2nd Ser. BOTANY.] [VOL. III. PART I.

THE

TRANSACTIONS

OF

THE LINNEAN SOCIETY OF LONDON.

THE BOTANY OF THE AFGHAN DELIMITATION COMMISSION.

BY

J. E. T. AITCHISON, M.D., C.I.E., F.R.S., F.L.S.,

NATURALIST ATTACHED TO THE MISSION, AND SECRETARY TO THE SURGEON-GENERAL, HER MAJESTY'S FORCES, BENGAL.

NATURAM DISCERE MORES

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April 1888.

Zagin 1,920

King

River Harut

Kin 1,520

Kushk-rud 1,480

Jowain (Lash-jowain) 1,420

Takht-i-rustum 1,280. I.NOV.

Khuspas Rud

Rud-i-Khor

Rud-i-Shor

Permanent Lake

Hamun

Mak-kara-habil 1,290

Ibrahim-abad 1,300

Dé-doda (Deh-dadeh) 1,300

Dé-Kamran 1,400

Padda Sultan 1,440

Kalifat

Chakr-burja 1,490

Koh-haja (Khaja) 1,500

Rudbar 1,510

Lundi 21. OCT.

Hadj-ali (Khwaja-ali) 1,550 16.19 OCT. 1884.

Helmand R.

Rud-i-Marjo

Girishk 3,641

Arghandab R.

Tarnak R.

KANDAHAR 3,350

Arghastan R.

63°

65°

32°

30°

PERSIA

AFGHANISTAN

BALUCHISTAN

Desert Country

Nasirabad 1770

Sheet 1.

A MAP TO SHOW
the route traversed by the
NATURALIST
OF THE AFGHAN DELIMITATION COMMISSION.
J.E.T. Aitchison. M.D., F.R.S.

SCALE

10 0 10 20 30 40 50 60 Statute Miles

Fixed encampments shewn thus ■, ◨.
Halting places ,, ,, ○
Route of Author ,, ,, ----
Direction of route shown by arrows →
Altitudes in feet above sea level 1,420

Gar-nushki

Sukaluk

Gal-i-cha 3,110

Boz-dan (Muzh-dan) 4,010

Mannu (Mamu) 4,110

Robat

Kuchen

Shorakin

Samuli

Barapchan

Gurgarok

Kila Kurd

Duganan

Chaghai

Mekh-i-Rustam or Pulchota

Thal

Yagi

Sha Ismail 3,860

Salian 3,890

Safia 3,370

Gaz-i-cha 2,680

Kani 2,700

Zaru 2,780

12. OCT. Band 2,960

Omar-Sha 2,840

Sanduri

Kaisar

Nushki

Baghok

Jabar

Muhabbat

Chaman

Panj-pai

Khanak

Gobrak

Spangaoli

QUETTA 5,604

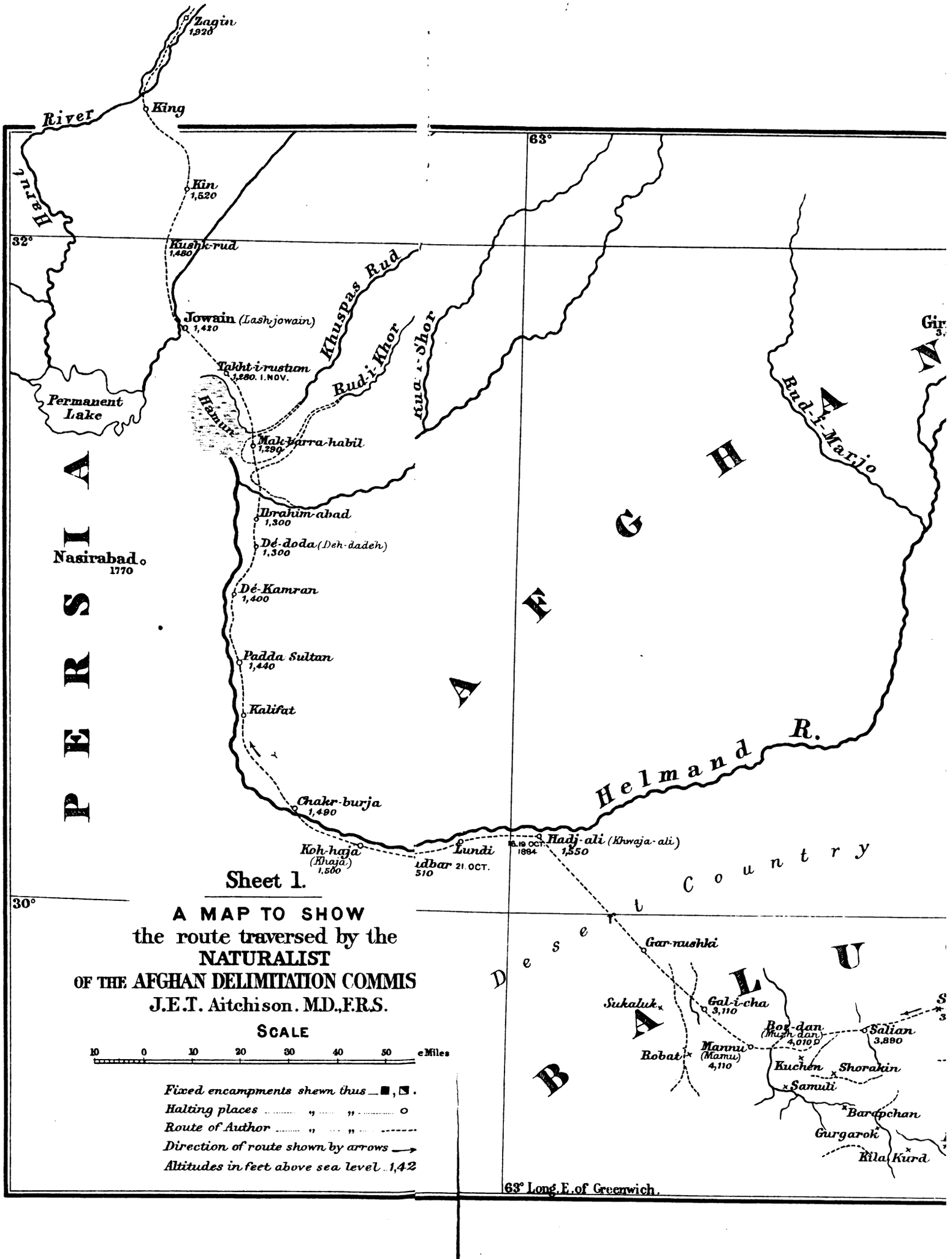
KALAT 6,783

63° Long. E. of Greenwich.

65

30°

Stanford's Geog.l Estab.t



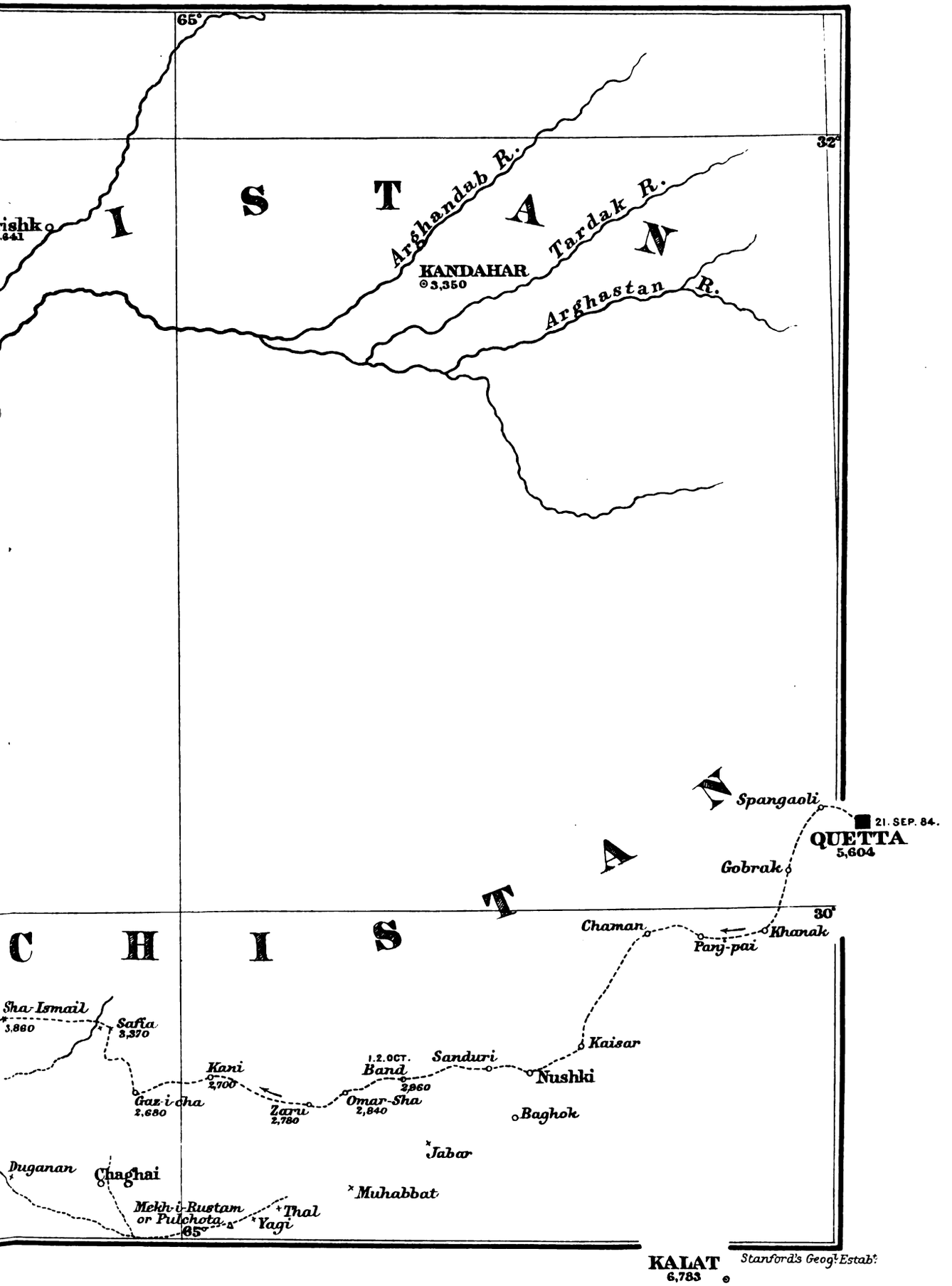
Sheet 1.

A MAP TO SHOW
the route traversed by the NATURALIST OF THE AFGHAN DELIMITATION COMMIS
J.E.T. Aitchison. M.D., F.R.S.

SCALE

10 0 10 20 30 40 50 e Miles

Fixed encampments shewn thus _■, ◥.
Halting places ..... ,, ... ,, ... o
Route of Author ..... ,, ... ,, ... ------
Direction of route shown by arrows →
Altitudes in feet above sea level 1,42



Sheet 2.

A MAP TO SHOW
the route traversed by the
NATURALIST
OF THE AFGHAN DELIMITATION COMMISSION.
J.E.T. Aitchison, M.D., F.R.S.

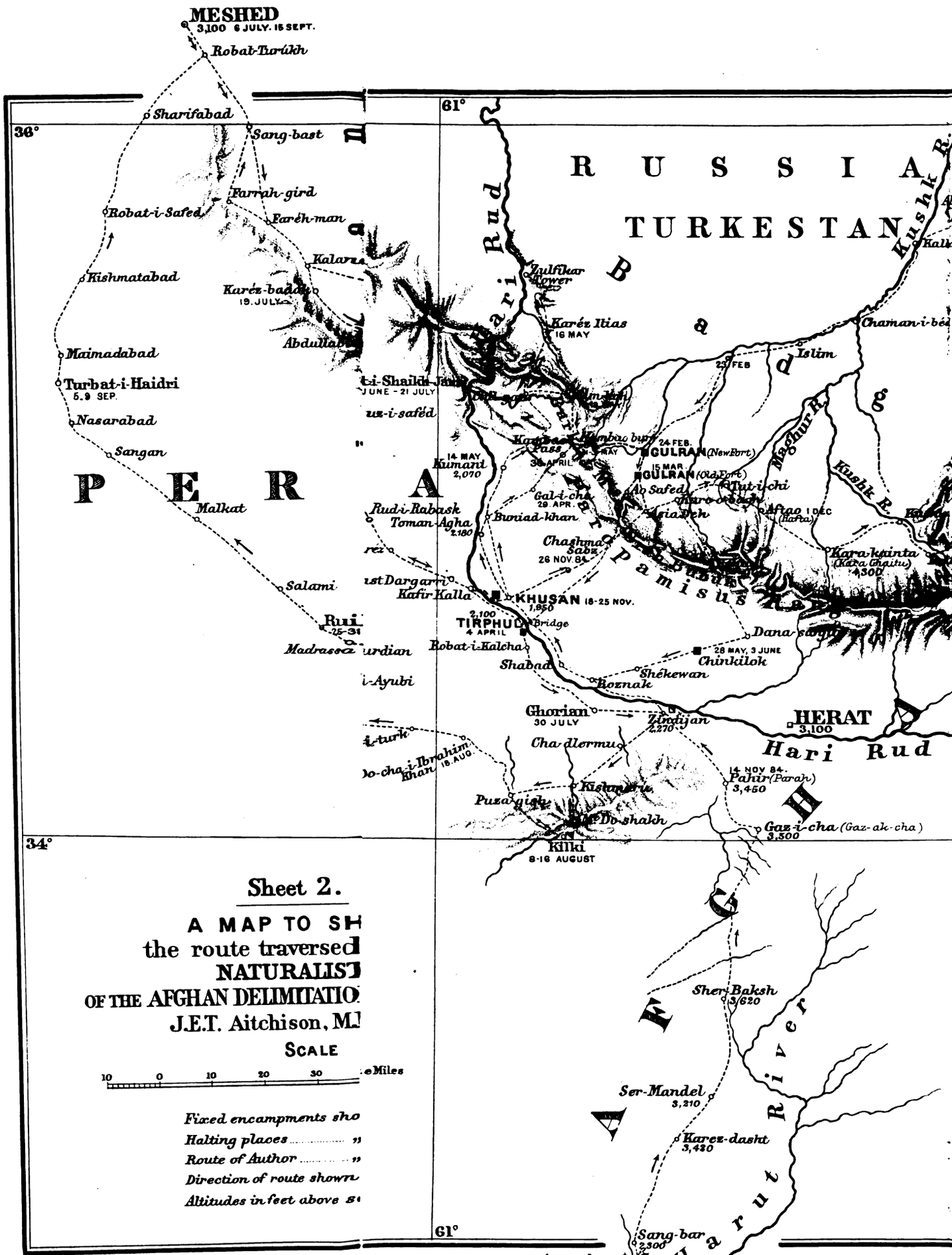
SCALE

10 0 10 20 30 40 50 60 Statute Miles

Fixed encampments shown thus —■,◥.
Halting places ..... ,, ... ,, ... o
Route of Author ..... ,, ... ,, ----------
Direction of route shown by arrows →
Altitudes in feet above sea level 1,420

MESHED
3,100 6 JULY. 15 SEPT.
Robat-Turúkh
Sharifabad
Sang-bast
Farrah-gird
Robat-i-Safed
Faréh-man
Kalanderabad
Kishmatabad
Karéz-badak
19. JULY
Khairabad
Abdullabad
Langar
Maimadabad
Turbat-i-Haidri
5-9 SEP.
Turbat-i-Shaikh-Jami
11 JUNE – 21 JULY
Nasarabad
Hauz-i-safed
Bézd
16-19 JUNE 85
Sangan
Kumari
2,070
14 MAY
30 APRIL
Malkat
24 JULY
Rud-i-Rabask
Toman-Agha
2,180
Karéz
Salami
Kalla-i-dast Dargarri
Kafir-Kalla
Rui Khauf
25-31 AUGUST
Madrassa
Sangan
Khal-i-Khurdian
Burj-i-Ayubi
Musabad
Robat-i-turk
Do-cha-i-Ibrahim Khan
18. AUG.
PERSIA
Harirud
Murghab
RUSSIAN TURKESTAN
Zulfikar Tower
Karéz Ilias
16 MAY
Chil-gaz
Sim-kah
18-19. MAY
Kambao-bury
24 FEB.
Kambao Pass
3-5 MAY
GULRAN (New Fort)
15 MAR.
GULRAN (Old Fort)
Ab Safed
Tut-i-chi
Karo-o-bagh
Asia Deh
Aftao
1 DEC.
(Haftao)
Gal-i-cha
29 APR.
Buniad-khan
Chashma Sabz
26 NOV. 84.
Koktal Sangi
Kara-kainta
(Kara Ghaitu)
4,300
Paludda
Karéz darra
Kushk
Ab-i-kamarra
Ab-i-shora
Padda
(Paddat-paj)
Parapamisus Range
Siah Buburk
Maghur R.
Kushk R.
Kolari R.
Karshiju R.
Morghab R.
Ab-i goshan
Kalla-i-maur
Mara-chak
Karaol-khana
16 FEB
Bala Morghab
KALLA-BALA-MORGHAB
1,330 14. DEC. 84. TO 15 FEB. 85
Marjan
Tir band-i-Turkistan
Tor-Shakh
Chaman-i-béd
23 FEB
Islim
KHUSAN 18-25 NOV.
1,950
2,100
TIRPHUL
4 APRIL
Bridge
Robat-i-Kalcha
Shabad
Dana-sangid
28 MAY, 3 JUNE
Chinkilok
Shékewan
Roznak
Ghorian
30 JULY
Zindijan
2,270
HERAT
3,100
Cha-dlermu
14 NOV 84.
Pahir (Parah)
3,450
Kishmaric
Puza-gish
Mt. Do-shakh
Gaz-i-cha (Gaz-ak-cha)
3,500
Kilki
8-16 AUGUST
Sher Baksh
3,620
Ser-Mandel
3,210
Karez-dasht
3,420
Sang-bar
2,300
Anar-darra
7. NOV. 84.
Zagin
6-7. NOV.
1,920
Harut River
Hari Rud

Stanford's Geogl Estabt



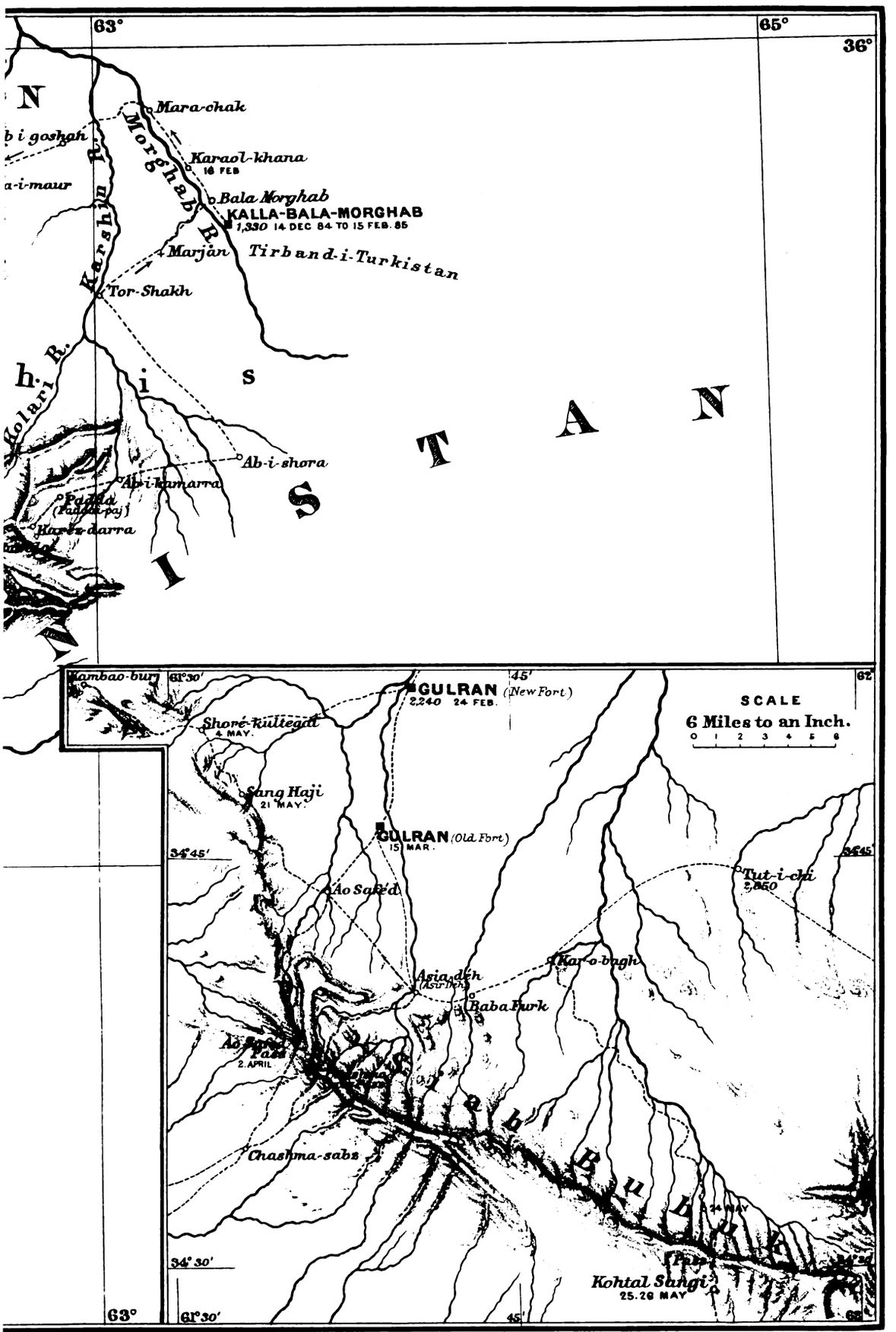
Sheet 2.

A MAP TO SH
the route traversed
NATURALIST
OF THE AFGHAN DELIMITATIO
J.E.T. Aitchison, M.

SCALE

10 0 10 20 30 Miles

Fixed encampments sho
Halting places ..... ,,
Route of Author ..... ,,
Direction of route shown
Altitudes in feet above s



TRANSACTIONS

OF

THE LINNEAN SOCIETY.

I. *The Botany of the Afghan Delimitation Commission.* *By* J. E. T. AITCHISON, *M.D., C.I.E., F.R.S., F.L.S., Naturalist attached to the Mission, and Secretary to the Surgeon-General, Her Majesty's Forces, Bengal.*

(Plates I.–XLVIII., and Two Maps.)

Read 3rd February, 1887.

INTRODUCTION.

THE paper which I have now the honour of laying before you is the result of my botanical investigations and collections made while I was attached to the Afghan Delimitation Commission during the years 1884 and 1885.

My collections amount to about 800 species and some 10,000 specimens. Of these nearly one hundred are probably * new to science, and, as may be seen from this Report, I have been able to accumulate much interesting matter in relation to products, and to trace several to the plants yielding them. The difficulties I have had to overcome in obtaining the material for the information I now lay before you were on this occasion very great.

I purpose dividing my paper so as to give the botanical characteristics of the country traversed in accordance with its natural divisions represented by its physical features, viz.:—Northern Baluchistan; the valley of the Helmand, from Hadj-ali to the Hamun; the basin of the Harut river, from the Hamun of the Helmand to Pahir; the valley of the Hari-rud; the Badghis district; Mount Do-shakh; and Khorasan.

* I say probably, because, in consequence of expecting to have to return to India, the collection has been hurriedly and only partially elaborated.

Northern Baluchistan.

The expedition left the vicinity of Quetta, in the extreme north-east of Baluchistan, on the 22nd of September, 1884, marching westwards almost parallel with its northern boundary, along the edge of and partly across the great desert, to the Helmand river at Hadj-ali. In this part of our journey our marches were very long and accomplished with great rapidity, chiefly during the night, as the days were still very hot. As there were no traces of a road of any sort to direct us we were guided at night by large fires, acting as beacons, and during the day by the marks of a plough which had been taken across the country, making a furrow for this special purpose. The season of the year was against any good collections being made, so that the little I did collect were mere scraps, most of which, however, have been identified by comparison with my subsequent collections.

The physical features of Northern Baluchistan consist of great gravel and clay plains, bordered by ranges of limestone and trap hills, intersected by numerous dry water-courses, and of undulated expanses of sand, which are said to be continuously shifting through the action of wind. Between Kani and Gaz-i-cha we saw the effects of the wind, the sand having been driven up against the face of a precipitous cliff to the height of 300 feet; and the range looked as if it would soon disappear altogether beneath this great shifting sea of sand. There are neither rivers nor streams, the vast drainage of the country being wholly swallowed up in the thirsty gravel beds. In traversing this desert we were informed that water was only to be procured at certain localities; this was no doubt true in the sense that water was only exposed at those localities; but it was evident that with a little trouble it was procurable close to the surface in many more places; for on no occasion was the water found at a greater depth than ten feet, often much less. Luckily the few dilapidated botanical specimens that I was able to collect on this portion of our travels, despatched at Hadj-ali on the Helmand for Kew, arrived safely at their destination, and from them I am able to give the general features of the more permanent or shrubby vegetation of Northern Baluchistan. At this season of the year the little vegetation to be seen may be divided, naturally, into that on the hills and on rock-formations; that on the gravel and clay plains; that of the sand-dunes; and, lastly, that where there was water during the whole year.

The most interesting plants found on the hills and on rock-formations were :—*Stocksia Brahuica*, a thorny shrub or small tree, first collected between Khanak and Panj-pai on the 24th of September, and subsequently more or less frequently as far as the Helmand. In its autumnal garb, when leafless, and covered with its brilliantly coloured inflated fruit, it was very showy. It is called by the natives *Koh-tor*, or the mountain-peach, no doubt from the attractive colouring of the fruit. *Pistacia Terebinthus*, var. *mutica*, was occasionally seen on limestone, occurring in some numbers. This is the only indigenous tree of Baluchistan that grows to any size; several I measured were over nine feet in girth at six feet from the ground; but in height none were over twenty feet. *Zygophyllum atriplicioides*, a shrub from four to six feet in height, with fleshy leaves, bright yellow flowers, and curious winged fruit, was seen everywhere, from

the stony bases of the hills into the gravel plains. *Perowskia abrotanoides*, a very attractive Labiata, forming a close bush three to four feet high, was general among the rocks; *Periploca aphylla* and two species of *Ephedra*. *Ephedra pachyclados*? was the common one, being very profuse amongst broken rock, boulders, &c., as well as on the gravel plains. The native name for the *Periploca* and the two species of *Ephedra* is *Hum* or *Huma*, the natives not distinguishing between them. *Tamarix gallica*, as a large shrub, the presence of which in quantity and size would, I think, indicate water at no great depth. Further, *Pteropyrum Aucheri*, *Rhazya stricta*, *Stellaria Lesserlii*, *Lactuca orientalis*, *Anabasis* sp., *Pennisetum dichotomum*, *Euphorbia osyridea*, *Astragalus hyrcanus*, *Calligonum comosum*, inhabit this region at the base of the hills, and extend thence over the gravel country.

On the gravel and clay plains the vegetation was extremely sparse and stunted; among the prevailing plants, *Alhagi Camelorum* was generally spread over the country, and in some favoured localities it grew in luxuriance and dense masses, through which it was hard to get our horses to go, owing to its numerous objectionable spines. This shrub is usually from one to two feet in height, occasionally as much as three. The ordinary term here for the plant is "Camel-thorn," as it is one of the chief sources of supply of fodder for these animals. In certain seasons it yields a manna. *Peganum Harmala*, *Sophora mollis*, *Sophora Griffithii*, and two species of *Heliotropium* were more or less frequent; and where saline matter impregnated the soil the following shrubs were often in great luxuriance, *Salsola Kali*, *Salsola arbuscula*, *Salsola fœtida*, and several others, with *Halanthium* sp., *Halocharis sulphurea*, *Haloxylon salicornicum*, and *H. Griffithii*.

On the sand-dunes and between the hillocks formed by the sand-waves vegetation was more general and of stronger growth than one would have expected to find on first seeing this formation. This is no doubt due to the deeper layers of the sand being able to retain moisture, down to which the roots easily penetrate through the soft superstructure. The characteristic shrub, often almost a tree in size, is *Haloxylon Ammodendron*, which is the *Tar-gaz* of Baluchistan, and its smaller branches yield the best camel-fodder of the country, and, unlike the Tamarisks, the camels can live continuously upon it without its impairing their health. In general appearance it resembles light-green Tamarisk, hence its native name; but it is at once distinguishable by its pendulous branches and grey white stems; hence the European name White Tamarisk. Although this shrub is found in all directions, it certainly seems to prefer, and grows in greatest luxuriance on, these sand hills. *Tamarix macrocarpa* and other large shrubby species were common. At Omar-sha, where we encamped on sand hills, there were some trees, probably planted, of *Tamarix articulata* with trunks nine feet in girth and over thirty feet in height, and associated with them were some trees of *Tamarix macrocarpa*, from four to six feet in circumference, evidence of the size this species may attain in a favourable locality. The ordinary native name for the latter is *Kirri*; and this term was equally applied to *T. articulata*, although the two species were recognized as different. *Tamarix articulata*, having no special native name here, leads one to surmise that it is not indigenous in this part of the country. At Zaru, close to our encampment,

were some large bushes of *Lycium barbarum*, almost devoid of foliage, but covered with bright red fruit, very like small capsicums. Here we lost several camels from no known cause, though all those found dead were lying near these bushes, and had been eating greedily of the berries. I opened several camels, but the post-mortem showed no symptoms of irritant poisoning, yet there was nothing I could detect in their paunches except the berries. From the camels having died so suddenly I suspected narcotic poisoning, and yet a *Lycium*, although nearly allied to a poisonous genus, is not supposed to be itself poisonous. I carefully examined the whole country round, and there was nothing else they could have eaten of a poisonous nature. The natives declared the *Lycium* was *not* poisonous, and subsequently I often saw camels browsing on this shrub without any ultimate evil effects.

In some localities the sand-dunes were covered with *Euphorbia cheirolepis*; a very elegant species, which still, late though the season was, maintained its green foliage. *Tribulus alatus* covered the tops of the sand-dunes in many places with a sward. *Cyperus pungens* at this season only existed in numerous leafy tufts, and very little of the fruiting heads were obtained, though sufficient for identification. *Convolvulus erinaceus* was not uncommon. Peculiar-looking balls formed of a prickly fruited shrub, *Agrophyllum latifolium*, with few or no leaves were noticed rolling about, driven by the winds hither and thither over the flat clay plains (or *Pat*), occasionally accumulating into heaps. This shrub grows in loose sand, and as it is very leafy it is easily lifted out of its position by the wind and, being driven about, it takes the form of a ball, which is often increased in size by coming in contact with other similar plants. It was soon dubbed "the wanderer;" the natives call it the "spinning-wheel," in allusion to this peculiarity. It was curious to note the condition of the roots of the plants that live in these beds of pure sand; some, like the *Haloxylon*, thrust their roots so deeply into the sand as to anchor themselves in the solid ground beneath; others, like *Euphorbia*, with slight stems, little affected by the wind, do not require to be so firmly fixed, and do not root so deeply; grasses and sedges have their fibrous roots greatly lengthened, and develop a spongy tissue as thick as a goose-quill. These spongy enlargements serve two purposes, one for holding fluid for future requirements, and the other for maintaining the position of the plants, each root acting as an individual anchor. The same plants not growing in this loose sand did not possess this peculiar development of their roots. Indeed all the plants that occupy these sandy dunes have a hard struggle for existence; not only have they much to do to keep themselves in position on account of the wind, but when sand is heaped upon them they have to learn to keep themselves alive under the superimposed weight and at the same time to fight their way through it. Furthermore the sand blown on them during summer is hot and dry, so hot and dry that unless these plants are capable of collecting and maintaining a supply of moisture, they must inevitably perish from drought. On other occasions their surrounding medium may be suddenly removed by wind, leaving them to be blown about with the chance of being utterly destroyed before they can be again partially covered with sand and thus afforded the means for supporting life.

In stream-beds amongst thickets of Tamarisk, where there were perennial streams,

as at Kaisar and Mannu, the *Oleander* was met with. It is well known to the natives, and said to be common in such localities all over the country. This shrub was very destructive to camels, especially when it was spread through the Tamarisk thickets, as these animals never seem to learn not to browse on it. The native name is *Jaur*, a corruption of the Persian word for poison. Climbing over these shrubs *Clematis orientalis* was in great luxuriance; and on the shady side of some rocks a variety of *Mentha sylvestris*, growing seven feet high, was common. *Andropogon laniger*, a lemon-scented grass, formed turf in the vicinity of the stream, as also *Juncus maritimus*. *Erianthus Ravennæ*, the *Munj* of the Punjab, was occasionally observed in great clumps. Where the stream spread out into broader shallows, flooding the low land occasionally, *Arundo Donax* occurred together with *Phragmites communis*, forming great beds; the latter, where the water was brackish and the soil saline, was extremely dwarfed, with rigid and sharp-pointed leaves. In the Tamarisk groves a large purple-flowered *Orobanche* was occasionally seen, perfect in form and colour, but dried to a cinder, so that it could not be preserved, as on the slightest touch it crumbled into dust.

The fodder supplied to us for our cattle during our journey consisted of the crushed straw of wheat and barley and of the stems of millet (*Sorghum*). Occasionally, in addition to these, the stems of *Pennisetum dichotomum* were also served out. These stems were from one to three feet in length, resembling miniature bamboos; and thus they were termed in camp. Notwithstanding their hardness, they were greedily eaten by our horses, much to our amusement and wonder. The natives call this grass *Barshonk*, and it grows on the stony formation at the bases of the hills only.

At Gaz-i-cha we encamped in a great meadow of *Eragrostis cynosuroides*, which was here unmixed with any other grass. It was called *Kirthag*, and grew in deep pure sand. Such a locality was looked upon as an oasis of plenty for our cattle, and this particular grass was considered very fattening, though had any of our horse-keepers supplied us with it in India, the result, I fear, would have been a general commotion in the establishment. *Aristida plumosa* is highly valued and an excellent fodder, growing in luxuriance on the sand hills of the desert, where usually no other grass is to be seen. It occurs in small separate tufts, from four to six inches in height, and is called *Mazj*. Sheep are especially fond of it. Several creeping species of *Æluropus*, were often mistaken by members of the mission for *Cynodon Dactylon*, the *Dub* of India. These were profuse, especially on the saline plains. *Cynodon* I did not see in Baluchistan, except at Quetta, where it was in abundance on the sides of irrigation-channels. Between Bozdan, Mannu, and Galicha, from the numerous dry leaves found driven about by the wind, a species of *Ferula* was detected in these gravel plains. After much seeking one leaf was at last discovered attached to a root-stock. On digging this up, there was no doubt, from its general appearance and the odour its fractured surfaces emitted, that it was the root of a species yielding *Asafœtida*. Not a single stem was obtainable, but, from the quantity of leaves seen, the plant must be abundant in this locality. The curious thistle-like umbellifer, *Pycnocycla Aucheriana*, was not rare, chiefly present in stony ground; happily sufficient material was collected for its accurate determination. It produces a yellowish gum-resin, and the root-stock, when employed

as fuel, emits a very offensive odour. One specimen only of the rare Crucifer *Cithareloma Lehmanni* was obtained in the desert between Nushki and Sanduri.

Our food for this part of the journey was in part previously stored along the route, the remainder being conveyed by the mission. The grain for our horses was all sent from Quetta; dry fodder, such as crushed straw, was collected from Quetta, Nushki, and Band, and where possible the grasses already alluded to were added to the stores. There was no difficulty with regard to fuel, as throughout all the journey Tamarisk wood was obtainable, although no doubt in some instances at a considerable distance from our encampments; but smaller fuel, consisting of *Artemisia* &c., was always to be had. It was noticed that the twigs of any of these desert bushes would burn though living; one could never say of them in this condition that they were green, and therefore unfit for fuel. Owing to the rapidity of our movements, and the distance of our encampments from habitations, I saw no cultivation except at Band, and there only the remains of Water-melons and other Cucurbitaceæ, *Sorghum*, cotton, and a little tobacco. It is generally admitted that there is a great scarcity of grain in Baluchistan. The supply might easily be augmented from the Helmand and Sistan by opening up a trade-route from these parts to Baluchistan. This could be accomplished at little expense by building a succession of wells at regular intervals, and a few tall pillars to indicate the route. As regards carriage there would never be any difficulty, as this is a country fully capable of maintaining any number of camels, and, indeed, with them even wheeled transport might be adopted.

Valley of the Helmand, from Hadj-ali to Hamun.

I regret having to report that the botanical specimens, comprising fully 100 species, collected in the valley of the Helmand from Hadj-ali to the Hamun, as well as those obtained between the Hamun and Pahir, were irretrievably injured by having apparently lain under water for some time. Upon opening the cases at Kew plants and paper were found forming a solid block. The cases had been despatched by caravan from Bala-morghab in January 1885, and only arrived in England in January 1886. A case of birds sent with them was received in almost as bad a plight; the only portions of the collections which escaped injury were the reptiles and insects, preserved in glass bottles in spirits. This loss is a real misfortune, because the greater part of these districts had not previously been visited, so far as is known, by any European. My remarks therefore on the vegetation are consequently very imperfect, and unsupported by authenticated specimens.

The mission encamped on the banks of the Helmand on the 16th of October, 1884. The river, even at this time of the year, had considerable depth and velocity, being fordable at only a few places. The water was said to be at its lowest, but that in February or March it rose from fifteen to twenty feet higher than it then was, and that it had been known to rise as high as thirty feet, doing incalculable injury to the cultivated land over which it flowed. The river here has worn itself a deep channel, similar to the cañons of western North America, closely bordered by somewhat high land, which on either side of the river-bed is in physical formation exactly the same as that between

Quetta and the Helmand, consisting of great gravel and clay plains, with seas of moving sand, bearing a similar scanty vegetation. The drainage from these high plateaus, except that in the immediate vicinity of the Helmand, seemed to be absorbed at once by the soil, owing to its limited amount, due to the small rainfall of this climate; in our route we crossed no tributaries or affluents to the river. There can be no doubt that the level of the bed of the river was once much higher than it is at present, inasmuch as in those parts where the high lands recede, plateaus of alluvial deposit of great extent occur at different levels. On these plateaus stand the ruins of forts, towns, and dwellings, the records of past ages and of a dense population. Looking up from the bed of the river at the escarped ends of the receding plains, they appeared like a range of low hills on either side. We at first marched down the left bank of the river, crossed it at Chakr-burja, and then followed its course on the right bank to its Hamun, reaching the Takht-i-Rustam, or throne of Rustam, on the 31st of October. The general appearance of this valley is desolate in the extreme, there being little cultivation and few inhabitants; the feeling of desolation being deepened by the constant sight of masses of clay-built ruins. The ruins extend on both sides of the river, and are situated usually on immense plains of alluvial deposit, now utterly treeless and barren. Without an exception all the edifices were built of clay, moulded into great blocks, or of sun-dried bricks, the walls of immense thickness, the roofs and doorways domed and arched, and all of the same material —conclusive proofs of the absence in those days, as now, of good timber and plentiful fuel. On a more close examination of the structure of the material of which these ruins were built, it was seen that it contained similar fragments of glazed and coloured pottery, glass, and slag as were now found spread over the plains on the alluvial clays, proving without doubt that the earlier inhabitants of this valley had possessed the knowledge requisite for the manufacture of glazed pottery and of glass. In a few instances large fire-burnt bricks lay about the plains, usually associated with great masses of slag. Some of the ruins could be traced to a much later period, from having the basement walls pierced with loopholes for musketry, unless similar structures existed in the days of bow-and-arrow equipment. To the archæologist and antiquarian a study of these relics would prove highly interesting, particularly if he could get the present inhabitants to aid him in his researches. There were still to be seen traces of the great irrigation-works of the past, originally built of the stiff clay soil alone, and which centuries ago had been allowed to go to ruin.

Having given an outline of the physical features of the country, I will now from my notes alone describe the vegetation of this the second stage of our journey. The islands of the river and its low banks, which are annually flooded, are in many places covered with good forests of *Populus euphratica* called *Padda*, the trees varying in size from four to six feet in girth, and up to about twenty-five feet in height. The timber is poor, soft and light, but makes good fuel, and would do well for the construction of rafts. The trees were covered with a large climbing *Apocynum* (?), of which the fruit, called *Shangar*, was eaten in a raw state by the camel-drivers. It was considered excellent fodder for the camels, and was collected for this purpose by their owners. In similar localities a bushy *Tamarix* reaching twelve feet in height, with several tall grasses, reeds,

&c., formed dense thickets, in which hogs were said to abound. As we descended the river the extent of cultivation rapidly increased, owing primarily to the banks of the river being low and allowing of easy irrigation, and secondarily to the greater area of the low land, the higher banks of the river gradually receding much further back. Comparatively speaking, by far the greater amount of land capable of cultivation lies fallow, owing to the paucity of inhabitants. We met a number of people who had been sent by the Afghan ruler to colonize some of the land on this river, but there is room for almost any amount of population. Villages, though never very common, gradually increased in number, and inhabitants became more numerous after we passed Lundi, where I saw the first cultivated mulberry-trees, and heard cock-crowing for the first time, the latter a sure sign of habitations. The chief crops observed were wheat, barley, millet, pulse, tobacco, water-melons and various other Cucurbitaceæ, oil-seed (*Sesamum*), *Carthamus*, and a little cotton. In some localities we saw quantities of crushed straw being stacked for the use of cattle during the winter, whereas in other places the heads of the corn and millet had only been detached, the straw being left; but this might have been due to a want of labour. Some poor specimens of Indian corn were seen; but of this, I was told, very little was ever grown. The amount of cotton produced was not sufficient for the needs of the population, as we saw large numbers of cattle laden with cotton being brought from Persian territory. The people possessed innumerable sheep and goats; the wool of the former goes to Persia; the hair of the latter is employed for local requirements. On cultivated land *Alhagi Camelorum* seemed to spring up like a second crop, after the removal of the wheat or barley, and covered some of the fields so closely that one could scarcely credit that a crop of corn had preceded this wilderness. Here, for the first time, I saw as a weed in fields, and apparently a most troublesome one, *Prosopis Stephaniana*, which, as will be hereafter seen, was met with extending to Balamorghab in the Badghis, and Meshad in Khorasan. It occurred usually as a low thorny bush, from three to four feet high, but it was occasionally seen fully ten feet in height. The fruit is, scarcely without an exception, attacked by an insect, which, although it does not injure the seed, causes the pod to develop into a bloated, twisted, bright-coloured gall. This gall-affected fruit is collected and employed in dyeing and tanning. The shrub is greedily browsed upon by all cattle. *Capparis spinosa*, as a straggling bush up to six feet in height, and spreading like a bramble, was dotted over the country, especially on land that had once been under cultivation. *Artemisia campestris* and *A. maritima*, *Xanthium strumarium*, *Crozophora tinctoria*, and a *Euphorbia* were common everywhere. The irrigation-channels were lined with *Arundo*, *Phragmites*, &c., and *Cynodon Dactylon* was profuse. Near villages were orchards enclosed within walls, and containing chiefly mulberries, vines, plums, and apricots. A large Tamarisk (*T. articulata*?) was, with the exception of *Populus euphratica*, the only indigenous tree in this country. It was in greatest abundance on our march between Rudbar and Koh-haja, growing solitarily on low mounds, a fact recognized by the inhabitants, who call it the "mound-tamarisk." It grows to a great size; I measured one fifteen feet in circumference at six feet from the ground. The reason why it is always found growing on a mound is due, I believe, to the surrounding soil having been washed away. It is noteworthy that I never saw

any young trees of this species, but always old specimens, in some localities forming thin forests and always on mounds. These may be the remains of dense forests, the soil on which the intermediate trees grew, and the trees themselves, having been gradually washed away

Near the Hamun, owing to the land lying so low as to be easily flooded by the river, we traversed immense tracts of the country covered with a dense thicket of a small species of tamarisk, reaching twelve feet in height. Between De-doda and Ibrahim-abad this growth was being burnt down. Two reasous were given for doing this; one that the land was going to be reclaimed for cultivation, and the other that it was to enable natural grasses to grow up for the use of the sheep, of which there were very large flocks in these parts. At Padda-sultan we encamped on low-lying ground, which was covered with a luxuriant bed of succulent grasses, much to the delight of our animals. The chief of these grasses was *Panicum antidotale*, which here grew three feet high, springing from great bush-like, woody rhizomes, covered with a dense woolly soft pubescence, and was associated with *Eragrostis poæoides*, *Helochloa schœnoides*, and a species of *Æluropus*. Creeping amongst them and in great luxuriance was the wild state of *Cucumis Melo*, covered with fruit, none averaging over an inch and a half in length. Whilst young the fruit is pubescent, on ripening perfectly glabrous. These were eaten with avidity both raw and cooked by the camp-followers. I must say that the ripe fruit has a most delicious aroma sufficiently tempting to induce anyone to eat it. Near this we saw a weir laid across the river, to supply water for immense irrigation-works, which are still maintained on its left bank. This weir has to be replaced annually, as during the high floods it is always carried away.

At De-doda *Pluchea caspia* formed dense bushes, from three to four feet in height, giving excellent cover to black partridge. *Solanum nigrum* grew in quantity, and was employed as a pot-herb by the camp-followers. Between Rudbar and Koh-haja I picked up what turned out to be the portion of the stem nearest the root of a species of *Balanophora*. A Baluchi camel-man told me it was well known in his country, where it was called *Labbu*, and that it was collected for feeding camels on. A large *Orobanche* is similarly named and employed for the same purpose. To those likely to traverse Baluchistan it would be as well to note that a large and apparently new species of *Balanophora* exists in those regions. Along this portion of our journey the art of house-building was to be seen in its most primitive forms, from the arched bower of tamarisk-rods, leaving the sides so as to form a sort of open lattice-work, for the free inlet of any passing breeze, the top covered with grasses and *Alhaghi* to give shade, to those built for a colder climate, having the sides filled up with rushwork and soil, or replaced by *natural* bricks, with a flattish roof supported by stems of tamarisk or other like material and covered with matting, boughs, and clay. The form of these structures was chiefly circular, imitating a domed roof as nearly as possible, considering the material employed. It may be desirable so explain what is meant by "*natural bricks*." In one of the first letters Dr. W. H. Russell, the 'Times' correspondent, wrote from India during the mutiny, he spoke of part of the country as "a land producing bricks." On flooded land where clay has been deposited, after the water has evaporated, the clay

begins to dry; it then cracks all over into innumerable fissures, some of which divide the deposit into pieces in size and shape resembling roughly made bricks; these pieces, while still damp, are lifted up and employed as bricks. Here I saw entire houses built of them; much of the land we crossed near the Hamun was in this brick-producing stage, and it proved very unsafe ground for our horses. Our encampment at the Takht-i-Rustam was on the margin of the Hamun. By the term Hamun the natives of the district mean any piece of water deep enough to allow tamarisk-shrubs, reeds, bulrushes, and such like to grow. The Helmand terminates by expanding out into a great lake, the margin of which consists of miles of Hamun, or shallow water. This was here bounded by a clay hill called the Takht or throne of Rustam, having a precipitous escarpment facing the lake, which rose to a height of about 150 feet, and from which a fair view of the lake was obtained. The reeds extended into the lake about a mile; beyond was an expanse of clear water covered with numerous flocks of water-fowl. The natives of this part possessed large herds of a small species of black cattle very like Highland *Kyloes*, as well as sheep and goats. In the autumn they grazed in the drier portions of the tamarisk and reed-thickets; and in this cover the natives lived in temporary reed huts, erected for protection for themselves and their cattle from the strong winds which had now begun to be prevalent.

