rarely flourishes at an elevation of more than 10,000 ft. above the level of the sea.

“For further details concerning the habitats of the various plants I brought home with me I beg to refer to the annexed enumeration.”

W. WOODVILLE ROCKHILL.

This is an exceedingly interesting collection, especially when

* There was no specimen of this plant in Mr. Rockhill's collection.—
W. B. H.

examined in connection with Mr. Thorold's; the plants for the greater part being of the same habit and diminutive size. More than half of them, however, are different species; and most of them had previously only been collected by Przewalsky, from whose specimens the lamented Maximowicz described them. Several, it will be seen, too, were previously only known from the extreme western part of Tibet. In all cases where the species are different from Thorold's their general distribution is given. The localities, altitudes, and geographical positions were supplied by Mr. Rockhill.

Mr. Rockhill also brought home leaves of the famous "white sandalwood tree" of Kumbum, *Syringa villosa*, Vahl, which he erroneously refers to as *Philadelphus coronarius*, Linn., in his 'Land of the Lamas.'

ENUMERATION of the Plants collected by
Mr. W. Woodville Rockhill.

1. *Clematis graveolens*, *Lindl.*—Flowers light yellow. Pochu valley; very abundant at 14,000 ft. Lat. N. $31^{\circ} 45'$, long. E. $94^{\circ} 45'$. Aug. 14, 1892.

Western Himalaya at 6000 to 11,000 ft., Tibet and Western China.

This form is the same as that named *C. orientalis* var. *tangutica* by Maximowicz, but if the two are maintained as independent species it is better referred here.

2. *Anemone imbricata*, *Maxim. Fl. Tangut.* i. p. 8, t. 22. ff. 1-6.—Foot-hills of Dangla mountains, N.W. extremity of range at 16,500 ft. Lat. N. $33^{\circ} 40'$, long. E. $90^{\circ} 35'$. June 27, 1892.

Previously collected only by Przewalsky on the extreme Upper Yangtsekiang in Tibet.

3. *Ranunculus tricuspis*, *Maxim. Fl. Tangut.* i. p. 12; *Enum. Pl. Mongol.* i. p. 16, t. 4. ff. 17-27.—Valley of Murus; valley bottom at 15,640 ft. Lat. N. $33^{\circ} 44'$, long. E. $91^{\circ} 18'$. June 23, 1892.

Mongolia.

4. *Delphinium grandiflorum*, *Linn.*—Kechu valley at 12,700 ft. Lat. N. $31^{\circ} 25'$, long. E. $96^{\circ} 28'$. Aug. 22, 1892.

On river-bottom; fine forest-growth, mostly pines (?), on hill-sides; fine grass.

5. *Delphinium Pylzowii*, *Maxim. in Mél. Biol.* ix. p. 709; *Fl. Tangut.* i. p. 21, t. 3.—Dangchu valley, river-bottom of gravel and clay; good fodder, at 14,500 ft. Lat. N. $32^{\circ} 12'$, long. E. $92^{\circ} 12'$. July 23, 1892.

Mongolia.

6. *Meconopsis horridula*, *Hook. f. et Thoms.*—Plateau west of Dangla mountains at 16,350 ft. Lat. N. $32^{\circ} 51'$, long. E. $89^{\circ} 44'$. July 3, 1892.

Sandy soil, some clay.

7. *Corydalis Hendersonii*, *Hemsl.*—Basin of Murus. Extreme head of valley on foot-hills of Dangla mountains at 16,340 ft. Lat. N. $33^{\circ} 43'$, long. E. $90^{\circ} 50'$. June 25, 1892.

Sandstone.

See description of this species in Thorold's list at p. 109.

8. *Parrya exscapa*, *Ledeb.*—Basin of Murus. Extreme head of valley, on foot-hills of Dangla mountains, sandstone, at 16,340 ft. Lat. N. $33^{\circ} 43'$, long. E. $90^{\circ} 50'$. June 25, 1892.

Altai mountains and Western Tibet.

9. *Arabis*, sp. ? Insufficient for determination.—Valley of Tsacha-tsang-bo-chu at 14,700 ft. Lat. N. $32^{\circ} 13'$, long. E. $90^{\circ} 14'$. July 6, 1892.