The Basin of the Harut River, from the Hamun of the Helmand to Pahir.

We marched from Takht-i-Rustam on the 1st of November, keeping generally to the basin of the Harut river, and reached Pahir on the 13th of the same month. In our first march our route lay almost due north, passing over a series of low hills of gravelly soil and skirting closely a town of considerable importance, called indiscriminately Lash, Lash-jowain, or Jowain. It consists of a number of villages close to each other, and is considered the centre of commerce in these parts. The vegetation in the low hills was much the same as that seen on our journey through parts of Baluchistan. *Ephedra pachyclada*, a low shrub, occurred in great masses, and *Zygophyllum atriplicioides* and numerous Chenopodiaceous shrubs were thinly spread over the country. When we at length descended to a locality with water nearer the surface, the cultivation and vegetation resembled that of the Helmand. *Capparis* was in abundance, with *Prosopis* and *Peganum*. Irrigation-channels were plentiful, and we passed close to miles of ruins; but all appeared of a later date than those seen on the Helmand. In the corner of one of these ruins, partly inhabited, was the first windmill we had yet seen, though of very different construction and appearance to those we are familiar with in England. The portion of the mill that corresponds to the vanes of an English mill consisted of an upright axle, with six or eight vanes applied to it, as in the paddle-wheel of a steamer. This was placed upright on the second story of a house, the upper end working in a beam which crossed between the two side walls continued up to that height. The lower portion of the axle passes through the roof of the building beneath into the millstone on the

ground floor; and in many cases it is attached to the upper stone, which revolves with the axle, the lower stone being adjusted so as to bring it into proper contact with the upper by a lever. The axle portion bearing the vanes is enclosed by three walls, the two lateral, as already stated, being carried up to support the upper bearings of the axle, and the third facing the direction of the prevailing wind. In this third wall a slit is cut of a sufficient length and width to allow of the wind passing through to drive the axle by its force on the vanes. Each vane consists of a wooden framework covered over with grass-rope or matting, in appearance very like an ordinary Afghan door. We did not need to be reminded during our last march that we had entered a country of wind, of which these mills are characteristic, and which are employed in grinding the various grains of the country. Water-mills are quite as numerous and, indeed, supersede them wherever water-power is obtainable; but I never saw a single hand-mill. The nomads I found crushing their corn between two stones, a roller and a flat stone. Before reaching our camp, we passed across miles of a loose sandy soil, which was one vast meadow of *Eragrostis cynosuroides* alone, in habit reminding me much of the bent-grass in Scotland. We then rode through the remains of a forest of *Populus euphratica*, the larger trees of which, owing to their depth of root, were still alive; but the smaller were all dead, the water-supply to the forest having been in some way cut off. Beyond Lash-jowain, owing to the season of the year, it was almost impossible to get an idea of what the indigenous vegetation of the country is like. Between Kushk-rud and Kin numerous bushes of *Vitex agnus-castus* occurred in sheltered localities, and where in all likelihood there was water close to the surface. The villages became now much more numerous, and the houses were in good condition, all built of sun-dried bricks, with their roofs in the form of a dome, which gave them a curious beehive appearance. The fact of their all having domed roofs proved the absence of good timber in the country for roofing-purposes. The houses are all built, without exception, opening into a general enclosure, out of which leads a common gateway. As these houses are never built higher than ten or twelve feet, generally below the level of the orchard-walls, a village might be easily passed unnoticed, or its extent greatly underestimated. Some of the best orchards we had as yet seen were met with here, surrounded by high walls, some as much as twenty feet in height, affording the necessary protection from the wind. In those at King I saw trees of apple, quince, apricot, mulberry, and trailing vines, and there were some splendid trees of *Populus euphratica*. Much land around these villages was under cultivation. We saw winter wheat three to four inches in height and some only now being sown; a little cotton, from which the ripe pods were being gathered; and a good deal of a very poor form of our ordinary field-bean, some of which was in blossom. The fields were apparently well irrigated from a *Karez*, which means an underground channel leading towards the required locality from a spring of water tapped at a higher level. Of course under all circumstances as little underground work is carried out as possible. The work is begun by sinking shafts in the required course to the proper depth, the bottom of these shafts being joined by tunnelling through the intermediate pieces of ground. Usually the tunnels are left just as they are dug out; sometimes the lower surface is lined with tiles to minimize the loss of water; but

I never saw any of the tunnels lined with masonry. Beyond this, on all cultivated land, the *Prosopis* of the Helmand and *Capparis spinosa* abound, and are a great nuisance to the cultivator. In our march to Zagin we crossed a great deal of scrub, consisting of a small tamarisk, *Lycium*, and *Vitex*; but there was not an indigenous tree to be seen, and the hills near us looked sterile and bare. In the villages passed through were beans in flower, planted as a margin to cotton-fields, and the orchards were larger in size, containing figs, pomegranates, and jujubes, in addition to the trees already mentioned; and the mulberry was much more extensively grown for feeding silkworms. We saw silk in skeins in quantity as well as being spun, spinning-wheels being noticed on the roofs of all the houses. Our last two marches had brought us into a country of peace, plenty, and prosperity, and the people seemed to be energetic and hard-working. Here I got a specimen of *Fagonia cretica* given to me by Captain Maitland, and close to our encampment at Zagin I observed on the outskirts of the village the remains of a cluster of date-palms, one tree only, however, being in good condition. During our journey one or two specimens of this palm in a young condition were seen at Nushki and Koh-haja, and at Kalifat a few dates, which were said to be the produce of Persia, were for sale in the bazaar. Owing to the severity of the winter, Zagin is the northern limit of the date-palm in this region. On the 7th of November, by keeping along the bed of a water-course, we passed through a range of limestone hills. On both sides of the water-course for fully three miles extended the large town of Anar-darra, a very numerously populated place, surrounded by splendid orchards and gardens, which yielded a fine pomegranate in large quantities; hence its name, meaning the pomegranate-pass. There were also many other good fruits and immense quantities of vegetables, such as carrots, beetroot, onions, &c., as well as green fodder, including clover. I was told opium and tobacco were grown too, all owing to the copious and continuous supply of water and the excellent situation of the town, which is sheltered by the hills. I here saw *Ranunculus aquatilis* still in flower; and the trees noted in the orchards which have not been previously mentioned were the almond, peach, plum, *Elæagnus*, and numerous willows, large trees very like *Salix babylonica*. To these gardens, orchards, and fields the Afghans apply all the manure they possess, none of it being burnt or employed for fuel, as in India. On leaving Anar-darra for Sang-bar we gradually ascended to an altitude of nearly 3000 feet above the sea-level, and entered upon a district much resembling portions of our march through Baluchistan, both with regard to its physical aspect and its vegetation—as here we again came across *Stocksia* covered with fruit, and in addition began to touch upon a new flora. A shrubby *Amygdalus*, the remains of *Eremuri*, a different *Ephedra*, *Cousinia heterophylla*, a bush Composita with oak-like leaves, and various species of *Artemisia*, and a few small trees of the *Rhus* previously collected, the leaves of a tree, probably a species of *Acer*, an *Acanthophyllum*, and several *Astragali* in great hummocks. As we continued our journey, we traversed extensive gravel-plains and plateaus with limestone hills on either side. These plains were covered in some places, as if cultivated, by *Iris sibirica*, the leaves and stems of which lay on the ground like so much straw; and it was difficult, except after careful examination, to believe that we were not riding through ordinary straw, the residue of field-culture. Our marches here were very long and tedious,

and the sameness of the sterile treeless plains made them uninteresting. This monotony was, however, occasionally relieved by views of the distant hills, with their picturesque, irregular outlines, and by the great beauty of the sunrises and sunsets. We eagerly looked forward to the first sight we should have of Mount Do-shakh, the most prominent peak, with two points, of a range of hills that divided the watershed of the south from the north, and in turning the eastern flank of which at Pahir we should begin to enter the Hari-rud valley, and probably see Herat in the distance. On the 12th of November we had the most superb view of the Do-shakh range at sunrise from Gaz-i-cha; and near our camp there I saw the first cultivated ash, and with it several willows and *Populus euphratica.* The camp-sutlers brought in for sale some fine specimens of the celebrated *Sarda* melons, besides grapes, pistacio nuts, and raisins; showing that we had at last reached a land overflowing with fruit. On the 13th of November we arrived at Pahir, and there beneath us, at a distance of some 25 miles, lay the city of Herat, its position being chiefly distinguishable by the deep shadows of its numerous orchards and some buildings with tall minarets. From Pahir, a small village at the eastern extremity of the Do-shakh range, and fully 300 feet above the bed of the Hari-rud river, we had a most excellent view of the general aspect of the valley.

The Valley of the Hari-rud.

The portion of the valley of that part of the Hari-rud river with which I am acquainted lies between the village of Shekewan in the south-east, to a little further north than Kumani-besht in the west. This portion of the valley is bounded to the north and east by the Paropamisus range, to the south by the Do-shakh range, and to the west by low ranges of hills, offshoots of the Koh-Bakharaz on the Persian frontier. Its altitude above the sea-level at Shekewan is about 2300 feet, and at Kumani-besht about 2000 feet. The general appearance of the valley in winter, when we first saw it, totally devoid of trees, shrubs, and bushes, led one to speculate as to the probability or otherwise of verdure ever being present. Great was my surprise therefore, when passing over the same ground in summer, to find that a vegetation of marvellous luxuriance had sprung up, constituting a flora distinct from anything I had before seen. Along the banks of the river stretch immense rich alluvial plateaus, which are only partially cultivated by irrigation from the river. The Hari-rud is only fordable from midsummer to the end of December; during the rest of the year all the traffic is conveyed across it over two bridges, one at Herat and the other at Tirphul. I have heard that there are ferry-boats, but I never saw any. The general course of the river, as far as Tirphul, is from east to west; but from this point it makes a wide detour in a north-westerly direction, until it reaches Toman-agha, whence it proceeds almost due north. The chief towns in the valley are Shekewan, Zindijan, Ghorian, Roznak, and Khusan. During early summer, owing to the extent of land under cultivation, as well as to the general fertility of the soil and the presence of the moisture of the spring rains, the valley appears one vast green meadow. The towns just mentioned are not solely inhabited by cultivators of the soil; fully one half of the population are owners of immense flocks of sheep and goats. During summer

these semi-nomads disappear with their flocks to the great grazing-grounds of the surrounding country, and only return late in the year to winter their flocks. The cultivation, as it at present exists, is very poor and second-rate, compared with what it might be under a strong and vigorous government, favourably disposed to the agricultural development of the country. The people look and are miserably poor and badly clad; the houses are all more or less in ruins, walls unrepaired, many orchards running to waste, and fields lying fallow. Everywhere signs of decay and poverty were apparent, a great contrast to the state of things found at Lash-jowain. Yet the valley looked capable of maintaining 100,000 inhabitants, were only labour and capital forthcoming to extend the cultivated area by developing and improving the present system of irrigation-works, for without a liberal artificial supply of water at this altitude nothing will grow.

There are no indigenous trees in the valley, except on the islands and low lands of the river, where in some instances dense forests of *Populus euphratica* occur, with several large species of *Tamarix*, as *T. tetragyna*, *T. Pallasii*, *T. tetrandra*, and others, and *Lycium barbarum*, remarkable in early spring for its vivid green foliage. Climbing over them were *Clematis orientalis*, *Cynanchum acutum*, *Asparagus Breslerianus*, and *A. verticillatus*, with *Dodartia orientalis*, which has a very curious, stiff, broom-like habit, beneath. *Erianthus Ravennæ*, *Phragmitis*, and *Arundo* are common: the two latter especially along the embankments of all irrigation-channels. On the receding of the river in early summer it was extraordinary how millions of a small fungus, *Agaricus* (*Naucoria*) *Vervacti* sprang up out of the freshly deposited soil. At Kumani-besht, where the river widens, forming many islands, *Haloxylon Ammodendron* constitutes a great part of the thicket already described, and is here almost a tree, both in height and in girth—what a contrast to the locality in which I first met this shrub, in the sandy dunes of Baluchistan! Its presence here no doubt helps to prove its dependence upon moisture. Cultivation, as already stated, can only be carried out with the aid of irrigation; hence the villages and fields are situated in the vicinity of the river, unless, as at Ghorian, which is at some distance, large irrigation-channels have been opened. The houses of all these villages are built of sun-dried bricks, having, with few exceptions, domed roofs, and there is generally but one door, and in the roof an outlet for smoke, such a thing as a window being unknown. For winter accommodation they are very comfortable, but in summer the heat within them is unbearable; hence all those who can, live out in the open under the cover of black tents, made of goats' hair blanketing fixed on a wooden framework, sufficiently raised to permit of a free passage for air and yet preserve a certain amount of privacy. The orchards are here, as in the Harut valley, surrounded by high walls; a row of mulberry-trees running round the inner side are grown for feeding silkworms. A native, in pointing out these to me, said, "When you see large trees they are no longer employed for this purpose." On my observing that all the trees at that village were large, he admitted the fact, but added, "You know that there is no silk-culture now in comparison to what there has been, owing to the disease among the worms."

In several villages, owing to this disease, silk-culture had been entirely abandoned. For silk-culture the trees are pollarded about four feet from the ground, and at this

height the annual shoots are removed. When the trees are large, they give shelter generally to the orchard, and are kept for their fruit, which, although poor in the extreme, is collected and dried in the sun for the purpose of being subsequently ground into flour and made, mixed with ordinary flour, into bread. After seeing the soil on which the mulberries were collected, and that on which they are placed to dry, I never wish to taste another Afghan dried mulberry! There could not be a more prolific source for the propagation of disease. The other orchard-trees were apricots, plums, apples, cherries, quinces, jujubes, *Elæagnus*, and vines. The last are either permitted to climb on the trees in the orchard, or are planted in deep broad trenches, the soil from which is made into a sloping bank with a northern exposure. On the banks the vines are either allowed directly to trail, or are supported on a lattice-work fixed on the slope so as to keep the fruit from coming into contact with the ground.

Occasionally pears, peaches, almonds, pomegranates, and figs are grown in the better class of orchards, where it is very common to see both yellow and red roses. The latter, *R. damascena*, is cultivated for the distillation of rose-water, and *Rubia tinctorum* for its roots as a dye-stuff; and under the trees, *Medicago* and *Trigonella* are usually cultivated for fodder. As garden-crops numerous kinds of vegetables are cultivated, of which the Afghans are extremely fond, and some of them are excellent in quality. Even in England one scarcely expects to see finer beetroot, carrots, turnips, onions, or cabbages than are grown here, besides radishes, tomatos, brinjals, and chillies, which are all fairly good, with numerous pot-herbs. Requiring more care than ordinary field-crops, opium, tobacco, and some oil-seeds are also grown in gardens.

The field-cultivation consists primarily of wheat, which is fairly good; but in some localities it is overgrown with rye, which is an indigenous weed. Barley of two kinds is grown; the finer, and the grain of which is the sweeter and considered fit for human food, is *Hordeum hexastichon*, which is said to take a month longer to ripen than the other. The grain of *Hordeum vulgare* is only considered suitable for horses, &c.; but as it takes much less time to ripen, it is occasionally grown as a second crop; usually there is no such thing as a second crop, in these parts, of any produce.

Only when water can be liberally supplied is *Sorghum*, the greater millet, grown as a crop by itself; it is commonly seen spread at irregular distances in fields of tobacco or of melons. Cotton is grown to some extent, but the staple cannot be compared with that from Turkistan. I should say that water-melons rank next to wheat in value as a food-crop. During two or three months of the hot weather the natives seem to live entirely upon them with a little bread; and they contain so much saccharine matter that in Herat a syrup or sugar is extracted from them. Ordinary melons are cultivated, but in much less quantity than the water-melon, and mixed with them is a great variety of pumpkins and other Cucurbitaceæ. In these melon-fields it is curious to see, either sprinkled thinly through them, or growing in single lines along the outer margin of the fields, the castor-oil plant, cultivated as it was in Griffith's time, for its oil for burning, the inhabitants being still ignorant of its uses as a medicine. The cultivated trees in the vicinity of villages and in orchards are an ash, an elm, the Lombardy poplar, *Pinus halepensis*, and several large willows, and, rarely, the Oriental plane.

I saw *Datura alba* as an introduced weed near dwellings at Khusan. Of *Cannabis sativa* I never saw a single plant, except a little cultivated in Khorasan. The weeds of field-cultivation were *Prosopis*, *Capparis*, *Rosa berberifolia*, rye amongst growing wheat only, and in some instances outnumbering the wheat-crop, *Avena fatua*, *Adonis æstivalis*, which was a much more luxuriant and larger-flowered plant than when it grew in the adjoining plains, *Isatis Boisseriana*, *Neslia*, *Sisymbrium*, *Arenaria holosteoides*, *Centaurea depressa*, *Cnicus*, *Anchsua italica*, a splendid herb when in full blossom, having superb blue flowers, *Orobanche ægyptiaca* in many localities, colouring the melon- and tobacco-fields with its bright purple flowers. In a few places I met with *Cynomorium coccineum*, a blood-red species of the Balanophoreæ, which altogether captivated my Indian followers, who collected portions to take home for purposes of medicine. Here also I found a very handsome new yellow *Centaurea* (*C. plumosa*, Aitch. et Hemsl.).

The indigenous flora of the Hari-rud valley consists of annuals and perennial herbs and shrubs with large root-stocks, bulbous roots, bulbs, or rhizomes—structural developments which enable them to baffle and survive through the extremes of temperature and climate. Umbelliferæ are characteristic of this flora; and many of them are of large dimensions, including *Ferula fœtida* (Asafœtida), *Ferula galbaniflua* (Galbanum), and *Dorema Ammoniacum* (Gum Ammoniacum). In four months these large plants have come and gone; suddenly appearing in the beginning of May, when their root-foliage is fully developed, covering the whole country with a carpet of the richest verdure, they as completely by the end of August have disappeared. If there is anything at all to be seen of them subsequent to this period it consists merely of a few dried stems, with an occasional bunch of ripe fruit. Usually these three plants grow gregariously and unmixed; sometimes, however, the Asafœtida and the Ammoniacum are associated together. Of the Asafœtida, only one plant out of a hundred met with was in flower, and in that state it is remarkable for the cabbage-like head at first thrown up, the flowers being enclosed in the enormous sheathing stipules, of which the stem-leaves almost entirely consist. As development progresses, these are thrown off, and for a short time the flower-head presents the appearance of a large cauliflower. From this period the stem bearing the inflorescence rapidly shoots upwards to a height of from four to five feet, its proportions being singularly massive and pillar-like. The Ammoniacum and Galbanum seem to me to differ from the Asafœtida in throwing up from their perennial roots a flowering stem annually, whereas the Asafœtida after several years' growth throws up a flowering stem and then dies. This view may appear unsound, but the facts that all the plants of the Ammoniacum and Galbanum were seen to be either in flower or in fruit, and that their stems and roots were found to vary greatly as to size, go a long way to support my opinion; but this remains a subject for future investigation.

The Galbanum, from its youngest stage, has a slight tinge of yellow all through its stems and leaves, and there is a general semitransparency about the plant which gives it the appearance of being made of wax. When a great bed of this is in full but young blossom, the sight is a most striking one, the whole plant, at that period of its growth, being of an orange colour. The Ammoniacum is more remarkable for the great

expanse of its root-leaves, and the similarity which they present to the same leaves of the Asafœtida, so great, that experts alone could possibly distinguish them. The stems of all these large Umbelliferæ vary from four to five feet in height, and probably that of the Asafœtida is the tallest, and is remarkable for its bamboo-like appearance and its ending in a cluster of flowering peduncles; and that of the Ammoniacum for its enlarged nodes at the base of each stem-leaf. The stem of the Galbanum has no enlarged nodes, and its flowering peduncles originate irregularly along the stem, and are not clustered at the top of the stem. These Umbelliferæ extend both into the Badghis and Khorasan. In the Badghis the greater moisture of the climate, I think, enables the Galbanum to attain its greatest perfection; but wherever they appear they excite attention by their remarkable habit and magnificent appearance.

Zygophyllum atriplicoides, a bush never over four feet in height, is found scattered in a few localities over the country. It is useless as fodder or for fuel. Two species of *Artemisia*, with woody stems, one to two feet in height, cover the country with a thin scrub, and form the chief pasturage on these gravelly plains, and their gnarled root-stocks and stems are excellent fuel. There are numerous Leguminosæ, among which *Eversmannia* is a superb plant, bearing a profusion of purplish rose-coloured flowers. *Acanthophyllum squarrosum* was in abundance and a very variable species, including, in my opinion, three of Boissier's. It occurs with several species of *Acantholimon*, *Statice*, and *Astragalus* in the form of great spheroid tufts, cushions, and hummocks, covered with numerous blossoms, simulating artificial bouquets of greater or less size, the favourite morsels of camels, sheep, and goats. In some instances the sheep and goats cannot browse them, owing to the spines being in advance of the flowers—an instance of fixed bayonets. Associated with them are numerous species of *Cousinia*, among which *C. Deserti* came much under our notice, owing to its holly-like leaves, and *C. heterophylla*, with its grey oak-like leaves. Other prominent plants were *Gaillonia*, *Ephedra*, and *Eurotia*. In early spring *Tulipa montana* gave a rich colouring to the whole plain, of every shade from bright crimson, crimson and yellow, to pure yellow, and *Iris songarica* scattered sparsely in large clumps, continued flowering well on into autumn, was remarkable for its handsome mauve flowers. A species of *Helicophyllum* was also profuse, at once attracting attention in early spring by its deeply purple-coloured spathes. Annuals were in abundance; most of these are spring flowers, and grow, many of them, in such profusion, covering large areas, that they colour the country with their varied hues—among them *Papaver*, *Glaucium*, *Rœmeria*, *Chorispora*, *Malcolmia*, *Sisymbrium*, *Goldbachia*, *Isatis*, and one species of *Ranunculus*.

One of the chief grasses, most prolific in early summer, and covering the ground everywhere, was *Poa bulbosa*, growing from ten to eighteen inches in height; in these parts it might be collected with the greatest ease as fodder sufficient to supply large numbers of cattle. *Stipa pennata* is one of the few grasses which extends to the sterile portions of these plains, covering them with great spreading tufts. Close to the hills, and at an altitude of 3000 feet, *Amygdalus eburnea* occurs as a low shrub. Where there was the least shelter, as in dry water-courses and irregular depressions of the ground, there was a low scrub of *Tamarix gallica*, *Lactuca orientalis*, *Pteropyrum Aucheri*, *Calligonum*,

Atraphaxis, *Ruta*, *Stellaria*, *Convolvulus erinaceus*, *C. fruticosus*, and *Nitraria*, with various species of *Cousinia*, *Centaurea*, and *Ephedra*. Where there was any indication of moisture, as in the vicinity of cultivation, there was abundance of *Ammothamnus Lehmanni*, *Sophora pachycarpa*, with *Zygophyllum Fabago* and *Cleome coluteoides*, having curiously inflated purplish-coloured fruit; and in certain localities where the clay soil was largely charged with saline matter and cut up into low irregular mounds (one could scarcely call them hills), a curious plant, *Miltianthus portulacoides*, was found, with, for its size, enormous, spongy, much-decayed root-stocks, and a profusion of copper-coloured flowers. This was the only herb that grew on this peculiar formation. In proceeding north from Khusan, at Toman-agha and still further north, a very marked species of Rhubarb, *Rheum tataricum*, occurred in the plains. The showy part of this plant was usually three enormous root-leaves, each measuring when full-grown about four feet across, and spread out flat on the ground. The flowering stem averages from two to three feet in height, and terminates in a loose panicle of flowers, which in due season develops large ruby-coloured, or sometimes yellow, winged fruit. From the novel and striking appearance presented by the leaves and fruit of this Rhubarb, it might prove a valuable acquisition to the stores of the landscape-gardener. I am glad therefore that I was able to obtain a large quantity of the seed, part of which has already germinated successfully at Kew.

On the left bank of the Hari-rud, near Ghorian, a large expanse of saline country exists, where flourished almost every species of Chenopodiaceæ which I had collected elsewhere. Here were *Atriplex*, *Eurotia*, *Halostachys*, *Sucæda*, *Haloxylon*, *Salsola fœtida*, *S. arbuscula*, *S. auricula*, *S. Kali*, *Anabasis*, &c., together with *Statice perfoliata*, which grows very much in the way of a *Rubus*, having large trailing branches, *Statice suffruticosa* in tufts covered with saline matter, and *Frankenia* in great abundance.

At Zindijan, one of the few Afghan villages which I visited, there was a considerable amount of cultivation, which, however, was much hindered by a continuous deposit of sand blown across the river from the low hills on its right bank. To such an extent does the sand accumulate that portions of the village are almost buried, and great drifts have formed on the weather-side of all the walls. Where there was much sand spread over the level ground, the turf consisted solely of *Plantago maritima*. In August, when I last visited Zindijan, the field crops had been harvested, and all irrigation had ceased, so that water was only to be obtained from the river some distance off, or from reservoirs enclosed and roofed over. Throughout the whole of my wanderings I neither saw nor heard of a single well lined with masonry, such as one meets with in India. The roofed reservoirs keep the water cool in summer, and prevent its freezing in winter; but, although the water deposits all the soil and foreign matter usually held in suspension by river-water, it subsequently becomes highly charged with various organic impurities, rendering it for drinking-purposes extremely injurious to the general health of the community.

The Badghis District.

Badghis is the term applied to that part of the country to the north and east of the Paropamisus range of mountains. The members of the Mission traversed this district, entering it by the Chashma-sabz Pass (5000 ft.) on the south-west, and skirting the northern slopes of hills in an easterly direction, by way of Karo-bagh, Kushk, Kalla-nao, Ab-i-kamara, and Tor-shakh to Bala-morghab, where they wintered, returning in the early spring to Gulran through Mara-chak, Kalla-i-maur, Chaman-i-bed, and Islim. Along this route I do not think we ever ascended above an altitude of 4000 feet, and the entire country to the north of the line we took, between Karo-bagh and Kalla-nao, does not average above 3000 feet in altitude. This country is drained by the Kushk and Morghab rivers, and constitutes a continuous succession of ranges of low hills, like sand dunes, the soil of which is composed chiefly of a rich mould in addition to sand, and where occasionally there is sandstone rock *in situ*. The climate of this region is very different from that of the portion of the Hari-rud valley already described. It is much more humid, due to the drainage which passes through it from the melting snow of the surrounding high ranges of hills, as well as to that moisture, derived more indirectly from the Caspian, which in the shape of clouds rolls eastwards along the ridges of the hills lying between the Caspian and the Hari-rud. It is therefore characterized not only by a greater verdure and a more luxuriant vegetation, but these conditions are of a more permanent nature than in the valley of the Hari-rud. The temperature in winter falls several degrees below zero, and in summer, I believe, the heat never reaches anything approaching that experienced in the adjoining plains. Generally throughout the year there is also much less wind, although sudden storms of wind, accompanied by rain and hail, do occur in summer, and prove very destructive to all forms of vegetation.

The only places where I saw cultivation in the Badghis were on the banks of the Morghab river and near Kalla-nao, chiefly by the aid of irrigation; for although crops of wheat and barley were raised without it, they were inferior in quality. The natives greatly enrich the soil by dressing it with manure, which they obtain from their immensely numerous flocks of sheep and goats. As it was the depth of winter when we were at Bala-morghab my information was mostly obtained from native reports, from which I could not discover that there was any exceptional cultivation, but maize and rice were said to be grown largely at Panjdeh. The fuel brought into camp consisted of the wood of juniper, pistacio, and *Celtis*. In the immediate vicinity and for some few miles out of camp I did not see a single tree of any sort; and to show how they are prized when they do occur, a solitary pistacio tree which we saw on our march to Mara-chak, perched on a distant hill, gave to the shrine near which it grew the name of the "one-tree shrine;" but I was told that forests of various trees existed in the Tir-band range. In the neighbourhood of Bala-morghab I noticed numerous deep holes, which on inquiry I found had been made by the natives digging out the turnip-like roots of *Crambe cordifolia*, upon which they feed their camels during winter, and which are frequently stored for this purpose. The only plants I collected here which I was

able to identify are:—*Eranthis cilicica*, *Crocus Korolkovii* (the most eastern species of the genus), *Taraxacum officinale*, *Merendera persica*, and *M. sobolifera*, the last a very pretty creeping herb, growing in damp soil on the margin of water, or where the ground was flooded. During February, on the sun coming out brightly, these flowers open up like so many stars amongst the short grass. In the fields *Prosopis Stephaniana*, *Alhagi Camelorum*, *Peganum Harmala*, and a *Glycyrrhiza* were common. On our march to Gulran, with snow occasionally lying on the ground, *Merendera persica* grew in great luxuriance in clumps consisting of numerous flowers from each corm, and owing, I suppose, to its arid and colourless surroundings appeared very showy and brilliant. In the bed of the Morghab, a tamarisk, some tall grasses, species of *Arundo* and *Phragmites* formed a dense thicket, which gave excellent cover for pigs and numerous pheasants. On the march to Kalla-maur I saw for the first time plants of the singular Umbellifer, *Ferula oopoda*, bearing enormous cup- or bowl-like stipules; and though completely dried up, it still showed signs of having been a very handsome plant. It was said to be common round Bala-morghab and to enter northwards into the salt desert, but, like all the vegetation of these parts during winter, had utterly disappeared. Subsequently I found it in all its spring beauty at Gulran, and again in the Hari-rud valley and Khorasan.

The vegetation of the Badghis divides itself naturally into that found upon the dunes, which reach an altitude of from 1500 to 3000 feet, with a soil varying from pure sand to a rich alluvial mould; that met with at a similar altitude but upon gravel or rock formation; and lastly that which occurs on the Paropamisus range from an altitude of 3000 feet to a little above 5000, this being about the highest point at which I collected. The loose soil of these dunes was covered with a close turf of *Carex physodes* and *C. stenophylla*, the former of which is remarkable for its largely inflated chocolate-coloured utricles. For a short period the hillocks are tinted an exquisite blue by the flowers of *Gentiana Olivieri*, which is, as Boissier noted, the hot-country gentian. This is followed by *Delphinium Zalil*, a perennial which throws up a spike of bright yellow flowers two feet in height. Its showy blossoms suddenly cover the downs, which they illuminate with their brilliant colouring, affording a sight never to be forgotten. In some localities, as at Gulran, *Ferula galbaniflua* was found in great luxuriance, its early spring stems and leaves being greedily devoured by our camels; and *Fritillaria Karelina* covered the meadows in all directions with its graceful and lovely spikes of flowers. *Leontice* and *Bongardia* (genera previously unknown to me), with numerous *Eremuri*, *Gagea*, a fine *Tulipa*, several *Onobrychides*, some of them new, with *Biebersteinia*, and the small dwarf yellow single-leaved *Rosa berberifolia*, were in profusion everywhere. Mixed with them, but occasionally in meadows apart from them, were several grasses, the most characteristic of which were *Poa bulbosa* and, later in the season, *Agropyrum Aucheri*. *Tanacetum umbelliferum* with large yellow flower-heads, displayed occasional fine patches of colour, and *Camelina sativa* and *Gypsophila paniculata* were abundant everywhere, the latter especially so, over ground which had been years ago under cultivation.

It may be noted here that throughout the whole Badghis the remains of a system of

irrigation-works were constantly coming under our notice—indications of a bygone period when the country was inhabited by a vast and energetic population. Near water several tamarisks were common, and associated with them *Apocynum venetum* was abundant. This plant I first saw in winter, when it was leafless, showing a thicket of the annual shoots of several years' growth; but what attracted my particular attention to it were the heaps of naturally removed fibre lying at their roots. They still bore fruit, some of which, with cuttings from the last year's stems and a large bundle of fibre, I despatched to Kew; and living roots I sent to Seharanpore. From the fine quality of the fibre, and hearing that the natives employed it in the manufacture of cloth, I thought it worthy of special attention.

In the valleys of the dunes, where there is some local non-saline moisture, there were immense beds of underscrub, formed by a robust, tall, perennial, *Codonocephalum Peacockianum*, a new species of a previously monotypic genus, which grew to a height of about five feet; and a similar underscrub consisting solely of *Gundelia Tournefortii*, remarkable for the large spinous involucre surrounding the flower-heads. These plants extended for miles, looking at a distance like cultivated fields, but on a closer inspection proving to be dense thickets almost impassable by man on foot, and providing admirable cover for pigs, tiger, and other game. Strange to say, this luxuriant growth had totally disappeared by the beginning of winter, the decay of which no doubt accounts for the large amount of rich mould in various parts of the Badghis.

On the gravelly soil and rock formation *Amygdalus eburnea* was very luxuriant, forming a shrub from two to six feet in height, and presenting a beautiful sight when in full blossom. There were also many *Astragali*, several of which are regarded as new; *Onobrychis*, the superb *Lathyrus subvillosus* in dense clumps and well worthy of the horticulturist's attention; *Mathiola albicaulis*, having a very handsome flowering stem two to three feet in height, usually with rather dull-coloured purplish flowers, but sometimes pure white or greenish; several *Statice* with showy flowers; *Crambe cordifolia* very plentiful, with ample foliage and inflorescence, with sweetly scented flowers; *Thalictrum*, *Conringia*, *Galium*, *Arum*, diffuse at the roots of tamarisk and berberry bushes; *Eremostachys diversifolia* with splendid flowers and curiously knotted roots; numerous species of *Allium*, the variety *Charlesii* of *Geranium tuberosum*, having spheroidal superposed tubers; *Anemone biflora*, *Thalictrum isopyroides*, several splendid *Eremuri*, and the new *Iris Fosteriana*. Up to the altitude of 3000 feet there are few shrubs and no trees, unless the formation consists of sandstone rock, where there are forests of *Pistacia vera*, which were first encountered on our march between Karez-darra and Padda, subsequently near Gulran and again at Karez-Ilias, where a portion of the country, owing to the prevalence of this tree, goes by the name of *Pistalik*. The tree has little or no main trunk, and branches freely from the base. During winter, when leafless and seen along the edge of the cliffs against the sky, the peculiar grey colouring of its bark gives one the impression of smoke. We saw occasional clumps of it all along our route through the Badghis. The pistacio nut is an article of considerable commercial importance, being largely exported to India from these very forests; and the wood is the most valuable for fuel of any found in the country. At the foot of the same rocks,

growing in the sand accumulated from their disintegration, was the very luxuriant *Corydalis Sewerzovii*, having large bright yellow flowers. In certain localities and exposures in the Paropamisus range, at an altitude of 3000 feet and upwards, trees begin to appear, the most prominent being *Juniperus excelsa*, chiefly valued for its wood for construction and fuel; *Cratægus Oxyacantha*, *Elæagnus hortensis*, *Lonicera nummularifolia*, the last usually as a large shrub, but occasionally forming scattered forests of short trees with great boles; several species of *Prunus* and *Cotoneaster Nummularia*, well known to the natives as yielding *Shir-khist*, a kind of manna largely exported as well as consumed by the inhabitants. The last is local, owing to the nature of the soil. In some of the deep valleys between Kushk and Palounda I saw *Zizyphus vulgaris*, with a species of *Pyrus*, and an *Acer*, all apparently indigenous. I did not meet with any oaks or pine, but heard of *Pinus halepensis* occurring in the Paropamisus range, at a shrine around which it has extended its area. Other characteristic types of a high altitude were *Rheum Ribes* in immense beds, *Rosa*, *Solenanthus circinnatus*, *Smyrnium cordifolium*, *Prangos pabularia*, and *Alyssum persicum*.

At its north-west limit the Paropamisus range breaks up before it reaches the Hari-rud and spreads out into a fan-shaped expanse of low hills, ordinarily not over a few hundred feet above the level of the river (which is here about 2000 feet above the sea), with the exception of a few solitary peaks such as those of the Sim-koh, which in all probability are not over 3500 feet in altitude. On the 14th May I started on a tour from Kumani-besht through this expansion of the range, across the Nihal-sheni pass to Chil-gaz, Karez-Ilias, and Sim-koh, to the east of the Kambao pass. The soil of this district being saline, pure sweet water is only to be obtained in a few localities; hence there is no cultivation. Indeed the country is practically a desert, and only occasionally used for pasturage, the distance between the watering-stations rendering it almost valueless for grazing purposes. Between Toman-agha and Kumani-besht, close to the river, rises a range of high clay cliffs, a counterpart of those called Takht-i-Rustam on the Hamun. On ascending these cliffs they were found to be the edge of a continuous plateau, extending to the Paropamisus on the east and north, and consisting of vast alluvial deposits. The general aspect of the vegetation here strongly resembled that around Tirphul, but contained a good many new and interesting types. The first remarkable plant observed was *Statice spicata*, growing chiefly in the washings of sand at the base of the cliffs, and which although only a few inches in height was very attractive from the bright pink colour of its spikes of flowers. Along with it, conspicuous by its dark foliage rather than for anything else, was *Statice leptostachya* frequently covering the plateaus in the low hills. Where water accumulates, owing to clay deposit, on these plains, a matted turf-like sward composed solely of creeping *Lepidium Aucheri* is specially noticeable; and in the gravelly soil several species of *Tragopogon*, *Scorzonera*, and *Lactuca* occur in abundance. The chief grasses were *Poa bulbosa*, *Bromus Danthoniæ*, and in many places *Hordeum ithaburense* was in such profusion and so much resembled cultivated fields, that my followers called it wild barley, an opinion shared by most of us; further, *Triticum squarrosum*, *Hordeum Caput-medusæ*, and *Melica ciliata* were prominent elements of the pasturage. Various species

of *Allium* were equally abundant, giving their own peculiar colouring to immense tracts of country. In the water-courses *Tamarix gallica*, *T. tetandra*, and *Dorema glabrum* were found; the last throwing up flowering stems fully twelve feet in height, clothed with a blaze of mimosa-like flowers, and forming a thicket in the shade of which a large *Atriplex* was very luxuriant, and was greedily eaten by our cattle and camels. At Sim-koh we encamped at the base of the hill of that name, at an altitude of about 3000 feet, the hill itself being about 500 feet higher, and in the vicinity of a fine perpetual spring of water. Here in the deep gorge of the stream *Morus alba*, a large indigenous tree, was common, associated with *Celtis caucasica* and a large shrubby *Ficus*, which is without doubt the wild condition of the cultivated fig. The *Celtis* I had not seen before, although much of the fuel we used during the previous winter at Bala-morghab was the wood of this tree. At Tirphul I had seen stunted plants of the *Ficus*; but here it was a fine large shrub laden with the yet unripe fruit, covering the whole southern exposure of the Sim-koh hill. *Salix acmophylla* grew plentifully in some of the water-courses, especially between Sim-koh and Karez-Ilias. In the alluvial soil at the source of the stream *Glycyrrhiza glandulifera* grew in great luxuriance, reaching a height of fully nine feet, with *Althæa officinalis*, not met with elsewhere. *Rosa anserinæfolia* was common on the rocks; and at a waterfall I collected my only Afghan fern, *Adiantum Capillus-veneris*. Here, as well as near Karez-Ilias, on the gravel slopes of the water-courses the indigenous form (*S. tetranda*, Stev.) of *Spinacia oleracea* was common, and recognized by the Afghans as *Spinaj* or *Spinahk*. In addition to the plants already named various species of *Acantholimon*, *Eremostachys*, *Cousinia*, and *Artemisia* were plentiful, with several species of *Orobanche* parasitic on the last two genera.

Mount Do-shakh.

From Zindijan I visited the Do-shakh range, which forms the watershed between the Hari-rud and Harut rivers. These hills are of limestone formation, with an extremely jagged outline, and have two principal peaks, from which the range takes its name, and which are probably not above 4,500 feet in altitude. On the journey I found *Cousinia Deserti* and *Cousinia heterophylla* both very common on the gravel plateaus, with *Cnicus arvensis*, *Lactuca orientalis*, *Eryngium carlinioides*, and *Ephedra*, covering vast tracts of country; and here and there a few patches of *Andropogon laniger*. In some of the dry water-courses *Glycyrrhiza triphylla* was very prevalent, growing in luxuriant beds, bearing numerous spikes of lovely white flowers, succeeded by curious brown bristly pods. *Astragulus anisacanthus* and *Convolvulus fruticosus* were likewise common; the latter an extremely stiff, woody, thorny species, most unlike any of our British *Convolvuli*. *Chenopodium Botrys* occurred in large tufts, and was collected and used as a pot-herb by my guides. On reaching Kishimaru, an encamping ground, I found a stream of water which issued from the northern base of the Do-shakh hills, close to one of the main peaks. I followed this watercourse up to its source and found *Cercis Siliquastrum* as a large bush up to twelve feet in height, forming a thicket on both sides of the stream. I did not meet with this elsewhere in

Afghanistan; and I was told here that the shrub was of no use, not even for fodder; but near Meshed I found that the people used its annual shoots for basket-work. Except near water the northern declivity of these hills is entirely devoid of vegetation; but on these southern exposures I found several good examples of *Pistacia Terebinthus*, var. *mutica*; *Salix babylonica*, a large tree in the vicinity of water; and in the clefts of the rocks, the same *Ficus* as that collected at Sim-koh was occasional, and in the stream-beds numerous groves of tamarisk. It should be mentioned that several small streams which originate in this range, after running for some distance, gradually sink into the soil, and disappear.

Khorasan.

I made two journeys into Khorasan as far as Meshed, on the first occasion travelling by Turbat-i-Shaikh-Jami, and on the second by Rui-khauf and Turbat-i-Haidri. The most interesting portion of these journeys, botanically speaking, was that experienced in the hills south of Turbat-i-Shaikh-Jami, near Bezd, which reach an altitude of perhaps 7000 feet. The village of Bezd lay hidden at the base of the hills, and was well watered by a stream. Here I first saw some fine orchards of splendid walnut trees, besides all the fruit trees previously mentioned, with the almond and peach in great luxuriance; and in addition to the common trailing vine, there was a standard variety bearing a rather sweet green grape said to be seedless. *Rhus coriaria* was cultivated for its leaves for dyeing and tanning processes, and the pistacio was cultivated, which last I was told was not the case in Afghanistan. In the village there were some fine trees of *Platanus orientalis*, and in the orchards the mulberry trees were remarkable for their immense size. I was informed that for some time back sericulture had ceased, owing to disease amongst the silk-worms, but that the village had been celebrated for the yield of its silk some fifty years previously. The inhabitants have now in its place taken to the cultivation of the poppy for the production of opium, which was proving the ruin of the inhabitants, as every one, even children, either smoked or ate the drug.

I made an excursion into the hills by following up the stream-bed, and at about 5000 feet I found myself in a deep gorge between cliffs of limestone and conglomerate rocks. On these *Dionysia tapetodes* occurred in moss-like clusters with *Campanula incanescens*, *Parietaria officinalis*, and *Cheilanthes Szovitsii*, the last being the second fern that I had seen or collected in my wanderings, besides a species of *Euphorbia*, remarkable in habit of growth, in the clefts of the rock. Before I had it in my hand I thought it was another fern, owing to its resemblance to an *Asplenium*. In the water-courses, along with shrubs of *Berberis*, *Cotoneaster*, *Elæagnus*, *Lonicera*, *Prunus*, *Salix*, and *Rosa*, was a tall dicecious species of *Lychnis*, with *Orchis laxiflora* and *O. latifolia*, *Scrophularia alata*, and *Iris Gueldenstaedtii*. Between the stream-bed and the rocks the gnarled, woody, dwarf, scrubby *Rhamnus persica* was common, with several grasses, including *Oryzopsis cærulescens* in great beds; *Arrhenatherum Kotschyi*, an oat-like grass with curious bulbous roots, and *Agropyrum repens*. The showy *Hemenocraster elegans* was in great luxuriance, its large rose-coloured calyces rendering it very conspicuous; *Eremurus aurantiacus*, brilliant against the dull colouring of the

rocks; finally *Codonocephalum Peacockianum* and a *Hyoscyamus*, perhaps a variety of *H. Senecionis*, the last creeping amongst the boulders.

At 6000 feet the hill became very barren, and such plants as flourished were grazed to a sward by the sheep. Much of this herbage consisted of a *Pedicularis*, of which I could not obtain a single good flowering or fruiting specimen, together with *Alyssum persicum*, *Hypericum scabrum*, several species of *Echinospermum*, and *Jurineæ*, *Geranium collinum*, *Onobrychis* in immense broad hummocks, *Erysimum persipolitanum* and a new one-flowered *Astragalus* (*A. Durandianus*), *Gaillonia*, *Paracaryum*, and *Pteropyrum*.

In traversing the northern slopes of these hills, at an elevation of 5000 feet, I saw plateaus covered with *Eremuri*, chiefly *E. algæ* and *E. aurantiacus*; but my principal object was to visit the locality where the bulk of the gum called *Katira* was collected for exportation. I found it was the product of *Astragalus heratensis* and another species, near *A. strobilifera*, Royle, growing like miniature oaks. The gum tragacanth or *Katira* was collected from natural exudations from cracks in the bark of the lower branches and near the root. I also went to see a forest of trees called here *Kinjak*, the leaves of which are employed in dyeing. From the description of it given me, I thought it might prove something new; however, it turned out to be *Pistacia vera* in a wild condition, and bearing barren fruit. I was glad to be able to visit and see these trees for myself; otherwise I should have always fancied that in this part of Persia another tree existed of which I had collected no specimens. It is curious to note that the Persians will not admit that *Pistacia vera* exists as a wild tree in this neighbourhood. Here also I saw thin forests of *Lonicera nummularifolia* yielding fair timber. At about the same altitude, *Juniperus excelsa* was a good-sized tree and common. Hummocks of *Astragalus angustifolius*, and with it *Acanthophyllum macrodon*, having a similar habit. The roots of the latter are largely collected and employed as a substitute for soap. In some places barley and wheat were growing without irrigation; and in these fields *Gladiolus Kotschyanus* was prevalent. In many of the villages in Khorasan, but more particularly at Rui-khauf, I found *Pinus halepensis*, cultivated in long rows on the windward sides of orchards for protection. Of these there were some very fine trees fully 100 feet high and nine feet in circumference.