10. *Erysimum Chamæphyton*, *Maxim. Fl. Tangut.* i. p. 63, t. 28. ff. 1–10.—Hill-slope two miles north of Murus river (headwaters of Yangtsekiang); sandy soil, some clay, at 14,750 ft. Lat. N. $33^{\circ} 53'$, long. E. $91^{\circ} 31'$. June 21, 1892.

Basin of Murus in lateral valley, sandstone, at 15,700 ft. Lat. N. $33^{\circ} 45'$, long. E. $91^{\circ} 05'$. June 24, 1892.

North-eastern Tibet.

11. *Eutrema Przewalskii*, *Maxim. Fl. Tangut.* i. p. 68, t. 28. ff. 11–23.—Basin of Murus, in lateral valley, sandstone, at 15,700 ft. Lat. N. $33^{\circ} 45'$, long. E. $91^{\circ} 05'$. June 24, 1892.

North-eastern Tibet.

12. *Myricaria prostrata*, *Hook. f. et Thoms. in Benth. et Hook. f. Gen. Pl.* i. p. 161.—Upper Naichi gol valley near river at 12,130 ft. Lat. N. $35^{\circ} 52'$, long. E. $93^{\circ} 49'$. May 21, 1892.

Called "aura kashim" by the Mongols. First plant in flower seen on journey.

I have followed Maximowicz in restoring this form to specific

rank. It is restricted to the elevated alpine regions of the Himalayas and Tibet. See Maximowicz (Fl. Tangut. p. 95, t. 31), where it is fully described and figured. In Hooker's Fl. Brit. Ind. i. p. 250, it is treated as a variety of *M. germanica*.

13. *Gueldenstædtia* ?, insufficient for determination.—Gela, on Ramongchu at 12,670 ft. Lat. N. $31^{\circ} 40'$, long. E. $94^{\circ} 36'$. Aug. 13, 1892.

Fine crops of barley and turnips near by.

14. *Astragalus* or *Oxytropis*, sp. ? Material insufficient to determine the genus.—Toktomai-ulan-muren at 14,340 ft. Lat. N. $34^{\circ} 09'$, long. E. $91^{\circ} 30'$. June 20, 1892.

Sandy soil.

15. *Astragalus* or *Oxytropis*, sp. ? Material insufficient to determine the genus with certainty.—Valley of Murus, head-waters Yangtsekiang, at 14,900 ft. Lat. N. $33^{\circ} 45'$, long. E. $91^{\circ} 20'$. June 22, 1892.

16. *Potentilla fruticosa*, *Linn.*, var. *pumila*, *Hook. f.*—Plateau west of Dangla mountains at 16,350 ft. Lat. N. $32^{\circ} 51'$, long. E. $89^{\circ} 44'$. July 3, 1892.

Sandy soil, some clay.

17. *Potentilla anserina*, *Linn.*—Plateau west of Dangla mountains; sandy, some clay, at 16,220 ft. Lat. N. $33^{\circ} 09'$, long. E. $89^{\circ} 38'$. July 2, 1892.

This is widely spread in the temperate and cold regions of both the northern and southern hemispheres.

18. *Potentilla nivea*, *Linn.*—Kechu valley; on river-bottom at 12,700 ft. Lat. N. $31^{\circ} 25'$, long. E. $96^{\circ} 28'$. Aug. 22, 1892.

Fine forest-growth, mostly pines (?) on hill-sides; fine grass. Alpine and Arctic regions of the northern hemisphere.

19. *Sedum algidum*, *Ledeb.*, var. *tanguticum*, *Maxim.*—Camp north of Tsacha-tsang-bo-chu; sandy soil at 15,650 ft. Lat. N. $32^{\circ} 28'$, long. E. $90^{\circ} 03'$. July 5, 1892.

The species is a native of the Altai regions of Siberia; the variety was described from specimens from north-western Kansub.

20. *Aster tibeticus*, *Hook. f.*—Valley of Murus, valley-bottom at 15,640 ft. Lat. N. $33^{\circ} 44'$, long. E. $91^{\circ} 18'$. June 23, 1892.