Generalizations on the Flora of North-west Afghanistan.

The flora of North-western Afghanistan differs much from the typical flora of Eastern Afghanistan, so graphically described by Hooker and Thomson in their introductory essay to the 'Flora Indica.' On comparison of data, I have been led to the conclusion that this difference is due to climatic conditions. The winter is much more severe and of longer duration at similar altitudes than that experienced in Eastern Afghanistan, the temperature falling several degrees below zero (Fahrenheit), and snow lying for some days at an altitude of 2000 feet. In spring the persistence of damp and cold is also more prolonged—rain, which at any moment might be converted into sleet and snow, occurring occasionally as late in the season as the end of May. The highest temperature is in July and August, reaching 105° in the shade; and although the summer is very

much shorter than that in the tropical zone, the weather is intensely hot while it lasts, no dew falling under an altitude of 3500 feet. These extremes of temperature between summer and winter and night and day are much intensified by the absence to the north of any mountain-range affording adequate shelter from the continuous blasts of bitterly cold wind in winter and of hot dry air in summer, coming from the north-east and north-west respectively. The mountains in the vicinity not being sufficiently high to retain perpetual snow, the water-supply is limited to the rivers Hari-rud and Morghab and to a very few perennial springs.

With such climatic conditions cultivation, below an altitude of 3500 feet, is impossible without the aid of irrigation, except under the ameliorating influences of a river; and until the dew-line is gained it is a land totally devoid of trees or even shrubs. But as soon as this point is reached *Pistacia vera*, *Juniperus excelsa*, and *Lonicera nummularifolia* appear as forest-trees, and wheat and barley no longer need irrigation.

I may mention here that my collections do not wholly consist of what is usually regarded as the oriental flora, for they contain a considerable admixture of Siberian and Central Asiatic types; and doubtless the proportion of the latter would have been larger had I been able to collect at greater altitudes, as it is there where the greatest overlapping of the two elements occurs. There are also a few Western Himalayan or Tibetan plants, and a very limited number common to the Punjab and Scind regions. The local species comprise, in all probability, one sixth of the whole collection.

I met with no indigenous Coniferæ except *Juniperus excelsa*, but *Pinus halepensis* is cultivated. There were no oaks, nor any species of the genera *Æsculus*, *Olea*, or *Myrtus*.

The tropical zone, spoken of by Hooker and Thomson as skirting the Afghan region, does not extend to the north-west, owing to the excessive fall in the winter temperature and the shortened summer; a conclusive proof of this is the absence of the date-palm. The area of *Pistacia Terebinthus*, var. *mutica* (*Kinjak*), is limited to the southern aspect of the Do-shakh range. A few subtropical shrubs from Scind and the Punjab do just exist through the low winter temperature, namely, *Peganum Harmala*, *Prosopis Stephaniana*, *Alhagi Camelorum*, and *Capparis spinosa*, with the grasses *Erianthus Ravennæ* and *Andropogon laniger*. *Populus euphratica* forms forests in the river-beds; but as long as this tree is situated near water, it is indifferent to altitude, being known to extend from Scind and the Punjab to Western Tibet, up to a height of 12,000 feet. A more curious extension is *Haloxylon Ammodendron* from the apparently dry shifting desert sands of Baluchistan to the river-beds of this area. *Pulicaria foliosa* is the only plant collected whose area extends from India proper (Banda, in Bandelkhand, on the Jumna river) to this region.

Among the Himalayan types met with were *Sisymbrium himalaicum*, *Sophora mollis*, *Rosa moschata* (cult.), *Prangos pabularia*, *Pterotheca Falconeri*, and *Epilasia ammophila*, with several of the Chenopodiaceous shrubs found in the arid Tibetan region. Of species common to Central Asia I may name *Nigella integrifolia*, *Corydalis Sewerzovii*, *Isatis Boissieriana*, *Crucianella filifolia*, *Kuschakewiczia turkestanica*, *Convolvulus subhirsutus*, *Astragalus buchtormensis*, and *Orobus subvillosus*.

As already mentioned, I had little opportunity afforded me for investigating the Alpine flora of this country, seldom having been able to collect in localities above 5000 feet in altitude, though above this height, in exposed positions, I found that there were neither trees nor shrubs. The change in the vegetation was represented by certain types of plants, as *Acanthophyllum*, *Astragalus*, *Onobrychis*, &c., assuming a peculiar habit, forming dense solid bushes, which look like small knolls or hummocks. Above this level occurred a belt of *Euphorbia*, exactly as seen in Kashmir and Kuram; and still higher the soil was covered with a close pasturage of *Pedicularis*, *Alyssum persicum*, *Erysimum persepolitanum*, and various *Astragali*. At 7000 feet the soil was absolutely sterile. What are generally understood as subalpine forms, such as *Rheum Ribes*, a *Primula*, and a Gentian (the only one I met with), extended down as low as 2000 feet in some places.

ITINERARY.

Alt. in feet.		1884.
5,604.	Quetta	Sept.
	Spangaoli	„ 22
	Gobrak	„ 23
	Khanak	„ 24
	Panj-pai	„ 25
	Chaman	„ 26
	Kaisar	„ 27
	Nushki	„ 28, 29
	Sandjuri	„ 30
2,960.	Band	Oct. 1, 2
2,840.	Omar-sha	„ 3, 4
2,780.	Zaru	„ 5
2,700.	Kani	„ 6
2,680.	Gaz-i-cha	„ 7
3,370.	Safia	„ 8
3,860.	Sha-ismail	„ 9
3,890.	Salian	„ 10
4,010.	Boz-dan (Muzh-dan)	„ 11
4,110.	Mannu (Mamu)	„ 12
3,110.	Gal-i-cha	„ 13, 14
	Gar-nushki	„ 15
1,550.	Hadj-ali (Khwaja-ali)	„ 16–19
	Lundi	„ 20
1,510.	Rudbar	„ 21
1,500.	Koh-haja (Khaja)	„ 22
1,490.	Chakr-burja	„ 23
	Kalifat	„ 24, 25
1,440.	Padda-sultan	„ 26
1,400.	De-kamran	„ 27
1,300.	De-doda (Deh-dadeh)	„ 28
1,300.	Ibrahim-abad	„ 29, 30
1,290.	Mak-barra-habil	„ 31
1,280.	Takht-i-Rustam	Nov. 1
1,420.	Jowain (Lash-Jowain)	„ 2
1,480.	Kushk-rud	„ 3
1,520.	Kin	„ 4
	King	„ 5
1,920.	Zagin	„ 6, 7
2,300.	Sang-bar	„ 8

Alt. in feet.		1884.
3,420.	Karez-dasht	Nov. 9
3,210.	Ser-mandel	„ 10
3,620.	Sher-baksh	„ 11
3,500.	Gaz-i-cha (Gaz-ak-cha)	„ 12, 13
3,450.	Pahir (Parah)	„ 14
2,270.	Zindijan	„ 15, 16
	Roznak	„ 17
1,950.	Khusan	„ 18–25
	Halfway to Chashma-sabz	„ 26
	Chashma-sabz	„ 27
	Asia-deh (Asir-deh)	„ 28
	Kar-o-bagh	„ 29
2,850.	Tut-i-chi	„ 30
	Aftao (Haftu)	Dec. 1
4,300.	Kara-kainta (Kara-ghaitu)	„ 2
	Kushk	„ 3–5
	Palounda	„ 6
	Karez-darra	„ 7
	Padda (Paddai-paj)	„ 8
	Ab-i-kamarra	„ 9
	Ab-i-shora	„ 10
	Tor-shakh	„ 11
	Marjan	„ 12
	Bala-morghab	„ 13
1,330.	Bala-morghab (Fort)	„ 14
	Halted here until the 15th Feb., 1885.	1885.
	Karaol-khana	Feb. 16
	Mara-chak	„ 17
	Ab-i-goshan	„ 18
	Kalla-i-maur	„ 19, 20
	Chaman-i-bed	„ 21
	Islim	„ 22
	Locality without name	„ 23
2,240.	Gulran (New Fort)	„ 24
	Halted here until the 14th March.	
	Gulran (Old Fort)	Mar. 15
	Halted here until the 1st April.	

Alt. in feet.		1885.	
	Ao-safed (Pass)	April	2
	Chasma-sabz (Spring)	„	3
	Tirphul	„	4
	Halted here until 25 April.		
1,950.	Khusan	„	26
2,180.	Toman-agha	„	27, 28
	Gal-i-cha	„	29
	West of Kambao Pass	„	30
	East of Kambao Pass at Burj	May	1–3
	Shore-kaltegai	„	4
2,240.	Gulran (New Fort)	„	5
	Gulran (Old Fort)—Chasma-sabz Pass to Tirphul	„	6, 7
2,100.	Tirphul (Halt)	„	8
	Tirphul moved to encampment opposite to Khusan	„	9–11
1,950.	Khusan (Village)	„	12
	Buniad-khan	„	13
2,070.	Kumani-besht	„	14
	Chil-gaz	„	15
	Karez-ilias	„	16
	Chil-gaz	„	17
	Sim-koh	„	18, 19
	Kambao burj	„	20
	Sang-haji	„	21
	Ao-Safed (East Base)	„	22
	Baba-furk	„	23
	Kohtal-sangi (Pass) (North side)	„	24
	Kohtal-sangi (Pass) (South side)	„	25, 26
	Dana-sanjiti	„	27
	Chinkilok	„	28
	Halted here until June 3rd.		
	Shekewan	June	4
	Roznak	„	5
	Shabad	„	6
	Tirphul (Second encampment opposite Khusan)	„	7
	Kalla-i-dast Dargarri	„	8
	Karez	„	9
	Hauz-i-safed	„	10
	Turbat-i-shaikh-jami	„	11
	Halted here until June 15th.		
	Bezd	„	16
	Halted here until June 19th.		
	Turbat-i-shaikh-jami	„	20
	Halted here until June 29th.		
	Langar	„	30
	Khairabad	July	1
	Kalanderabad	„	2
	Farrah-gird	„	3

Alt. in feet.		1885.	
	Sang-bast	July	4
	Turukh	„	5
3,100.	Meshed	„	6
	Halted here until July 15th.		
	Turukh	„	16
	Sang-bast	„	17
	Fareh-man	„	18
	Karez-badak	„	19
	Abdullabad	„	20
	Turbat-i-shaikh-jami	„	21–23
	Rud-i-rabask	„	24
	Karez	„	25
	Kafir-kalla	„	26
	Khusan (Left Bank)	„	27, 28
	Robat-i-kalcha	„	29
	Ghorian	„	30
	Zindijan (Village)	„	31
	Zindijan (Encampment)	Aug.	1–3
	Cha-dlermu	„	4
	Kishmaru	„	5
	Do-shakh (Mt.)	„	6
	Puza-gish	„	7
	Kilki	„	8
	Halted here until Aug. 16th.		
	Puza-gish	„	17
	Do-cha-i-ibrahim-khan	„	18
	Robat-i-turk	„	19
	Musabad	„	20
	Burj-i-ayubi	„	21
	Khal-i-khurdian	„	22
	Sangun	„	23
	Madrassa	„	24
	Rui-Khauf	„	25
	Halted here until Aug. 31st.		
	Salami	Sept.	1
	Malkat	„	2
	Sangan	„	3
	Nasarabad	„	4
	Turbat-i-haidri	„	5
	Halted here until Sept. 9th.		
	Maimadabad	„	10
	Kishmatabad	„	11
	Robat-i-safed	„	12
	Sharifabad	„	13
	Robat-turukh	„	14
3,100.	Meshed	„	15
	Halted here until the 1st October, when I left for England, marching through Persia, *vid* Sabsawar and Sharud to Astrabad, thence *vid* the Caspian to Baku, by rail to Batoum. My collections were conveyed by sea from Batoum direct to England.		

In conclusion, I have to thank Sir Joseph Dalton Hooker, K.C.S.I., C.B., the late Director, and Mr. Thiselton Dyer, C.M.G., the present Director of the Royal Gardens at Kew, for having afforded me every facility at the Royal Herbarium; to Professor Oliver for his assistance in the determination of many species, and the liberality with which he

permitted me to consult him. To Mr. Baker I am again indebted for identifying the Leguminosæ and Monocotyledones Petaloideæ; to Dr. M. C. Cooke for his determinations and descriptions of the Fungi, and to Mr. N. E. Brown for the identification of the Aroids and other assistance.'

I feel that I cannot sufficiently thank my friend Mr. W. B. Hemsley, who has again come to my assistance as my coadjutor in working out this my third collection of Afghan plants. I need not say that without his valuable aid this paper could not possibly have been completed within the period prescribed by the Government of India.

I have to thank Miss Smith for her excellent drawings and dissections under Mr. Hemsley's supervision.

ENUMERATION OF THE PLANTS.

RANUNCULACEÆ.

Clematis orientalis, Linn.; Boiss. Fl. Or. i. p. 3; var. foliorum segmentis angustis.
Northern Baluchistan: 6, Sept. 27, 1884; Hari-rud valley: 772, August 5, 1885.
Common in the beds of streams amongst Tamarisk.

Thalictrum isopyroides, C. A. Mey.; Boiss. Fl. Or. i. p. 6.
Hari-rud valley: 427, May 10, 1885; Badghis: 345, April 29, 1885.
Profuse in clay soil amongst stones and rocks in the low hills.

Anemone biflora, DC.; Boiss. Fl. Or. i. p. 12.
Badghis: 378, May 2, 1885; May 1, 1885.
Not uncommon in the clefts of sandstone rocks. The persistent sepals increase largely in size until the fruit ripens.

Adonis æstivalis, Linn.; Boiss. Fl. Or. i. p. 17, et var. floribus majoribus.
Hari-rud valley: 235, April 13, 1885.
Occurs in two forms, one with small flowers, generally spread over the whole country; the second with large flowers, usually in corn-fields and on cultivated land.

Ranunculus aquatilis, Linn.; Boiss. Fl. Or. i. p. 23, var. foliis omnibus dissectis, segmentis filiformibus.
Khorasan: 815, August 29, 1885.
Was seen also in the basin of the Harut river; and in the Badghis, in the Kushk stream.

Ranunculus (§ Euranunculus) leptorrhynchus, Aitch. et Hemsl., n. sp. (Plate I.)
Herba perennis, erecta, 4–12 poll. alta, parce adpresse hirsuta, radicis fibris fasciculatis elongatis subcarnosis, caule sæpius triflori. *Folia* radicalia usque ad 3½ poll. longa, petiolata, nunc tripartita nunc pinnatipartita, segmentis angustis acutis trilobatis vel lateralibus interdum aut bilobatis aut integris; caulina superiora subsessilia, tripartita, segmentis fere linearibus. *Flores* aurei, 1–1¼ poll. diametro, longe pedunculati,

pedunculis teretibus; sepala patentia, late ovata, obtusissima, extus hirsuta, margine membranacea, colorata; petala obovata, venosa, subunguiculata, basi squama lata truncata vel leviter rotundata instructa. *Carpella* numerosissima, longe spicata (matura non visa), glabra, lævia, valde compressa, oblique rotundata, infra insertionem magis producta, longe arcuatim uncinato-rostrata, rostro tenui.

Hari-rud valley: 210, April 12, 13, 21, 22, 1885.

Very abundant in the shingle plains of the Hari-rud valley as well as in the Badghis.

The plant varies from one foot to two feet in height, and the flowers increase in size as the fruit forms; it sends out stolons which bear young plants.

RANUNCULUS ARVENSIS, Linn.; Boiss. Fl. Or. i. p. 57.

Paropamisus range: 556, May 24 and 25, 1885.

Not common, in moist meadow soil, at an altitude of 3500 feet and upwards.

RANUNCULUS FALCATUS, Linn.—*Ceratocephalus falcatus*, Pers.; Boiss. Fl. Or. i. p. 58.

Hari-rud valley: 149, April 2, 1885.

Spread over the whole country, and flowering in early spring, under the shade of shrubs.

ERANTHIS CILICICA, Schott et Kotschy; Boiss. Fl. Or. i. p. 60.

Badghis: 118, March 9, 1885.

Common from Bala-morghab to Gulran, throughout the whole of the Badghis.

NIGELLA INTEGRIFOLIA, Regel in Suppl. 2 ad Enum. Pl. Semenov. p. 10; Bull. Soc. Nat. Mosc. xliii. (1870), p. 246. (Plate II.) Folia superiora tantum indivisa, caulina sessilia, sæpissime ad basin tripartita vel suprema interdum quinquepartita.

Nigella diversifolia, Franchet (in Ann. Sc. Nat. 6ème série, xv. p. 9, t. 10), is very near, if not the same as *N. integrifolia*, Regel.

Hari-rud valley: May 10, 14, 1885; Badghis: 372, May 1, 1885. A small, weak, erect annual, with light blue flowers, that are much hidden in the deeply cleft bracts; occurs singly all over the shingly plains.

DELPHINIUM PERSICUM, Boiss.; Fl. Or. i. p. 76, et var. floribus numerosissimis.

Hari-rud valley: 1002, May 26, 1885, June 4, 1885; 1001, May 10, 1885.

Common on the shingly plains.

DELPHINIUM RUGULOSUM, Boiss.; Boiss. Fl. Or. i. p. 76.

Hari-rud valley: 310, April 25, 1885; April 27, May 11, 1885.

On the shingly plains everywhere. Flowers from greenish to pure white, and often tipped with purple.

DELPHINIUM ORIENTALE, J. Gay; Boiss. Fl. Or. i. p. 79.

Hari-rud valley: 233, April 13, 1885; 444, May 11, 1885.

Occurs commonly in the open country, as well as in corn-fields, where it is a much taller and more erect plant.

DELPHINIUM (§ DELPHINASTRUM) ZALIL, Aitch. et Hemsl., n. sp. (Plate III.) *Herba*

perennis, erecta, 1–2-pedalis, primum leviter puberula cito glabrescens, caulibus simplicibus vel pauci-ramosis pallidis subnitidis striatulis. *Folia* gracilia, inferiora longe petiolata, petiolis superiorum gradatim brevioribus, omnia ternatipartita, sæpius triternatipartita vel divisione intermedia interdum pinnatipartita, 3–4 poll. diametro, segmentis linearibus rigidis. *Flores* lutei, extus glabri, laxiuscule racemosi, circiter 1 poll. diametro, pedicellis antice pubescentibus; calcar apice attenuatum, sepalis æquans; sepala lata; petala angusta, bifida, intus leviter pilosa vel barbata; filamenta dilatata, superne leviter pilosula; gynæcium glabrum. *Folliculi* 3, oblongi, glabri, longitudinaliter 5-costati, inter costas distanter reticulati; semina oblonga, subquadrata, transversim eleganter fimbriato-lamellata.

Allied to *D. ochroleucum*, Stev., but differing in its more finely cut leaves, much looser racemes, glabrous flowers, pedicels densely pubescent below, and short, strongly ribbed follicles. Dr. Regel, to whom we submitted two or three flowers and a leaf, thought it might be *D. ochroleuca*.

Khorasan: 671, June 17, 1885; July 4, 1885.

Native name *Zalil*. This plant forms a great portion of the herbage of the rolling downs of the Badghis; in the vicinity of Gulran it was in great abundance, and when in blossom gave a wondrous golden hue to the pastures; in many localities in Khorasan above 3000 feet altitude it is equally common. The flowers are collected largely for exportation, chiefly to Persia, for dyeing silk; they are also exported from Herat through Afghanistan to Northern India, to be employed as a dye, as well as to be used in medicine.

BERBERIDEÆ.

BERBERIS VULGARIS, Linn.; Boiss. Fl. Or. i. p. 102.

Khorasan; 650, June 16, 18, 1885.

Native name *Zihr-bar*.

Common at an altitude above 3000 feet, near water, in Khorasan, and on the Paropamisus range. The edible fruit is collected for sale in the markets.

BONGARDIA RAUWOLFII, C. A. Mey.—*Bongardia chrysogonum*, Boiss. Fl. Or. i. p. 99.

Hari-rud valley: 145, April 1, 1885.

Very common in the loamy sandy soil of the Badghis near Gulran.

LEONTICE LEONTOPETALUM, Linn.; Boiss. Fl. Or. i. p. 99.

Badghis: 130, March 18, 1885; Hari-rud valley, April 6, 10, 21, 1885.

Occurs everywhere, in sandy loam. It has large curiously irregular-shaped root-stocks, which are deeply buried in the soil.

LEONTICE LEONTOPETALUM, Linn.; var.? floribus viridi-luteis minoribus.

Badghis: 1003, March 19, 1885.

This is a dwarf plant, growing in pure sand; the petals strongly veined, the lower bracts more divided, and the flowers more green than yellow.

PAPAVERACEÆ.

Papaver dubium, var. lævigatum, Elk.—*Papaver lævigatum*, Bieb.; Boiss. Fl. Or. i. p. 114.
Hari-rud valley: 271, April 19, 1885. Very common in soft soil.

Papaver somniferum, Linn.; Boiss. Fl. Or. i. p. 116.
Native name *Khok-nar*.
Cultivated: on a small scale in the Hari-rud valley; largely in Khorasan.

Papaver pavoninum, C. A. Mey.; Boiss. Fl. Or. i. p. 116.
Hari-rud valley: 269, April 18, 19, 21, 26, 1885; and Badghis.
Native name *Gul-i-dukhter*.
In abundance over the whole country; when in flower brightens the landscape with its brilliant colouring.

Glaucium fimbrilligerum, Boiss.; Boiss. Fl. Or. i. p. 120.
Hari-rud valley: 272, April 19, 1885; Badghis, May 1, 1885.
Profuse on stony ground.

Rœmeria hybrida, DC.; Boiss. Fl. Or. i. p. 118.
Hari-rud valley: 209, April 1885.
Native name *Shatira*. Very common throughout the country traversed; flowers deep claret, drying to an inky blue.

Rœmeria rhœadiflora, Boiss.; Boiss. Fl. Or. i. p. 119.
Badghis: 1004, May 1, 1885; and Hari-rud valley.
In large quantity everywhere, with *Papaver pavoninum*; when in full blossom colours the country bright red.

Hypecoum procumbens, Linn.; Boiss. Fl. Or. i. p. 124.
Hari-rud valley: 158, April 6, 1885.
In shaded situations, and also in cultivated ground; common.

Corydalis Sewerzovi, Regel, Pl. Semenov. fasc. i. Suppl. ii. p. 16. n. 606; Gartenflora, vol. xxxi. (1882), p. 97, t. 1077; Bot. Mag. vol. cxii. tab. 6896 (1886).
Badghis: 122, March 12, 18, 1885.
At the base of sandstone rocks, at an altitude of 3000 feet; frequent, but local.

Fumaria parviflora, Lam.; Boiss. Fl. Or. i. p. 135.
Hari-rud valley: 216, April 13, 1885. Generally distributed over the whole country.

CRUCIFERÆ.

Mathiola albicaulis, Boiss.; Boiss. Fl. Or. i. p. 147.
Badghis: 337, April 29, 1885; May 2, 19, 1885.
On the ridges of low sandstone hills, at an altitude of 3000 feet, frequent. A very handsome perennial, throwing up annual, erect, almost woody shoots up to 3 feet in height, and ending in a lax spike of purplish or occasionally light greenish-yellow flowers.

MATHIOLA CHENOPODIFOLIA, Fisch. et Mey.; Boiss. Fl. Or. i. p. 153.
Hari-rud valley: 294, April 21, 1885; May 13, 1885; 278, April 19, 1885.
Common in stony ground.

MATHIOLA ODORATISSIMA, R. Br.; Boiss. Fl. Or. i. p. 149 (*Hesperis*, Poir.).
Hari-rud valley: 212, April 13, 1885. Near Khusan, not common.

MATHIOLA, sp.
Badghis: 514, May 19, 1885.
Common at an altitude of 3000 feet, on stony soil. A perennial, about a foot in height, with numerous annual shoots that become woody and remain on the stem into the following year. The flowers are few, smoke-coloured, and the petals twisted.

DIPTYCHOCARPUS STRICTUS, Boiss. Fl. Or. i. p. 145 (*Alloceratium*, Hook. f. et Thoms.).
Hari-rud valley: 205, April 11, 17, 29, 1885; 242, April 15, 1885. Common.

CITHARELOMA LEHMANNI, Bunge; Boiss. Fl. Or. i. p. 238.
Northern Baluchistan: 13, Sept. 30, 1884. Between Nushki and Sanduri in the desert. Only one specimen obtained.

BARBAREA VULGARIS, R. Br.; Boiss. Fl. Or. i. p. 183.
Paropamisus range: 552, May 24, 1885. On the Kohtal-pangi pass, in moist meadow-land, at an altitude of 3500 feet and upwards. Eaten raw by the natives.

ARABIS? sp.
Hari-rud valley: 185, April 7, 1885; 260, April 16, 1885. A very common plant, growing in dense clusters amongst stones and gravel, on hill-sides. Flowers minute, white.

ALYSSUM CAMPESTRE, Linn.; Boiss. Fl. Or. i. p. 283.
Hari-rud valley: 194, April 6, 7, 17, 26, 1885; Khorasan, June 17, 1885.
Frequent in dry stony places.

ALYSSUM LINIFOLIUM, Steph.; Boiss. Fl. Or. i. p. 286 (*Meniocus*, DC. Syst. ii. p. 325).
Hari-rud valley: 160, April 6, 19, 1885; 403, May 9, 1885.
In the shade under bushes, very common.

ALYSSUM PERSICUM, Boiss. Fl. Or. i. p. 279.
Paropamisus range: 394, May 5, 1885; Khorasan: 680, June 18, 1885.
On the Chashma-sabz pass, and on the pass above Bezd, at an altitude of 5000 feet; growing in large clusters.

EROPHILA VULGARIS, DC.; Boiss. Fl. Or. i. p. 304.—*Draba verna*, Linn.
Badghis: 140, March 24, 1885; 1154, May 1, 1885.
There are two forms of this very variable plant; 140 is very minute, whereas 1154 is from four to six inches high. Very common in moist gravelly soil, in the vicinity of streams.

MALCOLMIA AFRICANA, R. Br.; Boiss. Fl. Or. i. p. 223.
Hari-rud valley: 178, April 6, 1885; 186, April 7, 1885. Common everywhere.

MALCOLMIA CABULICA, Hook. f. et Thoms.; Boiss. Fl. Or. i. p. 224 (*Strigosella*, Boiss. Diag. ii. 1. p. 22).
Hari-rud valley: 1005, April 10, 1885.

MALCOLMIA INTERMEDIA, C. A. Mey.; *Malcolmia africana*, R. Br.; var. β. *intermedia*, Boiss. Fl. Or. i. p. 223.
Hari-rud valley: 187, April 7, 1885. In abundance; but usually found under the shade of bushes.

MALCOLMIA BUNGEI, Boiss. Fl. Or. i. p. 226, var. β. *glabrescens*.—*Malcolmia circinnata*, Hook. f. et Thoms., non Bunge.
Hari-rud valley: 177, April 6, 1885; 302, April 21, 1885; and April 11, 17, 26, 1885; May 10, 1885. In great abundance, in a gravelly soil. When in flower it gives a bright colour to the country.

MALCOLMIA, sp.
Hari-rud valley: 1006, April 17, 1885.

SISYMBRIUM PUMILUM, Steph.; Boiss. Fl. Or. i. p. 213.
Hari-rud valley: 163, April 6, 1885; 189, April 7, 1885; April 2, 17, 1885.
In the shade of shrubs, very common.

SISYMBRIUM HIMALAICUM, Hook. f. et Thoms.; Hook. f. Flora British India, i. p. 147.
Badghis: 519, May 4, 20, 1885. In sandy soil, common.

SISYMBRIUM WALLICHII, Hook. f. et Thoms.; Boiss. Fl. Or. i. p. 215.
Khorasan: 1008, June 6, 1885.
The only specimen was collected in the gorge above Bezd, at an altitude of about 3000 ft.

SISYMBRIUM SOPHIA, Linn.; Boiss. Fl. Or. i. p. 216.
Hari-rud valley: 218, April 13, 1885.
In abundance all over the country; varying very greatly in size.

SISYMBRIUM, sp.
Hari-rud valley: 240, April 15, 19, 1885. No ripe fruit for identifying the species. A spreading annual from 4 inches to 1 foot in height, with rather large white or pink flowers; general over the country, in gravelly and stony soil.

SISYMBRIUM, sp.
Hari-rud valley: 161, April 6, 1885. Without ripe fruit. A weak spreading annual, from 4 to 6 inches in height; flowers small, pinkish or white; frequent near shrubs.

SISYMBRIUM, sp.
Hari-rud valley: 222, 232, April 13, 16, 1885. On the borders of fields and near villages; common. An erect annual, with numerous spreading branches, from 1 foot to 3 feet in height; lower leaves over 6 inches in length, deeply pinnate with the lobes broadly

toothed; the upper leaves with almost linear lobes. Flowers yellow, very large; no ripe fruit. It is closely allied to *S. pannonicum*.

CONRINGIA CLAVATA, Boiss. Fl. Or. i. p. 211.

Hari-rud valley: 346, April 29, 1885. Abundant all over the country. Dyes the hands yellow-green when bruised or broken.

ERYSIMUM PERSEPOLITANUM, Boiss. Fl. Or. i. p. 203.

Khorasan: 687, June 18, 1885. Abundant on the pass south of Bezd, above 6000 feet.

ERYSIMUM REPANDUM, Linn.; Boiss. Fl. Or. i. p. 189.

Hari-rud valley: 195, April 7, 19, 1885. Very common, in the shade of bushes in sandy soil.

ERYSIMUM SISYMBRIOIDES, C. A. Mey.; Boiss. Fl. Or. i. p. 188.

Hari-rud valley?: 1009. In fruit only. No locality nor date. A characteristic plant of Central Asia.

ERYSIMUM, sp.

Hari-rud valley: 153, April 2, 1885; Badghis, May 3, 1885. In sandy plains; Gulran, profuse.

No ripe fruit for determination; nearly allied to *E. canescens*, Benth.

ERYSIMUM, sp.

Hari-rud valley: 298, April 21, 1885.

A tall, much branched perennial, about two feet in height. Common in sandy loamy soil, in open plains; very showy when in full flower; flowers large, bright yellow.

LEPTALEUM FILIFOLIUM, DC.; Boiss. Fl. Or. i. p. 243 (*L. pygmæum*, DC.).

Hari-rud valley: 159, April 6, 21, 1885; May 9, 1885.

Abundant in shingly places. Flowers the colour of those of *Geranium lucidum*, Linn.

CAMELINA SATIVA, Crantz; Boiss. Fl. Or. i. p. 311.

Badghis: 392, May 4, 1885. On sandy downs, in abundance. It is not cultivated, so far as I could find out, in Afghanistan.

BRASSICA CAMPESTRIS, Linn.—Subsp. *Napus*, Linn. (sp.); Boiss. Fl. Or. i. p. 392.

Hari-rud valley: 1010, May 11, 1885. Rape; native name *Shersham*. Cultivated in fields for the oil extracted from its seeds, but only of late years to any great extent.

BRASSICA CAMPESTRIS, Linn.—Subsp. *Rapa*, Linn. (sp.); Boiss. Fl. Or. i. p. 391.

Hari-rud valley: 244, April 16, 1885.

The Turnip. Native name *Shalgham*. Extensively cultivated throughout Afghanistan and Persia. At Khusan, in a garden where the cultivator had only a few seeds left from last year, he told me he sowed the seed in spring from which, in May, he would obtain a good crop of seed (from these my specimens were collected); this he would sow in autumn, and this sowing would produce his winter crop of turnips.

BRASSICA, sp.

Hari-rud valley: 276, April 17, 19, 27, 1885. Native name *Gul-zard*. Common throughout the valley on stony soil, but especially near sheepfolds.

A coarse annual, from one to three feet in height, with numerous branches covered more or less densely with long white hairs.

BRASSICA, sp.

Hari-rud: 1011, April, 10, 1885. A small annual species; leaves glaucous; no fruit. We were unable to match it.

ERUCA SATIVA, Lam.; Boiss. Fl. Or. i. p. 396.

Hari-rud valley: 225, 261, April 13, 16, 1885; Khorasan: June 5, 1885. Native name *Mandao*. Cultivated largely, both in Afghanistan and Persia, for its seed, from which oil is extracted.

LEPIDIUM AUCHERI, Boiss. Fl. Or. i. p. 354.

Hari-rud valley: 451, May 12, 1885; June 6, 1885. In abundance where rain-water had accumulated in shallow pools on a clay deposit, forming a dense sward closely appressed to the ground.

LEPIDIUM LATIFOLIUM, Linn.; Boiss. Fl. Or. i. p. 359.

Hari-rud valley: 607, June 5, 1885. This widely-spread coarse weed was not uncommon near villages and cultivation.

LEPIDIUM DRABA, Linn.; Boiss. Fl. Or. i. p. 356.

Hari-rud valley: 315, April 25, 1885. Native name *Bijindak*. Profuse near villages and in cultivated land; a common corn-weed. The leaves are collected and eaten as a pot-herb.

LEPIDIUM CRASSIFOLIUM, Waldst. & Kit.; Boiss. Fl. Or. i. p. 357.

Hari-rud valley?: 1012. No locality nor date attached to the specimen of this remarkable thick-leaved plant.

LEPIDIUM PERFOLIATUM, Linn.; Boiss. Fl. Or. i. p. 362.

Hari-rud valley: 284, April 12, 19, 1885. Abundant in lands from which the river had retired in spring. A very pretty and curious species, remarkable for the two very different forms of leaves it bears.

ÆTHIONEMA CRISTATUM, DC.; Boiss. Fl. Or. i. p. 352.

Hari-rud valley: 280, April 13, 19, 1885; Badghis: May 1, 16, 1885.

A small annual species which is not common, or else it is very easily overlooked.

HELDREICHIA LONGIFOLIA, Boiss. Fl. Or. i. p. 319.

Badghis: 516, May 19, 1885; Mt. Do-shakh: August 5, 1885. A remarkable plant, with numerous slender twiggy flowering stems rising from a tuft of plantain-like leaves, Flowers white.

CLYPEOLA DICHOTOMA, Boiss. in Ann. Sc. Nat. 2me série, xvii. p. 175; Fl. Or. i. p. 310.
Hari-rud valley: 1155, April 19, 27, 1885.

ISATIS MINIMA, Bunge; Boiss. Fl. Or. i. p. 383.
Hari-rud valley: 238, April 15, 18, 1885; 304, April 21, 1885. In land from which the river had retired after floods, where it was quite common.

ISATIS ARMENA, Linn.—*Sameraria armena*, Desv.; Boiss. Fl. Or. i. p. 375.
Hari-rud valley: 181, April 7, 19, 1885. Common. A conspicuous plant when in fruit, which is covered with a white felt and subtended by the persistent ruddy sepals.

ISATIS BOISSIERIANA, Reichb. f. in Trimen's Journal of Botany, xiv. 1876, p. 46.
Hari-rud valley: 227, April 13, 1885. Common, in cultivated land.
I also collected a specimen in young fruit of another species of *Isatis*: Hari-rud valley: 1013, April 17, 1885.

ISATIS BULLATA, Aitch. et Hemsl., n. sp. *Herba* annua vel saltem monocarpica, erecta, 1½–2-pedalis, undique glaberrima, caule basi simplici. *Folia* inferiora desunt, caulina crassiuscula, sessilia, amplexicaulia, oblonga, 1½–4 poll. longa, apice rotundata, sinuata, auriculis obtusissimis. *Flores* flavi, laxe racemosi, pedicellis filiformibus, fructiferis arcte recurvis. *Siliculæ* maturæ fere crustaceæ, ovatæ, 8–9 lineas longæ, stylo brevi coronatæ, circumalatæ, prominenter pauci-venosæ, inter venas depressæ.
Badghis: 1014, May 4, 1885. Common on the sandy downs of Gulran.

PACHYPTERYGIUM HETEROTRICHUM, Bunge; Boiss. Fl. Or. i. p. 374.
Paropamisus range: 565, May 1885. Between the Kohtal-sangi pass and Dana-sanjiti, at an altitude of about 4000 feet. Only two or three plants seen.

NESLIA PANICULATA, Desv.; Boiss. Fl. Or. i. p. 371.
Hari-rud valley: 219, April 13, 1885. Very common in cultivated land and amongst corn.

EUCLIDIUM SYRIACUM, R. Br.; Boiss. Fl. Or. i. p. 368.
Hari-rud valley: 188, April 7, 11, 1885. On stony ground, not common.

CRAMBE CORDIFOLIA, Stev.; Boiss. Fl. Or. i. p. 405. (Plate IV.)
Hari-rud valley: 344, April 29, 1885; Badghis, May 19, 1885. Native names: *Tetran, Tatran, Taturan, Tatera, Thatrang.* A very coarse-growing perennial, with an underground root-stock, somewhat resembling an elongated Swedish turnip, from a foot to eighteen inches in length, and from six to eight inches in circumference. From this root-stock, annual shoots are thrown up from three to four feet in height, bearing great masses of sweetly scented flowers.
This plant is extensively spread all over the Badghis, and, no doubt owing to the rich sandy loam in which it is found, it produces the large turnip-like root-stocks, which are collected and stored by the Turkomans for feeding their camels on during winter.

GOLDBACHIA LÆVIGATA, DC.; Boiss. Fl. Or. i. p. 243.

Hari-rud valley: 162, April 6, 1885; 176, June 4, 1885. Common in loamy soil.

GOLDBACHIA TORULOSA, DC.—*Goldbachia lævigata*, DC., var. β. Boiss. Fl. Or. i. p. 243.

Hari-rud valley: 1015, May 9, 1885. Our plant is identical with no. 1255 of the Karelin and Kiriloff collection in the Kew Herbarium, which, in my opinion, is distinct, as a species, from *G. lævigata*.

CHORISPORA TENELLA, DC.; Boiss. Fl. Or. i. p. 143.

Hari-rud valley: 1016, April 7, 1885. In the shade of shrubs; very common.

CHORISPORA, sp.

Hari-rud valley: 148, April 2, 1885. Collected at the Chashma-sabz spring; too young for identification, though perhaps a young state of *C. tenella*.

CAPPARIDEÆ.

CLEOME COLUTEOIDES, Boiss. Diagn. ser. 1, i. p. 3.—*Buhsea coluteoides*, Boiss. Fl. Or. i. p. 416.

Hari-rud valley: 165, April 6, 15, 21, 1885; May 10, 1885. Also frequent in Khorasan. A perennial, with large underground root-stocks, from which numerous annual stems, one to two feet high, are thrown up, forming a thick, close bush, conspicuous from the purplish colour of the flowers and the large inflated pods. An exceedingly nasty odour is given out from the crushed leaves.

CAPPARIS SPINOSA, Linn.; Boiss. Fl. Or. i. p. 420.

Baluchistan: Oct. 20, 1884; Badghis: May 19, 1885; Hari-rud valley: 590, June 3, 1885, July 30, 1885. Native name, *Kha-warg*. One of the few shrubs which extends from Northern Baluchistan, along the Helmand and the Hari-rud valley, to Bala-morghab and in Khorasan. Over all this country it grows in the open, and is a pest to the cultivator, as it seems to prefer cultivated fields. On the banks of the Helmand it grew very like a Bramble, and was often seen as a large scrambling bush six feet in height. The natives eat the fruit, and camels are very fond of browsing on the branches.

RESEDACEÆ.

RESEDA LUTEOLA, Linn.; Boiss. Fl. Or. i. p. 434.

Hari-rud valley: 633, June 15, 1885; Badghis: 529, May 21, 1885.

Generally over the country, and common as a field-weed.

RESEDA AUCHERI, Boiss. Fl. Or. i. p. 434.

Hari-rud valley: 291, April 21, 1885; 420, May 10, 1885, June 4, 1885.

A tall handsome perennial; common in stony ground and amongst shingle.

FRANKENIACEÆ.

FRANKENIA PULVERULENTA, Linn.; Boiss. Fl. Or. i. p. 779.

Hari-rud valley ?: 1017 (1885).

To these specimens there was no locality nor date attached; they were certainly collected during 1885, and probably in the Hari-rud valley.

FRANKENIA LÆVIS, Linn.—*Frankenia hirsuta*, Linn., var. *α. lævis*, Boiss. Fl. Or. i. p. 780.

Hari-rud valley: 581, May 28, 1885; 747, July 29, 1885; Khorasan: August 18, 85. In saline soil, very common.

CARYOPHYLLEÆ.

DIANTHUS CRINITUS, Smith; Boiss. Fl. Or. i. p. 496.

Khorasan: 715, July 19, 1885. On stony ground, above an altitude of 3000 feet; in quantity near Bezd.

DIANTHUS FIMBRIATUS, Bieb., var., Boiss. Fl. Or. i. p. 495.

Hari-rud valley: 1018, August 3, 1885. At the base of Mount Do-shakh; common.

ACANTHOPHYLLUM MACRODON, Edgew.; Hook. f. Fl. British India, i. p. 216.

Khorasan: 673, June 17, 1885. Native name *Behk*. Growing at an altitude of above 5000 feet, it occurs in dense hummocks, fully four feet in depth, and from six to twelve feet across. The stems and root-stocks are collected and sold in the markets, being employed in lieu of soap for washing clothes, wool, &c.

ACANTHOPHYLLUM SORDIDUM, Bunge; Boiss. Fl. Or. i. p. 565.

Khorasan: 1020, June 22, 1885. Forming very loose small hummocks, occurring singly or in pairs, in stony soil in the Badghis, Hari-rud, and Khorasan; the flowers very inconspicuous when compared with those of the other species met with. Bunge's typical specimens are less vigorous, and the only one we have seen has no perfect petals; yet we have little doubt of the correctness of this identification.

ACANTHOPHYLLUM SQUARROSUM, Boiss. Fl. Or. i. p. 562 (varietates).

Hari-rud valley: 575, May 28, 1885; 1021, 1885.

A spinous shrub, forming loose hummocks, bearing a very conspicuous inflorescence of white or rose-coloured flowers, appearing like large natural bouquets; it is characteristic of the boulder and gravel country.

ACANTHOPHYLLUM SQUARROSUM, Boiss. Fl. Or. i. p. 565, forma nana.

Hari-rud valley: May 27, 1885; Badghis: 475, May 16, 1885.

This forms small, dense, tight pillows or hummocks, with a great profusion of flowers over the whole surface, varying in colour from white to almost red. Associated with the ordinary form in the boulder and gravel country.

A. squarrosum, Boiss., is a very variable species, having a wide range, and should probably include *A. pungens*, Boiss., and *A. elatius*, Bunge.

GYPSOPHILA PANICULATA, Linn.; Boiss. Fl. Or. i. p. 542.

Badghis: 389, May 3, 16, 21, 1885; Khorasan, June 15, 1885. Native name *Saosafed*; the root, *Behk*. A shrubby plant, three or four feet in height, consisting of numerous annual stems springing from perennial underground root-stocks. These underground woody stems are collected and employed as soap. A characteristic plant of the sandy loamy districts; in Khorasan a weed in cultivated ground.

GYPSOPHILA ALSINOIDES, Bunge; Boiss. Fl. Or. i. p. 549.

Badghis: 520, May 19, 20, 1885; Hari-rud valley: 576, May 28, 1885.
In sandy soil, frequent.

GYPSOPHILA PORRIGENS, Boiss. Fl. Or. i. p. 557, syn. *Saponaria porrigens*, Linn. Mant. p. 239.

Badghis: 506, May 18, 1885. Amongst grass and other herbage; common.

SAPONARIA VACCARIA, Linn.; Boiss. Fl. Or. i. p. 525, syn. *Gypsophila Vaccaria*, Fl. Græc. t. 380.

Hari-rud valley: 456, May 12, 1885. A common weed in cultivated land and amongst corn.

SILENE CONOIDEA, Linn.; Boiss. Fl. Or. i. p. 580.

Hari-rud valley: 1022, April 25, 1885. Common in the open plains, and also a field-weed, as in the Punjab.

SILENE CONIFLORA, Nees; Boiss. Fl. Or. i. p. 578, syn. *Silene acarpophora*, Griseb. Spic. i. p. 172.

Hari-rud valley: 214, 279, April 13, 19, 1885. Common, in good soil, in the shade of shrubs.

SILENE, sp.

Hari-rud valley: 170, April 6, 12, 15, 17, 1885. An annual, from 4 to 5 inches in height, branching from the base; petals slightly protruding beyond the calyx, lemon-colour. In sandy soil, close to the base of large shrubs, frequent.

SILENE, sp. aff. *S. leyseroidei*, Boiss.

Hari-rud valley: 1023, 1885.

LYCHNIS VESPERTINA, Sibth.—*Melandrium pratense*, Roehl.; Boiss. Fl. Or. i. p. 660.

Khorasan; 647, June 16, 18, 1885. On banks of stream near Bezd; in abundance. A tall straggling perennial, dicœcious, with white flowers.

LYCHNIS, sp.

Persia: 1024, Oct. 1885. On the descent to Asterabad, in clefts of limestone rock, forming moss-like masses, covered with a profusion of large brilliant-coloured flowers. Seed sent to Kew.

HOLOSTEUM UMBELLATUM, Linn.; Boiss. Fl. Or. i. p. 709.

Hari-rud valley: 167, April 6, 7, 13, 15, 1885; Badghis: 376, May 1, 1885. In quantity under the shade of rocks.

CERASTIUM DICHOTOMUM, Linn.; Boiss. Fl. Or. i. p. 721.

Badghis: 358, May 1, 1885. Occasional, in shady places. This very distinct species extends westward to Spain.

STELLARIA KOTSCHYANA, Fenzl; Boiss. Fl. Or. i. p. 705.

Khorasan: 655, June 16, 1885. At an altitude of above 5000 feet; in shady places, amongst stones, common.

ARENARIA TENUIFOLIA, Linn., var.; Boiss. Fl. Or. i. p. 685.

Locality unknown: 1025 (1885).

ARENARIA HOLOSTEOIDES, Edgew.; Hook. f. Fl. British India, i. p. 241.—*Lepyrodiclis holosteoides*, Fenzl; Boiss. Fl. Or. i. p. 668.

Hari-rud valley: 229, April 13, 25, 1885, May 11, 1885; Khorasan: June 16, 1885.

Native name *Gandam-ak*. A profuse weed in cultivated ground, especially amongst corn.

ARENARIA MEYERI, Boiss. Fl. Or. i. p. 682.

No locality given: 1026 (1885).

ARENARIA SERPYLLIFOLIA, Linn.; Boiss. Fl. Or. i. p. 701 (incl. *A. leptoclados*, Reichb.).

Badghis: 361, May 1, 1885; 493, May 17, 1885. Under the shade of large rocks; scarce.

BUFFONIA MACROCARPA, Ser.; Boiss. Fl. Or. i. p. 667.

Hari-rud valley: 599, June 4, 1885, July 28, 1885. In stony rocky ground; not uncommon. From a woody root-stock a dense mass of annual stems spring, about 18 inches in height; in general appearance very much resembling a clump of *Linum*, only stiffer.

SPERGULARIA DIANDRA, Boiss. Fl. Or. i. p. 733.

Hari-rud valley: 1027 (1885).

In stony places, near Khusan.

TAMARISCINEÆ.

TAMARIX TETRANDA, Pall.; Boiss. Fl. Or. i. p. 769, var.?

Hari-rud valley: 285, April 19, 1885, 286, April 19, 1885, 296, April 21, 1885; Badghis: May 1, 4, 1885. This species is nearly allied to *T. parviflora*, DC. It is a shrub, sometimes as much as twelve feet in height, occurring on islands in the river, in stream-beds, and on the banks of streams throughout the Hari-rud valley, and over the whole of the Badghis. Native name *Gaz*, a term applied generically to several species; the wood forms excellent fuel.

TAMARIX PALLASII, Desv.; Boiss. Fl. Or. i. p. 773.

Hari-rud valley: 1028, August 6, 1885, June 4, 1885. On sides of water-courses; common.

TAMARIX TETRAGYNA, Ehrenb.; Boiss. Fl. Or. i. p. 768.

Hari-rud valley: May 7, 1885; Badghis; 391, May 4, 1885.

Native name *Gaz-shora*. A small graceful tree on the islands of the Hari-rud, and

in the Badghis near water. It is very conspicuous from the vivid green of its foliage, and its long pendulous spikes of pure white flowers.

TAMARIX MACROCARPA, Bunge; Boiss. Fl. Or. i. p. 779.

Northern Baluchistan: 32, October 3, 11, 1884. Native names *Kirri* and *Gaz-surkh*; the latter term is applied to this shrub owing to the bright red colour of the bark. It is a very common large shrub throughout Northern Baluchistan, in many places forming thickets. At Omar-sha there were several trees, six feet in circumference, of this species, but all cultivated and carefully protected.

TAMARIX GALLICA, Linn., var. MANNIFERA, Ehrenb. in Linnæa, 1827, p. 270.—*Tamarix mannifera*, Bunge, Tent. Tam. Sp. p. 63; Boiss. Fl. Or. i. p. 775.

Badghis: 1029, May 18, 1885. This was pointed out to me by a native of Kerman, in Persia, as being the Tamarisk that yielded a manna in that district, and there called *Gaz shakar*.

TAMARIX GALLICA, Linn., var.; Hook. f. Flora British India, i. p. 248.

Badghis: 1030, May 18, 1885. Native name *Gaz-surkh*; generally spread throughout the Hari-rud valley and Badghis; also common in Baluchistan, where it is called *Gaz-khera*, and where the wands of this shrub are largely employed in all sorts of basket-work. A Tamarisk which I believe to be the above species is called by the natives *Gaz-mazu*, owing to its yielding a gall; and from the stems of this are manufactured handles for whips.

TAMARIX ARTICULATA, Vahl; Boiss. Fl. Or. i. p. 777.

Northern Baluchistan: 31, October 3, 1884. Native name *Kirri*. At Omar-sha were several cultivated trees of this species, from 6 to 9 feet in circumference, and 40 feet high. On the Helmand this species is indigenous, and occurs as a large tree, characteristically growing on mounds, and hence called by the natives *Kohr-a-gaz*. I measured one tree which was 15 feet in circumference.

REAUMURIA HYPERICOIDES, Willd.; Boiss. Fl. Or. i. p. 761.

Hari-rud valley: 1032 (608_2). June 6, 1885.

REAUMURIA HYPERICOIDES, Willd., var. β. LATIFOLIA, Bieb.; Boiss. Fl. Or. i. p. 761.

Hari-rud valley: 608, June 6, 1885; July 28, 1885. On slopes of hill-sides, in gravelly soil; common.

HYPERICINEÆ.

HYPERICUM SCABRUM, Linn.; Boiss. Fl. Or. i. p. 796.

Badghis: 526, May 21, 1885; Khorasan: June 18, 1885.

On the margin of streams, above 3000 feet altitude; not uncommon in gravelly soil.

HYPERICUM HELIANTHEMOIDES, Boiss.; Fl. Or. i. p. 802.

Khorasan: 1033, July 1, 1885.

MALVACEÆ.

ALTHÆA HOHENACKERI, Boiss. Fl. Or. i. p. 833.
Khorasan: 713, July 19, 1885; June 17, 1885.
On gravelly plains, above 4000 feet altitude; common. A very showy plant.

ALTHÆA OFFICINALIS, Linn.; Boiss. Fl. Or. i. p. 825.
Badghis: 497, May 18, 1885. In loamy soil, near a stream-bed at Chilgaz; and near villages on the Hari-rud, but local; where it occurs it is in some quantity.

ALTHÆA LAVATERÆFLORA, DC.; Boiss. Fl. Or. i. p. 828.
Hari-rud valley: 584, June 3, 1885. A cultivated plant, on ridges between fields.

MALVA SYLVESTRIS, Linn.; Boiss. Fl. Or. i. p. 819.
Khorasan: 628, June 15, 1885; July 11, 1885. Native name *Gul-i-Khadmi*. A weed of cultivation; common in gardens and also in fields.

MALVA ROTUNDIFOLIA, Linn.; Boiss. Fl. Or. i. p. 820.
Hari-rud valley: 252, April 16, 25, 1885; June 14, 1885. Near cultivation, in stony soil, everywhere.

HIBISCUS TRIONUM, Linn.; Boiss. Fl. Or. i. p. 840, syn. *H. ternatus*, Cav.
Khorasan: 799, August 23, 1885. A weed, in cultivated ground, frequent.

GOSSYPIUM HERBACEUM, Linn.; Hook. f. Flora British India, i. p. 346.
Khorasan: 1034, August 23, 1885. Native name *Goza*. Cultivated throughout Afghanistan and Persia.

ZYGOPHYLLEÆ.

TRIBULUS ALATUS, Del., var.—*Tribulus macropterus*, Boiss. Fl. Or. i. pp. 902, 903.
Northern Baluchistan: 35, October 4, 1884. Characteristic of the drifting sand-hills of Baluchistan.

TRIBULUS TERRESTRIS, Linn.; Boiss. Fl. Or. i. p. 902.
Hari-rud valley: 755, August 1, 1885; Khorasan: August 23, 25, 1885. In soft soil, cultivated land, &c., common.

NITRARIA SCHOBERI, Linn.; Boiss. Fl. Or. i. p. 919.
Hari-rud valley: 724, July 27, 1885.
A shrub from four to six feet in height; stems and branches very white, and with its fleshy leaves and spinous branches very like a *Lycium*; flowers pure white, in large cymes; fruit, when ripe, a black-purple fleshy drupe, the size of a large pea. Common near Khusan. One of the few shrubs that is not browsed by camels.

MILTIANTHUS PORTULACOIDES, Boiss. Fl. Or. i. p. 916.
Hari-rud valley: 199, April 9–10, 1885; Badghis: May 13, 1885.
Grows in a saline clay soil, on the sides of low hills, that are otherwise quite barren. It has large, spongy, rotting root-stocks, from which the annual flowering shoots

spring; the flowers are copper-coloured. The plant has been well named, as its general appearance and fleshy leaves much resemble a *Portulaca*.

Zygophyllum Fabago, Linn.; Boiss. Fl. Or. i. p. 913.

Hari-rud valley: 568, May 26, 1885; July 30, 1885; Khorasan: June 15, 1885; Badghis: 108, Dec. 9, 1884. In waste places round villages and old buildings; very common. Native name *Simang*. The roots crushed and employed to cleanse sores.

Zygophyllum atriplicoides, Fisch. et Mey.; Boiss. Fl. Or. i. p. 911.

Northern Baluchistan: 7, Sept. 27, 1884; Hari-rud valley: 152, April 2, 18, 19, 1885. Native name *Kich*. This is the characteristic shrub from Quetta to Bala-morghab, although never very numerous, still sufficiently so as to make it a striking object in the most desert places. Its curious fleshy leaves, bright yellow flowers, and large winged fruit always attract attention. No animals browse on it, and its wood is useless for fuel.

Fagonia arabica, Linn.; Boiss. Fl. Or. i. p. 907.

Collected between the Hamun of the Helmand and Zagin, Nov. 5, 1884. Specimen lost.

GERANIACEÆ.

Biebersteinia multifida, DC.; Boiss. Fl. Or. i. p. 899.

Badghis: 144, April 1, 1885; May 1, 20, 1885; Hari-rud, April 29, 1885. Abundant in sandy loamy soil in the Badghis; has large tuberculated root-stocks.

Geranium rotundifolium, Linn.; Boiss. Fl. Or. i. p. 881.

Badghis: 499, May 18, 1885; Hari-rud valley: June 16, 1885. Very occasional, in the shade of rocks and bushes.

Geranium collinum, Steph., var. Londesii, Fisch.; Boiss. Fl. Or. i. p. 874.

Khorasan: 684, June 18, 1885. In moist meadow-lands, along with the species of *Orchis* enumerated below, at an altitude of 5000 feet, near Bezd.

Geranium tuberosum, Linn.; Boiss. Fl. Or. i. p. 873.—Var. Charlesii, Aitch. et Hemsl.; Bot. Mag. t. 6910.

Badghis: 379, May 2, 3, 1885. In the crevices of ledges of limestone and sandstone rocks, at an altitude of 3000 feet, on the north and east sides of the Kambao pass; frequent. A perennial, one to two feet in height, though usually from four to six inches; stems of the larger plants weak and spreading, of the smaller stiff and erect; root-stock consisting of a number of superposed tubers, the lowest usually the largest and about an inch in diameter; lowest stem-leaves on long petioles; flowers rose-coloured, varying a good deal in size; the petals increase in size until they fall off.

Erodium ciconium, Willd.; Boiss. Fl. Or. i. p. 891.

Hari-rud valley: 1036, 281_2, April 21, 1885. Common in the shade of rocks and between boulders.

Erodium cicutarium, L'Hér.; Boiss. Fl. Or. i. p. 890.

Hari-rud valley: 213, April 13, 1885; Badghis: 369, May 1, 1885. Native name *Susan-ak*.

Erodium bryoniæfolium, Boiss. Fl. Or. i. p. 896, cum var. foliis magis incisis.

Hari-rud valley: 281, April 19, 27, 1885; Badghis: 1037, May 16, 1885. In the shade of rocks; common.

RUTACEÆ.

Ruta acutifolia, DC.; *Haplophyllum acutifolium*, Boiss. Fl. Or. i. p. 942.

Badghis: 500, May 4, 18, 1885. A perennial, with annual shoots of about two feet in height, covered with a mass of bright mustard-coloured flowers, which are very sweetly scented. In great luxuriance over the whole country.

Ruta erythræa, Aitch. et Hemsl.—*Haplophyllam erythræum*, Boiss. Fl. Or. i. p. 929.

Hari-rud valley: May 27, 1885. Very common in the low hills, west of the Kohtal-sangi pass.

Ruta (§ Haplophyllum) affinis, Aitch. et Hemsl., n. sp. (Plate V. figs. 1–10.) *Herba* humilis, multicaulis, undique glaberrima, caulibus simplicibus gracilibus adscendentibus. *Folia* subsessilia, anguste lanceolata, oblanceolata vel linearia, obtusa vel subacuta, crassiuscula, inconspicue punctata. *Flores* aurei, laxiuscule corymbosi, distincte pedicellati; calycis segmenta brevia, ovali-oblonga, obtusa; petala ovalia, 3–4 lineas longa; filamenta inappendiculata, imberbia; ovarium breviter stipitatum, 5-loculare, loculis 4–6-ovulatis. *Capsula* tuberculata, introrsum dehiscens, lobis apice gibbosis; semina atra, reniformia, rugulosa.

Hari-rud valley: 406, May 9, 12, 1885; July 28, 1885. This species is nearly allied to *R. erythræa*, differing in its much smaller, quite glabrous flowers, and in having six (or perhaps sometimes four) ovules in each cell. Whether the number of ovules is a constant character remains to be proved; but we doubt it, because we find ten to twelve ovules in each cell in our specimens of *R. pedicellata*, which is described as having six.

Ruta pedicellata, Aitch. et Hemsl.—*Haplophyllum pedicellatum*, Spach; Boiss. Fl. Or. i. p. 925.

Hari-rud valley: 297, April 21, 26, 1885; Badghis: May 21, 1885. On sandstone hills and exposed plains; common. A perennial, with numerous, annual, stiff, erect stems, from a foot to eighteen inches in height, ending in an almost umbellate head of numerous flowers; flowers large, pure yellow, or the corolla deeply coloured externally of a chocolate-brown. This is the same species as Griffith's no. 1261. We find that the cells of the ovary are from 8 to 12, not uniformly 6-ovulate, as described by Boissier; and the young stems are hairy.

Ruta (§ Haplophyllum) rotundifolia, Aitch. et Hemsl., n. sp. (Plate V. figs. 11–16.) *Herba* humilis, multicaulis, fere omnino glaberrima, caulibus simplicibus adscendentibus albidis. *Folia* crassiuscula, distincte nigro-punctata, petiolata vel sessilia, infima rotundata, sursum gradatim angustiora et longiora, margine obscure ciliolata. *Flores* flavo-virentes, dichotome cymosa, centrales sessiles, cæteri breviter pedicellati; sepala parva, obtusa; petala ovali-oblonga, obtusa, glandulosa, primum puberula, sed cito glabrescentia, $2\frac{1}{2}$–3 lineas longa; filamenta ad medium dilatata, barbata; ovarium

supra discum sessile, tuberculato-glandulosum, lobis apice gibbosis, loculis 2-ovulatis, ovulis collateralibus. *Capsula* deest.

Hari-rud valley: 457, May 12, 1885. Common in sandy soil. This strongly resembles *R. glaberrima* in general appearance, but the bearded filaments, gibbose ovary, and geminate ovules readily distinguish it.

PEGANUM HARMALA, Linn.; Boiss. Fl. Or. i. p. 917.

Hari-rud valley: 579, May 28, 1885; Northern Baluchistan: 17, Sept. 29, 30, 1884. Native names: *Spand, Spanj, Ispanthan.* A very common shrub over the whole country, from Baluchistan to Bala-morghab. The natives everywhere seem to hold it in some superstitious awe.

TETRADICLIS SALSA, Stev.; Boiss. Fl. Or. i. p. 918.

Hari-rud valley: 332, April 1885. Extremely common in salt spongy soil, growing in dense moss-like clusters, in shade; the fleshy leaves much resemble those of many salsolaceous plants.

RHAMNACEÆ.

ZIZYPHUS VULGARIS, Lam.; Bois. Fl. Or. ii. p. 12.

Khorasan: 748, July 30, 1885. Native name *Anab.* A tree about 20 feet high, largely cultivated in orchards throughout Afghanistan and Persia for its fruit. On the 6th of December, 1884, amongst the hills between Palounda and Karez-darra, I came upon a thicket of this species, which I have no doubt was here indigenous, as it is in Kashmir.

RHAMNUS PERSICA, Boiss. Fl. Or. ii. p. 17.

Khorasan: 654, June 6, 1885; August 21, 1885. A small shrub growing in the clefts of limestone rocks, at an altitude of about 5000 feet; not uncommon.

AMPELIDEÆ.

VITIS VINIFERA, Linn.; Hook. f. Fl. British India, i. p. 652.

Hari-rud valley: 1038, May 12, 1885. Native name *Tak.* The grape-vine largely cultivated in orchards, throughout Afghanistan and Persia, for its fruit, called *Angur.*

SAPINDACEÆ.

STOCKSIA BRAHUICA, Benth.; Hooker's Kew Journal of Botany, v. p. 304 (1853).

Northern Baluchistan: 5, Sept. 27, 1884. A spinous tree or shrub, up to eighteen feet in height, covered in autumn with brilliantly coloured inflated fruit about an inch long and three inches in circumference, which remains hanging on the tree long after the leaves have fallen off. Native name *Koh-tor* or mountain-peach. The area of this extends into Afghanistan as far north as Sang-bar, where I saw it, and in all probability it will be found in North-eastern Persia.

ANACARDIACEÆ.

RHUS CORIARIA, Linn.; Boiss. Fl. Or. ii. p. 4.

Khorasan: 632, June 15, 1885; August 23, 1885.

Native name *Samahk*, *Sumahk*. A small tree, cultivated in orchards for its leaves, which are employed in dyeing and tanning.

PISTACIA TEREBINTHUS, Linn., var. MUTICA, Aitch. et Hemsley.—*Pistacia mutica*, Fisch. et Mey.; *Pistacia Khinjuk*, Stocks; *Pistacia cabulica*, Stocks; Boiss. Fl. Or. ii. pp. 6, 7.

Northern Baluchistan: D. 61, October 11, 1884; Mt. Do-shakh: C. 1039, August 5, 1885; B. 1040, August 5, 13, 1885; Khorasan: C. 1039, August 19, 1885; A. 1041, August 19, 1885; E. 790, August 21, 1885.

Native name in Baluchistan *Gwan*, *Wana*, *Bana*; Afghanistan and Persia, *Kinjak*. A small tree, from fourteen to twenty feet high, usually met with on low hills of limestone formation; occasionally in small groups, but never so numerously together as to constitute a forest. Camels and goats browse on it. The nuts, though small, are roasted, and the kernels eaten; but usually the kernels are crushed, and from them an oil obtained, which is eaten with food. The leaves are said to be employed in dyeing and tanning, but not the galls. The galls are developed on the margin of the leaf, and are very different in form from those of *Pistacia vera*.

After a careful examination of the large amount of material we had to aid us, we are of opinion that the several forms which have been described as species may all be placed as varieties of *P. Terebinthus*, Linn.

PISTACIA VERA, Linn.; Boiss. Fl. Or. ii. p. 5.

Badghis: 390, May 3, 4, 14, 21, 1885; Khorasan: 665, June 17, 1885. Native name *Pista*. A small indigenous tree, forming forests, at an altitude of from 3000 feet and upwards, usually on sandstone formation. The country where the forests abound is called *Pistalik*, and these forests are greatly valued for their yield of nuts (*Pista*), as well as for the galls on their leaves (*Boz-ganj*), both of which are articles of commerce, especially the former, which are largely exported to India. It yields a gum-resin (*Shilm-i-pista*), employed in household medicine; and the wood is considered the best fuel that the country produces. The tree is cultivated in orchards in Persia, but apparently not in Afghanistan, at least not in the parts visited by me.

LEGUMINOSÆ.

TRIGONELLA EMODI, Benth.; Hook. f. Flora British India, ii. p. 88.

Badghis: 553, May 24, 1885. Common, above 3000 feet.

TRIGONELLA LAXIFLORA, Aitch. et Baker, n. sp.; caulibus erectis elongatis ramosis obscure pilosis, foliolis obovato-cuneatis emarginatis dentatis, racemis laxissimis 6–12-floris, pedicellis calyce 2–3-plo longioribus, calyce piloso, dentibus deltoideis tubo brevioribus, petalis aureis calyce triplo longioribus, legumine lineari-oblongo, plano tenui glabro 1–3-spermo transversaliter venoso.

Caules graciles, straminei, sesquipedales et ultra. *Stipulæ* parvæ, lanceolatæ,

persistentes; petioli inferiores 3–4 lin. longi; foliola 4–6 lin. longa, supra medium 3–4 lin. lata, apice late emarginata, minute mucronata, utrinque viridia, obscure pilosa. *Racemi* copiosi, terminales, longe pedunculati, floriferi 1–1½ poll. longi; pedicelli 2–3 lin. longi, floriferi apice cernui, fructiferi deflexi. *Calyx* 2 lin. longus, tubo campanulato, dentibus deltoideis acutis tubo brevioribus. *Petala* 6 lin. longa. *Fructus* 9–12 lin. longus, medio 2–2½ lin. diam., leviter curvatus, deflexus, venis transversalibus gracilibus obliquis exsculptis, suturis incrassatis.

Ad *T. corniculatam*, Linn., et *T. Emodi*, Benth., magis accedit.

Badghis: 484, May 17, 1886. In great profusion between Sim-koh and Kambao-burj; in dense clumps formed by numerous annual stems springing from a perennial root-stock; stems from one to two feet in height; flowers bright yellow.

Trigonella monantha, C. A. Mey.; Boiss. Fl. Or. ii. p. 77.

Hari-rud valley: 323, April 26, 1885.

Trigonella Fœnumgræcum, Linn.; Boiss. Fl. Or. ii. p. 71.

Hari-rud valley: 227 (2), April 13, 1885; June 5, 1885. Native name *Shamli*. Cultivated extensively in fields for fodder; and in gardens as a pot-herb. It exists frequently as an escape from cultivation.

Trigonella radiata, Boiss. Fl. Or. ii. p. 90, syn. *Medicago radiata*, Linn. Sp. Pl. p. 1096.

Khorasan: 710, July 1, 1885. Only obtained once.

Medicago sativa, Linn.; Boiss. Fl. Or. ii. p. 94.

Badghis: 532, May 21, 1885. Native name *Sebist*. In the Badghis, at an altitude above 3000 feet, this plant seems to be indigenous; it is, however, cultivated as fodder for horses, wherever water can be obtained for irrigation.

Medicago Gerardi, Willd.; Boiss. Fl. Or. ii. p. 100.

Badghis: 522, May 20, 1885.

Melilotus arvensis, Wallr.—*Melilotus officinalis*, Desr.; Boiss. Fl. Or. ii. p. 109.

Hari-rud valley: 583, June 3, 1885. A common plant in cultivated land.

Trifolium fragiferum, Linn.; Boiss. Fl. Or. ii. p. 135; Hook. f. Fl. Brit. Ind. ii. p. 86.

Khorasan: 709, July 1, 1885. On the sides of irrigation channels; common.

Trifolium resupinatum, Linn.; Boiss. Fl. Or. ii. p. 137.

Hari-rud valley: 752, July 30, 1885. Native name *Shautal*. Only met with this plant under cultivation in fields as fodder for cattle and sheep.

Trifolium repens, Linn.; Boiss. Fl. Or. ii. p. 145.

Khorasan: 1156 (709-2), July 1, 1885.

Very common on the sides of irrigation channels and streams; everywhere above 3000 feet altitude.

Lotus corniculatus, Linn.; Boiss. Fl. Or. ii. p. 165.

Khorasan: 1042, June 16, 1885; August 20, 1885. At an altitude of above 4000 feet; forming a turf on the sides of streams and irrigation channels.

LOTUS TENUIFOLIUS, Reichb. var.; Boiss. Fl. Or. ii. p. 166, syn. *L. corniculatus*, var., Linn.
Neither locality nor date: 1043.

ASTRAGALUS AMMOPHILUS, Kar et Kir.; Boiss. Fl. Or. ii. p. 228.
Hari-rud valley: 322, April 18, 26, 1885; 407, May 9, 1885. In great abundance, in sandy soil, forming soft, mossy turf along with *A. Nawabianus*.

ASTRAGALUS (§ OXYGLOTTIS) NAWABIANUS, Aitch. et Baker, n. sp.—Annua, caule erecto sæpissime simplici, stipulis liberis linearibus, foliolis 9–13 oblongis obtusis, utrinque laxe albo-hispidulis, floribus 6–10 in capitula densa longe pedunculata aggregatis, calyce dense piloso, dentibus linearibus tubo æquilongis vel longioribus, petalis lilacinis, calyce duplo longioribus, legumine oblongo abrupte rostrato biloculari 4-spermo dense piloso.

Caules graciles, erecti, 6–9 lin. longi, sursum tenuiter strigillosi. *Folia* 2–4 poll. longa, foliolis oppositis viridibus 3–4 lin. longis. *Capitula* 1–4, axillaria, omnia longe pedunculata. *Calyx* 1½ lin. longus, pilis albis et nigris elongatis flexuosis dense vestitus. *Carina* 3 lin. longa. *Fructus* 2 lin. longus, stylo persistente abrupte rostratus.

Ad *A. ammophilum* magis accedit. Recedit pilis laxis elongatis, capitulis omnibus longe pedunculatis, dentibus calycinis elongatis, legumine abrupte rostrato.

Hari-rud valley: 1044, April 12, 1885; Badghis: May 14, 1885. A slender annual, about six inches in height, growing in great masses close together so as to form a soft moss-like sward; greedily eaten by horses.

ASTRAGALUS TENUIRUGIS, Boiss. Fl. Or. ii. p. 232, syn. *A. corrugatus*, Bert., var.
Hari-rud valley: 132 (2), 264, April 7, 17, 19, 21, 1885. Very common.

ASTRAGALUS CAMPYLORRHYNCHUS, Fisch. et Mey.; Boiss. Fl. Or. ii. p. 233.
Badghis: 374, May 1, 1885; Hari-rud valley: 404, May 9, 1885.

ASTRAGALUS GYZENSIS, Delile; Boiss. Fl. Or. ii. p. 234, syn. *A. hauarensis*, Boiss.
Hari-rud valley: 410, May 9, 1885. Common, in sandy soil amongst gravel.

ASTRAGALUS, sp. aff. *A. trimestri*, Linn.
Hari-rud valley: 1045, May 14, 1885. Common; intermixed with *A. Nawabianus*. Ripe pod wanting for exact determination.

ASTRAGALUS, sp. aff. *A. hispidulo*, DC.
Hari-rud valley: 226, April 13, 1885. In cultivated land; one specimen only, and insufficient in this genus for description.

ASTRAGALUS (§ PHACA) STEPHENIANUS, Aitch. et Baker, n. sp. Perennis, pilis basifixis, caulibus elongatis breviter pilosis, stipulis parvis liberis lanceolatis, foliolis circiter 30-jugis parvis oblongis obtusis utrinque breviter tenuiter albo-pilosis, racemis multis paucifloris densis axillaribus sessilibus, pedicellis brevibus, calyce piloso pilis albis nigrisque intermixtis, tubo oblongo dentibus linearibus tubo vix

brevioribus, petalis primum albidis demum purpureo-rubellis calyce duplo longioribus, legumine oblongo parvo piloso biloculari recto 4–6-spermo.

Caules cæspitosi, erecti, pedales vel sesquipedales. *Folia* 3–4 poll. longa, foliolis 3–6 lin. longis. *Racemi* 2–8-flori, ad caulem interdum 15–18, dissiti, ad foliorum axillas sessiles. *Calyx* 4 lin. longus, pilis flexuosis elongatis nigris, vel albis vestitus. *Petala* 8–9 lin. longa. *Fructus* oblongus, 3–4 lin. longus, perfecte bilocularis.

Ad *A. tephrosioidem*, Boiss., magis accedit.

Badghis: 383, May 2, 3, 19, 1885. A perennial, with numerous annual almost erect stems, from one to two feet high, originating from a woody root-stock, and bearing in the axils of the stem-leaves numerous flowers in fascicles; flowers pure white at first, but gradually becoming pink or purplish. Common on the Badghis at 3000 feet altitude.

Astragalus Sieversianus, Pall.; Boiss. Fl. Or. ii. p. 273.

Badghis: 544, May 22, 1885. In the vicinity of running streams; not common. Large pods, much resembling cocoons of the silkworm, characterize this species.

Astragalus pellitus, Bunge; Boiss. Fl. Or. ii. p. 279.

Hari-rud valley: 1046, August 8, 1885. In stony ground; common.

Astragalus buchtormensis, Pall.; Bunge, Astragali Sp. Geron. ii. p. 45. no. 200.

Badghis: 380, May 2, 1885; Paropamisus: May 25, 1885.

Astragalus buchtormensis, Pall.; var.?

Hari-rud valley: 156, April 3, 6, 1885; April 21?, 1885. In sandy, gravelly soil; common. Each plant grows much isolated; its leaves grow closely appressed to the ground and spread out; and it has a long fibrous whip-like root two to three feet deep in the soil. These roots are employed in lieu of twine by the shepherds.

Astragalus (§ Myobroma) Barrowianus, Aitch. et Baker, n. sp. Perennis, exscapus pilis albis mollibus basifixis, stipulis lanceolatis, foliis longe petiolatis, foliolis circiter 30-jugis parvis oblongis utrinque dense albo-pilosis, racemis laxis paucifloris foliis multo brevioribus, calyce dense albo-piloso dentibus e basi lata linearibus tubo æquilongis, petalis luteis calyce sesquilongioribus, legumine oblongo compresso piloso breviter stipitato uniloculari trispermo intus farcto.

Herba perennis, radice elongato fusiformi. *Petioli* 1½–3 poll. longi; lamina semipedalis et ultra foliolis 3–4 lin. longis. *Racemi* pauciflori, breviter pedunculati, pedicellis cernuis 1½–2 lin. longis, bracteis parvis persistentibus lanceolatis. *Calyx* semipollicaris, tubo oblongo, dentibus e basi deltoidea linearibus. *Corolla* 8–9 lin. longa. *Fructus* 4–6 lin. longus, 2½–3 lin. diam.

Ad *A. buchtormensem*, Pall., arcte accedit.

Badghis: 371, May 1, 4, 20, 1885. Common small bush in the loamy sandy soil of the Badghis; flowers pure white. It affords excellent grazing on the rolling plains.

Astragalus Auganus, Bunge; Boiss. Fl. Or. ii. p. 282.

Badghis: 342, April 29, 1885. Common in the low hills; has very long, fibrous, whip-like roots.

Astragalus (§ Myobroma) Cottonianus, Aitch. et Baker, n. sp. Acaulis, perennis, exscapus, pilis parcis brevibus adpressis albis, stipulis lanceolato-deltoideis, foliis longe petiolatis, foliolis 11–13 orbiculari-cuneatis, pedunculo foliis subæquilongo, racemo laxe elongato, bracteis lanceolatis persistentibus, pedicellis brevibus ascendentibus, calyce vix piloso basi bracteolato dentibus lanceolatis tubo oblongo brevioribus, petalis luteis calyce sesquilongioribus, legumine lineari recurvato uniloculari 4–5-spermo breviter stipitato.

Herba perennis, radice elongato fusiformi. *Petioli* 2–3 poll. longi, pilis adpressis albis dense vestiti. *Lamina* 2–4-pollicaris; foliola 6–9 lin. longa, utrinque viridia, pilis adpressis hispidulis albis tenuiter vestiti. *Pedunculus* 5–6-pollicaris; racemus 3–6-pollicaris, laxe 10–20-florus, pedicellis 1–2 lin. longis. *Calyx* 6–7 lin. longus, pilis paucis sparsis albis vel nigris præditus. *Petala* 10–11 lin. longa. *Fructum* maturum non vidi.

Habitus *A. longiflori*, Pall., et *A. flexi*, Fisch. Recedit racemis foliis conspicue eminentibus, etc.

Badghis: 377, May 2, 4, 1885. In great luxuriance, on the low rocky hill-sides of the Badghis; flowers numerous, large, bright yellow, on long spikes. A very showy plant and one well worthy of cultivation.

Astragalus Gompholobium, Benth.; Bunge, Astragali Sp. Geron. ii. p. 50. no. 218.

Badghis: 343, April 29, May 1, 21, 1885. Very common in the sandy soil of the Badghis. It has very long fibrous whip-like roots; the pods are the size of a grape, inflated and full of liquid, and greedily eaten by the natives, who call them both "grapes" and "melons."

Astragalus, sp. aff. *A. ovino*, Boiss. Fl. Or. ii. p. 288.

Badghis: 1047, May 21, 1885. Not sufficient material for identification. The pods are as large as good-sized gooseberries, and, previous to ripening, largely inflated and full of liquid, like those of *A. Gompholobium*; at this period greatly resembling miniature melons. They are sought for and eaten by the shepherds.

Astragalus gerensis, Boiss. Fl. Or. ii. p. 300.

Khorasan: 694, June 14, 18, 1885. In the arid gravelly plains, not uncommon; characterized by its large pod, ending in a hard woody spine.

Astragalus, sp. aff. *A. viciæfolio*, DC.; Boiss. Fl. Or. ii. p. 252.

Badghis: 1048, May 19, 1885.

Astragalus (§ Hypoglottis) Rawlinsianus, Aitch. et Baker, n. sp. Perennis, pilis mollibus albis basifixis, caule brevi, stipulis lanceolatis, foliis breviter petiolatis, foliolis circiter 12-jugis parvis oblongis utrinque laxe albo-pilosis, pedunculo foliis longiore, racemo denso multifloro subspicato pilis elongatis mollibus albis nigrisque dense vestito, bracteis linearibus, calycis dentibus linearibus tubo oblongo-cylindrico vix brevioribus, petalis violaceis calyce sesquilongioribus, legumine sessili parvo oblongo 4-spermo longe piloso stylo elongato curvato apiculato.

Herba perennis, radice elongato fusiformi, caulibus brevibus erectis cæspitosis dense pilosis. *Petioli* 1–1½ poll. longi; lamina 3–4-pollicaris, foliolis inferioribus 5–6 lin. longis. *Pedunculus* sæpe semipedalis; racemus 1½–2 poll. longus. *Calyx* 4 lin. longus. *Petala* saturate lilacina, 6 lin. longa, inferiora vexillo oblongo-unguiculato 1½–2 lin. breviora. *Fructus* calyci æquilongus, pilis elongatis albis dense vestitus.

Ad *A. Fresenii*, Decne., magis accedit.

Badghis: 357, May 1, 19, 20, 1885. A very common undershrub, reaching a foot in height on the low hills, and forming excellent fodder for sheep and goats. Flowers purple, in heads, and very like clover when young; but the heads gradually increase in length, and by the time the fruit has formed they are often fully four inches long.

Astragalus (§ Calycophysa) Grisebachianus, Aitch. et Baker, n. sp. Perennis, caulibus elongatis angulatis flexuosis pilis albis adpressis vestitis, stipulis herbaceis lanceolatis persistentibus, petiolis inermibus, foliolis 20–25-jugis oblongis mucronatis utrinque dense albo-pilosis, floribus in capitula magna globosa axillaria pedunculata aggregatis, bracteis linearibus, calyce densissime longe albo-villoso dentibus linearibus tubo campanulato longioribus, petalis pallide luteis copiose viridi-venosis calycem vix superantibus, vexillo sericeo petalis reliquis longiore, legumine parvo oblongo turgido biloculari 2-spermo.

Herba perennis, caulibus subpedalibus. *Folia* 6–8 poll. longa, foliolis inferioribus 6–8 lin. longis. *Pedunculi* 1½–2 poll. longi. *Capitula* florifera dense lanosa 2 poll. diam. *Calyx* subpollicaris, dentibus linearibus flexuosis, tubo inflato post anthesin haud rupto; vexillum 4–5 lin. latum. *Fructus* in calycis tubo inclusus.

Ad *A. vulpinum*, Willd., magis accedit.

Hari-rud valley: 419, May 10, 1885; June 4, 1885. Not common, though very striking from its large, globular, greenish-yellow flower-heads.

Astragalus schahrudensis, Bunge; Boiss. Fl. Or. ii. p. 416.

Khorasan: 669, June 17, 1885. Common in cultivated land, at 5000 feet altitude. Flowers bright yellow.

Astragalus kahiricus, DC.; Boiss. Fl. Or. ii. p. 420.

Hari-rud valley: 236, April 10, 15, 18, 1885; May 9, 1885. Very common in sandy soil. It has a tough fibrous root three feet in length, which is employed as a substitute for rope by the country people.

Astragalus chrysostachys, Boiss. Fl. Or. ii. p. 377.

Khorasan: 645, June 16, 1885. Common, at 5000 feet altitude, and forming great hassocks from three to five feet across, and two to three feet deep. When covered, as I saw it, with its great spikes of golden flowers it is a grand sight.

Astragalus (§ Calycophysa) Lumsdenianus, Aitch. et Baker, n. sp. Herbaceus, perennis, subacaulis, foliis pilis copiosis albis brevibus vestitis, stipulis ovatis scariosis basi adnatis, petiolis apice spinosis vetustis paucis persistentibus, foliolis circiter 15-jugis obovatis rigidulis conspicue mucronatis, floribus in spicas densas longe pedunculatas aggregatis, bracteis parvis ovatis dense pilosis, calyce breviter piloso

pilis albis nigrisque intermixtis, tubo magno post anthesin vesicario, dentibus parvis ovatis, petalis sulphureis breviter exsertis, ovario dense albo-sericeo uniloculari triovulato.

Herba perennis, subacaulis, radice duro elongato. *Folia* semipedalia, paripinnata, petiolo apice stramineo subpungente; foliola 3–4 lin. longa, mucrone stramineo pungente. *Pedunculi* stricti, erecti, adpresse albo-pilosi, 7–8 poll. longi. *Spicæ* 2–3 poll. longæ. *Calyx* pallidus vel purpurascens, tubo demum 5–6 lin. longo et lato. *Petala* 8–9 lin. longa, sulphurea, purpureo-venosa, vexillo glabro lamina orbiculari 2 lin. longa petalis reliquis vix longiore. *Fructum* maturum non vidi.

Ad *A. submitem*, Boiss. et Hohenack, magis accedit.

Badghis: 1049, May 19, 1885; Khorasan: August 19, 1885. Common in the low hills to 3000 feet altitude. The calyx becomes purple, making the plant very conspicuous.

ASTRAGALUS (§ CALYCOPHYSA) MERKIANUS, Aitch. et Baker, n. sp. Herbaceus, perennis, subacaulis, foliis pilis copiosis albis vestitis, stipulis lanceolatis basi adnatis, petiolis apice obscure spinosis vetustis pluribus persistentibus, foliolis circiter 20-jugis obovatis parvis conspicue mucronatis, floribus 10–12 in capitula longe pedunculata aggregatis, bracteis parvis ovatis dense pilosis, calyce dense breviter piloso pilis albis nigrisque copiosis intermixtis, tubo oblongo demum inflato scarioso, dentibus parvis deltoideis, petalis sulphureis breviter protrusis, ovario lineari dense albo-piloso uniloculari 2–3-ovulato.

Herba perennis, radice duro elongato, caule infra foliorum petiolis vetustis induratis ascendentibus prædito. *Folia* 4–6 poll. longa; foliola inferiora 4–5 lin. longa, superiora sensim minora. *Pedunculus* 6–7-pollicaris, strictus, erectus, dense breviter albo-pilosus. *Calyx* floriferus 6 lin. longus. *Petala* 8–9 lin. longa, vexillo glabro pallide sulphureo 3 lin. lato. *Fructum* non vidimus.

Ad *A. submitem*, Boiss. et Hohen., arcte accedit.

Badghis: 351, May 1, 1885.

ASTRAGALUS ANISACANTHUS, Boiss. Fl. Or. ii. p. 395.

Hari-rud valley: 1050, August 3, 4, 1885. A common, extremely spinous undershrub reaching two feet in height.

ASTRAGALUS HERATENSIS, Bunge; Boiss. Fl. Or. ii. p. 335. (Plate VI.)

Hari-rud valley: 1051, August 16, 1885. Native name *Gabina*. A common shrub, two to three feet in height; in habit very like a miniature oak, the main stem and lower branches being devoid of all spines and smooth, with a dark-coloured bark. From cracks in the bark exudes a gum called *Katira*; this is an article of commerce and export.

ASTRAGALUS, sp. aff. *A. strobilifero*, Royle; Hook. f. Flora British India, ii. p. 135.

Hari-rud valley: 571, May 26, 1885. Native name *Kon, Khon*.

Common along the base of the Paropamisus at an altitude of nearly 3000 feet. An undershrub from two to three feet in height. From this also exubes a gum called

Katira, which is considered one and the same thing as that yielded by *A. heratensis*, and with it is collected for exportation.

Astragalus (§ Cercidothrix) Durandianus, Aitch. et Baker, n. sp. Herbaceus, perennis, multiceps, acaulis, foliis imparipinnatis pilis albis rigidulis dense vestitis, stipulis ovatis basi ad petiolum adnatis, petiolo brevi, foliolis 7 oblanceolato-oblongis parvis crassis, floribus solitariis breviter pedunculatis, calyce breviter piloso pilis albis paucis nigris multis, tubo oblongo post anthesin rupto, dentibus parvis lanceolatis, petalis pallidis glabris calyce sesquilongioribus, legumine sessili ovoideo albo-villoso inflato biloculari, seminibus in loculo pluribus.

Herba perennis, dense cæspitosa. *Petioli* 3–4 lin. longi; lamina 5–6 lin.; foliola 2–3 lin. *Pedunculus* foliis brevior. *Calyx* semipollicaris segmentis tubo 4-plo brevioribus. *Petala* 8–9 lin. longa. *Fructus* imperfecte maturus 6–7 lin. longus, 4 lin. diam.

Ad *A. ammodytem*, Pall., et *A. Helmii*, Fisch., habitu magis accedit.

Khorasan: 688, June 18, 1885. This forms a close turf, on the pass to the south of Bezd, at an altitude above 6000 feet. It has extremely large pods for so small a plant, and they are covered with long silky grey hairs.

Astragalus (§ Cercidothrix) Weirianus, Aitch. et Baker, n. sp. Perennis, caulibus brevibus erectis ramosis, stipulis lanceolatis dimidio inferiore ad petiolum adnatis, foliis imparipinnatis foliolis 3–5 oblanceolato-oblongis acutis pilis paucis albis hispidulis mediofixis præditis, racemis pedunculatis laxis multifloris, pedicellis brevibus, bracteis parvis ovato-lanceolatis, calyce parvo dense piloso pilis nigris et albis intermixtis tubo oblongo segmentis linearibus tubo duplo brevioribus, petalis violaceis calycem duplo superantibus, ovario cylindrico elongato recurvato glabro biloculari multiovulato.

Herba perennis, copiose ramosa, caulibus erectis pedalibus vel semipedalibus. *Folia* 12–18 lin. longa, foliolis pallide viridibus 9–12 lin. longis, 3–4 lin. latis. *Pedunculi* 1½–2 poll. longi. *Racemi* 2–2½ poll. longi. *Calyx* 3 lin. longus; vexillum glabrum, 6 lin. longum, petala reliqua distincte superans. *Fructus* immaturus calyce haud rupto triplo longior.

Badghis: 336, April 29, 1885. A woody undershrub about eighteen inches high, extremely common in sandy loam in the Badghis, where it forms good pasturage for goats and sheep. Flowers purplish.

Astragalus (§ Cercidothrix) Holdichianus, Aitch. et Baker, n. sp. Perennis acaulis, petiolis inermibus paucis vetustis persistentibus, foliis pilis albis rigidulis adpressis dense vestitis, stipulis ovatis acuminatis basi ad petiolum adnatis, foliolis 13–15 oblongis acutis vel obtusis, pedunculis elongatis, racemis laxis paucifloris, pedicellis brevibus, bracteis lanceolatis persistentibus, calyce pilis plerisque nigris brevibus adpressis vestito, tubo oblongo dentibus lanceolatis tubo duplo brevioribus, petalis luteis calyce sesquilongioribus, legumine lineari compresso recurvato elongato piloso polyspermo perfecte biloculari.

Herba perennis acaulis, radice duro elongato. *Petioli* 1–2 poll. longi; lamina 3–4 poll.; foliola breviter petiolulata, 4–6 lin. longa. *Pedunculus* 4–6 poll. *Racemi* 3–9-flori, 2–4 poll. longi, pedicellis floriferis ascendentibus 1½–2 lin. longis. *Calyx* semipollicaris. *Corolla* 9 lin. longa, vexillo glabro petalis reliquis paulo longiore. *Fructus* 15–18 lin. longus, 2½ lin. diam., breviter pilosus, crebre nigro maculatus.

Ad *A. incurvum*, Desf., et *A. incanum*, Linn., magis accedit.

Badghis: 347, April 29, 1885; May 19, 1885.

A very common plant in sandy loam, in which it sends down a long tough root, which, as well as that of several other species, is employed instead of rope or twine by the shepherds.

Astragalus subulatus, Bieber.; Boiss. Fl. Or. ii. p. 481; Pallas, Ic. Astrag. t. 20.

Hari-rud valley: 201, April 10, 13, 18, 1885; May 9, 1885.

In sandy soil; most common.

Astragalus hyrcanus, Pall.; Boiss. Fl. Or. ii. p. 488.

Hari-rud valley: 287, April 18, 21, 1885; Northern Baluchistan: October 3, 1884.

Native name in Baluchistan *Udish*.

A common shrub in the arid tracts, conspicuous from the extreme whiteness of its bark, and the rhachis of the very distant leaves persisting as spines. It is a valuable fodder-shrub in the desert, and the long leafless pliant branches were greedily eaten even by our horses. In the desert when the plant was perfectly bare of leaves its pyramidal form was quite characteristic and very striking.

Astragalus oligophyllus, Boiss. Fl. Or. ii. p. 488.

Hari-rud valley: 1052, May 9, 1885; Badghis: May 19, 1885.

Astragalus angustifolius, Lam.; Boiss. Fl. Or. ii. p. 489.

Khorasan: 666, June 17, 1885. Common, forming great flat hummocks, at an altitude of 5000 feet. One of the very characteristic plants of the country.

Astragalus (§ Cercidothrix) Goreanus, Aitch. et Baker, n. sp. Fruticulosus, caulibus brevibus pilis albis adpressis dense vestitis, petiolis vetustis subspinosis pluribus persistentibus, stipulis lanceolatis basi ad petiolum adnatis, foliolis 9–15 oblanceolatis utrinque pilis albis hispidulis adpressis vestitis, racemis paucifloris breviter pedunculatis, pedicellis brevibus, bracteis parvis pilosis, calyce pilis nigris et albis dense vestito, tubo oblongo, dentibus lanceolatis tubo quadruplo brevioribus, petalis luteis calyce sesquilongioribus, legumine lineari recto sessili piloso polyspermo perfecte biloculari.

Fruticulus parvus dense ramosus, caulibus brevibus, foliorum rachidibus strictis subpungentibus erecto-patentibus. *Petioli* 6–12 lin.; lamina 2–3 poll.; foliola 3–6 lin. longa. *Racemi* 4–8-flori, pedicellis floriferis ascendentibus. *Calyx* 6–8 lin.

longus. *Petala* 9–10 lin. longa, vexillo glabro petala reliqua superante. *Fructus* 15–16 lin. longus, 2½ lin. diam.

Ad *A. hyrcanum*, Pall., magis accedit.

Hari-rud valley: 1053, May 9, 1885. A low shrub, about 2 feet in height.