Western Tibet and Kashmir at altitudes of 14,000 to 16,000 ft.

21. *Inula*? Material insufficient for determination.—Foot-hills of Dangla mountains, north-west extremity of range at 16,500 ft. Lat. N. $33^{\circ} 40'$, long. E. $90^{\circ} 35'$. June 27, 1892.

22. *Leontopodium alpinum*, *Cass.*, var.—Bank Chilchang-tso (Lake Glenelg). Hill-side; limestone and red sandstone; lake salt, at 16,000 ft. Lat. N. $33^{\circ} 27'$, long. E. $90^{\circ} 10'$. June 30, 1892.

Alps of Europe, through Central Asia and North India to China, ascending in the Himalayas to nearly 18,000 ft. The variety collected by Mr. Rockhill is a very elegant little plant about three inches high with remarkably spatulate leaves.

23. *Leontopodium Stracheyi*, *C. B. Clarke in Herb. Kew.* (*L. alpinum*, *Cass.*, var. *Stracheyi*, *Hook. f.*).—Ruchu valley, in river-bottom, at 12,100 ft. Lat. N. $31^{\circ} 10'$, long. E. $95^{\circ} 12'$. Aug. 16, 1892.

Fine crops of barley and turnips now ripe. Also a little wheat.

This Western Tibet and Himalayan plant is so easily distinguished from the other forms that it may well be accorded specific rank. It ranges from Kumaon to Nepal.

24. *Anaphalis mucronata*, *C. B. Clarke.*—Basin of Dangchu, right bank affluent. Clay and sand-gravel, at 15,180 ft. Lat. N. $32^{\circ} 20'$, long. E. $92^{\circ} 08'$. July 21, 1892.

This form is united with *A. nubigena*, DC., in the 'Flora of British India.' It is only found at great altitudes in the Himalayas and Tibet.

25. *Antennaria nana*, *Hook. f. et Thoms.*—Valley of Murus, head-waters Yangtsekiang, at 14,900 ft. Lat. N. $33^{\circ} 45'$, long. E. $91^{\circ} 20'$. June 22, 1892.

Western Tibet in the Nubra and Shayuk valleys at 12,000 to 14,000 ft.

26. *Saussurea tangutica*, *Maxim. in Mém. Biol.* xi. p. 247.—Near summit of Gam (or Angti) la at 15,600 ft. Lat. N. $30^{\circ} 40'$, long. E. $98^{\circ} 13'$. Sept. 4, 1892.

Tangut and Northern Tibet.

The leaves are infused and used by the natives as a tonic. Called in Tibetan Sha-pó gong-t'ag. It is said to grow only on

the west side of this mountain. The Chinese call it "snow lotus" (*Hsuch lien*).

27. *Taraxacum palustre*, DC.—Valley of Murus, valley-bottom at 15,640 ft. Lat. N. 33° 44', long. E. 91° 18'. June 23, 1892.

This is usually regarded as a variety of the almost ubiquitous *T. officinale*.

28. *Cyananthus incanus*, Hook. f. et Thoms., var. *leicalyx*, Franch. in Morot's *Journ. de Bot.* i. 1887, p. 279.—Kechu valley at 12,700 ft. Lat. N. 31° 25', long. E. 96° 28'. Aug. 22, 1892.

On river-bottom. Fine forest-growth, mostly pines (?) on hill-sides; fine grass.

A Himalayan species, of which this is a naked-calyx variety, also found in Yunnan. The typical form inhabits alpine localities at 12,000 to 16,000 ft.

29. *Androsace tapeta*, Maxim. in *Mél. Biol.* xii. p. 754.—Valley of Murus, head-waters Yangtsekiang, at 14,900 ft. Lat. N. 33° 45', long. E. 91° 20'. June 22, 1892.

Kansub and Szechuen, in Western China.

30. *Androsace villosa*, Linn., var. *latifolia*, Ledeb.—Valley of Murus, valley-bottom at 15,640 ft. Lat. N. 33° 44', long. E. 91° 18'. June 23, 1892.

This species is widely dispersed from Asia Minor through Central Asia, North Asia, and the mountains of North India.

31. *Gentiana Rockhillii*, Hemsl., n. sp.

Species *G. aristatæ*, Maxim., similis sed minor strictior floribus fere cylindricis angustissimis.

Annua, erecta, simplex vel pauciramosa, 1-2-pollicaris, glaber-rima. *Folia* subscariosa, lineari-subulata, vere conduplicata, 3-4 lineas longa, apice breviter aristata, basi semiamplexicaulia, suberecta, cauli fere appressa. *Flores* cærulei, terminales, solitarii, subsessiles, circiter 9 lineas longi; calyx subscariosus, corollæ tubum æquans, dentibus lineari-subulatis; corollæ sursum leviter dilatatae, lobi breves, oblongi, vix acuti, erecti, conniventes, intermediis brevioribus albis tenuissimis, fauce nuda; stamina cum pistillo omnino inclusa; styli brevissimi, stigmatibus capitatis.

Kechu valley at 12,700 ft. Lat. N. $31^{\circ} 25'$, long. E. $96^{\circ} 28'$.
Aug. 22, 1892.

On river-bottom. Fine forest-growth, mostly pines (?), on hill-sides; fine grass.

32. *Tretocarya sikkimensis*, *Oliver*, in *Hook. Ic. Plant.* t. 2255.
—Basin of Suchu valley, north side, Drayalamo pass, at 14,600 ft.
Lat. N. $31^{\circ} 52'$, long. E. $93^{\circ} 17'$. Aug. 2, 1892.

Limestone; fine grass; flowers blue, very abundant.

Sikkim Himalaya at 11,500 ft., and Western China near Tachienlu. Mr. Rockhill's specimen is much smaller than the others and nearly glabrous.

33. *Pedicularis Oederi*, *Vahl* (*P. versicolor*, *Wahlenb.*).—Valley of Murus, valley-bottom at 15,640 ft. Lat. N. $33^{\circ} 44'$, long. E. $91^{\circ} 18'$. June 23, 1892.

Alpine and Arctic regions of Europe, Asia, and America.

34. *Pedicularis Przewalskii*, *Maxim.* in *Mél. Biol.* x. p. 84, et xii. p. 787, n. 2. fig. 2.—Large state. Basin of Suchu, valley north side, Drayalamo pass, at 14,000 ft. Lat. N. $31^{\circ} 52'$, long. E. $93^{\circ} 17'$. Aug. 2, 1892.

Limestone; fine grass; flowers blue, very abundant.

Eastern Himalaya, Tibet, and China.

35. *Lagotis brachystachya*, *Maxim.* in *Mél. Biol.* xi. p. 300.—Hill-slope 2 miles N. of Murus river, head-waters Yangtsekiang, at 14,750 ft. Lat. N. $33^{\circ} 53'$, long. E. $91^{\circ} 31'$. June 21, 1892.

Sandy soil, some clay.

Kansuh.

36. *Polygonum Bistorta*, *Linn.*—Pochu valley at 14,000 ft. Lat. N. $31^{\circ} 45'$, long. E. $94^{\circ} 45'$. Aug. 14, 1892.

Temperate and cold regions of Europe, Asia, and America.

37. *Polygonum viviparum*, *Linn.*—Pochu valley at 14,000 ft. Lat. N. $31^{\circ} 45'$, long. E. $94^{\circ} 45'$. Aug. 14, 1892.

The seeds are parched and ground and eaten mixed with barley-meal (*tsamba*). Tibetans call it *ranpa* or *ramba*.

Temperate and Arctic regions of Europe, Asia, and America.

38. *Polygonum bistortioides*, *Boiss.*—Ramachu valley, hill-side, at 12,800 ft. Lat. N. $31^{\circ} 48'$, long. E. $94^{\circ} 28'$. Aug. 12, 1892.

Used by the natives for food like *P. viviparum*.

This species or variety is found in Asia Minor and Persia. Although very distinct from ordinary *P. Bistorta*, Boissier (*Flora Orientalis*, iv. p. 1028) subsequently united it with that species.