ASTRAGALUS (§ CERCIDOTHRIX) TALBOTIANUS, Aitch. et Baker, n. sp. Fruticulosus, caulibus brevibus, petiolis vetustis strictis pluribus persistentibus, foliis imparipinnatis pilis albidis hispidulis adpressis ubique vestitis, stipulis lanceolatis basi ad petiolum adnatis, foliolis 9–13 oblanceolatis subacutis, racemis paucifloris breviter pedunculatis, pedicellis brevibus nigro-pilosis, bracteis parvis lanceolatis, calyce pilis plerisque nigris dense vestito, tubo oblongo-cylindrico, dentibus lanceolatis tubo 3–4-plo brevioribus, petalis luteis calyce sesquilongioribus, ovario lineari biloculari multiovulato.

Habitus omnino *A. Goreani*. *Petioli* 6–15 lin. longi; lamina 1–2½ poll.; foliola 3–6 lin. longa. *Pedunculus* 1–2 poll. longus. *Racemi* 2–6-flori, pedicellis floriferis 1–2 lin. longis omnibus ascendentibus. *Calyx* 8–9 lin. longus. *Corolla* circiter pollicaris, vexillo glabro petala reliqua superante.

Ad præcedentem (*A. Goreanum*) arcte accedit. Varietas *condensatus* adest, habitu dense condensato, floribus et foliis minoribus.

Hari-rud valley: 202, April 13, 1885 (type); April 10, 1885 (var. *condensatus*).

A common small bush much browsed by sheep, &c.

GLYCYRRHIZA GLABRA, Linn.; Boiss. Fl. Or. ii. p. 202.

Hari-rud valley: August 5, 1885; Badghis: 129, March 1885, May 22, 1885.

Native name *Mahk*, *Sus*. One of the most common and characteristic shrubs of the Badghis, and generally common throughout the Hari-rud valley, but always near water. I do not remember ever seeing it in Khorasan. The great underground root-stocks make excellent fuel even when green and moist; and from them is obtained a common household medicine, a coarse extract (Liquorice), called by the Turkomans *Mahk*, and by the Persians *Asus*, *Rob-a-sus*.

GLYCYRRHIZA GLABRA, Linn. var. γ. GLANDULIFERA, Reg. et Herd.; Boiss. Fl. Or. ii. p. 202.

Badghis: 509, May 18, 1885; Hari-rud valley: June 6, 1885.

GLYCYRRHIZA TRIPHYLLA, Fisch. et Mey.; Boiss. Fl. Or. ii. p. 203.

Hari-rud valley: 737, August 8, 1885; Khorasan: July 3, 1885.

Among stony shingle, forming a thick sward in the beds of dried-up water-courses, especially on the tract of land between two stream-beds where they join. Flowers extremely pretty, in snow-white spikes.

EVERSMANNIA HEDYSAROIDES, Bunge; Boiss. Fl. Or. ii. p. 510.

Hari-rud valley: 574, May 27, 1885.

Common in gravel and clay soil, on the sides of escarpments, a bush of from two to three feet covered with dense masses of rose-coloured flowers; very handsome and would be well worth cultivating.

NOTE.—Dr. Regel identifies this with *Eversmannia astragaloides*, Reg. et Schmalh. (in Reg. Pl. Nov. Fedtsch. p. 18), which, with a large number of specimens before us, we should regard, as he himself suggests in the place cited, as a state of *E. hedysaroides*.

HEDYSARUM MAITLANDIANUM, Aitch. et Baker, n. sp. Perenne, caule producto pilis albis brevibus tenuiter vestito, stipulis deltoideis membranaceis, foliolis 5–7 obovatis obtusis utrinque breviter albo-pilosis, racemis laxis paucifloris longe pedunculatis, pedicellis brevibus dense pilosis, bracteis bracteolisque lanceolatis, calyce dense piloso dentibus lanceolatis tubo duplo longioribus, petalis saturate lilacinis calyce duplo longioribus, vexillo glabro carina sublongiore, legumine recurvato pedicellato articulis 3–4 suborbicularibus discoideis facie glabris venulosis margine breviter ciliatis.

Herba erecta semipedalis vel pedalis. *Petioli* 6–12 lin. longi; lamina 2–3 poll.; foliola 6–9 lin. longa. *Pedunculi* stricti, 2–4 poll. longi. *Racemus* demum 2–3-pollicaris. *Calyx* 3 lin. longus, vexillum 8–9 lin. longum, 5–6 lin. latum. *Leguminis* articuli 2–3 lin. longi.

Ad stirpem *Multicaulia*, Boiss., prope *H. elymaiticum*, Boiss. et Haussk., pertinet.

Badghis: 381, May 2, 4, 1885; Hari-rud valley: May 19, 1885.

A dense bush, about a foot in height, with very numerous annual shoots, growing closely together and forming clumps of from nine to twelve feet in circumference. Flowers large, rose-pink, in loose spikes. A very handsome shrub when in full flower. Common.

HEDYSARUM WRIGHTIANUM, Aitch. et Baker, n. sp. Perenne, caulibus brevibus dense albo-incanis, stipulis e basi deltoidea acuminatis, foliolis 13–15 lineari-oblongis obtusis facie subcalvatis dorso albo-pilosis, racemis pedunculatis elongatis multifloris, pedicellis brevibus dense pilosis, bracteis minutis deciduis, calyce dense piloso dentibus linearibus tubo campanulato 3–4-plo longioribus, floribus parvis sordide rubello-luteis, vexillo alisque calyci æquilongis carina brevioribus, legumine piloso pedicellato articulis 1–3 facie et margine longe crinitis.

Caules dense cæspitosi, semipedales vel pedales. *Petioli* 6–12 lin. longi; lamina 2–4-pollicaris; foliola 9–12 lin. longa, 1½–2 lin. lata. *Racemus* demum 3–4 poll. *Calyx* 3 lin. longus. *Carina* 4–5 lin. *Leguminis* articuli demum 3 lin. longi, setis 1½–2 lin. longis brunneis vel purpurascentibus.

Ad *H. criniferum*, Boiss., et *H. micropterum*, Bunge, magis accedit.

Hari-rud valley: 421, May 10, 28, 1885; Badghis: April 4, May 19, 1885.

An extremely common shrub, greedily eaten by goats and sheep. The ripe fruit is covered with bright purple bristles.

ONOBRYCHIS MICRANTHA, Schrenk; Ledebour, Fl. Ross. i. p. 710.

Hari-rud valley: 405, May 9, 1885; 611, June 6, 1885.

An excessively common annual, in stony soil. The form of the fruit might give artists a new design for ear-rings.

Onobrychis tavernierÆfolia, Stocks; Boiss. Fl. Or. ii. p. 545.

Hari-rud valley: 320, April 26, 1885; May 9, 1885.

An annual, common in sand; the whole plant is spread out flat, and grows close to the soil. The fruit escapes observation until the plant is removed from the ground, and the lower side turned up.

Onobrychis cornuta, Desv.; Boiss. Fl. Or. ii. p. 537.

Khorasan: 686, June 18, 1885.

Common above 5000 feet altitude, forming immense hummocks, very characteristic of the country.

Onobrychis (§ Hymenobrychis) megalobotrys, Aitch. et Baker, n. sp. Perennis, caulibus elongatis erectis molliter albo-pilosis, stipulis liberis lanceolatis, foliolis 15–17 oblongis mucronatis facie glabris dorso pilosis, racemis laxis longissimis, pedicellis brevibus pilosis, bracteis parvis lanceolatis membranaceis, calyce piloso, dentibus e basi lata acuminatis tubo campanulato longioribus, vexillo sericeo rubello-luteo calyce triplo longiore, alis obtusis auriculatis calyce brevioribus, legumine orbiculari piloso late cristato margine spinuloso disco profunde foveolato parce spinoso.

Caulis pedalis et ultra. *Petiolus* 1–2-pollicaris; lamina 4–5 poll.; foliola inferiora 1 poll. longa. *Racemus* demum pedalis. *Calyx* 2 lin. longus. *Vexillum* 6 lin. longum. *Fructus* 6 lin. longus, sutura seminifera curvata.

Ad *O. Pallasii*, Bieb., et *O. hyperargyræam*, Boiss., magis accedit.

Badghis: 340, April 29, 1885; May 21, 1885.

A perennial, from two to three feet in height, with spikes of purple-veined flowers almost a foot in length; growing in great luxuriance in the sandy loamy soil of the Badghis, and especially around Gulran.

Onobrychis (§ Hymenobrychis) caloptera, Aitch. et Baker, n. sp. Annua, caulibus elongatis erectis gracilibus glabris, stipulis ovatis acuminatis membranaceis liberis, foliolis 9–11 lanceolatis mucronatis maturis facie glabris dorso tenuiter adpresse albo-pilosis, racemis multifloris laxifloris, pedicellis calyci æquilongis, bracteis minutis lanceolatis membranaceis, calyce piloso dentibus lanceolatis acuminatis tubo campanulato 2–3-plo longioribus, petalis parvis rubellis, vexillo oblongo glabro calyce duplo longiore, alis calyci subæquilongis, legumine glabro late cristato, crista hyalina chartacea integra basi producta, disco profunde foveolato haud spinoso.

Caulis subpedalis. *Petiolus* 6–12 lin. longus; lamina demum 3–4 poll.; foliola 12–15 lin. longa, 2–3 lin. lata. *Racemi* floriferi 1–1½ poll.; fructiferi 2–3 poll. longi. *Calyx* 1½ lin. longus. *Fructus* 6–7 lin. longus, crista 1 lin. lata.

Badghis: 393, May 4, 14, 1885.

A tall annual, common over the Gulran meadows.

Onobrychis Aucheri, Boiss., Fl. Or. ii. p. 544, ex descriptione.

Hari-rud valley: 452, May 12, 1885; June 6, 1885.

In sandy soil, common. In its habit of growing closely appressed to the ground it resembles *O. tavernieræfolia.*

ALHAGI CAMELORUM, Fisch.; Boiss. Fl. Or. ii. p. 559.
Northern Baluchistan: 33, Oct. 3, 1884. Khorasan: 703, June 29, 1885; August 23, 1885. Native names: *Khar-i-buz, Shuthar-khar.*
A very common shrub, from three to four feet in height, on open plains in gravelly soil, frequently growing gregariously. A very valuable fodder for camels and which in certain localities, depending much on the season, yields a manna called *Tar-anjabin*, which is collected for local use, as well as for exportation.

CICER ARIETINUM, Linn.; Boiss. Fl. Or. ii. p. 560.
Khorasan: 714, July 19, 1885.
Native name *Nakhud.* Cultivated under irrigation at an altitude of 5000 feet.

VICIA ERVILIA, Willd.; Boiss. Fl. Or. ii. p. 595, syn. *Ervum Ervilia*, Linn.
Khorasan: 670, June 17, 1885.
Native name *Adas.* Cultivated at an altitude above 4000 feet.

VICIA HYRCANICA, Fisch. et Mey.; Boiss. Fl. Or. ii. p. 571.
Badghis: 485, May 17, 1885; Hari-rud valley: June 5, 1885.
Common in the Badghis; and only in the Hari-rud valley in cultivated soil, margins of fields, &c.

VICIA PEREGRINA, Linn.; Boiss. Fl. Or. ii. p. 576, var. pedicellis longioribus floribus minoribus.
Badghis: 385, May 3, 1885; 518, May 9, 1885; 521, May 20, 1885.
Common. Differs from the type in the pedicels being often longer than the calyx, and in having smaller flowers.

VICIA VILLOSA, Roth; Boiss. Fl. Or. ii. p. 591.
Hari-rud valley: 441, May 11, 1885.
In hedges near cultivation, very common. In habit resembling *Vicia Cracca.*

LENS ESCULENTA, Mœnch.—*Ervum Lens*, Linn.; Boiss. Fl. Or. ii. p. 598.
Khorasan: 664, June 17, 1885.
Native names: *Adah, Adas.* Cultivated in fields above 5000 feet altitude.

LATHYRUS SUBVILLOSUS, Aitch. et Hemsl.—*Orobus subvillosus*, Ledeb. Fl. Alt. iii. p. 359.
Badghis: 348, May 1, 19, 1885.
Common, in the low hills, at 3000 feet elevation; a dwarf everlasting pea, with handsome heads of large purple flowers, growing in great luxuriance. Would be well worth cultivating.

LATHYRUS APHACA, Linn.; Boiss. Fl. Or. ii. p. 602.
Hari-rud valley: 445, May 11, 1885. Very common in cultivated soil.

Ammothamnus Lehmanni, Bunge; Boiss. Fl. Or. ii. p. 628.

Hari-rud valley: 327, April 27, 1885; May 28, 1885; June 4, 1885.

A common shrub, with a large root-stock, from which numerous annual flowering stems spring, bearing loose spikes of flowers from six to nine inches in length and pure white in colour. The plant when in flower is very handsome.

Sophora pachycarpa, C. A. Mey.—*Goebelia pachycarpa*, Boiss. Fl. Or. ii. p. 629.

Hari-rud valley: 435, May 10, 1885; June 3, 4, 1885; July 27, 1885.

Native name *Talkh-ak.*

Equally common with *Ammothamnus*, and scarcely to be distinguished from it when in leaf only. This blossoms later, and has the white flowers clustered. It is very bitter, hence the native name.

Sophora mollis, Graham in Wall. Cat.; Hook. f. Flora British India, ii. p. 251.

Khorasan: 801, August 23, 1885. A shrub from four to five feet high; only once collected and then neither in flower nor fruit.

Sophora Griffithii, Stocks.—*Keyserlingia Griffithii*, Boiss. Fl. Or. ii. p. 630.

Northern Baluchistan: 3, September 25, 1884.

Cercis Siliquastrum, Linn.; Boiss. Fl. Or. ii. p. 633.

Mount Do-shakh: 765, August 4, 5, 1885. Native names: *Arghamon, Argahwan.*

A tree, or tall shrub, common in the stream-beds leading north from Mt. Do-shakh. The shoots, which are a deep purple or almost black in colour, are employed largely in the manufacture of baskets, sieves, and strainers, especially in Persia, where the plant is also very common. The tree at Baber's tomb, near Cabul, is this. It is a common shrub or tree, perfectly indigenous, and was not introduced, as some supposed, into that locality.

Prosopis Stephaniana, Spreng.; Boiss. Fl. Or. ii. p. 633.

Hari-rud valley: 1054, May 25, 1885; August 6, 19, 1885. Khorasan: August 23, 28, 1885. Native names: *Chiggak, Chogak, Khar-i-jinghak.*

A common shrub from the Helmand northwards. Over the whole Badghis from Bala Morghab to the Hari-rud valley and Persia. The pods are usually infested by insects, and become immensely enlarged and irregular in form. They are called *He-chi*, and are employed in tanning, for which purpose they are collected and exported.

ROSACEÆ.

Prunus divaricata, Ledeb.; Boiss. Fl. Or. ii. p. 651.

Hari-rud valley: 253, April 16, 1885. Native name of the tree and its fruit *Alu-bokhara.*

A small tree, cultivated in orchards; usually self-sown, and not from grafts. The fruit is a small plum.

Prunus prostrata, Labill.—*Cerasus Griffithii*, Boiss. Fl. Or. ii. p. 648.

Badghis: 551, 554, May 23, 24, 25, 1885. A small tree or shrub, on the Paropamisus range, at an altitude above 3500 feet; common.

Our specimens correspond exactly with those of *Cerasus Griffithii*, Boiss.; and this we consider to be a form of *Prunus prostrata*, Labill.

PRUNUS PROSTRATA, Labill.; Boiss. Fl. Or. ii. p. 648, var.?

Paropamisus range: May 25, 1885; Khorasan: 1055, June 16, 1885.

Near water, at an altitude above 3500 feet. By an oversight no specimen of this was retained for the Kew Herbarium.

PRUNUS (§ CERASUS), sp.

Hari-rud valley: 257, April 15, 1885. Native name *Gurjha*, the fruit *Alu-balu*.

A small tree, cultivated in orchards for its fruit, which is rather larger than an ordinary cherry, almost black in colour, and very austere and harsh to a European palate.

PRUNUS (§ CERASUS) CALYCOSUS, Aitch. et Hemsl. n. sp. (Plate VIII.) *Frutex* 8–10-pedalis, undique fere glaber, dense ramosus. *Folia* parva ad apices ramorum lateralium brevium conferta, graciliter petiolata, papyracea vel fere membranacea, ovato-oblonga, absque petiolo 6–12 lineas longa, apice sæpius rotundata, basi cuneata, argute serrulata; petiolus 2–4 lineas longus; stipulæ membranaceæ, lineares, acutissimæ, 3–4 lineas longæ, dentatæ vel sublaceratæ. *Flores* rosei, sæpius bini, graciliter pedunculati, e gemmis lateralibus infra folia oriundi; pedunculus gracilis, 4–6 lineas longus; calycis tubus cylindricus, basi leviter ventricosus, 3–4 lineas longus; calycis segmenta petaloidea, venosa, tubo paullo longiora, obovato-oblonga, concava, subsinuata, intus basi villosa; petala nulla vel saltem non visa; stamina 8–10; ovarium glabrum, stylo staminibus æquali. *Fructus* maturus ignotus.

Badghis: 1059, May 1, 3, 1885. Native name *Siah-ling*, yields a fruit *Alucha*.

A shrub or small tree, with very dark-coloured cherry-like bark; common in the hills at an altitude above 3000 feet. The stems are valued as staves, and the bark of the root is employed as a dye-stuff, for producing a dark red or maroon colour. The fruit is said to be the size of a cherry.

PRUNUS TORTUOSA, Aitch. et Hemsl.—*Cerasus tortuosa*, Boiss. et Haussk.; Boiss. Fl. Or. ii. p. 647.

Badghis: 134, March 18, 31, 1885; April 1, 1885.

A common bush in the hills, above 3000 feet elevation. Flowers before the leaves.

It would be better perhaps to treat this as a variety of *Prunus microcarpa*, C. A. Mey., syn. *Cerasus orientalis*, Spach.

PRUNUS MICROCARPA, C. A. Mey.—*Cerasus microcarpa*, Boiss. Fl. Or. ii. p. 646.

Paropamisus range: 1058, May 25, 1885; Khorasan, June 16, 1885.

Common at an altitude above 3500 feet.

PRUNUS ARMENIACA, Linn.—*Armeniaca vulgaris*, Lam.; Boiss. Fl. Or. ii. p. 652.

Hari-rud valley: 259, April 16, 1885; 256, April 16, 1885. Native name *Zard-alu*.

The ordinary cultivated apricot, the kernels of which are bitter; it is raised from seed and layers. Common in orchards.

There is a variety with sweet kernels, which is grafted; it is merely spoken of as "the grafted," or as "the sweet-kernelled" one, and is much less common than the former,

PRUNUS AMYGDALUS, Baill.—*Amygdalus communis*, Linn.; Boiss. Fl. Or. ii. p. 641.
Hari-rud valley: 243, April 16, 1885. Native name for tree and fruit *Bedam*; cultivated in orchards.

PRUNUS PERSICA, Benth. & Hook. f.—*Persica vulgaris*, Mill.; Boiss. Fl. Or. ii. p. 640.
Hari-rud valley: 250, April 16, 1885.
Native name *Shaft-alu*. Cultivated in orchards and always grafted; bears fine fruit.

PRUNUS EBURNEA, Aitch. & Hemsl.—*Amygdalus eburnea*, Spach.; Boiss. Fl. Or. ii. p. 645, var. floribus solitariis.
Hari-rud valley: 1056, April 15, 1885.
Varies from the type in having solitary flowers, and the calyx and leaves woolly.
Aol is the native name for *P. eburnea* and *P. brahuica*, both of which yield excellent fuel.

PRUNUS EBURNEA, Aitch. & Hemsl., var. fructu flavo.—*Amygdalus eburnea*, Spach.; Boiss. Fl. Or. ii. p. 645.
Badghis: 1057, May 22, 1885.
Noted on the spot that the fruit was ripening yellow, like an apricot; but this may have been due to an insect affecting it.

PRUNUS BRAHUICA, Aitch. & Hemsl., var. calyce omnino glabro.—*Amygdalus brahuica*, Boiss. Fl. Or. ii. p. 645.
Badghis: 133, March 18, 1885; May 20, 1885.

PRUNUS, sp. aff. *P. brahuicæ*, Aitch. & Hemsl.
Hari-rud valley: 1151, 1885. At an altitude of 3000 feet. Fruit only, which is broader than that of *P. brahuica*.

RUBUS DISCOLOR, Weihe et Nees; Boiss. Fl. Or. ii. p. 695.
Mount Do-shakh: 1060, August 5, 1885. Near running water, in shady places; very common above 3000 feet altitude. Extends throughout the Badghis from Bala-morghab westwards across the Hari-rud valley into Khorasan.

RUBUS CÆSIUS, Linn.; Boiss. Fl. Or. ii. p. 693.
Badghis: 537, May 22, 1885. Throughout the Badghis, near running water, in gravelly soil, common.

POTERIUM SANGUISORBA, Linn.; Boiss. Fl. Or. ii. p. 733.
Badghis: 528, May 21, 24, 1885. At an altitude of 3000 feet, common.

ROSA BERBERIFOLIA, Pall.—*Hulthemia berberifolia*, Dumort.; Boiss. Fl. Or. ii. p. 668.
Hari-rud valley: 305, April 22, 25, 1885; May 12, 1885; June 4, 1885. Badghis: April 29, 1885; May 19, 1885. The most characteristic shrub of the country from Bala-morghab westward, over the whole Badghis, the Hari-rud valley into Khorasan; up to an altitude of 5000 feet. Flowers bright yellow, with a dark purple spot at the base of each petal.

ROSA DAMASCENA, Mill.; Hook. f. Fl. British India, ii. p. 364.
Hari-rud valley: 254, April 16, May 12, 1885. Native name *Gulab*. Cultivated in

gardens and orchards for the flowers, which are daily collected and made over to the distiller for the manufacture of rose-water. I never saw more than half a dozen bushes in any of the gardens.

Rosa lutea, Mill.; Boiss. Fl. Or. ii. p. 671.

Hari-rud valley: 245, April 16, May 12, 1885. Native name *Gul-i-ranan zeba*. Cultivated in orchards and gardens; the flower is yellow and single, and not briar-scented. It is the Persian yellow rose of our gardens.

Rosa moschata, Mill.; Hook. f. Fl. British India, ii. p. 367.

Hari-rud valley: 749, July 30, 1885. Cultivated in the vicinity of shrines in Afghanistan, and also in Persia.

Rosa anserinæfolia, Boiss. Fl. Or. ii. p. 677.

Badghis: 504, May 18, 1885. Not common, on damp rocks near Sim-koh, at an altitude of 3200 feet. Briar-scented; flowers almost pure white.

Rosa Beggeriana, Schrenk; Crépin, Prim. Monogr. Ros. in Bull. Soc. Bot. Belg. xiv. 18 (reprint, p. 312), et var. γ. *Lehmanniana*, Crépin, *l. c.* p. 20.

Mount Do-shakh: 1061, August 5, 1885. Specimens marked "A," locality not recorded. Common at 4000 feet altitude near running streams and in shade. This is remarkable for the peduncles bearing the ripe fruit being fleshy and of the same colour as the fruit.

Var. γ. Lehmanniana.

Badghis: 352, May 1, 1885; Khorasan, 657, June 16, 1885. Common, on the sides of running streams, above 3000 feet altitude.

Pyrus Cydonia, Linn.—*Cydonia vulgaris*, Pers.; Boiss. Fl. Or. ii. p. 656.

Hari-rud valley: 246, April 4, 1885. Native name *Bhihi*. The Quince is commonly cultivated in orchards. The fruit is usually very large and of fine quality from grafted trees.

Pyrus communis, Linn.; Boiss. Fl. Or. ii. p. 653.

Hari-rud valley: 248, April 16, 1885. The Pear; native name *Amrud*. Cultivated in orchards; this form bears a small pear called *Amrud*; it is raised by slips or seed, but is not grafted. There is also a variety raised always by grafting on this, which bears a large fruit, for which the native name is *Nak*. This is the fruit that is so largely exported from other parts of Afghanistan into India. In the Badghis I came upon a small forest of Pear-trees which I thought might have been the remains of an old orchard, but I was informed that this was not the case. The tree is well known as a wild one. It is called *Amrucha* from the small fruit it bears, this being a diminutive for *Amrud*. The fruit is dried, ground into a flour, and mixed with ordinary wheat flour to increase its bulk.

Pyrus Malus, Linn.—*Malus communis*, Desf.; Boiss. Fl. Or. ii. p. 656.

Hari-rud valley; 258, April 16, 1885. The Apple; native name *Seb*. A cultivated tree in orchards, said not to be grafted. In the hills around Kushk and above Bala-

morghab a wild apple is reported to be common, and the fruit a little smaller than the cultivated one, yet good to eat.

Cratægus Oxyacantha, Linn., var.; Boiss. Fl. Or. ii. p. 664.

Badghis: 349, May 1, 25, 1885. Native names: *Daluna*, *Alaf-karez*, *Alaf-khez*, *Guj-i-kohja*, *Seb-ak*. Plentiful as a small tree, above 3000 feet elevation, usually in the vicinity of streams.

Cotoneaster nummularia, Fisch. & Mey.; Boiss. Fl. Or. ii. p. 666; Aitchison, Pharmac. Journ. & Trans. 3rd ser. xvii. p. 467, Lond. 1887. (Plate IX.)

Paropamisus range: 396, May 5, 1886; May 24, 1885; June 16, 1885. Native name *Siah-chob*. A tall shrub or small tree; common on all the hills where there is moisture, at 4000 feet altitude. The stems are esteemed for walking-sticks, and for handles to agricultural implements, axes, &c. From this shrub a manna called *Shir khist* at a certain season of the year is collected; it is largely exported to Hindostan and Persia.

LYTHRARIEÆ.

Lythrum Hyssopifolia, Linn.; Boiss. Fl. Or. ii. p. 739.

Khorasan: 783, August 19, 1885. In clay soil, on the sides of irrigation-channels and streams; not common.

ONAGRARIEÆ.

Epilobium hirsutum, Linn.; Boiss. Fl. Or. ii. p. 746.

Hari-rud valley: 768, August 5, 1885; Khorasan, June 29, 1885. Common in all irrigation-channels.

CUCURBITACEÆ.

Citrullus Colocynthis, Schrad.; Boiss. Fl. Or. ii. p. 759.

Northern Baluchistan: 16, Sept. 29, 1884. Native name *Kur-kushta*. Very common all over the desert country.

Citrullus vulgaris, Schrad.; Boiss. Fl. Or. ii. p. 759, obs.; Hook. f. Fl. British India, iii. p. 621.

Native name for the Water-melon *Hindu-ani*. Cultivated extensively over the whole country traversed from Northern Baluchistan to Bala-morghab, and west to Khorasan. During autumn, when travellers are moving in localities where they are uncertain of obtaining water, or there is a probability of its being saline, a donkey-load or so of water-melons is always conveyed along with the party, supplying both food and drink. The fruit, as a rule, is very much sweeter than any I ever tasted in India.

Cucumis trigonus, Roxb.; Boiss. Fl. Or. ii. p. 758.

Helmand: Oct. 25, 1884. What I, from memory, believe to have been the above species was extremely common in clayey soil, near cultivation, that had been flooded with water, between Kalifat and Padda-sultan. Our camp-followers feasted on the small ripe fruit, both in its natural condition and cooked.

CUCUMIS MELO, Linn.; Boiss. Fl. Or. ii. p. 759, Obs. sub *C. trigonus*; Roxb. Fl. British India, iii. p. 620.

Native name for the Melon, *Khar-buze*. Cultivated, though not to the great extent that the water-melon is. The variety of the fruit distinguished as the *Sarda* is certainly very fine, and it is this that is so largely exported to India during the winter months.

BRYONIA MONOICA, Aitch. et Hemsl., n. sp. (Plate X.) *Herba* alte scandens, caulibus annuis gracilibus lævibus. *Cirrhi* simplices. *Folia* graciliter petiolata, ambitu cordato-ovata, inæqualiter 5-lobata, lobo terminali longiore acuto, supra lævia, subtus scabrida, cum petiolo 2½–4 poll. longa. *Flores* viridi-lutei, papillosi, feminei et masculini in eodem racemo, 1 vel plures inferiores feminei, racemis foliis demum æquilongis vel longioribus; calyx fl. fem. in tubo supra ovarium productus, segmenta linearia, inæqualia, petalis æqualia vel longiora; petala ovato-oblonga, vix acuta; stamina 3, fere sessilia; antheræ magnæ, una unilocularis, ceteræ biloculares; stylus elongatus, stigmate trilobato leviter papilloso. *Fructus* maturus non visus.

Badghis: 339, April 29, 1885. Very common in the beds of dry water-courses, at an altitude of about 2500 to 3000 feet; climbing upon and completely covering with its dense foliage large shrubby species of *Tamarix*. The fruit ripens red.

This species differs from *Bryonia alba*, the only other monœcious species described, in the male and female flowers being borne in the same racemes, and in having long narrow calyx-lobes.

UMBELLIFERÆ.

ERYNGIUM CARLINOIDES, Boiss.; Fl. Or. ii. p. 825.

Hari-rud valley: 754, August 1, 1885. In great luxuriance, everywhere on the clayey and gravelly plains; from one to two feet in height, sometimes very bushy.

ECHINOPHORA PLATYLOBA, DC.; Boiss. Fl. Or. ii. p. 749.

Korasan: 819, September 3, 1885. A low shrub with lemon-scented flowers, yielding a red gummy exudation. Common in stony places.

PYCNOCYCLA AUCHERIANA, Decaisne; Boiss. Fl. Or. ii. p. 949.

Northern Baluchistan: 18, September 1884, October 10, 1884; Khorasan: 817, September 2, 1885. In the gravelly beds of dry water-courses, very common, especially in the desert country. The root-stocks, when employed for fuel, exhale a fœtid odour.

CONIUM MACULATUM, Linn.; Boiss. Fl. Or. ii. p. 922.

Badghis: 539, May 22, 1885; Khorasan: June 16, 1885. In moist localities near water, in the shade of shrubs and trees; growing as much as seven feet in height. Common at an altitude above 5000 feet.

TRACHYDIUM LEHMANNI, Benth. & Hook. f.—*Eremodaucus Lehmanni*, Bunge; *Albertia margaritifera*, Regel & Schmalh.; Boiss. Fl. Or. ii. p. 930. (Plate XI.)

Badghis: 471, May 16, 21, 1885. Native name *Shahk-akhal*. A very common annual in the loamy soil of the Badghis. The central flower of the umbel usually

exhibits a rose-coloured exudation, caused by the puncture of an insect. The roots are collected and exported to India, *viâ* Herat.

TRACHYDIUM KOTSCHYI, Boiss. Fl. Or. ii. p. 929.

Hari-rud valley: 417, May 10, 1885, June 18, 1885; 560, Paropamisus range: May 25, 1885. General throughout the country in the low hills.

SMYRNIUM CORDIFOLIUM, Boiss. Fl. Or. ii. p. 926.

Paropamisus range: 399, May 5, 1885. Native name *Kun-halk*. In damp localities, near water; at an altitude above 3000 feet. The natives eat it both raw and cooked.

APIUM GRAVEOLENS, Linn.; var. Boiss. Fl. Or. ii. p. 856.

Badghis: 106, December 8, 1884. A very common plant, on the steep banks of slow-running streams.

CARUM BULBOCASTANUM, W. D. J. Koch; Hook. f. Fl. British India, ii. p. 681.

Hari-rud valley: 312, April 25, 26, 1885. Common in cultivated land. The bulbs, *Jiri-shak*, collected by the natives and eaten raw. Wild pigs are very destructive in fields, apparently on the search for these roots.

CARUM (§ EUCARUM), sp.

Hari-rud valley: 368, May 1, 1885. Common in soft soil; roots tuberous, as in the last.

CARUM (§ EUCARUM), sp.

Badghis: 524, May 20, 1885. Profuse on sides of running streams.

CARUM (§ PTYCHOTIS) LEPTOCLADUM, Aitch. et Hemsl., n. sp. (Plate XXII.) *Herba* annua, gracillima, glaberrima, divaricatim ramosa, 4–8 poll. alta. *Folia* biternatim partita, ternatim partita vel superiora simplicia, segmentis linearibus acutis 6–9 lineas longis. *Umbellæ* 4–6-radiatæ, pedunculis divergentibus filiformibus; umbellulæ 8–12-floræ, bracteis bracteolisque parvis scariosis. *Flores* albi; petala majuscula, valde inflexa; stylopodium crassiusculum, basi non dilatatum; styli recurvi, stigmatibus capitatis. *Fructus* latior quam longus, a latere breviter compressus, tota pilis crassiusculis albidis capitatis vestitus; vittæ ad valleculas solitariæ, inconspicuæ, commissura bivittata; carpophorum bifidum.

Hari-rud valley: 603, June 5, 1885. Very common in gravelly soil. A small annual, usually from 3 to 4 inches in height, sometimes as much as 8 inches, with very elegant fine wire-like stems; flowers minute, white.

PIMPINELLA, sp.

Hari-rud valley: 1062, 1885. Quite young and indeterminable.

SCANDIX PINNATIFIDA, Vent.; Boiss. Fl. Or. ii. p. 916.

Badghis: 489, May 17, 1885. In the shade of rocks and between boulders; common.

PRANGOS PABULARIA, Lindl.; Hook. f. Fl. British India, ii. p. 695.

Badghis: 386, May 3; 492, May 17, 1885; Paropamisus range, May 25, 1885.

Native name *Badian-kohi*. On the shady sides of rocks, from 3000 feet elevation at Simkho, to 6000 feet on the Paropamisus range; not uncommon.

FERULA OOPODA, Boiss. Fl. Or. ii. p. 984. (Plates XVIII., XIX.) (Descript. amplif.) *Caulis* 4–6-pedalis, erectus, albescens vel rubescens, subnitidus. *Folia* impetiolata, radicalia 3–4 ped. diametro, iterato-tripartita, late vaginata; caulina sursum gradatim minora, cum vaginis amplexicaulibus cyathiformibus gradatim minoribus instructis. *Inflorescentia* ampla, terminalis, subverticillatim ramosa. *Flores* polygami, umbellæ centralis fertiles, umbellarum minorum lateralium centralem superantium sæpissime masculi. *Fructus* oblongus, valde dorso compressus, fere planus; vittæ ad valleculas solitariæ, ad commisuram geminatæ.—*Peucedanum oopodum*, Boiss. et Buhse, Aufz. p. 100.

Badghis: 114, February 18, 1885; Hari-rud valley: 321, April 26, 1885, May 13, 1885; Khorasan, June 9, 1885. Native native *Ejik-okharasi, Kilki, Kalkilli*. Generally distributed throughout the Badghis, and the most northern part of the Hari-rud valley; occasional in Khorasan, growing gregariously. Its annual stems reach six feet in height, and are remarkable for the three large cups, or bowls, borne on the stem. Were it cultivated in this country, at which an attempt has been made, these bowls, with the upper part of the stalk cut off close to the base of the cup, and of the lower portion four inches left as a handle, they would make lovely artistic bouquet- or fruit-holders. The Turkomans have a story that on some occasion when a fugitive fleeing from his enemies was dying from thirst, he got a life-saving drink of water out of one of these cups, from the dew collected therein. I examined many, but not a drop of fluid could I ever find in any of them; their usual occupants being beetles and a small bee.

It was only after a very careful examination of the fragmentary specimens of *Ferula oopoda*, Boiss., in the Kew Herbarium, and Boissier's imperfect description, that we thought it probable ours could be the same. Boissier had neither radical leaves nor fruit, and apparently only very much less luxuriant specimens; for he says of the leaf-sheaths:—"Vaginæ caulinæ interdum ovo gallinaceo vix minores." In the present specimens the larger of these sheaths are at least six inches across, and the largest observed lower on the stem, were at least a foot across; and they more nearly resemble a bowl or cup than an egg. Nevertheless, from the specimens before us, we have little doubt that we are right. Certainly a portion of Stocks's Baluchistan 956, which is referred by Boissier to *F. oopoda*, is the same species. This is also very near to *Ferula Schaïr*, Borszczow (Ferul. Aral. Casp. p. 37, tt. 6–8), but that is represented as having open, not connate, sheaths, and narrower ultimate segments of the leaves. In this connexion it may be mentioned that Stocks writes the native name of *F. oopoda*, and of another very distinct species which he confused with it, "Cheer." We are a little puzzled with Borszczow's description of *F. Schaïr*, as we have not found the same conditions that he describes in any of the species which we have examined. The central umbels he describes as consisting of fertile female flowers, the lateral, smaller umbels which rise above the central, of sterile females, and the clusters of minute flowers seated near the base of the peduncles of the lateral umbels, males. He says of *Ferula Schaïr*:—

"*A Fer. soongorica*, Pall., *quæ mihi ex descriptione tantum optime notis cursive impressis differt*;" and these are the words he prints in italics: "*Umbellis masculis minutissimis, capituliformibus ad basin umbellarum femineārum, brevissime pedunculatis, pedunculo basi dilatato floribus vix conspicuis; antherarum filamentis crassis perbrevibus; involucris involucellisque nullis.*" In the various species we have examined these clusters of minute flowers appear to be always abortive, and the lateral umbels usually male, with scarcely any rudiments of gynæcium; while the central umbels are bisexual, though functionally female.

FERULA SZOVITSIANA, DC.; Boiss. Fl. Or. ii. p. 994.

Hari-rud valley: 277, April 19, 21, 1885; May 10, 12, 1885. A rigid herb, scarcely two feet high; common in the stony country and gravelly plains. The root-stock possesses a slight odour of assafœtida.

FERULA OVINA, Boiss. Fl. Or. ii. p. 986.

Badghis: 525, May 21, 25, 1885. Native name *Stourga, Kema-kohi.* A very characteristic plant about three feet in height, covering large expanses of the hill-sides in the Badghis, at an altitude of above 3000 feet. Is considered excellent grazing for all animals, and very fattening for horses.

FERULA FŒTIDA, Regel; Aitchison, Pharmac. Journ. & Trans. 3rd ser. xvii. p. 465 (Lond. 1887). (Plates XII., XIII., XIV.) *F. Scorodosma*, Bentley & Trimen; *Scorodosma fœtidum*, Bunge, Boiss. Fl. Or.; *Ferula Asafœtida*, Boiss. Fl. Or. ii. p. 994.

Native names: *Anguza-kema, Kurne-kema, Khora-kema.* Stems from three to five feet in height, from a perennial root-stock that produces annual radical leaves for several years, and then a flowering-stem, and upon the fruit ripening the plant dies. The young flowering-stem, rising from a tuft of radical leaves, appears in the form of a cabbage, being at first wholly enclosed in the broad stipular expansions, or bracts, to which the cauline leaves are reduced; and when the growing branches of the inflorescence first push them open, the whole plant somewhat resembles a cauliflower.

The stem seems out of all proportion massive, pillar-like, and stout for the plant. The inflorescence is globose, and from one to two feet in circumference. The flowers are white, and the young fruit soon takes a more or less purplish tinge.

In all stages of its growth, every part of the plant exudes upon abrasion a milky juice, which is collected, and constitutes the drug of commerce called Asafœtida, *Anguza, Hing.*

The stem in a young state is eaten raw, or cooked.

FERULA GALBANIFLUA, Boiss. et Buhse, Aufz. p. 99; Boiss. Fl. Or. ii. p. 988; Aitchison, Pharmac. Journ. & Trans. 3rd ser. xvii. p. 466 (Lond. 1887). (Plates XV., XVI., XVII.) (Descript. amplific.) Caulis simplex, medio 2–3 poll. crassus sursum sensim attenuatus, inter nodos cavus. *Folia* radicalia petiolata, circiter 1½–2 ped. longa et 1–1½ ped. lata. *Inflorescentia* ampla, terminalis, subverticillatim ramosa, ramis pluriumbellatis; umbellæ centralessæpissime femineæ, laterales masculæ. *Petala* ampla, fere plana, extus arachnoido-pilosa.

Hari-rud valley: 237, April 15, 19, 1885; May 10, 1885; Badghis, May 16, 1885. Native name *Badra-kema, Bi-ri-jeh.* One of the Umbelliferæ which are so characteristic of the flora, growing like several others gregariously, no other plants being visible over large expanses of country. This was the one that was so common around Gulran, of the young foliage of which the camels made havoc. Owing to the minute divisions of the leaves we called this the parsley-leaved *Ferula.* It was the first to show its leaves in spring, and when its radical leaves were perfect and fresh, they formed round the stem what appeared like a cushion of soft moss.

The stem shoots up very rapidly and is hollow throughout its whole length. It rapidly tapers upwards and bears a most lovely loose panicle of orange-coloured flowers. At this stage the stem is orange-coloured and has a transparent appearance, subsequently assuming a more or less ruddy autumnal tint. From the very first an orange-coloured creamy juice exudes from any injured part; but wherever I saw the thickened juice on the stem, the injury had not been caused by an insect, but by some accident to the plant. The usual place to find the gum is at the base of the stem, where, owing to the violence of the wind being most felt, the bark cracks, and beneath this the gum collects, usually in contact with the stems of the radical leaves and the soil. The native name for the gum is *Jao-shir.*

We have seen only a small portion of a leaf and a fruit-bearing umbel of Boissier's var. β *Aucheri* of this species, and our plant has hollow, not solid, stems, and conspicuously hairy, not glabrous, petals; yet we feel convinced that it is the same species. The stem may be solid at first, and as to the hairs on the petals, they appear to be very fugacious. It is the only species with such exceedingly small, short, hairy, ultimate leaf-segments that has come under our observation, and the fruit of our plant agrees exactly in shape and with the description of *F. galbaniflua.*

FERULA (§ EURYANGIUM) SUAVEOLENS, Aitch. et Hemsl., n. sp.; Aitch. Pharmac. Journ. *l. c.* p. 407. (Plates XX., XXI.) *Planta* perennis, monocarpica (?), undique glabra vel glabrescens, gummifera, radice crassissima. *Caulis* 4–5-pedalis, ad nodos incrassatus. *Folia radicalia* 1½–2 ped. longa (et forsan sæpius longiora), longe petiolata, tripartita, divisionibus pinnatifidis sæpius 5-lobatis, lobis crassiusculis oblongis vel ovali-oblongis ¾–1½ poll. latis decurrentibus interdum irregulariter paucicrenatis simul minutissime denticulatis subtus hispidulis. *Folia caulina* similia sed minus secta, superiora simpliciter pinnatifida longeque vaginata. *Inflorescentia* verticillatim ramosa, ramis sæpius 3–5-umbellatis; umbella multiradiata, centrali breviter pedunculata, feminea, lateralibus minoribus longe pedunculatis masculinis. *Flores* flavi; petala lata, vix apice inflexa; pistilli carpella semicircularia vel a latere leviter compressa, vittis solitariis vallecularibus maximis jam instructa, commisura 2-vittata. *Fructus* deest.

Khorasan; 1064, June 18, 1885. On the hills to the south of Bezd, at an altitude of 6000 feet, in shady places and in the vicinity of running water. The root is scented, and it is one of the kinds of *Sumbul* exported from Persia to Bombay by the Persian Gulf.

From the shape of the pistil and very young fruit, one would never suspect that the

mericarps could eventually be strongly dorsally compressed; but it may well be so, for *Ferula* (§ *Euryangium*) *Sumbul*, Hook. f., exhibits this peculiarity in a marked degree, and our plant is clearly allied to it, though readily distinguished by the much larger and broader segments of the leaves, and the verticillate branching of the inflorescence.

DOREMA AMMONIACUM, D. Don; Aitchison, Pharmac. Journ. & Trans. 3rd ser. xvii. p. 466 (Lond. 1887); Boiss. Fl. Or. ii. p. 1008. (Plates XXIII., XXIV., XXV.)—*Diserneston gummiferum*, Jaub. et Spach, Ill. Pl. Or. i. t. 40; *Dorema hirsutum*, Loftus ex Borsz. Ferul. p. 28.

Vittæ obsoletæ vel perobscuræ, nunquam latiusculæ.

Hari-rud valley: 422, May 10, June 6, July 26, 27, 1885. Native name *Kandal-kema, Ushak*. One of the characteristic plants of the country, which it covers in some places to such an extent that on looking round one can see nothing else, and no limit to it. The radical leaves are very large and very similar to those of *Ferula fœtida*, Regel; and both plants on being injured yield a milky juice before the flower-stem is thrown up. Without the aid of smell, it was almost impossible to tell which plant one was looking at. However, the moment the plant begins to throw up its stem, there can be no doubt as to the genus. Unlike many species of *Ferula*, the inflorescence of the species of the present genus is unprotected by stipular expansions or foliaceous bracts. No sooner is the fruit well formed and beginning to ripen than the plant is attacked by some boring insect, which causes the milky juice to escape. This dries into hard blocks, frequently enclosing the fruit. The *Kandal, Ushak* or Ammoniacum is usually collected from the stem and frutescence, and often encloses clusters of the fruit.

A large series of sections was made of different carpels, and at all heights, but only faint traces of vittæ were observed, and these occurred irregularly; yet Borszczow (Ferula, t. 5) figures them comparatively wide.

DOREMA GLABRUM, Fisch. et Mey. Ind. Sem. Hort. Petrop. i. p. 26; Linnæa, x. (1835–36), Literatur-Ber. p. 88; Boiss. Fl. Or. ii. p. 1009. (Plates XXVI., XXVII.)—*D. Aucheri*, Boiss. in Ann. Sc. Nat. 3me série, i. (1844), p. 329; *D. robustum*, Loftus in Borszc. Ferul. p. 28; *Ferula racemifera*, Szovits, MS., ex Borszcow.

Planta majestica usque ad 12-pedalem, foliis radicalibus amplissimis longe petiolatis, floribus polygamis.

Badghis: 462, May 14, 16, 1885. Native name *Kema-i-asp*. A gigantic plant growing in the beds of dried-up water-courses and forming a thicket with Tamarisk. The enormous pyramidal panicle covered with soft balls of brilliant yellow flowers could only be likened to *Acacia arabica* when in its full glory of inflorescence. It yields a yellow gum resin, but I did not hear of this being collected. As a rule all the outer flowers on the stems are male, those closer to the main stem being female; and it is the male flowers that make the great show in the inflorescence.

DOREMA SERRATUM, Aitch. et Hemsl., n. sp. (Plate XXVIII.) *Planta* monocarpica, perennis, undique glaberrima, albicans radice crassa. *Caulis* inferne simplex, 4–6-pedalis, lævis, demum candicans, nitidus. *Folia radicalia* petiolata, trifoliolata; foliola lateralia subsessilia, intermedium longiuscule petiolulatum, omnia crassiuscula, leviter inæqualia, oblonga vel ovali-oblonga, 6–9 poll. longa, apice rotundata,

basi subcuneata, interdum inæqualia, eleganter rigideque serrata, simul minutissime denticulata, costa crassa subtus elevata, venis laxe reticulatis; petiolus crassiusculus, 4–5 poll. longus, parvivaginatus. *Folia caulina* similia sed subpinnata, magnivaginata, foliolis 2-inferioribus multo majoribus petiolulatis, vaginis caulem arcte involventibus. *Inflorescentiæ* rami primarii divaricati, verticillatim dispositi et in apice caulis aggregati, simplices vel pauci-ramulosi; umbellæ breviter pedunculatæ, secus ramos sæpius ternatim dispositæ, pedicelli 1–1½ lineas longi. *Flores* non visi. *Fructus* obovato-oblongus, 6–7 lineas longus; vittæ omnino obsoletæ; carpophorum bipartitum.

Hari-rud valley: 718, July 25, 1885; Badghis: 476, May 16, 1885. This is an extremely common plant in the Badghis, where I only saw it in a very young state. I missed it completely in its flowering condition. However, I am glad to say that there are young plants of it in the gardens at Kew, which looked flourishing when I last saw them.

Zozimia absinthifolia, Vent.; Boiss. Fl. Or. ii. p. 1037.

Badghis: 367, May 1, 16, 1885. Native name *Zardak-kohi, Trak-mastar, Terek-mustar*. A very common and well-known herb, of which the leaves and root are eaten, both raw and cooked, by the people of the country. Extends throughout the Badghis and the Hari-rud valley into Khorasan.

Johrenia platypoda, Aitch. et Hemsl., n. sp. (Plate XXIX.) *Herba* perennis, erecta, undique glaberrima, radicibus fasciculatis carnosis clavatis. *Caulis* graciliusculus, teres, 2½–3-pedalis, sursum ramosissimus, ramulis ultimis gracillimis. *Folia* 5–8 poll. longa, breviter petiolata, circumscriptione deltoidea, triternato-pinnatisecta, segmentis ultimis linearibus vel filiformibus 6–9 lineas longis; foliorum caulinorum vaginæ latæ, basi auriculatæ, marginibus demum (saltem in siccis) revolutis. *Umbellæ* valde inæqualiter 4–6-radiatæ, bracteis bracteolisque parvis linearibus; umbellulæ inæqualiter 5–8-radiatæ. *Flores* desunt. *Fructus* mericarpia obovato-oblonga, margine fungosa, jugis dorsalibus tenuibus; vittæ valleculares solitariæ, sat conspicuæ.

Hari-rud valley: 620, June 8, 1885. In clayey soil inundated with rain-water, growing in great expanses, and looking from the distance as if it were under cultivation. A plant from three to four feet in height, with very curious spongy roots, in addition to the ordinary fibrous roots.

In habit, and the very unequal umbels, this is very similar to *J. fungosa*, from which it is readily distinguished by its more finely cut leaves and relatively narrow fungous margin of the mericarps. It also approaches *J. Candollei*, but that has deeply furrowed stems.

Daucus Carota, Linn.; Boiss. Fl. Or. ii. p. 1076.

Hari-rud valley: 582, June 3, 1885. Native name *Zardak*. This is not an indigenous plant, but a weed and an escape from cultivation in cultivated land; whereas the plant I collected in the Kuram valley * was truly indigenous. The carrot is very extensively cultivated both in Afghanistan and in Persia.

* Journ. Linn. Soc. (Bot.) xviii. (1881) p. 64.

Caucalis latifolia, Linn.—*Turgenia latifolia*, Hoffm.; Boiss. Fl. Or. ii. p. 1087.

Badghis: 479, May 16, 17, 1885. Very common in good soil.

Psammogeton setifolium, Boiss.; Fl. Or. ii. p. 1079; Aitchison, Pharmac. Journ. & Trans. 3rd ser. xvii. p. 467 (Lond. 1887).

Hari-rud valley: 335, April 27, 1885; May 10, 1885; June 3, 1885. Native name *Kara-bia*. Common over the whole country. The fruits largely collected and employed in native medicine.

Psammogeton biternatum, Edgew.; Hook. f. Fl. Brit. Ind. ii. p. 719.—*Psammogeton crinitum*, Boiss.; Fl. Or. ii. p. 1078.

Hari-rud valley: 742, July 7, 1885. Not common; about a foot in height; flowers tipped with magenta whilst in bud, this colour rapidly disappearing as the flowers expand. Boissier describes the plant as an annual; there are such specimens in the Herbarium at Kew, but it is sometimes biennial.

Umbelliferarum genus? *Herba* perennis?, circiter bipedalis, omnino glaberrima, ramosissima, caule striato basi tantum foliato, ramulis gracilibus. *Folia* angusta, absque petiolo plano alato caule appresso 3–4 poll. longa, laxe bipinnatisecta, segmentis ultimis parvis angustis vix acutis. *Umbellæ* compositæ, sæpissime valde inæqualiter triradiatæ; involucri bracteæ 3, ovatæ, acutæ; umbellulæ paucifloræ, bracteolis latioribus, margine albo hyalinæ. *Flores* lutei, polygami; calycis dentes obsoleti; petala lata, apice acuminato-incurva. *Fructus* (maturus non visus) deorsum attenuatus; mericarpia æqualiter 5-alata, alis sinuatis; valleculæ conspicue univittatæ.

Hari-rud valley: 1063, June 5, 1885. In stony ground, common.

We have not succeeded in identifying this very distinct plant, and the fruit is in too young a state to determine the genus.

CAPRIFOLIACEÆ.

Lonicera nummularifolia, Jaub. et Spach; Boiss. Fl. Or. iii. p. 7, forma floribus majoribus.

Badghis: 395, May 5, 1885, 555, May 24, 1885; Khorasan: 674, June 16, 17, 18, 1885. Native name *Kulfa, Kalpa*. Usually met with as a shrub, but in certain localities it attains the dimensions of a small tree, with a short stem four to five feet in circumference, forming thin forests, at an altitude of about 5000 feet. Near Bezd and also on the Paropamisus range.

Specimen 674, collected June 17, 1885, has much smaller leaves than the type.

RUBIACEÆ.

Gaillonia Oliverii, A. Rich.; Boiss. Fl. Or. iii. p. 13.

Khorasan; 691, June 18, 1885; Hari-rud valley: 730, July 27, 1885. Very common; in dry shingle, old water-courses, and stony places generally. The annual shoots and woody root-stocks make excellent fuel.

GAILLONIA (§ MICROSTEPHUS) DUBIA, Aitch. et Hemsl., n. sp. (Plate XXX.) *Frutex* semipedalis ad sesquipedalem, dense ramosus, ramis teretibus, rigidis, scabridis. *Folia* opposita, crassiuscula, rigida, scabrida, apice aculeata, sessilia, linearia, 1–1½ poll. longa, margine arcte revoluta, costa crassa; stipulæ parvæ, pallidæ, pergamentaceæ, mucronulatæ, petiolo basi brevissime conjunctæ. *Flores* dichotomo-cymosi, breviter pedunculati vel subsessiles, pallide rosei, 6–9 lineas longi; calyx longe sericeo-pilosus; corolla anguste infundibularis, extus pubescens, lobis oblongis apice inflexis. *Fructus* sericeus, calycis dentibus parvis coronatus.

Hari-rud valley: 602, June 5, 1885, August 1, 1885; Khorasan: August 19, 1885. A low, stiff undershrub, with numerous annual stems, a foot to two feet in height, from large woody root-stocks; flowers salmon-coloured, mauve, or pink. In gravelly soil, in the most arid tracts of the country where nothing else seemed to be able to exist.

We advance this species with some doubts; it is intermediate in character between *G. eriantha* and *G. incana*.

CALLIPELTIS CUCULLARIA, DC.; Boiss. Fl. Or. iii. p. 83.

Badghis: 468, May 16, 1885; Khorasan: June 17, 1885. Common, from 3000 feet altitude and upwards.

RUBIA TINCTORUM, Linn.; Boiss. Fl. Or. iii. p. 17.

Hari-rud valley: 255, April 16, 1885; Khorasan: June 22, 23, 1885. Native name *Rodang*. A plant extensively cultivated for its roots, which are largely employed in dyeing, and are exported for this purpose.

RUBIA FLORIDA, Boiss. Fl. Or. iii. p. 18.

Badghis: 338, April 29, 1885, May 20, 1885; Hari-rud valley: May 27, 1885. An undershrub, two to three feet in height, covered with a dense mass of leaves and greenish-yellow flowers. Common in rocky situations on the low hills, at 3000 feet elevation.

GALIUM TRICORNE, Stokes; Boiss. Fl. Or. iii. p. 67.

Hari-rud valley: 228, April 13, 16, 1885. In cultivated land; very common.

GALIUM APARINE, Linn.; Boiss. Fl. Or. iii. p. 68.

Badghis: 1065, May 1, 1885.

GALIUM, sp.

Badghis: 346, April 29, 1885. Very common, in the shade of rocks, on the low hills. Dyes the hands a yellow-green in collecting.

ASPERULA TRICHODES, J. Gay; Boiss. Fl. Or. iii. p. 31.

Khorasan: 738, July 3, 1885. In stony, gravelly soil; very common.

ASPERULA ARVENSIS, Linn.—*Asperula setosa*, Jaub. et Spach; Boiss. Fl. Or. iii. p. 30.

Paropamisus range: 564, May 25, 1885. On the Sang-i-khotal pass, at an altitude of 5000 feet elevation; profuse in stony soil.

ASPERULA HUMIFUSA, Bieb., var. β. PYCNANTHA, Boiss. ?; Boiss. Fl. Or. iii. p. 44.

Khorasan: 658, June 16, 1885. On the banks of streams, in stony places, above 3000 feet altitude; common.

Crucianella glauca, Rich.; Boiss. Fl. Or. iii. p. 24.

Badghis: 488, May 17, 1885. In large quantity, on the top and northern exposure of Mount Sim-koh, at an altitude of 3500 feet.

Var. β. laxiflora, Boiss. Fl. Or. iii. p. 25.

Khorasan: 672, June 17, 1885. A weed in cultivated soil, at an altitude of 5000 feet.

Crucianella filifolia, Regel et Winkler in Herb. Kew.; cf. Acta horti Petrop. iii. p. 419, n. 2526, Regel et Schmalh. ?

Hari-rud valley: 580, May 28, 1885. An excessively common, erect, rather stiff annual, in gravelly soil. Flowers yellowish green.

VALERIANEÆ.

Valerianella diodon, Boiss. Fl. Or. iii. p. 99.—*V. oxyrrhyncha*, var. *diodon*, Krok.

Hari-rud valley: 1066, May 10, 1885.

Valerianella Dufresnia, Bunge; Boiss. Fl. Or. iii. p. 109.

Hari-rud valley: 1067, May 9, 1885. Common, growing under shrubs, in loamy soil.

Valerianella, sp.

Hari-rud valley: 215, April 13, 19, 1885.

Valerianella, sp.

Hari-rud valley: 1068, April 17, 18, 19, 1885. Occasional, under bushes in loamy soil.

DIPSACACEÆ.

Cephalaria syriaca, Schrad.; Boiss. Fl. Or. iii. p. 120 (*Scabiosa*, Linn.).

Hari-rud valley: 587, June 3, 1885. A common weed in corn-fields.

Scabiosa Olivieri, Coult.; Boiss. Fl. Or. iii. p. 141.

Hari-rud valley: 453, May 12, 1885; 578, May 28, 1885; July 27, 1885. Extremely common in stony ground over the whole country.

Scabiosa rotata, Bieb., var.; Boiss. Fl. Or. iii. p. 145.

Hari-rud valley: 424, May 10, 1885. Very common, in stony soil; flowers whitish grey.

The segments of the calyx in these specimens are included well within the involucre, not exserted, as in the type.

COMPOSITÆ.

Aster, sp.

Khorasan: 789, August 21, 1885.

Pluchea Caspia, Benth. in Journ. Linn. Soc. xiii. p. 416.—*Karelinia Caspia*, Less.; Boiss. Fl. Or. iii. p. 218.

Khorasan: 786, August 20, 1885; Helmand: 90, October 28, 1884. Extremely

local, occurring near water, on the edges of fields and margins of irrigation-channels; it grows in thick dense clumps of from 3 to 4 feet in height, and makes excellent cover for Black Partridge, as at De-doda and Ibrahim-a-bad. The surfaces of the leaves are vertical.

IFLOGA FONTANESII, Cass.—*Trichogyne cauliflora*, DC.; *Ifloga spicata*, Schrad.; Boiss. Fl. Or. iii. p. 248.

Northern Baluchistan: 44, October, 1884. In sandy soil, common.

INULA RUPESTRIS, Aitch. & Hemsl., Journ. Linn. Soc. xix. p. 169.

Khorasan: 808, August 27, 1885. In quantity, in hot exposed country, on broken limestone rock.

CODONOCEPHALUM PEACOCKIANUM, Aitch. et Hemsl., n. sp. (Plates XXXI. & XXXII.)

Herba robusta, ramosa, 5 ped. alta, grandifolia, fere omnino glabra. *Folia* crassiuscula, prominenter laxe reticulato-venosa, primum subtus præcipue secus costam crassam puberula, oblongo-ovalia, obtusissima, sinuata, ceterum integra; radicalia petiolata; caulina sessilia, amplexicaulia, basi auriculata, auriculis rotundatis. *Capitula* ¾–1 poll. longa, laxissime corymbosa, alia sessilia alia pedunculata; involucri bracteæ pluriseriatæ, rigidæ, acutissimæ, ciliolatæ, exteriores breviores; receptaculum areolatum, fimbrilligerum. *Achænia* (matura non visa) puberula, striata; pappus breviter pilosus.

Khorasan: 646, June 16, 17, 1885; July 19, 1885. Native name *Landar*. A very characteristic herb of the country, covering immense tracts in the Badghis and Khorasan at an altitude of 3000 feet; the large perennial root-stocks throw up great stout annual shoots five feet in height, covered with leaves, some of which are fully two feet long; they form a dense close cover unmixed with any other plants, in a rich soil where water is not far from the surface. This herbage is greedily eaten by goats and sheep, so much so that I had some difficulty in getting flowering and fruiting specimens.

Easily distinguished from *C. inuloides*, the only other species, by its sessile cauline leaves, and loosely corymbose inflorescence. Moreover, the pappus is not so distinctly plumose.

VICOA PENTANEMA, Aitch. & Hemsl.—*Pentanema divaricatum*, Cass.; *Inula divaricata*, Boiss. Fl. Or. iii. p. 200.

Khorasan: 784, August 19, 1885. Near water, amongst grass, in stony soil.

The specific name *divaricata* could not be applied to this species, as it had already been appropriated for an African species.

PULICARIA FOLIOLOSA, DC.; Hook. f. Flora British India, iii. p. 298.

Hari-rud valley: 761, August 3, 1885. In the beds of dry water-courses; common. Flowers dull yellow.

PULICARIA GNAPHALODES, Boiss. Fl. Or. iii. p. 203.

Khorasan: 804, August 27, 1885. Local, on hot pulverized limestone in extremely bare soil. Exquisitely scented, somewhat like lemon-Verbena, but more powerful.

Achillea Santolina, Linn.; Boiss. Fl. Or. iii. p. 266.

Paropamisus range: April 2, 1885; Hari-rud valley: 434, May 10, 1885. In clayey soil, extremely common.

Achillea micrantha, Bieb.; Boiss. Fl. Or. iii. p. 264.

Badghis: 541, May 22, 1885. In meadow-land, near water, where Orchis grows; a very handsome and showy species.

Anthemis caulescens, Aitch. et Hemsl., n. sp. (Plate XXXIII.) *Herba* perennis, 1–2-pedalis (forsan interdum ultra) cano-pubescens, caule basi simplice sursum divaricatim ramosa. *Folia* petiolata vel subsessilia, inferiora 3–9 poll. longa, 2–3-pinnatipartita, segmentis ultimis parvis linearibus acutis. *Capitula* numerosa, longe pedunculata (pedunculis bracteis parvis instructis), discoidea, hemisphærica; involucri bracteæ pauciseriatæ, ovato-oblongæ, obtusæ, arcte appressæ, incurvæ; receptaculi paleæ lineares vel filiformes, flores paullo breviores. *Flores* flavi, omnes tubulosi, parcissime papillosi. *Achænia* glabra, matura non visa.

Badghis: May 4, 1885; Hari-rud valley: 610, June 6, 1885. An occasional plant, spread generally over the country. Leaves strongly scented.

This is quite unlike any other species of *Anthemis*, yet we think it can belong to no other genus.

Matricaria lasiocarpa, Boiss.; Fl. Or. iii. p. 324.

Hari-rud valley: 198, April 7, 16, 17, 1885. This is an extremely common species, growing usually in loamy soil, under the shade of shrubs.

Tanacetum umbelliferum, Boiss.—*Pyrethrum umbelliferum*, Boiss. Fl. Or. i. p. 352.

Hari-rud valley: 460, May 13, 1885; Badghis: May 20, 22, 1885. On the rolling downs of the Badghis; very common in certain localities. A very showy species.

Artemisia campestris, Linn., var.; Boiss. Fl. Or. iii. p. 363.

Hari-rud valley: 609, June 6, 1885; 735, July 27, 1885. This and *A. maritima* are the two most characteristic plants of the great gravel- and boulder-plains of the whole country. Native name for both *Trek*. They have large woody root-stocks from which numerous annual stems spring; these annual shoots form the chief camel-fodder of the arid tracts of the country, and the woody root-stocks are splendid fuel. The two plants are easily distinguished from each other when growing; this species having white stems and the general aspect of the plant grey, whereas the stems of the other are deep red, almost black.

At first sight this is so unlike European *A. campestris* that one would take it for a distinct species. The foliage is much reduced, and the slender red-brown, eventually shining stems and branches are woody and wiry. The same state is in the Kew Herbarium, collected by Griffith (547), and it was named *A. campestris* by the late Mr. Bentham. Mr. C. Winkler, Curator of the St. Petersburg Herbarium, who obligingly compared a number of our Compositæ with Turkestan types, independently arrived at the same conclusion.

ARTEMISIA MARITIMA, Linn.; Boiss. Fl. Or. iii. p. 366.

Hari-rud valley: 370, May 1, 1885: 734, July 27, 1885. Native name *Trek*. With *A. campestris* characteristic of the whole country, growing in the most arid parts; constituting the chief camel-fodder, and valued for fuel.

ARTEMISIA SCOPARIA, Waldst. et Kitaib; Boiss. Fl. Or. iii. p. 364.

Khorasan: 807, August 27, 1885. Very seldom seen, but occasional in the Hari-rud valley.

SENECIO CORONOPIFOLIUS, Desf.; Boiss. Fl. Or. iii. p. 390.

Hari-rud valley: 197, April 7, 13, 11, 1885. Common in the shelter of bushes and in cultivated soil.

DIPTEROCOME PUSILLA, Fisch. et Mey.; Boiss. Fl. Or. iii. p. 420.

Hari-rud valley: 447, May 12, 1885. In clayey soil, common.

GUNDELIA TOURNEFORTII, Linn.; Boiss. Fl. Or. iii. p. 421.

Badghis: 543, May 22, 1885; Khorasan, June 16, 1885. Native name *Kangar*. This, like *Codonocephalum Peacockianum*, occupies vast tracts of country, its size depending greatly on the soil and locality; but it averages from two to four feet in height. It is of spreading habit, and the radical leaves alone often measure three feet, and stick out like bayonets. It forms dense impassable thickets, owing to its stout hard spines. In autumn it is collected and stored, as we do hay, for fodder for cattle. When dry it easily breaks up, and is then very like crushed straw fodder.

ECHINOPS GRIFFITHIANUS, Boiss. Fl. Or. iii. p. 434?

Khorasan: 705, June 30, 1885. In shingle, common.

CHARDINIA XERANTHEMOIDES, Desf.; Boiss. Fl. Or. iii. p. 446.

Hari-rud valley: 334, April 27, 1885; Badghis, May 16, 1885. A very common plant; flowers somewhat tinged with rose when collected.

THEVENOTIA SCABRA, Boiss. Fl. Or. iii. p. 455.

Hari-rud valley: July 31, 1885; Khorasan: 1069, August 24, 1885. A very local plant, characteristic of clayey plains; widely scattered, singly and in pairs.

COUSINIA MICROCARPA, Boiss. Fl. Or. iii. p. 496.

Badghis: 498, May 18, 21, 1885; Khorasan, June 6, 1885. Very common. This plant varies in size from eight inches to a spreading bush of three to four feet.

COUSINIA DESERTI, Bunge; Boiss. Fl. Or. iii. p. 468.

Hari-rud valley: 740, July 28, 1885; Khorasan: 621, June 9, 1885. Characteristic of the arid desert country in shingle, associated with other species of *Cousinia* and *Artemisia*. The annual shoots and leaves are very brittle, and easily swept off by the wind. Flowers yellow, tipped with purple. This is the Holly-leafed Thistle of the Mission.

Cousinia alata, C. A. Mey.; Boiss. Fl. Or. iii. p. 478.

Hari-rud valley: 577, May 28, 1885; June 5, 1885. Most common all over the gravelly country.

Cousinia uncinata, Regel.—*Cousinia umbrosa*, Bunge; Boiss. Fl. Or. iii. p. 463.

Badghis: 508, May 18, 1885; Mt. Do-shakh: 767, August 5, 1885. Our plant is certainly *C. uncinata*, Regel, which is probably *C. umbrosa*, Bunge; but we have no authenticated specimens of Bunge's plant to refer to. It is a tall graceful plant with very large leaves, and presents a general resemblance to *Arctium*.

It occurs in moist meadow-land, in the shade of rocks and trees; except in such localities, not common.

Cousinia aptera, Aitch. & Hemsl.; Journ. Linn. Soc. Bot. xix. p. 171.

Khorasan: 712, July 18, 1885. In stony exposed barren soil, at an altitude of 4500 feet; very common.

Cousinia congesta, Bunge; Boiss. Fl. Or. iii. p. 469.

Hari-rud valley: 598, June 4, 5, 1885. Very characteristic of the gravel and shingle plains of the arid tracts of the country; growing three feet in height. It has a peculiar woolly crown, or ring, round the base of the annual stem. This ring is formed by the bases of the petioles of the root-leaves, which persist and form a covering for the crown of the following year's stem.

Cousinia eryngioides, Boiss. Fl. Or. iii. p. 490.

Khorasan: 631, June 13, 1885. In stony and gravel slopes, at an altitude of 3000 feet; growing gregariously over a great extent of country. It is almost impossible to ride through an undergrowth of this, owing to the great spinous pliant heads striking the horses, and driving them almost mad.

Cousinia tenella, Fisch. et Mey.; Boiss. Fl. Or. iii. p. 494.

Hari-rud valley: 432, May 10, 16, 1885. A common weed in the vicinity of cultivation and in cultivated soil. By its semiscandent habit it forms itself into dense masses over shrubs.

Cousinia arctotidifolia, Bunge, var.; Boiss. Fl. Or. iii. p. 499.

Khorasan: 622, June 9, 1885. The radical leaves not so deeply pinnatifid as in the specimens originally described. Common over the whole country, on shingle, &c.

Cousinia heterophylla, Boiss. Fl. Or. iii. p. 470.

Hari-rud valley: 753, July 1885. One of the characteristic plants of the gravelly and stony desert country, having large spongy root-stocks that make capital fuel. It has a very oak-like grey leaf, and is the Oak-thistle of the Mission.

Cousinia minuta, Boiss. Fl. Or. iii. p. 489.

Hari-rud valley: 448, May 12, 1885; June 6, 1885. Common everywhere; and varying extremely in leafiness, which depends whether it grows in dry gravelly soil or in moist meadow-land.

Cousinia Chamæpeuce, Boiss. Fl. Or. iii. p. 465.

Badghis: 486, May 17, 1885; 515, May 19, 1886. Very common on dry clayey hills and banks, and remarkable for its large woolly flower-heads.

Cousinia, sp.

Hari-rud valley: 1070, July 26, 1885. In gravelly plains; common.

Cousinia (§ Serratuloideæ, Bunge ?) Winkleriana, Aitch. et Hemsl. *Herba* perennis, rigida, pedalis ad sesquipedalis, canescens, tarde glabrescens, caulibus pauciramosis oligocephalis. *Folia* rigidissima (radicalia non visa), oblonga, usque ad 4 poll. longa, plana, arcte ad ramos appressa, longe lateque decurrentia, elevato-venosa, secus margines tantum longiuscule rigideque aculeata. *Capitula* sparsa (ramulis sæpius tricephalis), lateralia sessilia, terminalia breviter pedunculata, arachnoideo-tomentosa, multiflora, ovoidea ore constricto; involucri bracteæ numerosissimæ, exteriores atque intermediæ breves, angustissimæ, spiniformes, arcte appressæ, interiores glaberrimæ, cartilagineæ, lineares, acutissimæ, 10–15 lineas longæ; receptaculi setæ fere filiformes, achæniis cum pappo longiores. *Achænia* ecostata, compressa, obovata, apice rotundata, glabra, opaca, obscure maculata; pappi setæ breves, sæpius bistortæ, longe bifariam barbellatæ.

Hari-rud valley: 759, August 3, 1885. Very common in gravelly and clayey plains.

We have much pleasure in naming this after Mr. Const. Winkler, Curator of the St. Petersburg Herbarium, who compared this and other Compositæ with Turkestan species not represented in the Kew Herbarium.

Cousinia cynaroides, C. A. Mey.; Boiss. Fl. Or. iii. p. 506, var. foliis radicalibus a forma typica diversa.

Hari-rud valley; 601, June 4, 1885; Khorasan: 1079, June 21, 1885. Very common in stony ground and shingle. The plant has a general grey appearance, from the woolly tomentum with which it is covered.

We have followed Mr. C. Winkler's suggestion in referring this to *C. cynaroides*, as we have only seen Hohenacker's Caucasian specimens.

Cousinia, sp.

Badghis: 365, May 1, 1885. Native name *Pulush*. A perennial with numerous creeping root-stocks, which throw up annual flowering-stems, three to four inches in height, with numerous clusters of leaves. The plant grows in large irregular patches, and is of a remarkable grey colour, rendering it very conspicuous at a distance. It is found in rocky places on the low hills above 3000 feet. It would, we think, prove a good plant for garden purposes.

Cousinia, sp. Cousinia "nova species, *C. arachnoideæ*, Fisch. et Mey., valde affinis (an potius forma glabriuscula hujus speciei ?)."—*C. Winkler* in litt.

Hari-rud valley: 596, June 4, 1885. One specimen only. A plant three feet in height; flowers yellow.

The inner involucral bracts of *C. arachnoidea* are conspicuously dilated, scarious, and

coloured at the tips, while in this they are not; hence we suspect a different species may have been sent to St. Petersburg under this name.

CARDUUS PYCNOCEPHALUS, Jacq.; Boiss. Fl. Or. iii. p. 520.
Hari-rud valley: 437, May 11, 1885. A troublesome weed in cultivated land.

CNICUS ACARNA, Linn.—*Cirsium Acarna*, Mœnch; Boiss. Fl. Or. iii. p. 549.
Hari-rud valley: 750, July 30, 1885. On the margins of cultivation; common, in good soil.

CNICUS ARVENSIS, Hoffm.—*Cirsium arvense*, Scop.; Boiss. Fl. Or. iii. p. 552.
A common weed, in cultivated land.

ONOPORDON LEPTOLEPIS, DC.?; Boiss. Fl. Or. iii. p. 564.
Khorasan: 704, June 30, 1885. Our plant is identical with Griffith's specimens numbered 680 and 932, and Stocks's 1066. We have seen no authenticated specimens of *O. leptolepis*, and Boissier does not mention Griffith and Stocks's specimens. It is a very characteristic plant of these regions, being common in the Hari-rud valley as well as in Khorasan, growing in gravelly soil. It reaches five feet in height, is slender in habit, and covered with large extremely showy flower-heads.

JURINEA VARIABILIS, Aitch. et Hemsl., n. sp. (Plate XXXIV.) *Herba* perennis?, 6–18 poll. alta, caule tantum infra medium foliosa, sæpius tricephala, ad collum lanata. *Folia* lanceolato-oblonga, usque ad 4 poll. longa, integra, dentata vel alte pinnatifida, præcipue subtus cano-lanata; radicalia in petiolum attenuata; caulina sessilia, amplexicaulia. *Capitula* usque ad $1\frac{1}{2}$ poll. diametro; involucri bracteæ pluriseriatæ, rectæ, acutissimæ, glabrescentes, extimæ brevissimæ, longiores, roseæ; receptaculi squamæ vere paleaceæ, acutæ, acheniis duplo triplove longiores. *Achænia* (matura non visa) lævia, glabra, pappo multoties breviora; pappus copiosus, longe plumosus, setis 2–5 interioribus longioribus.
Paropamisus range: 572, May 26, 1885. Common everywhere. Sheep do not eat it.
Allied to *J. adenocarpa* and *J. chætocarpa*, differing in its relatively naked, smooth achenes. The accessible material is too scanty to allow of our testing the constancy of these characters. Our plant is identical with Griffith's no. 3317.

JURINEA MONOCEPHALA, Aitch. et Hemsl., n. sp. Affinis *J. variabili*, differt foliis linearibus vel lineari-lanceolatis, collo vix lanato, caulibus monocephalis, involucri bracteis brevioribus, patentibus, achæniis longioribus, pappo breviore minus plumoso.
Khorasan: 682, June 18, 1885. In shady localities, on limestone rock, at an altitude of 5000 feet; growing in patches, and the thick, close clumps of its broad leaves matted together look like turf, from which the tall slender-stemmed handsome flower-heads spring.

CENTAUREA (§ MICROLOPHUS) PLUMOSA, Aitch. et Hemsl., n. sp *Herba* perennis vel biennis, erecta, 1–2-pedalis, fere omnino glaberrima, pauciramosa, ramis sulcatis mono-

cephalis erectis. *Folia* radicalia breviter petiolata, caulina sessilia, plus minusve oblique decurrentia, omnia coriacea, pallida, rigida, oblonga, maxima 6 poll. longa, sæpius integra, undulata, utrinque prominentia laxeque reticulato-venosa. *Capitula* citrina, fere cylindrica, 1½–2 poll. longa, pedunculis parvi-foliosis; involucri bracteæ pluriseriatæ, appressæ, coriaceæ, primum puberulæ vel scaberulæ, acutæ vel subaculeatæ, exteriores brevissimæ, ovato-oblongæ, interiores subscariosæ, lineares, usque 15 lineas longæ; flores homomorphi, 5–6 lineas exserti; receptaculum planum, paleis numerosissimis angustissimis circiter 9 lineas longis instructum. *Achænia* glabra (matura desunt), leviter costata, 3–4 lineas longa; pappi setæ numerosissimæ, inæquales, longiuscule plumosæ, longiores 9 lineas longæ.

Near *C. alata*, Lam., in the cauline leaves and flower-heads; but the latter are fewer and larger, and the achenes and pappus are wholly different.

Khorasan: 667, June 17, 1885. A weed, in fields, at an altitude of 5000 feet, having large, handsome, lemon-coloured flower-heads.

CENTAUREA PHYLLOCEPHALA, Boiss. Fl. Or. iii. p. 684.

Badghis: 480, May 16, 1885; Hari-rud valley: 595, June 3, 1885. Abundant everywhere, but especially so near villages. Its habit of growth is very varied, as in gravel soil and in the arid country it lies flat on the ground, while in moist ground it is an erect bush almost three feet high.

CENTAUREA VIRGATA, Lam.; Boiss. Fl. Or. iii. p. 651.

Khorasan: 690, June 18, 1885, July 1, 1885. Very common, in all sorts of soil, throughout the Hari-rud valley, as well as in Khorasan.

CENTAUREA BALSAMITA, Lam.; Boiss. Fl. Or. iii. p. 679.

Khorasan: 630, June 15, 1885. Common in cultivated soil.

CENTAUREA DEPRESSA, Bieb.; Boiss. Fl. Or. iii. p. 635.

Hari-rud valley: 223, April 13, 1885, June 5, 1885. A very attractive and characteristic weed in corn-fields.

CENTAUREA PULCHELLA, Ledeb.; Boiss. Fl. Or. iii. p. 620.

Hari-rud valley: 288, April 21, 1885, May 28, 1885; Badghis: May 16, 1885. Common in shingle and stony soil.

CENTAUREA PICRIS, Pall.—*Acroptilon Picris*, DC.; Boiss. Fl. Or. iii. p. 612.

Hari-rud valley: 1071, June 3, 1885; Khorasan: June 21, 1885. Excessively common, on the margins of fields and sides of irrigation-channels.

CENTAUREA MOSCHATA, Linn.—*Amberboa moschata*, Boiss. Fl. Or. iii. p. 605.

Hari-rud valley: 262, April 17, 18, 19, 1885; May 10, 13, 1885. Native name *Mai-i-mesh*. Very common in shade.

CENTAUREA ALBISPINA, Aitch. & Hemsley.—*Microlonchus albispinus*, Bunge; Boiss. Fl. Or. iii. p. 701.

Hari-rud valley: 428, May 10, 1885. Very local in gravelly soil on the sides of low hills near Tirphul. The flowers vary from white and yellow to pink.

CENTAUREA IBERICA, Trevir.; Boiss. Fl. Or. iii. p. 690.
Hari-rud valley: 605, June 5, 1885. Common in cultivated ground near villages.

CARTHAMUS TINCTORIUS, Linn.; Boiss. Fl. Or. iii. p. 709.
Khorasan: 792, August 23, 1885. Native name *Kajura*. Cultivated in Afghanistan as well as Khorasan for the dye-stuff obtained from the flowers.

CARTHAMUS OXYACANTHA, Bieb.; Boiss. Fl. Or. iii. p. 709.
Hari-rud valley: 589, June 3, 1885; Khorasan, June 21, 1885. Very common.

CICHORIUM INTYBUS, Linn.; Boiss. Fl. Or. iii. p. 715.
Khorasan: 697, June 21, 1885. Native name *Kashni*. In loamy soil common everywhere; also cultivated in gardens as a pot-herb.

KOELPINIA LINEARIS, Pallas; Boiss. Fl. Or. iii. p. 721.
Hari-rud valley: 282, April 19, 21, 26, 1885. Very common amongst boulders in gravelly soil.

RHAGADIOLUS HEDYPNOIS, Fisch. et Mey.—*Garhadiolus Hedypnois*, Jaub. et Spach; Boiss. Fl. Or. iii. p. 723.
Badghis: 363, May 1, 1885.

HETERACIA SZOVITSII, Fisch.; Boiss. Fl. Or. iii. p. 724.
Hari-rud valley: 426, May 10, 1885; Badghis: May 20, 1885. Common in stony soil.

CREPIS STOCKSIANA, Aitch. & Hemsl.—*Heteroderis Stocksiana*, Boiss. Fl. Or. iii. p. 794.
Hari-rud valley: 324, April 26, 1885, May 9, 10, 28, 1885; 602, June 5, 1885; Khorasan: June 21, 1885. In loamy soil near the roots of shrubs.

PTEROTHECA FALCONERI, Hook. fil. Flora British India, iii. p. 399.
Hari-rud valley: 293, April 21, 1885, May 10, 1885. Abundant, in gravelly soil, on low hills.

TARAXACUM OFFICINALE, Web.; Boiss. Fl. Or. iii. p. 787.
Badghis: 110, January 20, 1885; Hari-rud valley: April 2, 1885. Generally distributed, wherever there is moist soil, over the whole country.

LACTUCA LONGIROSTRA, Aitch. et Hemsl., n. sp. *Herba* annua, undique fere glabra vel glabrescens, a basi ramosa, 3–6 poll. alta. *Folia* radicalia rosulata, obovato-spathulata, $\frac{3}{4}$–2 poll. longa, irregulariter dentata vel plus minus lobulata, simul denticulata, supra glabra, subtus pilis longis albis parce instructa; folia caulina subnulla vel parva, amplexicaulia. *Capitula* numerosa, circiter 10-flora, 6–8 lineas longa; involucri bracteæ 10–12, extimæ minimæ, calyculatæ, intimæ lineares, vix acutæ. *Achænia* pallida, obovato-oblonga, valde compressa, medio leviter 1-costata, transversim striatula, margine incrassata, obscure muriculata; pappus breviter exsertus, brevis, longirostratus; rostrum quam achænium fere triplo longius.

Hari-rud valley: 416, May 10, 1885. This is near *L. undulata*, Ledeb., and also to *L. canescens*. Winkler writes "*Lactuca* nova species a *L. undulata*, Ledeb., cui proxima, foliis cuneatis subtus pilis parcis scabris differt. *L. canescens*, Regel et Schmalh., foliis involucri phyllisque scabris (ut species nova) foliorumque forma et habitu persimilis, differt achæniis muricato-scabris, rostro triplo breviore."

An annual, from three to four inches in height, with numerous copper-coloured basal leaves and a large loose corymbose inflorescence.

LACTUCA ORIENTALIS, Boiss. Fl. Or. iii. p. 819.

Northern Baluchistan: 52, Oct. 9, 1884; Hari-rud valley: 751, July 30, 1885; Khorasan: August 27, 1885. A characteristic shrub of the dry, arid, stony regions, from Baluchistan to the Hari-rud and Persia. Its branches so densely interlace that it forms a hard prickly ball.

LACTUCA SCARIOLA, Linn.; Boiss. Fl. Or. iii. p. 809.

Khorasan: 699, June 21, 1885. Common in cultivated soil, and in hedges near villages.

LACTUCA PERSICA, Boiss. Fl. Or. iii. p. 806.

Badghis: 366, 466, May 1, 14, 1885. A very handsome-flowered species; would be worth cultivating. It was in some quantity near the Nihal-sheni Pass.

SONCHUS ASPER, Vill.; Boiss. Fl. Or. iii. p. 796.

Hari-rud valley: 455, May 12, 1885. Common.

MICRORHYNCHUS NUDICAULIS, Less.—*Zollikoferia nudicaulis*, Boiss. Fl. Or. iii. p. 824.

Hari-rud valley: 726, July 27, 1885.

MICRORHYNCHUS SPINOSUS, Benth. & Hook. f., forma.—*Zollikoferia spinosa*, Boiss. Fl. Or. iii. p. 826; Aitch. in Trans. Pharmac. Soc. Lond. vol. xvii. (1887), p. 468.

Hari-rud valley: 723, July 26, 27, 1885. This is the same plant as 3373, and $\frac{715}{883}$ Griffith's Journal, and the same form as our plant is in the Herbarium at Kew from Persia, the Egyptian desert, and Syria. It differs from typical *M. spinosus* in its lateral capitula being on short scaly peduncles. Native name *Chirkah*. This and *Lactuca orientalis* are extremely characteristic of the arid gravelly tracts of the whole country, and form spinous balls, those of the present plant being larger and much laxer. *M. spinosus* yields a resinous exudation, which is collected for adulterating true *Anzerut*. This when freshly gathered has a most horrible odour like decaying animal matter.

TRAGOPOGON COLORATUM, C. A. Mey.; Boiss. Fl. Or. iii. p. 746 (varietates).

Hari-rud valley: 325, April 26, 1885; Badghis: 1073, May 1, 4, 20, 1885. Profuse in sandy loam; flowers purple.

Native name *Gash-goshi*.

TRAGOPOGON GRAMINIFOLIUM, DC.; Boiss. Fl. Or. iii. p. 752.

Hari-rud valley: 459, May 12, 1885; Khorasan: 700, June 23, 1885, August 23, 1885. Very common in cultivated soil. Flowers yellow; heads closed during the heat of the day.

T. brevirostre, DC., *T. floccosum*, Kit., and *T. graminifolium*, DC., are so near each other that we are inclined to regard them as forms of one species.

SCORZONERA TUBEROSA, Pall.; Boiss. Fl. Or. iii. p. 777.

Hari-rud valley: 192, April 7, 1885, May 9, 1885. Common. Bulbs of the size and somewhat of the form of a chestnut, with a yellow-ochre-coloured juice; eaten by the natives.

SCORZONERA MOLLIS, Bieb.; Boiss. Fl. Or. iii. p. 761.

Hari-rud valley: 1074, April 7, 15, 26, 1885, May 10, 1885. Native names *Kambul* and *Jhag*. Very common. With large roots, tuberous, irregular in shape, from two to three inches long, by an inch to one and a half inches broad. Both the bulbs and leaves largely collected and eaten; the leaves are usually cooked.

SCORZONERA PAPPOSA, DC.; Boiss. Fl. Or. iii. p. 765.

Badghis: 483, May 17, 1885. In loose sandy gravel; by no means common.

SCORZONERA PUSILLA, Pallas; Boiss. Fl. Or. iii. p. 771.

Hari-rud valley: 175, April 6, 19, 21, 1885, May 10, 1885. Very abundant, growing near the roots of bushes, in good soil; bulbs eaten.

EPILASIA AMMOPHILA, Bunge; Hook. fil. Flora British India, iii. p. 419.

Hari-rud valley: 273, April 19, 21, 1885, May 12, 1885. Common in gravelly soil.

CAMPANULACEÆ.

CAMPANULA INCANESCENS, Boiss. Fl. Or. iii. p. 912.

Khorasan: 638, June 16, 1885. In the crevices of limestone cliffs, above 5000 feet altitude; only obtained near Bezd.

PLUMBAGINEÆ.

ACANTHOLIMON, sp. aff. *A. roseo*, Boiss. Fl. Or. iv. p. 853.

Hari-rud valley: 782, August 19, 1885. In stony ground on hill-sides, at an altitude of 3000 feet. A shrub about two feet in height, forming a dense spinous hassock, three feet across. The flowers of this species do not rise above the spiny branches.

ACANTHOLIMON (§ ARMERIOPSIS) ECÆ, Aitch. et Hemsl., n. sp. (Plate XXXVI.)

Suffrutex nanus, densissime ramosus, foliis semiteretibus, spiniformibus pollicaribus papillosis. *Flores* speciosi, in spiculas sæpius trifloras subcapitatim dispositi; scapus gracilis, 2–3-articulatus, simul parvi-bracteatus, 2–4 poll. longus; capitula circiter 8-spiculata; bracteæ exteriores latissimæ, truncato-rotundatæ, ecarinatæ,

fere omnino scariosæ, emarginatæ, interiores longiores, præter carinam elevatam hirsutam scariosæ, bracteæ carina in mucronem distinctum producta; calyx cylindricus, bracteas paulo superans, elimbatus, 5-costatus, inter costas breviter 5-lobatus, costis extus hirsutis breviter mucronatis; corolla ampla, rosea.

Badghis: 573, May 27, 1885. A small shrub, forming dense hummocks of a foot in height and a foot across. The flowers bright rose-pink, on peduncles three inches long; very common in rocky places, at an altitude of 3000 feet.

ACANTHOLIMON, sp.

Khorasan: 1075, July 1, 1885. A shrub, about two feet in height, forming hassocks as much as three feet in breadth. Only one set of poor specimens collected.

ACANTHOLIMON LONGIFLORUM, Boiss. Fl. Or. iv. p. 849.

Badghis: 400, May 5, 19, 20, 1885; Hari-rud valley: 408, May 9, 10, 1885. A low shrub, common in rocky places, forming very loose open soft hassocks; the flowers in loose panicles on long pliant peduncles, from four inches to over a foot in length. Flowers rose-coloured, large and distant.

ACANTHOLIMON (§ GLUMARIA) SPECIOSISSIMUM, Aitch. et Hemsl., n. sp. (Plate XXXV.)

Herba perennis, cæspitosa, graminifolia, ramis subelongatis, foliis vetustis refractis textis. *Folia* omnia plana, glauca, pulverulenta, scabrida, pungentia, inferiora latiora, breviora, crassiora, glabrescentia, cetera elongata, longiuscule lateque vaginantia. *Scapus* lateralis, circiter semipedalis, simplex vel 2–3-ramosus; spiculæ demum dissitæ, 2–3-floræ, sæpius 3-floræ, 3-bracteatæ, bracteis latis acerosis late scariosis. *Flores* splendide rosei, circiter 1 poll. diametro; calyx cylindricus, fere elimbatus, valide 10-costatus, costis distincte puberulis; limbi lobi scariosi, breves, acuti.

Badghis: 350, May 1, 1885; 512, May 19, 20, 21, 1885. A shrub, from one to two feet in height, with grass-like leaves nearly three inches in length; flowers large, rose-coloured, in short broad spikes. A very well-marked species, common throughout the Badghis at 3000 feet altitude.

Allied to *A. splendidum* and *A. latifolium*, which it resembles in its inflorescence and calyx.

STATICE SUFFRUTICOSA, Linn.; Boiss. Fl. Or. iv. p. 867.

Between Sher-baksh and Gaz-i-cha in the Harut basin; 65, November 10, 1884; Hari-rud valley: May 9, 1885; 780, August 18, 1885. In the shingly beds of dry water-courses; very characteristic and common.

STATICE PERFOLIATA, C. A. Mey.; Boiss. Fl. Or. iv. p. 866.

Hari-rud valley: 744, July 29, 1885. In saline, moist soil, associated with chenopodiaceous plants, ranging from a few inches in height to over four feet, with weak straggling branches often semi-scandent, springing from a large woody root-stock. In some localities it forms a thick scrub, but it is not generally common in the country.

Statice leptostachya, Boiss. Fl. Or. iv. p. 872.

Hari-rud valley: 1076, May 12, 1885. In salt, sandy soil, especially where moisture has collected after a fall of rain, closely crowded together, forming a turf. Flowers snow-white.

Var. *scapis filiformibus*. Hari-rud valley: 331, April 27, 1885.

Statice spicata, Willd.; Boiss. Fl. Or. iv. p. 871.

Hari-rud valley: 291, April 21, 1885; 341, April 29, 1885, May 13, 14, 1885. On sandy soil; only common in the northern part of the Hari-rud valley and Badghis district. A very conspicuous herb, with spikes of splendid rose-pink flowers.

Var. *foliis subintegris*.

Hari-rud valley: 1077, April 27, 1885. In saline sandy soil, associated with the type and *S. leptostachya*, forming together a sward. Flowers pure white.

PRIMULACEÆ.

Primula, sp.

Badghis: 126, March 14, 15, 1885. In moist loamy soil on the low hills near Gulran, at an elevation above 2000 feet. Leaves from two to three inches in length; flower-buds carmine, developing magenta.

Androsace maxima, Linn.; Boiss. Fl. Or. iv. p. 18.

Hari-rud valley: 217, April 13, 1885; Badghis, May 1, 1885. In stony soil; very common. Flowers yellowish.

Dionysia tapetodes, Bunge; Boiss. Fl. Or. iv. p. 21.

Khorasan: 634, June 16, 1885. Limestone cliffs, on a north-east exposure, at an altitude of above 5000 feet. Characteristic and clothing the rocks like a carpet of moss, but very difficult to collect.

Glaux maritima, Linn.; Boiss. Fl. Or. iv. p. 7.

Hari-rud valley: 1078, 1885. Common on banks of streams and in river-beds.