39. *Iris Thoroldi*, *Baker, ante*, p. 118, *et Hook. Ic. Plant. ined.*—Sharakuyi-gol, hill-slope at 13,800 ft. Lat. N. 35° 50', long. E. 93° 27'. May 29, 1892.

Described from specimens collected by Dr. Thorold at an altitude of 17,800 ft. Mr. Rockhill's specimens furnish better flowers.

40. *Tulipa* (§ *Orithyia*) *sp. aff. T. eduli, Baker.*—Sharakuyi-gol, hill-slope at 13,800 feet. Lat. N. 35° 50', long. E. 93° 27'. May 29, 1892.

Tulipa edulis is a native of Japan, and Mr. Rockhill's one flower is insufficient for satisfactory identification.

41. *Carex Moorcroftii, Boott.*—Hill-slope two miles north of Murus river, head-waters Yangtsekiang, at 14,750 ft. Lat. N. 35° 53', long. E. 91° 31'. Sandy soil, some clay. June 21, 1892.

Yarkand and Western Himalaya.

42. *Kobresia Sargentiana, Hemsl., n. sp.*

R. schænoidei valde affinis sed bracteis latissimis spicam fere omnino involventibus late scariosis subtruncatis simul emarginatis.

Hill-slope two miles N. of Murus river, head-waters Yangtsekiang, at 14,750 ft. Lat. N. 33° 53', long. E. 91° 31'. Sandy soil, some clay. June 21, 1892.

43. *Miscanthus sinensis, Anderss.*—Near top of Feiyuehkuan pass, S.W. of Yachoufu, in West Szechuen, at 3583 ft. Oct. 11, 1892.

China, from Japan and Korea to Hongkong and Canton, Luchu and Bonin Islands, Tonquin, Borneo, and Celebes.

44. *Stipa*, insufficient for determination.—Hill-slope two miles N. of Murus river, head-waters Yangtsekiang, at 14,750 ft. Lat. N. 33° 53', long. E. 91° 31'. Sandy soil, some clay. June 21, 1892.

45. *Calamagrostis, sp.*—Near top of Feiyuehkuan pass, S.W. of Yachoufu, in West Szechuen, at 3583 ft. Oct. 11, 1892.

46. *Festuca ovina*, *Linn.*?—Hill-slope two miles north of Murus river, head-waters Yangtsekiang, at 14,750 ft. Lat. N. 33° 53', long. E. 91° 31'. Sandy soil, some clay. June 21, 1892.

Europe, N. Africa, Siberia, Himalaya, N. & S. America, and mountains of Australasia. Mr. Rockhill's specimen is a mere fragment.

47. *Usnea barbata*, *Fries.*—Valley of Pontramo, east of Batang, at 12,600 ft. Lat. N. 29° 59', long. E. 99° 42'. Sept. 19, 1892.

Sometimes 30 feet long. Hangs only on the oaks called "green oaks" (ching kang) by the Chinese. This oak is called by the French missionaries "chêne à feuilles de houx."

All over the world in temperate and tropical regions.

Recent Botanical Exploration in Southern Persia, being the substance of a Letter from Mr. J. BORNMÜLLER to Dr. OTTO STAPP. (Communicated by the Secretary.)

[Read 16th February, 1893.]

MR. J. BORNMÜLLER, a botanist known from his collections in Asia Minor, went, late in 1891, to S. Persia with the intention of exploring the high mountains of Kirman, which were botanically a *terra incognita*. He reached the province of Kirman early in May of last year, and visited first Kuh Sirdsh and Kuh Jupar. As it was still too early in the season for exploring the high alpine region, he repeated his excursions to Kuh Jupar, from which point his narrative begins.

Mr. J. Bornmüller brought his exploring tour in the province of Kirman to a successful conclusion. The following is a short summary of his excursions after his first visit to Kuh Jupar.

He visited Kuh Jupar again in the second week of June, when he reached an elevation of 3850 m. (12,644 English feet), but was unable to get to the very top on account of the excessive steepness of the rocks along the ridge. He encamped for six days at 3000 m. (9842 feet). In the beginning of July he started for Kuh Lalesar and Kuh Hezar, which, like Jupar, had never been visited before by a botanist.