Anagallis arvensis, Linn.; Boiss. Fl. Or. iv. p. 6.

Hari-rud valley: 787, August 20, 1885. Occasional in loamy soil.

OLEACEÆ.

Fraxinus oxyphylla, Bieb.; var. β, Boiss. Fl. Or. iv. p. 40.

Khorasan: 1080, August 28, 1885. Native names: *Binaush*, *Benaush*. Cultivated in orchards and in the vicinity of houses; wood valued for all domestic purposes.

Fraxinus, sp.

Hari-rud valley: 251, April 16, 1885; 1081, May 12, 1885. Native names: *Binaush*, *Benaush*. A cultivated tree, usually met with near shrines, and held sacred. The wood is valued for ploughs and farm-implements. I measured a tree in the village of Khusan which was 10 feet 6 inches in girth at six feet from the ground, though not 30 feet high, but divided into very large bulky branches.

APOCYNACEÆ.

RHAZYA STRICTA, Decne.; Boiss. Fl. Or. iv. p. 46.

Northern Baluchistan: 20, Sept. 29, 30, 1884; 19, Sept. 29, 30, 1884. A shrub about three feet in height, very common in stony soil. The specimens numbered 20 have broader and more obtuse leaves than the type.

NERIUM ODORUM, Sol.; Boiss. Fl. Or. iv. p. 47.

Northern Baluchistan: 1082, 1884. Native name *Jaur*. In Tamarisk-groves, near water; very common. This is extremely poisonous to camels.

APOCYNUM VENETUM, Linn.; Boiss. Fl. Or. iv. p. 48. (Plate XXXVII.)

Badghis: 115, March 5, 1885. Native names: *Dumb-i-roba*, *Kundar*, *Dumb-i-gosalla*. Common in beds of streams and in marshy localities at Gulran, at an altitude of 2000 feet. Stems about four feet high, springing from a creeping root-stock, and terminating in a panicle of flowers. The annual stems remain attached to the root-stocks, but by the action of the wind they are soon reduced to their fibrous element, and this is found in bunches, having the appearance of artificial preparation. My attention was attracted to them by the seed-vessels still persistent on the battered branches. The fibre is a most excellent one, and the wonder is, as the plant seems to be common from Eastern Europe to China, that it has not heretofore been employed in manufactures. The bark of the creeping root-stocks is employed in tanning the leather skins used as water-bottles.

Roots of this plant were sent to Saharunpore, whence we received flowering specimens for the Herbarium at Kew.

ASCLEPIADACEÆ.

PERIPLOCA APHYLLA, Decne.; Boiss. Fl. Or. ii. p. 50.

Northern Baluchistan: 47, October 6, 1884. Native names: *Um*, *Uma*; Punjabi *Batta*. Very common in the desert country amongst rocks.

CYNANCHUM ACUTUM, Linn.; Boiss. Fl. Or. iv. p. 60.

Hari-rud valley: 423, May 10, 1885; 725, July 27, 1885, August 18, 20, 1885. Native name *Pech-kak*. In stream-beds, with Tamarisk; very common. The fruit of this species is not eaten.

CYNANCHUM, sp.

Helmand: October 1884. Native name *Pir-wathi*. A tall climber on the banks of the river amongst Tamarisk and *Populus euphratica*; in some localities covering the Poplar trees. It was cut down largely as fodder for the camels. The natives collected and ate the fruit, calling it *Shangar*.

The natives of the Hari-rud valley knew of its existence, but I never collected it there.

GENTIANACEÆ.

ERYTHRÆA BABYLONICA, Griseb.—*Erythræa spicata*, Pers.; Boiss. Fl. Or. iv. p. 69.

Hari-rud valley: 760, August 3, 5, 20, 1885. Not uncommon on sandstone banks of streams.

GENTIANA OLIVIERI, Griseb.; Boiss. Fl. Or. iv. p. 76.

Badghis: 360, May 1, 4, 1885. Native name *Gul-khalle*. In great luxuriance on the sandy downs of the Badghis, forming part of the sward along with several Carices. This is undoubtedly, as Boissier remarks, the Gentian of the hot country. It is in such profusion, that when in flower it gives a blue colouring to the downs.

BORAGINEÆ.

HELIOTROPIUM EICHWALDI, Steud.; Boiss. Fl. Or. iv. p. 131.

Hari-rud valley: 592, June 3, 1885; Khorasan, June 21, 1885. A common plant in stony places.

HELIOTROPIUM UNDULATUM, Vahl; Boiss. Fl. Or. iv. p. 147.

Northern Baluchistan: 57, Oct. 9, 1884. A common plant in the desert.

HELIOTROPIUM CHORASSANICUM, Bunge; Boiss. Fl. Or. iv. p. 129.

Hari-rud valley: 591, June 3, 6, 1885, July 27, 1885. Abundant on sandstone cliffs, though local. Flowers very numerous, large, pure white, and strongly scented.

HELIOTROPIUM CABULICUM, Bunge; Boiss. Fl. Or. iv. p. 143.

Northern Baluchistan: 10, Sept. 29, 1884; Hari-rud valley: 1083, 411, May 9, 28, 1885.

TRICHODESMA MOLLE, DC.; Boiss. Fl. Or. iv. p. 281.

Khorasan: 706, July 1, 1885. In the shingly soil of dry water-courses; extremely common in the Hari-rud valley, as well as in Khorasan. Plant spread flatly over the ground; flowers bright blue at first, but eventually bleached a dirty white by the sun.

CACCINIA GLAUCA, Savi; Boiss. Fl. Or. iv. p. 277.

Hari-rud valley: 172, April 6, 27, 1885; 618, June 6, 1885. Native name *Gao-zeban*. Common in the Badghis and Khorasan, as well as the Hari-rud valley. A very bright-flowered perennial, the annual shoots of which spring from a large underground root-stock. The root-stock is eaten and, as well as the flowers, employed in medicine by the natives. It is loaded with a most viscid juice, which seems to be palatable to the people of these parts; however, on my attempting to chew a portion of the stalk, my mouth felt as if it were going to be glued together.

KUSCHAKEWICZIA TURKESTANICA, Regel & Smirnow, Descr. Pl. Nov. Turk. fasc. vi. p. 51, 1858.

Badghis: 132, March 18, 21, 1885, May 1, 21, 1885. Native name *Bajindak*. Very common on the downs of the Badghis. The cooked leaves are eaten as a pot-herb.

SOLENANTHUS CIRCINNATUS, Ledeb.; Boiss. Fl. Or. iv. p. 270.

Paropamisus range: 398, May 5, 25, 1885. In the shade of large rocks and bushes, at an altitude of 5000 feet. When in flower it is a most elegant plant, growing to a height of from three to four feet.

RINDERA CYCLODONTA, Bunge; Boiss. Fl. Or. iv. p. 275.
Badghis: 548, May 23, 1885. In sandy loamy soil near Kara-bagh.

PARACARYUM RUGULOSUM, Boiss. Fl. Or. iv. p. 256.
Khorasan, 692: June 18, 1885. In the bed of a dry water-course, at an altitude of 4000 feet.

PARACARYUM, sp. "*Solenantho coronato*, Regel (Pl. Fedtsch. p. 59), arcte affinis, differt achæniorum disco minutissime papuloso medio minute aculeato."—*Regel in litt.*
Badghis: 382, May 2, 3, 19, 20, 1885; Paropamisus range: May 25, 1885. On the low hills and ridges of the Badghis up to an altitude of 5000 feet; on the Paropamisus range, extremely common. Flowers deep purple, fruit stellate.

PARACARYUM, sp.
Hari-rud valley: 425, May 10, 1885. In low sandstone hills; common.

ECHINOSPERMUM BRACHYSEPALUM, Claus, Localfl. der Wolgageg. in Beitr. zur Pflanzenkunde des russ. R. viii. pp. 65, 240.
Hari-rud valley: 1084, April 14, 21, 1885. Common in the shade of bushes.

ECHINOSPERMUM SINAICUM, A. DC.; Boiss. Fl. Or. iv. p. 251.
Hari-rud valley: 241, April 15, 17, 1885.

ECHINOSPERMUM OLIGACANTHUM, Boiss. Fl. Or. iv. p. 248 (e descriptione).
Hari-rud valley: 1085, May 9, 1885.

ECHINOSPERMUM MINIMUM, Lehm.; Hook. fil. Fl. British India, iv. p. 162.
Hari-rud valley: 180, April 6, 11, 17, 1885. A common plant.

ECHINOSPERMUM LÆVIGATUM, Kar et Kir.; Boiss. Fl. Or. iv. p. 248.
Hari-rud valley: 166, 263, April 6, 17, 21, 1885; Paropamisus: May 25, 1885. Very common. One of the few plants of the order which are quite glabrous.

ECHINOSPERMUM SESSILIFLORUM, Boiss. Fl. Or. iv. p. 253.
Hari-rud valley: 1086, May 9, 1885.

ECHINOSPERMUM BARBATUM, Bieb.; Boiss. Fl. Or. iv. p. 250.
Paropamisus range: 1087, May 26, 1885. At an altitude of 5000 feet.

ECHINOSPERMUM LAPPULA, Lehm.; Boiss. Fl. Or. iv. p. 249.
Badghis: 388, May 3, 1885.

ECHINOSPERMUM, sp.—Aff. *E. microcarpo*, Ledeb.
Khorasan: 681, June 18, 1885. On damp rocks, at an altitude of above 3000 feet.

ECHINOSPERMUM, sp.
Hari-rud valley: 169, April 6, 7, 16, 17, 1885. In cultivated land, common.

ROCHELIA STYLARIS, Boiss. Fl. Or. iv. p. 245.
Hari-rud valley: 1088, May 10, 1885.

Asperugo procumbens, Linn.; Boiss. Fl. Or. iv. p. 275.
Hari-rud valley: 190, April 7, 13, 1885; Paropamisus, May 26, 1885. Very common, in good soil, and in the shade of bushes, &c.

Anchusa italica, Retz.; Boiss. Fl. Or. iv. p. 154.
Hari-rud valley: 314, April 25, 1885, May 12, 1885. In cultivated land, common; a very showy plant in corn-fields.

Lycopsis arvensis, Linn.—*Anchusa arvensis*, Bieb.; Boiss. Fl. Or. iv. p. 160.
Hari-rud valley: 588, June 3, 1885. In cultivated soil, common.

Nonnea picta, Fisch. et Mey.; Boiss. Fl. Or. iv. p. 166.
Hari-rud valley: 168, April 6, 18, 1885. Very common.
My Afghanistan specimens, distributed under the numbers 483 and 230, of 1879, are of this species and not *N. nigricans*, as originally named.

Myosotis stricta, Link; Boiss. Fl. Or. iv. p. 239.
Badghis: 375, May 1, 1885. In the shade of rocks, growing in dense patches.

Lithospermum tenuiflorum, Linn. fil.; Boiss. Fl. Or. iv. p. 217.
Hari-rud valley: 234, April 13, 1885. A common plant in cultivated fields.

Lithospermum officinale, Linn.; Boiss. Fl. Or. iv. p. 218.
Khorasan: 676, June 18, 1885. In the shade of bushes near water, at an altitude of 5000 feet; not common.

Arnebia linearifolia, DC.; Boiss. Fl. Or. iv. p. 214.
Hari-rud valley: 184, 206, 263, during April 1885, June 5, 1885. Excessively common in the shade, in gravelly soil. The flowers usually straw-coloured, but frequently having a dot of deep purple on each lobe of the corolla resembling the flowers of *Arnebia Griffithii* in miniature.

Onosma echioides, Linn.; Boiss. Fl. Or. iv. p. 181.
Badghis: 550, May 23, 1885; Khorasan, June 16, 1885. Not uncommon, in clefts of rocks, at an altitude of 3000 feet and upwards. Flowers of a brilliant orange-yellow.

CONVOLVULACEÆ.

Convolvulus fruticosus, Pall.; Boiss. Fl. Or. iv. p. 87.
Hari-rud valley: 401, May 7, 1885; 418, May 10, 1885; 763, August 4, 1885. A low, woody shrub, armed with numerous sharp spines; very characteristic of the arid country.

Convolvulus lineatus, Linn.; Boiss. Fl. Or. iv. p. 97.
Badghis: 540, May 22, 1885. Local, on bare stony ground.

Convolvulus erinaceus, Ledeb.; Boiss. Fl. Or. iv. p. 87.
Northern Baluchistan: 26, Sept. 29, 1884; Hari-rud valley: 606, June 5, 1885; 731,

July 27, 1885. A very characteristic shrub, from 2 to 3 feet in height, growing in the form of a large ball, and very much resembling in general habit, and from similar localities as, *Lactuca orientalis*. The flowers are pure white, open at sunrise, and closing at once under the direct rays of the sun.

CONVOLVULUS SUBHIRSUTUS, Regel & Schmalh. Descrip. Plant. Nov. Turkestan. fasc. vii. 1879, p. 53.

Badghis: 533, May 21, 1885. A conspicuous shrub, throwing up dense clusters of annual stems three to four feet in height.

CONVOLVULUS ARVENSIS, Linn.; Boiss. Fl. Or. iv. p. 108.

Hari-rud valley: 436, May 11, 1885, June 3, 1885; Badghis: May 16, 1885.

CONVOLVULUS PILOSELLÆFOLIUS, Desr.; Boiss. Fl. Or. iv. p. 103.

Hari-rud valley: 619, June 6, 1885; Khorasan: June 12, 21, 28, 1885. A very common plant in the vicinity of cultivation.

CRESSA CRETICA, Linn.; Boiss. Fl. Or. iv. p. 114.

Helmand valley: 76, Oct. 23, 1884; Hari-rud valley: 614, June 6, 1885; 785, August 20, 1885. Extremely common, especially on clay soil.

CUSCUTA, sp.

Hari-rud valley: 430, May 10, 1885; Badghis: May 19, 1885. A common parasite.

CUSCUTA, sp.

Hari-rud valley: 1089, May 28, 1885. Common on low bushes.

SOLANACEÆ.

SOLANUM NIGRUM, Linn.; Boiss. Fl. Or. iv. p. 284.

Helmand valley: October 28, 1884; Hari-rud valley: 727, July 27, 1885; Khorasan. A very common plant, the leaves of which are cooked as a pot-herb.

LYCIUM BARBARUM, Linn.; Boiss. Fl. Or. iv. p. 289.

Northern Baluchistan: 37, October 4, 1884, October 11, 1884; Hari-rud valley: April 18, 1885, June 5, 1885. Very characteristic of the Hari-rud river, where it was one of the first shrubs to throw out its early, bright, rice-green foliage, which was noticeable from a great distance. It is sometimes as much as 12 feet in height, with long, pendulous branches, like those of a Bramble. The fruit is bright red, and dries on the shrub. The natives in Baluchistan, owing to the bright colour of the fruit, call this, as well as *Stocksia, Koh-tor*. It was supposed that we lost so many camels at Omar-sha in consequence of their eating this shrub when in fruit.

LYCIUM RUTHENICUM, Murr.; Boiss. Fl. Or. iv. p. 290.

Hari-rud valley: 736, July 27, 30, 1885. A common shrub on the outskirts of villages and near old buildings. Fruit the shape and size of a large pea, deep purple when ripe.

DATURA STRAMONIUM, Linn.; Boiss. Fl. Or. iv. p. 292.

Hari-rud valley; Nov. 20, 1884. Native name *Katchola* or *Datura*. This plant was common in the neighbourhood of the fort at Khusan, but I did not see it anywhere else. I doubt its being indigenous, although propagating itself freely.

HYOSCYAMUS PUSILLUS, Linn.; Boiss. Fl. Or. iv. p. 294.

Hari-rud valley: 265, April 17, 19, 1885. Very common everywhere in good soil.

HYOSCYAMUS RETICULATUS, Linn.; Boiss. Fl. Or. iv. p. 295.

Badghis: 545, May 22, 1885; Paropamisus range: 567, May 22, 1885; Khorasan: June 17, 1885. Generally common, at an altitude above 2500 feet. It is greedily eaten by goats and sheep.

HYOSCYAMUS SENECIONIS, Willd., var.? MULTIFIDUS, Aitch. et Hemsl. (Plate XXXVIII.)

Ab typo et var. β. differt foliis tripinnatisectis, calycis lobis pinnatifidis.

Khorasan: 635, June 16, 1885. Only obtained in one locality, at an altitude above 5000 feet, on limestone formation, on the banks of a stream, in a deep gorge of the hills, to the south of Bezd. In general habit it strongly resembles cucurbitaceous plants, creeping over gravel and boulders.

We were at first disposed to regard this as a distinct species, and we are still in doubt whether it should rank as one, though it hardly differs more from *H. Senecionis*, β. *bipinnatisectus*, Boiss., than that does from typical *H. Senecionis*.

NICOTIANA TABACUM, Linn.; Hook. fil. Fl. British India, iv. p. 245.

Khorasan: 797, August 23, 1885. Native names: *Tumaku*, *Tambaku*. Cultivated largely both in Afghanistan and Khorasan.

NICOTIANA RUSTICA, Linn.; Hook. fil. Fl. British India, iv. p. 245.

Khorasan: 798, August 23, 1885. Native names: *Turkamani-tambaku*. Cultivated equally with *N. Tabacum*. From the native name this is supposed to have been an introduction from the Turkiman country. There is a considerable local trade in tobacco, but whether it is exported I was unable to find out.

SCROPHULARIACEÆ.

VERBASCUM, sp.

Badghis: 531, May 21, 1885; Khorasan: June 16, 1885. Common, at an altitude above 3000 feet, in the Badghis, and in the hills to the south of Bezd. A very handsome plant, from 3 to 4 feet in height; flowers large, bright yellow, with bright orange filaments.

CELSIA HETEROPHYLLA, Desf.; Boiss. Fl. Or. iv. p. 359.

Hari-rud valley: 1090, 1885. In gravelly soil, near running water at Tirphul.

LINARIA ELATINE, Mill.; Boiss. Fl. Or. iv. p. 367.

Khorasan: 810, August 28, 1885. Only one specimen obtained, in the shadow of a large rock, at Rui-khauf.

Linaria persica, Chav.; Boiss. Fl. Or. iv. p. 384.

Hari-rud valley: 328, April 27, 1885; May 13, 1885. Common, in the shade of shrubs, growing in good soil. Flowers almost pure white, with occasionally a slight tinge of pink.

Scrophularia alata, Gilib.; Boiss. Fl. Or. iv. p. 399.

Khorasan: 685, June 18, 1885. In moist meadow land, at an altitude of 5000 feet. A very handsome plant, growing three feet high, and much resembling in general character and habit *S. aquatica*, Linn.

Scrophularia cabulica, Benth., var. *ramulis gracilibus*; Boiss. Fl. Or. iv. p. 420.

Badghis: 491, May 17, 23, 1885; Khorasan: June 14, 1885. Common in stony soil over the country generally.

Scrophularia, sp.

Badghis: 513, May 19, 1885. In soft clayey soil, on the ridges of low hills, at an altitude of 3000 feet, common.

Dodartia orientalis, Linn.; Boiss. Fl. Or. iv. p. 424.

Hari-rud valley: 1091, July 27, 1885. On islands in the river, and in land that is occasionally overflown by the river; common. Flowers purple.

Veronica biloba, Linn.; Boiss. Fl. Or. iv. p. 464.

Hari-rud valley: 147, April 2, 6, 7, 13, 15, 16, 1885; Badghis: 380, May 1, 2, 1885. Everywhere common in the shade of other plants.

Veronica Anagallis, Linn.; Boiss. Fl. Or. iv. p. 437.

Badghis: 494, May 18, 1885; Hari-rud valley: August 4, 1885. In running water.

Var. *caulibus foliisque glanduloso-pubescentibus.*

Paropamisus range: 562, May 25, 1885. At an altitude above 5000 feet; in running water.

Pedicularis, sp.

Khorasan: 679, June 18, 1885. On hill-sides, at an altitude above 5000 feet, in great quantity; but not a good specimen could be obtained, owing to the pasturage having been closely grazed by sheep and goats.

OROBANCHACEÆ.

Cistanche Ridgewayana, Aitch. et Hemsl., n. sp. (Plate XXXIX.) *Herba* pedalis ad sesquipedalem. *Caulis* simplex, sursum crassior, densissime squamiferus, squamis scariosis obtusis. *Flores* sessiles, ebracteolati, glabri, numerosissimi, dense spicati; bracteæ oblongæ, obtusissimæ, margine albo-lanatæ, calycem excedentes; calyx fere regulariter 5-lobatus, lobis latis rotundatis; corolla cylindrica, recta, regulariter 5-lobata, lobis brevibus rotundatis; stamina inclusa, antheris filamentisque basi barbatis; ovarium glabrum, placentis 6 lamelliformibus; stylus stamina æquans vel paullo excedens, stigmate maximo capitato.

Hari-rud valley: 1093 (in part), April 23, 1885; May 12, 1885. On the banks of the

Hari-rud river, parasitical on Tamarisk. Stems from one to two feet in height, covered with numerous brown, leathery scales. Flowers yellowish white, tipped with reddish chocolate, or maroon, each flower being subtended by a large bract, which is fringed with a line of short white hairs. An extremely handsome parasite, differing from *C. Salsæ* in being wholly glabrous except the margins of the bracts.

CISTANCHE LAXIFLORA, Aitch. et Hemsl., n. sp. (Plate XL.) *Herba* glabra, circiter sesquipedalis, caule simplice pauci-squamifera, squamis pollicaribus. *Flores* glabri, 8–10, laxe racemosi, brevissime pedunculati, 1-bracteati, 2-bracteolati; bractea ovato-oblonga, obtusa, calyce paullo longiore, bracteolis angustioribus brevioribus; calyx fere regularis, 5-lobatus, lobis rotundatis integris vel interdum 3-dentatis; corollæ curvatæ limbus ampliatus, lobis latis rotundatis; stamina vix exserta, filamentis basi hirsutis, antheris densissime barbatis; ovarium glabrum, placentis 4, peltatis; stylus curvatus, breviter exsertus, stigmate capitato.

Hari-rud valley: 1093 (in part), April and May 1885. This species, which is allied to the European *C. lutea*, was mixed with *C. Ridgewayana* and distributed with it under the same number.

OROBANCHE ÆGYPTIACA, Boiss.—*Phelipæa ægyptiaca*, Walp.; Boiss. Fl. Or. iv. p. 499.

Khorasan: 793, August 23, 1885. A noxious weed in tobacco- and melon-fields, on both of which plants this species is parasitical. It grows in such quantity that, when in full blossom, it gives the field a general blue colour.

OROBANCHE STOCKSII, Boiss. Fl. Or. iv. p. 505.

Badghis: 482, May 17, 1885; Hari-rud valley: May 28, 1885. Very common, and parasitical on a species of *Cousinia*. Flowers large and showy, bell-shaped, and pale rose-pink.

In Northern Baluchistan I frequently met with the dried remains of a similar large *Orobanche* growing on Tamarisk, which the natives call *Labbu*, and which, in early summer, they collect to feed their camels.

OROBANCHE, sp.

Hari-rud valley: 333, April 27 and May 10, 1885. Parasitical on a Chenopodiaceous plant; flowers brown. Badghis: May 4, 1885. Flowers strawberry- and cream-colour. Native name *Pir-ingir*. Stems eaten as a vegetable.

OROBANCHE, sp.

Hari-rud valley: 1092, May 13, 14, 1885. Parasitical on *Cousinia*; flowers white edged with blue.

OROBANCHE, sp.

Hari-rud valley: 1094 (in part), June 4, 1885; May 28, 1885. Parasitical on *Artemisia*. About eight inches in height; flowers tipped with dark blue, gradually fading downwards to the lower part of the corolla, where it is pure white.

OROBANCHE, sp.

Hari-rud valley: 1094 (in part), May 4, 1885.

OROBANCHE, sp.

Hari-rud valley: 450, May 12, 1885. Parasitical on *Cousinia alata* and on a *Labiata*. Flowers almost blue.

PEDALINEÆ.

SESAMUM INDICUM, Linn.; Boiss. Fl. Or. iv. p. 81.

Khorasan: 809, August 27, 1885. Native name *Kunjit*. Cultivated extensively for the oil obtained from its seed. Dependent on irrigation and usually associated with water-melons. Flowers pure white.

VERBENACEÆ.

VITEX AGNUS-CASTUS, Linn.; Boiss. Fl. Or. iv. p. 535.

Northern Baluchistan, between Kushk-rud and Kin: 1099, Nov. 3, 1884. A shrub, from seven to nine feet in height, in water-courses, which, although apparently dry, looked as if water were still not far from the surface.

LABIATÆ.

OCIMUM BASILICUM, Linn.; Boiss. Fl. Or. iv. p. 539.

Khorasan: 811, August 28, 1885. A common weed in orchards, and noted at the time as probably an escape. Bunge collected it near Meshed, where Boissier regarded it as a colonist.

MENTHA SYLVESTRIS, Linn.; Boiss. Fl. Or. iv. p. 543, var. *elata*.

Baluchistan: 60, Oct. 11, 1884. In beds of streams amongst tamarisk shrubs; growing nearly seven feet high and forming large clumps.

Another variety was collected in the Hari-rud valley: 773, August 5, 1885. On the edges of irrigation-channels, and sides of running streams, common.

SATUREIA HORTENSIS, Linn.; Boiss. Fl. Or. iv. p. 562.

Khorasan: 813, August 28, 1885. A strongly aromatic herb, from one to two feet in height, growing in the vicinity of water, and forming a dense scrub.

PEROWSKIA ABROTANOIDES, Kar.; Boiss. Fl. Or. iv. p. 589.

Baluchistan: 4, Sept. 25, 1884; Khorasan: 806, August 27, 1885. In extremely hot localities, on limestone formation, boulders, and gravel, forming large densely branched bushes four feet in height, and some six feet across.

PEROWSKIA, sp.

Baluchistan: 22, Sept. 30, 1884.

SALVIA SPINOSA, Linn.; Boiss. Fl. Or. iv. p. 613.

Badghis: 505, May 18, 1885; 517, May 19, 20, 22, 1885. On the rolling downs of the Badghis; common. The plant is covered with large pure white flowers. The foliage is deliciously scented.

Salvia macrosiphon, Boiss. Fl. Or. iv. p. 615.

Hari-rud valley: 594, June 3, 1885; Khorasan: 636, June 16, 1885. A common plant in stony ground.

Salvia ceratophylla, Linn.; Boiss. Fl. Or. iv. p. 617.

Badghis: 530, May 21, 1885. In the low sandstone hills near Gulran, at an altitude of about 3000 feet; very conspicuous, owing to its peculiar soft velvety radical leaves, which are so very different from the rest of the plant. It is said to be employed in medicine.

Ziziphora tenuior, Linn.; Boiss. Fl. Or. iv. p. 587.

Hari-rud valley: 329, April 27, 1885, May 10, 1885; Khorasan, July 1, 1885. Native name *Kakuti*. Common in gravelly soil; employed in medicine.

Ziziphora canescens, Benth.—*Z. clinopodioides*, Bieb., var. β. *canescens*, Boiss. Fl. Or. iv. p. 585.

Khorasan: 639, June 16, 1885. In stony ground, at an altitude above 4000 feet; a small close bush, a foot in height.

Nepeta Meyeri, Benth.—*Nepeta micrantha*, Bunge; Boiss. Fl. Or. iv. p. 664.

Badghis: 467, 1095, May 16, 1885. Common in shady places, in stony soil.

Nepeta pungens, Benth.; Boiss. Fl. Or. iv. p. 666.

Badghis: 472, May 16, 1885.

Nepeta satureioides, Boiss. Fl. Or. iv. p. 667.

Hari-rud valley: 413, May 9, 1885; Khorasan: July 1, 1885. In the dried-up gravelly beds of water-courses. Flowers lavender-blue.

Nepeta persica, Boiss. Fl. Or. iv. p. 657.

Khorasan: 642, June 16, 1885. In the débris at the foot of limestone cliffs, at an altitude of 5000 feet; common.

Nepeta (§ Cataria, Benth., § Micranthæ, Boiss.) Sewerzowii, Regel. (Plate XLI.)

Annua, erecta, parce puberula, caule, ut videtur, semper simplici, 6–18 poll. alto, graciliusculo. *Folia* graciliter petiolata vel suprema subsessilia, cordato-rotundata vel oblonga, grosse crenata (specimina Stocksiana foliis angustioribus breviter petiolatis). *Flores* parvi, pauci in cymas laxas graciliter pedunculatas foliis breviores dispositi; calyx scabridus, conspicue 20-nervis, subæqualiter 5-dentatus, dentibus fere aculeatis, fructifer rigidus, basi valde ventricosus; corollæ hirtæ tubo incluso. *Nuculæ* rotundatæ, tuberculatæ vel verrucosæ, areola magna laterali.

Badghis: 373, May 1, 1885. In shady places, very common.

Next to *N. micrantha*, from which it is readily distinguished by its fewer-flowered looser cymes, and nearly equally toothed calyx, which is very much obliquely inflated in the fruiting stage. The same species was collected by Stocks in Baluchistan, and we at first took it for an undescribed one, as there was no specimen at Kew of *N. Sewerzowii*; but we have since received Dr. Regel's determination.

NEPETA MICRANTHA, Bunge; Boiss. Fl. Or. iv. p. 664.
Badghis: 467, May 16, 1885. In stony places, common.

LALLEMANTIA ROYLEANA, Benth.; Boiss. Fl. Or. iv. p. 674.
Hari-rud valley: 200, April 10, 15, 17, 26, 27, 1885. Very common, in good soil.

HYMENOCRATER ELEGANS, Bunge, var.; Boiss. Fl. Or. iv. p. 678.
Khorasan: 643, June 16, 1885. In limestone rubbish at the base of cliffs, at an altitude above 4000 feet. A woody herb, one to two feet high; flowers mauve, the enlarged calyx is of a lovely rose-colour. Owing to the brilliant colouring of the calyx, this plant would be well worth cultivation.

SCUTELLARIA MULTICAULIS, Boiss.; Fl. Or. iv. p. 685, var.
Badghis: 474, May 16, 1885. A common undershrub, in rocks, from a foot to eighteen inches in height; flowers yellow, lower lip deep purple.

MARRUBIUM VULGARE, Linn.; Boiss. Fl. Or. iv. p. 703.
Khorasan: 1096, June 16, 1885. Common at an elevation of 4000 feet.

CHAMÆSPHACOS PERSICUS, Aitch. et Hemsl. (Plate XLII. figs. 1–6.)—*Tapeinanthus persicus*, Boiss. Fl. Or. iv. p. 679.
Hari-rud valley: 207, April 11, 12, 15, 21, 27, 1885. Extremely common in shady places, under shrubs. Flowers pure white or rose-pink.

CHAMÆSPHACOS BRAHUICUS, Aitch. et Hemsl.—*Tapeinanthus brahuicus*, Boiss. Fl. Or. iv. p. 680.
Khorasan: 626, June 14, 1885. In stony ground; flowers rose-coloured.

CHAMÆSPHACOS AFGHANICUS, Aitch. et Hemsl., n. sp. (Plate XLII. figs. 7–11.) *Herba* annua, 2–4 poll. alta, pauciramosa, primum parce villosula. *Folia* crassiuscula, obovato-spathulata, 1–1½ poll. longa, in petiolum plus minusve distincte attenuata, integra vel obscure paucidentata, obtusa vel subacuta. *Flores* purpurei, villosuli, axillares, solitarii, breviter pedunculati; calycis faux villosa, dentibus latis subito acuminatis; corollæ tubus calyce inclusus; stamina 4. *Nuculæ* non visæ.
Hari-rud valley: 183, April 7, 1885. In damp soil, near the roots of large bushes, common. Flowers rose-coloured.
This is nearest to the smaller, much more branched, very villous *C. brahuicus*.

CHAMÆSPHACOS ILICIFOLIUS, Schrenk; Boiss. Fl. Or. iv. p. 680. (Plate XLII. figs. 12–18.)
Hari-rud valley: 299, April 21, 1885; 617, June 6, 1885. In sandy soil, on the banks of the Hari-rud river.

STACHYS TRINERVIS, Aitch. et Hemsl., n. sp. (Plate XLIII.) *Frutex* ramosus, 3–4-pedalis, undique plus minusve stellato-pubescens, ramulis floriferis dense cano-tomentosis. *Folia* sessilia, semiamplexicaulia, subconnata, papyracea, ovato-lanceolata, linearilanceolata, vel oblonga, circiter pollicaria, obtusa vel subacuta, subtrinervia. *Flores*

albi, in axillis foliorum solitarii, breviter pedunculati, 8–9 lineas longi; calyx 10-nervosus, fere æqualiter 5-lobatus, regularis, lobis latis 3-nervosis vix acutis, fructifer glabrescens, induratus, campanulatus; corollæ parcissime puberulæ tubus breviter exsertus; labium superius brevius, ovale, bidentatum, striatum, divaricatum; labium inferius trilobatum, lobis lateralibus brevissimis rotundatis; stamina 4, breviter exserta, fere æquilonga, filamentis planis papillosis simul puberulis; stylus inclusus. *Nuculæ* glabræ, oblongæ, anguste circumalatæ.

Hari-rud valley: 157, April 2, 3, 7, 29, 1885; May 10, 1885. Native name *Kalpura*. A characteristic shrub of the gravel plains of the Hari-rud valley; from three to four feet in height; much browsed by sheep and goats. Flowers pure white.

Near *S. fruticulosa*, from which it is readily distinguished by its stellate indumentum, acute calyx-lobes, &c. Perhaps this and its immediate allies should form an independent genus.

LAMIUM AMPLEXICAULE, Linn.; Boiss. Fl. Or. iv. p. 760.

Hari-rud valley: 230, April 13, 1885. In cultivated soil, common.

PHLOMIS HERBA-VENTI, Linn., var. *floribus albidis*, Boiss. Fl. Or. iv. p. 791.

Khorasan: 656, June 16, 17, 1885. In stony places, at an altitude of 4000 feet. A very conspicuous herb, growing in dense clumps, from a foot to two feet in height. Flowers of this variety a dirty white.

EREMOSTACHYS LABIOSA, Bunge, var. *a.* CANESCENS, Regel, Monogr. Gen. Erem. p. 8.—*E. diversifolia*, Regel, Descr. Pl. Nov. Turkest. 1879, fasc. vii. p. 94; *E. napuligera*, Franchet, in Ann. Sc. Nat. 6^{me} série, xviii. p. 237, t. 17.

Badghis: 355, May 1, 18, 1885. Native names: Turki, *Aggar-maggar*; Pers., *Khoar-barrar*. An extremely common plant in the loamy soil of the downs of the Badghis. The fibrous roots expand into tubers, due, I believe, to an insect. The tubers are largely collected and employed chiefly by the Turkomans in washing their bodies with, as a rubefacient. Flowers white, with a yellow lower lip. A very showy and handsome plant when in flower.

EREMOSTACHYS PERSIMILIS, Aitch. et Hemsl., n. sp. "A specie affini *E. glabra* differt, bracteis calycem æquantibus vel superantibus, calycis vix hirsuti apicem versus paullo dilatata dentes in spinam elongatam excurrentes."—*Regel in litt.*

Herba perennis, 1–2 ped. alta, glabra vel glabrescens, caule sæpius simplici. *Folia* papyracea, glabra, subnitida, petiolata (petiolo radicalium laminam fere æquante), ovato-oblonga, maxima, absque petiolo, 9 poll. longa, breviter pinnatifida, simul crenata vel duplicato grosse crenata, costa albida atque venis reticulatis subtus valde elevatis, petiolo basi sericeo-lanato; folia floralia sessilia, semiamplexicaulia, flores excedentia. *Flores* lutei, in axillis 3 subsessiles, bracteolis lineari-subulatis, calycem superantibus; calyx pilosulus vel glabrescens, apice leviter ampliatus, dentibus spiniformibus circiter 3 lineas longis; corollæ extus parcissime hirsutæ tubus breviter exsertus; labium superius brevius, galeatum, intus sat barbatum; labium

inferius late trilobatum; antheræ glabræ. *Nuculæ* brunneæ, lateribus glabræ, apice peniculoideæ.

Badghis: 464, May 14, 15, 19, 1885. On the ridges of low sandstone hills; not uncommon. An exceedingly handsome plant, about two feet in height; the spike of large bright yellow flowers being almost a foot long.

EREMOSTACHYS REGELIANA, Aitch. et Hemsl., n. sp. "Radice tuberosa *E. labiosæ* affinis, habitu *E. laciniatæ*, differt autem verticillastris bifloris, bracteolis calycem apicem versus paullo dilatatim subæquantibus, radice tuberoso, etc."—*Regel in litt.*

Herba perennis, plus minus, præcipue quoad calyces, arachnoideo-villosa, circiter pedalis, caule simplice vel ramoso. *Folia* radicalia petiolata, bipinnatifida, ad 6 poll. longa, petiolis basi sericeo-lanatis; folia caulina pauca, pinnatifida, floralia sursum gradatim minora, simul minus dissecta, superna bracteiformia, integra, floribus breviora. *Flores* albi, in axillis solitarii, subsessiles, bracteolis subulatis; calycis dentes breves, spiniformes, ore ampliato, intus valide elevato-nervoso; corollæ tubus inclusus, labio superiore galeato intus longe albo-barbato, extus plus minus hirsuto, labio inferiore late trilobato; antheræ longe exsertæ, glabræ. *Nuculæ* atræ, lateribus glabræ, vertice peniculoideæ.

Hari-rud valley: 290, April 21, 1885. Common in gravelly soil. Flowers pure white; roots covered with large tubercles.

EREMOSTACHYS, sp.

Hari-rud valley: 1097, May 10, 1885. An extremely woolly plant, with very large white flowers.

EREMOSTACHYS, sp.

Badghis: 1098, April 29, 1885. A species with glaucous leaves, &c., but we have too little material to identify it.

TEUCRIUM POLIUM, Linn.; Boiss. Fl. Or. iv. p. 821.

Khorasan: 791, August 23, 24, 1885. In broken limestone; common.

TEUCRIUM SERRATUM, Benth.; Boiss. Fl. Or. iv. p. 813.

Do-shakh Mt.: 771, August 5, 1885. The few specimens of this plant that we possess I collected with my own hands. It was strongly scented like *Asafœtida*. The moment I took portions for specimens, a very strong odour was perceived, and I looked carefully to see if it was not due to my having come in contact with *Asafœtida* itself; but this was not the case, and I found that on crushing its leaves the odour was at once more strongly perceptible.

AJUGA CHAMÆCISTUS, Ging., var. EUPHRASIOIDES, Boiss. Fl. Or. iv. p. 801.

Badghis: 549, May 23, 1885. In rocky ground, not uncommon. A very handsome species, having the lower lip of the corolla of a rose-pink, and rest of flower greenish, with dark veins of red. Well worth the attention of cultivators for the rock-garden.

PLANTAGINEÆ.

PLANTAGO LANCEOLATA, Linn. (varietates); Boiss. Fl. Or. iv. p. 881.
Hari-rud valley: 313, April 25, and 770, August 5, 1885; Badghis: May 14, 1885; Khorasan: 620, June 14, 1885. Common in cultivated soil and on the sides of irrigation-channels.

PLANTAGO MAJOR, Linn.; Boiss. Fl. Or. iv. p. 878.
Khorasan: 701, June 28, 1885. In cultivated land; common.

PLANTAGO MARITIMA, Linn.; Boiss. Fl. Or. iv. p. 889.
Hari-rud valley: 758, August 1, 1885. The encampment about three miles from Zindijan was on a dense turf of this plant, where it alone appeared to be able to struggle against the deposit of sand wafted by the wind from the low hills across the river.

PLANTAGO LACHNANTHA, Bunge; Boiss. Fl. Or. iv. p. 887.
Hari-rud valley: 275, April 19, 26, 1885, May 13, 1885. In sandy and clayey soil; very common.

ILLECEBRACEÆ.

PARONYCHIA KURDICA, Boiss. Fl. Or. i. p. 744.
Khorasan: 641, June 16, 1885. On the shady side of limestone rocks, at an elevation of 5000 feet.

AMARANTACEÆ.

AMARANTUS PANICULATUS, Linn.; Boiss. Fl. Or. iv. p. 989.
Khorasan: 1101, August 1885. Native name *Taj-Karrus*. A cultivated plant in melon-fields, both red and yellow-flowered varieties. There seems to be some superstition regarding the growing one or two of these in a field.

AMARANTUS BLITUM, Linn.—*Amarantus sylvestris*, Desf.; Boiss. Fl. Or. iv. p. 990.
Khorasan: 797, August 23, 1885. Common in moist soil.

CHENOPODIACEÆ.

CHENOPODIUM BOTRYS, Linn.; Boiss. Fl. Or. iv. p. 903.
Mount Do-shakh: 764, August 4, 1885. In gravelly beds of water-courses. A large coarse herb, very strongly scented; collected and eaten as a pot-herb.

CHENOPODIUM BLITUM, Hook. fil. Flora British India, v. p. 5.—*Blitum virgatum*, Linn.; Boiss. Fl. Or. iv. p. 905.
Khorasan: 652, June 16, 1885. Near moisture, in a limestone gorge, at an altitude above 5000 feet.

SPINACEA OLERACEA, Linn.; DC. Prodr. xiii. 2, p. 118.—*Spinacia tetrandra*, Stev.; Boiss. Fl. Or. iv. p. 906.

Badghis: 501, May 18, 1885. Profuse in the vicinity of Simkoh, collected as a pot-herb by the natives, and called *Spinaj*. I have no doubt that Mr. DeCandolle is quite correct in assuming *Spinacia tetrandra* to be the wild form of *S. oleracea*, the native country of which is unknown.

ATRIPLEX DIMORPHOSTEGIUM, Kar. et Kir., var.; Boiss. Fl. Or. iv. p. 909.

Khorasan: 696, June 21, 1885. The fruit in our specimens is distinctly sagittiform.

ATRIPLEX ROSEUM, Linn.; Boiss. Fl. Or. iv. p. 911.

Hari-rud valley: 781, August 18, 1885. In the vicinity of old buildings and villages. A very variable plant, from a few inches to three feet in height.

ATRIPLEX MONETA, Bunge; Boiss. Fl. Or. iv. p. 912. (Plate XLIV.)

Hari-rud valley: 449, May 12, 1885; July 28, 1885. A very conspicuous plant, from its bright green foliage. Occurring in abundance at the base of the sand cliffs overhanging the river near Kumani-bhest and also at Kalcha. It is a most excellent spinach.

We have identified this remarkable species from the description. Griffith's number 1750, cited by Bunge, is not represented in the Kew Herbarium; but two species of *Atriplex* were attached to the same sheet of Bentham's set under the number 1751, cited by Moquin (DC. Prodr. xiii. 2, p. 102), as the type of his *A. Griffithii*. It would appear, therefore, that the label of 1750 had been lost, and the plant taken to be the same as 1751. There is also a specimen of *A. Moneta* in the Hookerian set of Griffith's plants, but without an original label. Our specimens are much more luxuriant than Griffith's, and, at first sight, would be taken for a different species.

ATRIPLEX FLABELLUM, Bunge; Boiss. Fl. Or. iv. p. 912.

Badghis: 362, May 1, 1885; 469, May 16, 1885. Amongst Tamarisk scrub, growing 3 feet high, and occurring in great abundance; eaten greedily by camels.

EUROTIA CERATOIDES, C. A. Mey.; Boiss. Fl. Or. iv. p. 917.

Hari-rud valley: 300, April 21, 1885, May 9, 1885, June 5, 1885. A very characteristic shrub of the gravel and boulder country, all over the plains. About 3 feet in height and often forming a bush 9 feet in circumference. The long silky hairs of the fruiting bracts are naturally pure white, but in the herbarium become a red-brown, like those of several *Convolvuli* and some other genera.

CERATOCARPUS ARENARIUS, Linn.; Boiss. Fl. Or. iv. p. 919.

Hari-rud valley: 597, June 4, 1885. Covering the ground in the gravelly plains near Shekewan.

CORISPERMUM LEHMANNIANUM, Bunge; Boiss. Fl. Or. iv. p. 930.

Hari-rud valley: 616, June 6, 1885. In sand, on the banks of the river; not uncommon.

AGRIOPHYLLUM LATIFOLIUM, Fisch. et Mey.; Boiss. Fl. Or. iv. p. 929.

Northern Baluchistan: 8, Sept. 29, 30, 1884. Native name *Chirko*. This plant grows in almost pure sand, on the sand-hills of the Baluchistan desert; and notwithstanding its extremely long roots, the wind, owing to the quantity of its foliage, lifts it out of the sand, and it is to be seen rolling in collected masses all over the flat clayey plains.

CHENOLEA ERIOPHORA, Aitch. et Hemsley.—*Echinopsilon eriophorum*, Moq.; *Kochia latifolia*, Fresen., Boiss. Fl. Or. iv. p. 927.

Hari-rud valley: 431, May 10, 1885, July 27, 1885. Under the shade of bushes; very common. This plant is extremely prominent from the way it is covered with a snow-white soft wool, which becomes brown in the herbarium.

KOCHIA SCOPARIA, Schrad.; Boiss. Fl. Or. iv. p. 925.

Khorasan: 812, August 28, 1885. A tall weed, in cultivated ground.

HALOSTACHYS CASPIA, C. A. Mey.; Boiss. Fl. Or. iv. p. 935.

Hari-rud valley: 746, July 29, 1885. In moist saline soil; a shrub reaching four feet in height.

SUÆDA FRUTICOSA, Forsk.; Hook. fil. Fl. British India, v. p. 13.

Hari-rud valley: 1102, July 29, 1885. Native name *Shorag*. In salt marshy soil; very common.

SUÆDA SALSA, Pall.; Boiss. Fl. Or. iv. p. 942.

Hari-rud valley: 745, July 29, 1885. Covers the saline plains, giving them in early summer a vivid green, and looking at a distance like cultivated crops.

SUÆDA, sp.

Hari-rud valley: 743, July 29, 1885. In great abundance in the saline plains. A shrub three feet in height; the same as Griffith's 1769, Kew distribution no. 4209.

HALOXYLON AMMODENDRON, Bunge; Boiss. Fl. Or. iv. p. 948.

Northern Baluchistan: 15, Sept. 29, Oct. 3, 4, 1884; Hari-rud valley: 301, April 21, 1885; 326, April 27, 1885; Khorasan: August 21, 1885. Native names: *Ta-ghaz*, *Tar-gaz*, *Tar*, *Tahg*, *Tahk*, *Sax-aol*. A small tree or shrub, reaching 14 feet in height, with extremely heavy coarse wood. It is local, although its area extends from the sand hills of Baluchistan, where it is found in great luxuriance, to the banks of the Hari-rud river, and in Khorasan. The Baluchi name, *Tar-gaz*, is applied to it in allusion to the vivid green of its young branches, which are pendulous, and to its general likeness to a Tamarisk. The wood is excellent fuel; and from it is extracted a green dye, *Shakhai-i-tahg*.

I measured the trunk of one specimen at Toman-agha, and it was 12 feet in circumference at its thickest, but branched very low down; and I do not think the whole tree was more than fourteen feet high.

HALOXYLON GRIFFITHII, Moq.; Boiss. Fl. Or. iv. p. 950.

Baluchistan: 1, Sept. 25, 1885.

HALOXYLON SALICORNICUM, Bunge; Boiss. Fl. Or. iv. p. 949.

Northern Baluchistan: 55, October 8, 9, 1885. A low shrub, in some quantity at Sha-ismail, in the desert.

SALSOLA FŒTIDA, Del. ?; Boiss. Fl. Or. iv. p. 961.

Northern Baluchistan: 24, Sept. 29, 30, 1885; Hari-rud valley: 720, July 26, 27, 1885. Native names: *Shora*, *Shorag*. A spreading bush over four feet in height, that occurs more or less frequently from Baluchistan to the valley of the Hari-rud and into Khorasan. One of the forms of soda called *Ishkhar*. *Khar*, a coarse barilla, is said to be obtained from this shrub by burning. From this plant in Baluchistan I collected a kind of manna, which the natives called *Shakar*, not specially identifying it.

SALSOLA KALI, Linn.; Boiss. Fl. Or. iv. p. 954.

Northern Baluchistan: Oct. 14, 1884; Hari-rud valley: 729, July 27, 1885. Very common over the whole country, frequently as a large spreading bush.

SALSOLA RIGIDA, Pallas; Boiss. Fl. Or. ii. p. 962.

Hari-rud valley: 613, June 6, 1885. Very common on the gravelly plains.

SALSOLA AURICULA, Moq.; Boiss. Fl. Or. iv. p. 958.

Hari-rud valley: 600, June 4, 1885; 716, July 26, 1885. Scattered singly and sparsely over the sandy and clayey plains, and remarkable for the deep olive-green colour of its foliage, and orange to light purple flowers.

SALSOLA ARBUSCULA, Pall.; Boiss. Fl. Or. iv. p. 960.

Northern Baluchistan: 14, Sept. 29; 53, Oct. 8, 1884. Native names: *Narruk*, *Randuk*, *Randu*. A very characteristic shrub of the desert country, as much as 4 feet in height. Camels are very fond of it; and the natives employ it in preparing the skins for their water-bottles.

SALSOLA SUBAPHYLLA, C. A. Mey.; Boiss. Fl. Or. iv. p. 959.

Hari-rud valley: 717, July 26, 1885. Common in saline soil. A leafless olive-green shrub up to four feet in height; branches very stiff and densely interlaced.

SALSOLA, sp. affinis *S. carinatæ*, C. A. Mey.; Boiss. Fl. Or. iv. p. 955.

Hari-rud valley: 733, July 27, 28, 1885. A shrub about a foot in height, with a soft spongy mass of spreading branches, forming a bush of about four feet across. Flowers pink.

SALSOLÆ, spp. 2.

Baluchistan: 1103, Oct.; 56, Oct. 9, 1884.

NOEA SPINOSISSIMA, Moq.; Boiss. Fl. Or. iv. p. 965.

Khorasan: 802, August 24, 1885. Grows in the form of a dense spinous ball, from the interlacement of its branches. Flowers orange.

GIRGENSOHNIA OPPOSITIFLORA, Fenzl; Boiss. Fl. Or. iv. 967.

Hari-rud valley: 728, July 27, 1885. In dry stony soil, growing among other bushes. It is semiscandent in habit, its hard recurved leaves helping it to climb.

ANABASIS ERIOPODA, Benth. et Hook. f.—*Brachylepis eriopoda*, C. A. Mey.; Boiss. Fl. Or. iv. p. 971.

Hari-rud valley: 774, August 17, 1885. Native names: *Ishlun*, *Ishlan*. A very peculiar and characteristic plant. The branches spring from a curious, corky, warted, shortened stem, and are furnished with a ring of pure white hairs at the base. The plant is largely employed in the manufacture of a coarse barilla, *Khar*, *Ishkhar*.

ANABASIS, sp.

Northern Baluchistan: 54, Oct. 9, 1884. A common plant in the desert country; flowers pink.

ANABASIS, sp.

Northern Baluchistan: 42, Oct. 6, 1886. Native name *La-rag*. A small spreading bush, about a foot in height; common in the desert country.

HALOCHARIS SULPHUREA, Moq.; Boiss. Fl. Or. iv. p. 975.

Northern Baluchistan: 34, Sept. 29, 1884; Hari-rud valley: 721, July 26, 1885; Khorasan: June 21, 1885. On saline plains; a foot in height, and spreading so as to form a soft turf.

HALOCHARIS?

Hari-rud valley: 719, July 26, 1885. Common on saline plains. About a foot high, and spreading. The whole plant is hairy, and of a very peculiar blue-grey colour. Flowers light purple.

HALIMOCNEMIS PILOSA, Moq.; Boiss. Fl. Or. iv. p. 976.

Hari-rud valley: 722, July 26, 1885.

HALIMOCNEMIS MOLISSIMA, Bunge; Boiss. Fl. Or. iv. p. 977.

Locality unknown; probably Hari-rud valley, 1152.

HALANTHIUM, sp.

Hari-rud valley: 615, June 6, 1885. A common plant on stony ground; about a foot high, the branches spreading. Flowers straw-coloured. This, I believe, is a plant I also got in some quantity in Baluchistan (No. 38, Oct. 5, 1884), but it was so brittle and dry that the specimens were useless.

POLYGONACEÆ.

CALLIGONUM COMOSUM, L'Hérit.?; Boiss. Fl. Or. iv. p. 1000.

Northern Baluchistan: 30, October 3, 1884. Native name *Phog*. Common in Baluchistan. There was no fruit on the plant when I collected it, but near it the comose fruits

of this species were picked up. It yields good fuel, and the young shoots make excellent camel-fodder.

CALLIGONUM, sp.

Hari-rud valley: 267, April 17, 1885. A shrub from four to seven feet high, in the beds of dry water-courses; common.

CALLIGONUM, sp.

Hari-rud valley: 1104, May 9, 1885; Khorasan: July 9, 1885. A tall shrub, with large corky nodes on the main stems, from which the annual flowering shoots are developed. Fruit bright red, winged.

PTEROPYRUM AUCHERI, Jaub. et Spach; Boiss. Fl. Or. iv. p. 1002.

Northern Baluchistan: 46, October 6, 8, 1884; Khorasan: 693, June 18, 1885. Native name *Khar-whang-kush*. A common shrub, two to three feet high, growing in the shingly beds of dry water-courses. Very conspicuous from the profusion of its bright red fruit.

ATRAPHAXIS SPINOSA, Linn.; Boiss. Fl. Or. iv. p. 1020, var. γ. SINAICA, Boiss.

Khorasan: 708, July 1, 1885. A common shrub, in the shingly beds of dry water-courses.

ATRAPHAXIS LÆTEVIRENS, Jaub. et Spach, Ill. Pl. Or. ii. p. 14?

Hari-rud valley: 1105, May 10, 1885. Common in stony places. A shrub attaining five feet in height, spreading ten or twelve feet; in general aspect very like an overgrown, woody *Polygonum*. Fruit greenish white, large.

ATRAPHAXIS LÆTEVIRENS, Jaub. et Spach, Ill. Pl. Or. ii. p. 14?

Hari-rud valley: 274, April 19, 21, 1885. A large spreading bush, in stony localities. It may be the same species as 1105.

POLYGONUM AVICULARE, Linn. (varietates); Boiss. Fl. Or. iv. p. 1036.

Hari-rud valley: 283, April 19, 1885; 779, August 18, 1885.

POLYGONUM AFGHANICUM, Meissn.; Boiss. Fl. Or. iv. p. 1041.

Badghis: 470, May 16, 1885; Khorasan: June 17, 1885. Common at an altitude above 3000 feet.

POLYGONUM BELLARDI, Allioni; Boiss. Fl. Or. iv. p. 1034.

Khorasan: 1153, 696, June 21, 1885. Common, in the rubbish of old buildings.

POLYGONUM, sp.

Badghis: May 17, 1885; Paropamisus: 561, May 25, 1885. On stony ridges, at an altitude above 3500 feet, common. Grows like a miniature sturdy tree, with stout woody branches.

RHEUM RIBES, Gronov.; Boiss. Fl. Or. iv. p. 1003.

Paropamisus range: 397, May 5, 1885. Native names: *Rewash, Rewand, Chukri.*

Common, at an altitude of about 5000 feet. The branches of the inflorescence are collected and eaten raw by the natives. The root is employed in colouring leather.

Rheum tataricum, Linn. fil.; Boiss. Fl. Or. iv. p. 1003. (Plate XLV.)

Hari-rud valley: 319, April 26, 1885. Native names: *Rewash-i-dewana*, *Rewand-i-meghan*, *Ishkin*. In the shingly and clayey soil of the great gravel-plains to the north of Tomanagha. A characteristic plant of these plains, remarkable from the large size of its foliage, and the manner in which it lies spread out on the ground. The fruit and roots are employed as a purgative.

Rumex orientalis, Bernh.; Boiss. Fl. Or. iv. p. 1009.

Badghis: 538, May 22, 1885; Khorasan: June 6, 1885. In damp localities, near running water, at an altitude of above 2000 feet; common. I have seen specimens seven feet high.

Rumex dentatus, Linn.; Boiss. Fl. Or. iv. p. 1013.

Hari-rud valley: 438, May 11, 1885. In cultivated ground, and on the sides of irrigation-channels; common.

THYMELÆACEÆ.

Thymelæa arvensis, Lam.—*Lygia Passerina*, Fasan.; Boiss. Fl. Or. iv. p. 1052.

Hari-rud valley: 769, August 5, 1885.

Stellera Lessertii, C. A. Mey.; Boiss. Fl. Or. iv. p. 1051.

Locality unknown: 1106, 1885.

Var. β. angustifolia, Boiss. Fl. Or. iv. p. 1051.

Northern Baluchistan: 50, Oct. 10, 1884; Khorasan: 818, Sept. 2, 1885. In Baluchistan, native name *Phalitha*. An undershrub, in general appearance very like Myrtle. Common in stony and rocky ground; injurious to camels that browse on it.

Diarthron carinatum, Jaub. et Spach.—*Diarthron vesiculosum*, Fisch. et Mey.; Boiss. Fl. Or. iv. p. 1054.

Hari-rud valley: 417, May 10, 1885; 593, June 3, 4, 1885. Common, in stony ground.

ELÆAGNACEÆ.

Elæagnus hortensis, Bieb.; Boiss. Fl. Or. iv. p. 1056.—*E. angustifolia*, Linn. Sp. Pl. ed. i. p. 121.

Hari-rud valley: August 5, 1885; Badghis: 353, May 1, 1885, May 22, 1885; Paropamisus range: May 26, 1885; Khorasan: June 16, 1885: wild in all the localities named. Khorasan: June 15, 1885, from cultivated trees. Native names: *Sanjit*, *Sinjit*. A shrub or tree, at an altitude of 3000 feet and upwards, near running streams. Cultivated largely in orchards for its fruit.

BALANOPHOREÆ.

CYNOMORIUM COCCINEUM, Linn.; Boiss. Fl. Or. iv. p. 1073.

Hari-rud valley: 454, May 12, 1885. Collected in a wheat-field on two occasions; must be common, as it is well known to the people.

BALANOPHORA, sp.

Helmand river: Oct. 21, 1884.

In a tamarisk-grove on the banks of the Helmand, a large species of *Balanophora* was collected by a camel-driver, who called it *Labbu*, and said that it was used as fodder for camels in Baluchistan. In this he may have been mistaken, as an *Orobanche*, employed for the same purpose, bears the same name. Specimen lost.

EUPHORBIACEÆ.

EUPHORBIA CÆLADENIA, Boiss. Fl. Or. iv. p. 1094.

Badghis: 1107, May 1, 1885. Native name *Gao-turganak*. In clayey soil, common. This is perennial, and not, as described by Boissier, an annual.

EUPHORBIA OSYRIDEA, Boiss. Fl. Or. iv. p. 1092.

Northern Baluchistan: 1109, October 10, 12, 1884; Hari-rud valley: August 5, 1885. Native name *Gishar*. Common on limestone formation. A perennial that in autumn throws out from a large root-stock long whip-like leafy shoots, which bear flowers in the following spring.

EUPHORBIA CHEIROLEPIS, Fisch. et Mey.; Boiss. Fl. Or. iv. p. 1089.

Northern Baluchistan: 9, Sept. 29, 1884. Native names: *Palti*, *Roj-ghad*. A very common plant that grows in the pure loose sand of the desert, between Nushki and Sanduri.

EUPHORBIA CHAMÆSYCE, Linn.; Boiss. Fl. Or. iv. p. 1088.

Khorasan: 796, August 23, 28, 1885.

EUPHORBIA TURCOMANICA, Boiss. Fl. Or. iv. p. 1087.

Hari-rud valley: 1110, June 5, 1885.

EUPHORBIA HELIOSCOPIA, Linn.; Boiss. Fl. Or. iv. p. 1107.

Hari-rud valley: 231, April 13, 25, 1885. In cultivated ground, common.

EUPHORBIA DENSA, Schrenk; Boiss. Fl. Or. iv. p. 1091.

Hari-rud valley: 179, April 6, 7, 15, 19, 27, 1885, June 3, 1885. This is the common *Euphorbia* of the country, found everywhere in the shade of rocks and bushes.

EUPHORBIA SZOVITSII, Fisch. et Mey.; Boiss. Fl. Or. iv. p. 1113.

Khorasan: 707, July 1, 1885. In gravelly soil.

EUPHORBIA, sp.

Helmand river: 72, October 21, 1884. Native name *Shir-go*. Employed as a dye.

EUPHORBIA, sp. affinis *E. cæladeniæ*.
Badghis: 1108, May 20, 1885.

EUPHORBIA, sp.
Khorasan: 678, June 18, 1885. A perennial, about eighteen inches in height, growing on dry, hot, stony, exposed hill-sides, at an altitude above 5000 feet. A very characteristic plant of the region.

EUPHORBIA, sp.
Khorasan: 640, June 16, 1885. In clefts of limestone rocks, at an altitude above 5000 feet. Easily mistaken for a Fern at a distance.

EUPHORBIA, sp., near *E. Chamæsyce*, Linn.
Northern Baluchistan: 51, October 9, 1884. Growing in pure loose sand.

ANDRACHNE TELEPHIOIDES, Linn.; Boiss. Fl. Or. iv. p. 1138.
Hari-rud valley: 433, May 10, 1885.

CHROZOPHORA TINCTORIA, A. Juss.; Boiss. Fl. Or. iv. p. 1140.
Helmand river: 70, 732, October 20, 1884; Hari-rud valley: July 27, 1885. Native name, on the Helmand, *Kap-o-chist*. Common in and near cultivated fields.

RICINUS COMMUNIS, Linn.; Boiss. Fl. Or. iv. p. 1143.
Hari-rud valley: Khorasan, 1111. Native names: *Baz-anjir*, *Buz-anjir*. The Castor-oil plant is cultivated along the banks of irrigation-channels, and amongst melon-crops, for its seeds, from which oil is extracted for burning. The use of the oil as a purgative is unknown to the natives of these regions.

URTICACEÆ.

ULMUS CAMPESTRIS, Linn., var.; Boiss. Fl. Or. iv. p. 1157.
Khorasan: 711, July 11, 1885. A cultivated tree, yielding fair timber.

ULMUS MONTANA, Stokes; Boiss. Fl. Or. iv. p. 1158.
Hari-rud valley: 1112, June 5, 1885. Native names: *Pash-e-khar*, *Pash-e-kham*, *Grez*. A cultivated tree, 30 feet high and 9 feet in circumference. Highly valued for its timber.

A variety was collected in the Hari-rud valley: 458, May 12, 1885. It is a good-sized shrub on the sides of irrigation-channels. In all probability not indigenous in the localities where it was collected.

CELTIS CAUCASICA, Willd.; Boiss. Fl. Or. iv. p. 1156.
Badghis: 510, May 18, 1885. Native name *Tohkhm*. An indigenous tree, said to be common in the Badghis, where it grows to a large size, and its timber is in general use. The Afghans have a superstitious veneration for it. The fruit is converted into flour and mixed with wheat-flour in making bread.

HUMULUS LUPULUS, Linn.; Boiss. Fl. Or. iv. p. 1152.

Between Asterabad and the Caspian: 1113, October 30, 1885. This, with other shrubs, forms impenetrable hedges. It is indigenous over the whole country between the base of the mountains at Asterabad and the Caspian Sea.

CANNABIS SATIVA, Linn.; Boiss. Fl. Or. iv. p. 1152.

Khorasan: 1114, August 25, 1885. I never met with a single indigenous specimen of this plant. At Rui-Khauf it was cultivated by some Hindoos.

MORUS ALBA, Linn.; Boiss. Fl. Or. iv. p. 1153.

Badghis: 507, May 18, 1885. Native names: *Tuth*, *Tut*. An indigenous tree near water, at an altitude above 3000 feet. Extensively cultivated in orchards for feeding silkworms, and also for its fruit, which is eaten in a fresh state as well as dried; in the latter state it is made into bread with flour.

FICUS CARICA, Linn.; Boiss. Fl. Or. iv. p. 1154 (varietates). (Plate XLVI.)—*F. Johannis*, Boiss. Diagn. ser. 1, vii. p. 96.—*F. geraniifolia*, Miq. in Hooker's Lond. Journ. Bot. vii. p. 225, et Over de Africaanische Vijge-boomen, p. 18, t. 2, c.—*F. persica*, Boiss. loc. cit. ?

Badghis: 481, May 16, 19, 18, 1885; Khorasan: 1115, August 18, 1885. Native names: *Anjir*, *Anjir-kohi*. Of shrubby habit, reaching 12 feet in height, inhabiting clefts of rocks and escarpments of hill-sides; not uncommon. It was first seen at Tirphul and subsequently in great abundance on the rocks at Sim-koh. There were both yellow- and purple-fruited varieties. The Fig is largely cultivated for its fruit in Afghanistan, as well as in Persia.

Both the male and the female of *Ficus Carica* appear to be indigenous in the Badghis country and Eastern Persia, though DeCandolle ('Origine des Plantes Cultivées,' p. 237), as the result of his researches, restricts the area of the prehistoric Fig to the Mediterranean region, from Syria to the Canary Islands. Of course, it is very difficult to judge where a plant that has been cultivated for ages is really indigenous. It may occur in a wild state, but whether it has descended from originally wild progenitors or from cultivation, it is almost impossible to say, especially in countries formerly more generally inhabited and cultivated than at present. Yet the Fig, both male and female, seems to be as much at home in the districts named as blackberries in England, and the fact of the two sexes being equally common in a wild state points to its being indigenous.

Most readers interested in the subject of the fertilization of plants and the sexual relationships of the Fig and Caprifig will be acquainted with the results of the investigations of Saunders and Westwood in this country, and of Solms and Fritz Müller among foreign writers*. In this connection we have carefully examined the different forms collected, with the result that we find some of the specimens bearing receptacles which contain male flowers and "gall-flowers" (in other words, female flowers which are always

* It may be mentioned that Mr. W. B. Hemsley has summarized Solms and Müller's various articles on this subject in the 'Gardener's Chronicle,' n. s. xix. pp. 529 and 572, and xxv. p. 265, and in 'Nature,' xvii. p. 584.

infested by insects and yield no perfect seeds), and some of them bearing receptacles containing only female flowers, which produce perfect seeds. This is of so much interest that it has been thought worth while to devote a Plate to their illustration; and it was at first decided to figure the insects as well, but that has been left for a specialist to do, should it prove of sufficient interest. Both male and female insects were found, closely resembling those figured in Gasparrini's work *. Drawings of these, made by Miss M. Smith, together with a portion of an infested fruit, were forwarded to Mr. O. Westwood, who, although suffering from illness and unable to examine the material thoroughly, kindly replied that the insects are a species of *Blastophaga*, seemingly smaller than *B. Psenes*, Linn. "The female insects have the large, broad fore wings, with the strong, curved, stigmal branch, short, nearly quadrate mandibles furnished at the base with the curious oval, flat, serrated appendage which is so characteristic of the genus. The little fulvous ill-shaped wingless males agree with those of *Blastophaga Psenes*."

As may be seen from the drawings, the specimens exhibit great variety in the foliage as well as in the length of the peduncles and the shape of the figs (or receptacles), which are either sessile or more or lese stipitate. The functionally male specimens collected agree exactly with Miquel's *Ficus geraniifolia* and Boissier's *F. Johannis*; and there is little doubt that *F. persica*, Boissier, which appears to be a female form, is also *F. Carica*, though the specimens we have seen are insufficient to establish this satisfactorily. Some further particulars are given in the description of the Plate; but how far shape of receptacle, length of peduncle, and other characters coincide with the sexes, the specimens are insufficient to determine, though there is considerable variation in both sexes. Generally it may be said of the specimens examined, that the female receptacles are more or less pear-shaped, stipitate, and borne on relatively short peduncles, whereas the male receptacles are apple-shaped or spheroidal, shortly stipitate, and borne on long peduncles.

PARIETARIA OFFICINALIS, Linn.; Boiss. Fl. Or. iv. p. 1149.

Khorasan: 637, June 16, 1885. In clefts, on the shady side of limestone rocks, at altitudes above 5000 feet; common.

PLATANACEÆ.

PLATANUS ORIENTALIS, Linn.; Boiss. Fl. Or. iv. p. 1161.

Khorasan: 629, June 15, 1885. Native name *Chanar*. A cultivated tree in villages of Afghanistan and Persia. The wood is largely employed, especially in making the gates that open into a village. Some very large trees are said to exist at Maimannah.

JUGLANDEÆ.

JUGLANS REGIA, Linn.; Boiss. Fl. Or. iv. p. 1160.

Khorasan: 627, June 15, 1885. Native name *Jaoz*. Largely cultivated at an altitude above 3000 feet, where there is a good supply of water. The fruit is an article of export from Afghanistan and Persia to India.

* Ricerche sulla Natura del Caprifico e del Fico e sulla Caprificazione, 1845.

SALICINEÆ.

Salix pycnostachya, Anders.; DC. Prodr. xvi. pt. 2, p. 309.

Khorasan: 1116, June 16, 1885. A small indigenous tree, on the borders of streams, at an altitude of 4000 feet.

Salix Daviesii, Boiss. Fl. Or. iv. p. 1184.

Hari-rud valley: 211, April 13, 1885; 247, April 16, 1885. Native name *Bed*, which is the generic term for all willows; in Baluchistan *Get*. A cultivated tree of large size, on the banks of irrigation-channels.

Salix acmophylla, Boiss. Fl. Or. iv. p. 1183.

Badghis: 503, May 18, 1885. A small indigenous tree, in the vicinity of running water, at Sim-koh.

Salix babylonica, Linn.; Boiss. Fl. Or. iv. p. 1185.

Hari-rud valley: 1117, August 5, 1885. A large tree, on the banks of streams, at the base of Mount Do-shakh; indigenous and cultivated. I believe I saw the same species in the Badghis near Kushk.

Salix alba, Linn.; Boiss. Fl. Or. iv. p. 1185.

Hari-rud valley: April 25, 1885; 1118, June 5, 1885. Native name *Bed-i-siah*. A large tall tree, with dark bark; hence its native name. Cultivated in villages.

Salix songarica, And.; DC. Prodr. xvi. pt. 2, p. 213.

Hari-rud valley: 606, June 5, 1885. Native name *Bed-i-surkh*. A large tree, cultivated near villages. It obtains its native name from the red colour of its bark.

Populus euphratica, Oliv.; Boiss. Fl. Or. iv. p. 1194.

Badghis: March 19, 1885; Hari-rud valley: 1119, April 11, 1885. Native names: *Padda, Paddak*. An indigenous tree, on the Helmand, the Hari-rud, in the Badghis district, and on the Bala-morghab river, where, in many localities, it forms forests. The timber is of good size, but poor in quality, and is chiefly employed for fuel. Its foliage is excellent fodder for camels. At Nushki were several cultivated trees; one of these measured nine feet six inches in circumference at six feet from the ground. Except near shrines I have not seen it cultivated.

Populus nigra, Linn.; Boiss. Fl. Or. iv. p. 1194.

Hari-rud valley: 1120. Native name *Safedar*. Cultivated in gardens and orchards, in this part of Afghanistan; certainly not common.

GNETACEÆ.

Ephedra pachyclada, Boiss. Fl. Or. iv. p. 713? (Plate XLVII. figs. 1–10.)

Native names: *Hum, Huma, Yehma*. Hari-rud valley: 1122, April 26, 1885; June 4, 1885. A very common shrub, from Northern Baluchistan along our whole route, in the

Hari-rud valley, the Badghis district, and Persia, growing in stony gravelly soil. The small red fruit is eaten; the branches are employed in tanning the skins of goats for water-bottles, and their ashes, when burnt, mixed with, or employed in lieu of snuff.

There are no authentic fruiting specimens of Boissier's species at Kew, and we are not at all confident that we are right in referring our specimens to *E. pachyclada*. Boissier states that the only monœcious species of *Ephedra* observed by him was his *E. foliata*, but we find a few male flowers associated with the females on some of the specimens of the present species.

EPHEDRA SARCOCARPA, Aitch. et Hemsl. (Plate XLVII. figs. 11–15.) *Frutex* 4–5-pedalis, aphyllus, ramulis subverticillatis crassiusculis multistriatis, vaginis brevibus acuminatis. *Amenta* feminea tri- vel interdum biflora, in axillis vaginarum subsessiles vel pedunculata, interdum longiuscule; bracteæ carnosæ, 9, triseriatæ, floribus 3 (rarissime 8, quadriseriatæ, floribus 2), exteriores parvæ, interiores magnæ, anguste membranaceo-marginatæ. *Nuculæ* ovoideo-trigonæ, nitidæ.

Hari-rud valley: 739, July 27, 1885. A shrub resembling *E. pachyclada*, Boiss., but altogether a much larger plant, and the brilliant scarlet fruit twice as large.

To this probably belongs No. 49 from Baluchistan.

EPHEDRA FOLIATA, Boiss. et Kotschy, Fl. Or. v. p. 716.

Native name *Hum-i-bandak*. Badghis: 477, 1121, May 16, 18, 1885. A shrub reaching nine feet in height, with long bending branches, which are very knotty, and resemble *Calligonum*, sp., No. 1104. Common in the Badghis, especially in exposed localities.

EPHEDRA DISTACHYA, Linn.; Boiss. Fl. Or. v. p. 713 (varietates ?).

Hari-rud valley: 174, June 6, 1885, male flowers; May 10, 1885, female flowers. A common shrub.

EPHEDRA, sp.

Khorasan: 1123, June 18, 1885. At an altitude above 5000 feet, amongst boulders, common.

This and the next may belong to *Ephedra distachya*; but the species of this genus are very difficult of determination from mere comparison; and we had not time to examine critically a large number of specimens.

EPHEDRA, sp.

Khorasan: 1124, August 20, 1885. A large shrub, bearing male flowers only.

EPHEDRA, sp.

Northern Baluchistan: 43, October 10, 1884. In low rocky hills.

CONIFERÆ.

JUNIPERUS EXCELSA, Bieb.; Boiss. Fl. Or. v. p. 708.

Badghis: December 6, 1884; Paropamisus range: 1125, May 25, 1885. Native names: *Archa, Ors, Orsa.* A large tree, common and, in many places, forming good forests, at altitudes above 4500 feet. Its timber is employed extensively for all purposes and for fuel.

PINUS HALEPENSIS, Mill.; Boiss. Fl. Or. v. p. 695.

Khorasan: 1126, August 23, 1885. Native name *Naoju.* Cultivated round gardens and orchards to break the force of the wind. Also common near shrines. The cone and the tree both go by the same native name. The timber is largely employed in the woodwork of houses.

ORCHIDEÆ *.

ORCHIS LATIFOLIA, Linn.; Boiss. Fl. Or. v. p. 71.

Khorasan: 675, June 18, 1885. In moist meadow-land, at 3000 feet altitude and upwards; common; Badghis and Khorasan. The tubers, called *Salap* or *Salab*, exported in some quantity from Persia by way of Herat to India.

* Dr. H. G. Reichenbach has kindly contributed the following rectification of the determination of one of my Kuram Orchids:—

HABENARIA AITCHISONI, Reichb. f., n. sp.; tuberidiis cylindraceis, foliis suboppositis transverse ellipticis, acutis, pedunculo longe exserto, distanter vaginato, vaginis triangulis acutis; racemo densifloro, subsecundo, bracteis triangulis, acutis, uninerviis; ovaria pedicellata dimidia subæquantibus; sepalis tepalisque rostrato-conniventibus; sepalis triangulis, trinerviis, tepalis subæqualibus basi interna subangulatis; labelli tripartiti partitionibus linearibus acutis, lateralibus nunc divaricatis, calcari filiformi apicem versus ampliato, nunc uncato, ovarium pedicellatum non æquante; cruribus stigmaticis retusis basi nunc connatis.—"*Habenaria brachyphylla*, Lindl.," Aitchison! in Journ. Linn. Soc. Bot. xix. p. 188. Flores belle virides: "bright green." Cl. Aitchison cum magno gaudio dicata.

Darban valley, Kuram district, "in solo argillaceo sylvarum, alt. 7500 ped.," Aitchison!

Specimina Kewensia ejusdem speciei sequentia Sikkim 10,000–11,000 ped., J. D. Hooker, no. 59 Herb. Ind. Or. (no. 303 MSS.) (qui plantam statu pulcherrimo sine dubio detexit). Lali valley above Budhi 10,000–11,000 ped., J. F. Duthie! Murree Himal. 7000 ped., Aitchison! Herb. Falconeri, no. 1036, Kew Distrib. sine loco.

Plantæ duæ affines sunt.

HABENARIA BRACHYPHYLLA, Reichb. f.—*Platanthera brachyphylla*, Lindl. Orch. p. 293!; Wight, Icon. v. t. 1694! *Habenaria crassifolia*, A. Rich. in Ann. Sc. Nat. sér. 2, vol. xv. p. 72, t. 3 c (1841). Recedit vaginis in caule crebris, inflorescentia bene spirali, sepalis crassioribus brevioribus, latioribus, acutis, lateralibus revolutis, tepalis ellipticis uninerviis nervulo altero brevissimo nunc addito, supra basin angulatis, labelli tripartiti, partitionibus abbreviatis, latioribus, cruribus stigmaticis minutis vere absconditis, calcari magis æquali recto descendente. Flores dicti viridi-albi, calcari viridi (flowers greenish white, spur green).

Specimina in herbariis Kewensibus numerosa. Typus Lindleyi (*Gymnadenia brachyphylla*, Hb. Wight.), Nilgherries, Wight!, Perrottet! 1322, Katery Nilag. Metz.! Ghats, near Toorneca in the Deccan, Aug. 1852, Stocks! Khasia Hills, Lobb!

Similis præterea huic plantæ est *Habenaria vaginata*, A. Rich. in Ann. Sc. Nat. sér. 2, vol. xiv. p. 269, t. 17, II. (1840). Hæc planta Abyssinica optime recedit tepalis magis lunatis, labelli partitionibus lateralibus divaricatis nec antrorsis, cruribus stigmaticis maximis retusis.

Reliquæ species foliis basiliaribus sunt hæ:—1. *Habenaria platyphylla*, Spreng. 2. *Habenaria plantaginea*, Lindl. 3. *Habenaria rotundifolia*, Lindl. (*Habenaria diphylla*, Dalz. typica herb. Dalzell in herb. Kewensi).

Orchis laxiflora, Lam.; Boiss. Fl. Or. v. p. 71.

Badghis: 534, May 22, 24, 1885. In similar localities to *O. latifolia*, and equally common. The tubers of this are collected with those of *O. latifolia*, and, mixed with them, are exported as *Salab* or *Salap*.

IRIDEÆ.

Iris soongarica, Schrenk; Boiss. Fl. Or. v. p. 126.

Hari-rud valley: 317, April 25, 26, May 12, June 5, 1885; Badghis: May 21, 1885. Extremely common on the great gravelly plains, in shingly soil, growing in large clumps; flowers pale mauve.

Iris Gueldenstaedtiana, Lepech.; Boiss. Fl. Or. v. p. 129.

Khorasan: 683, June 18, 1885. In meadow-land, close to running water, at an altitude of 5000 feet. Flowers greenish white.

Iris falcifolia, Bunge; Boiss. Fl. Or. v. p. 133.

Hari-rud valley: 154, April 3, 6, 7, 21, 1885. In shingly soil, on the great gravelly plains; common. Flowers of a dingy smoky purple.

Iris Sisyrinchium, Linn.; Boiss. Fl. Or. v. p. 120.

Hari-rud valley: 309, April 25, 1885. In clay soil on the banks of the river.

Iris (§ Juno) Fosteriana, Aitch. et Baker, n. sp.; bulbo ovoideo-fusiformi tunicis exterioribus membranaceis sordide brunneis, caule brevi erecto 1–2-cephalo, foliis productis 5–6 lanceolatis complicatis distichis falcatis venis exsculptis scabris marginibus incrassatis albidis, spathæ valvis exterioribus oblongis viridibus margine hyalinis membranaceis, pedicello brevi, ovario cylindrico-trigono, tubo infundibulari limbo æquilongo, limbi segmentis exterioribus obovato-unguiculatis deflexis violaceis, interioribus pallide luteis erectis limbo parvo obovato ungue lato triplo breviore.

Bulbus 2–3-pollicaris, 9–12 lin. diam., tunicis multis brunneis, fibris radicalibus carnosis copiosis. *Folia* exteriora pauca parva membranacea; producta trijuga conferta semipedalia valde complicata, deorsum 5–6 lin. lata, venis crebris exsculptis, marginibus cartilagineis incrassatis. *Spatha* ventricosa bipollicaris. *Perianthium* bipollicare, tubo luteo anguste infundibulari ore 3–4 lin. diam., segmentis exteri-

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4. *Habenaria Sutteri*, Reichb. in Linnæa, vol. xxv. p. 229! (1852).—*H. Jerdoniana*, Wight, Icon. v. t. 1715 (1852). Nescio quid nomen prius fuerit divulgatum.—*Platanthera canarensis*, Lindl. MSS. in Hohenacker, Pl. Ind. Or. Canara, no. 142, and in Hook. & Thoms. Herb. Ind. Or.

5. *Habenaria Josephi*, Reichb. f., n. sp. *Neottiam* (*Listeram*) ludens, tuberidiis cylindraceo-ovoideis, foliis binis oppositis elliptico-acuminatis, racemo 2–4-floro, laxifloro, bracteis triangulo-lanceis ovaria pedicellata non æquantibus, ovario curvo, sepalo impari-fornicato triangulo, sepalis lateralibus oblongis acutis deflexis, tepalis triangulis antrorsum inferne angulatis, labelli partitionibus lateralibus setaceis, partitione mediana lineari-lancea, breviore calcari filiformi apicem versus clavato, ovarium pedicellatum subæquante, cruribus stigmaticis abbreviatis. Sikkim 12,000–19,000 ped., J. D. Hooker, no. 42, Herb. Ind. Or. cui magno cum gaudio dicata. Plantula parva pauci-pollicaris.

6. *Habenaria Dregeana*, Lindl., et species quædam ineditæ.

oribus pulchre violaceis 1 poll. latis, interioribus 18 lin. longis, ungue plano glabro 4–4½ lin. lato. *Styli* pollicares pallide lutei, cristis magnis deltoideis. *Antheræ* luteæ filamentis æquilongis.

Ab *I. caucasica* recedit perianthii segmentis exterioribus magnis violaceis limbo obovato.

Badghis: 128, March 15, 1885. In clay soil, on the low hills at an altitude of 3000 feet, common. Flowers bright yellow, with large purple falls; a very handsome species.

IRIS (§ JUNO) DREPANOPHYLLA, Aitch. et Baker, n. sp.; bulbo parvo ovoideo tunicis exterioribus membranaceo-fibrosis, foliis productis 6–8 lanceolatis acuminatis spiraliter recurvatis distichis complicatis marginibus albidis incrassatis ciliatis, caule brevi 1–4-cephalo, spathæ valvis apice acuminatis membranaceis, perianthio pallide luteo tubo gracili apice dilatato, limbi segmentis interioribus linearibus minimis patulis, exterioribus obovato-cuneatis limbo reflexo ungue suberecto triplo breviore.

Bulbus 6–9 lin. diam., tunicis exterioribus demum fibrosis, collo hypogæo elongato gracili, fibris radicalibus paucis basi carnosis. *Folia* semipedalia pallide viridia basi 9–12 lin. lata, venis haud confertis leviter exsculptis. *Spathæ* terminales et ad foliorum axillas productæ, bipollicares, valvis apice et margine hyalinis. *Perianthium* 2½–2¾ poll. longum, tubo apice solum ampliato, segmentis interioribus minimis linearibus, exterioribus tubo æquilongis, ungue suberecto pollicari, limbo obovato parvo. *Styli* pollicares, cristis parvis deltoideis. *Stamina* stylis æquilonga.

Habitus et folia omnino *I. caucasicæ*. Recedit limbi segmentis interioribus minutis, exterioribus limbo parvo ungue triplo breviore.

Hari-rud valley: 173, April 6, 1885; Badghis: April 29, 1885. In clay soil, where it is occasionally flooded; not very common. Flowers bright yellow.

CROCUS KOROLKOWI, Regel & Maw; Maw, The Genus *Crocus*, p. 275, pl. 56; Boiss. Fl. Or. v. p. 109.

Badghis: 109, January 20, March 9, April 1, 1885. In abundance throughout the Badghis; commences to flower as early as the middle of December.

CROCUS SPECIOSUS, Bieb.; Boiss. Fl. Or. v. p. 114.

Asterabad, Persia: 1128, October 1885. In grass-land, abundant. Flowering in the autumn.

GLADIOLUS KOTSCHYANUS, Boiss. Diagn. ser. i. 13, p. 15.—*Gladiolus imbricatus*, Linn.; var. β. *Kotschyanus*, Boiss. Fl. Or. v. p. 141.

Khorasan: 668, June 17, 1885. A weed in cultivated land; common in the Badghis as well as Khorasan.

AMARYLLIDEÆ.

UNGERNIA TRISPHÆRA, Bunge; Boiss. Fl. Or. v. p. 149.

Hari-rud valley: 741, July 28, 1885. Native name *Pias-kuki*. Common in clay soil all over the country, also in Khorasan and the Badghis. Leaves nine inches long, and three inches broad, appearing in early summer, and dying down at the end of summer, when

they are succeeded by a loose umbel of five or six handsome flowers, varying in colour from rose-pink to salmon.

The bulbs are flask-shaped, from six to nine inches in length, of almost a black colour, consisting of an immense number of very thin, papery, black tunics covering the true bulb. From the bulb proceed several thick, fleshy roots, like those of some *Eremuri*, as well as small fibrous ones.

Said to be employed in feeding camels.

Ixiolirion montanum, Herb.; Boiss. Fl. Or. v. p. 154.

Hari-rud valley: 268, April 18, 19, 1885, May 9, 1885. In gravelly soil, at the base of low hills close to the river; common.

LILIACEÆ.

Asparagus Breslerianus, Roem. & Schult.—*Asparagus maritimus*, Pall., var. *Breslerianus*, Boiss. Fl. Or. v. p. 337.

Hari-rud valley: 1129, July 27, 1885. In thickets of tamarisk, on land that is flooded by the river. Fruit bright red.

Asparagus verticillatus, Linn.; Boiss. Fl. Or. v. p. 339.

Hari-rud valley: 303, April 21, 1885, June 6, 1885. In tamarisk thickets occupying the bed of the river.

Eremurus spectabilis, Bieb.; Boiss. Fl. Or. v. p. 322.

Hari-rud valley: May 13, 1885; Badghis: 546, May 22, 23, 1885. Abundant in the loamy, sandy soil of the Badghis, from two to five feet in height. The showy part of the flower is not the perianth, but the long purple stamens bearing sulphur-coloured anthers.

Eremurus aurantiacus, Baker.—*Eremurus Bungei*, Baker, var. β. *stenophyllus*, Boiss. Fl. Or. v. p. 324.

Khorasan: 644, June 16, 1885. Common in the hills to the south of Bezd, above an altitude of 5000 feet, associated with *E. Olgæ*. Flowers lemon-coloured. Leaves eaten as a vegetable.

Eremurus luteus, Baker; Boiss. Fl. Or. v. p. 327.

Hari-rud valley: 191, April 7, 10, 19, 1885; Badghis: May 4, 1885. Excessively common on the low clay-hills. Flowers greenish white; in the process of drying the colour alters to a yellow.

Eremurus velutinus, Boiss. & Buhse; Boiss. Fl. Or. v. p. 324.

Hari-rud valley: 402, May 9, 13, 1885. In sandy gravel, on the great plains; common. Flowers inconspicuous.

Eremurus Aucherianus, Boiss. Fl. Or. v. p. 326; var. β. *Korolkowi*, Regel, Descript. Plant. Nov. Turkest. 1884, fasc. ix. p. 27.

Badghis: 387, May 3, 21, 1885. Native name *Siresh*. Profuse in the sandy loam of the Badghis. The long fleshy roots and, some say, the leaves also, of this species are collected and dried in an oven, then ground into powder, which is converted into a thick

jelly by boiling in water. This is employed in the manufacture of various vessels, called *Dabba*, for holding oil and clarified butter. There is a great trade in this material at Rui-Khauf in Khorasan. The introduction of this into India would, I feel sure, be highly prized by the Hindoo community, who would thus obtain vessels made of vegetable substance, in place of those at present employed in the oil and *ghi* (clarified butter) trade, viz. made of animal skins.

Other species of the genus probably yield a similar substance.

EREMURUS OLGÆ, Regel, Descript. Plant. Nov. Turkest. 1884, fasc. ix. p. 29.

Paropamisus range: 566, May 25, 1885; Khorasan, June 16, 1885. On slopes of hill-sides and in fields, between 4000 and 5000 feet altitude, in great luxuriance. One of the finest of the many flowering plants obtained on this expedition. The inflorescence usually salmon-coloured, occasionally pure white.

ALLIUM (§ SCHŒNOPRASUM) LEUCOSPHÆRUM, Aitch. et Baker, n. sp.; bulbis anguste ovoideis cæspitosis tunicis exterioribus membranaceis pallide brunneis apice fibrosis, caulibus gracilibus teretibus interdum geminis, foliis 3–6 gracilibus subulatis superpositis vaginis albis pulchre purpureo-striatis, umbellis densis globosis, spathæ valvis parvis ovatis membranaceis, pedicellis brevibus flexuosis, perianthio campanulato parvo segmentis oblongis subacutis albis viridulo carinatis, staminibus inclusis filamentis ovatis acuminatis.

Bulbi 5–6 lin. diam., tunicis exterioribus membranaceis ferrugineis, nervis crebris parallelis anastomosantibus. *Pedunculus* pedalis et ultra. *Folia* semipedalia glabra basi vix ultra $\frac{1}{2}$ lin. diam., vaginis imbricatis hyalinis venis parallelis pulchre purpureis. *Umbellæ* densæ, 12–15 lin. diam., spathæ valvis fugacibus 3–4 lin. longis, pedicellis demum 4–6 lin. longis. *Perianthium* 2 lin. longum, segmentis valde imbricatis oblongis subacutis costa viridula demum brunneola.

Ad *A. sabulosum*, Stev., et *A. rubellum*, Bieb., magis accedit.

Hari-rud valley: 412, May 9, 10, 1885. Very common in stony soil and in cultivated land.

ALLIUM RUBELLUM, Bieb., var. GRANDIFLORUM, Boiss. Fl. Or. v. p. 253.

Badghis: 527, May 21, 1885. Common in gravelly soil. Flowers rose-pink.

ALLIUM BRAHUICUM, Boiss. Fl. Or. v. p. 278.

Hari-rud valley: 429, May 10, 1885. Common in stony soil on the low hills on both sides of the Hari-rud near Tirphul. A most conspicuous plant, for its large inflorescence. It is in all probability the same as *A. caspium*, Willd.

ALLIUM MACLEANI, Baker in Bot. Mag. tab. 6707.

Badghis: 356, 463, May 14, 18, 1885. Covers the meadows of the Badghis; growing frequently to four feet in height. Flowers purple, colouring the country.

ALLIUM (§ MOLIUM) YATEI, Aitch. et Baker, n. sp.; bulbis solitariis ovoideis tunicis exterioribus firmulis apice fibrosis, caule gracili tereti pedali vel sesquipedali, foliis 1–3 linearibus ciliatis, umbellis densis multifloris, spathæ valvis brevibus ovatis, pedi-

cellis flore demum 2–4-plo superantibus, perianthio rubello segmentis oblongo-lanceolatis, staminibus inclusis filamentis longe monadelphis e basi ovata lanceolatis.

Bulbus rectus, ovoideus, 6–9 lin. diam., tunicis multis in squamas lanceolatas apice fibrosas dissolutis. *Folia* subbasalia haud superposita 6–9 poll. longa, 3–4 raro 5–6 lin. lata. *Umbella* 20–30-flora, pedicellis strictis ascendentibus rubellis demum 6–12 lin. longis. *Spathæ valvæ* membranaceæ, 5–6 lin. longæ. *Perianthium* 3–4 lin. longum pallide rubellum, segmentis acutis saturate rubello-costatis. *Stamina* perianthio distincte breviora, basi in cupulam magnam campanulatam ad perianthium adnatam coalitis. *Stylus* brevissimus. *Capsula* globoso-trigona, 3 lin. longa et lata.

Ad *A. roseum*, Linn., et *A. Thomsoni*, Baker, magis accedit.

Hari-rud valley: 289, April 21, 26, 1885; 414, May 9, 1885. Common in stony ground.

Allium (§ Rhiziridium) xiphopetalum, Aitch. et Baker, n. sp.; (Plate XLVIII.) bulbis cæspitosis ovoideo-oblongis, tunicis fibrosis, foliis productis 3 linearibus glabris superpositis, caulibus teretibus elongatis, umbellis multifloris densifloris, spathæ valvis 2–3 ovatis floribus brevioribus, pedicellis strictis ascendentibus floribus longioribus, perianthio rubello segmentis lanceolatis acuminatis, staminibus inclusis filamentis linearibus vel supra basin subulatis basi longe monadelphis.

Bulbi oblique congesti, fibris radicalibus copiosis gracilibus elongatis, tunicis exterioribus reticulato-fibrosis. *Caulis* sesquipedalis vel bipedalis modice validus. *Folia* semipedalia 2–3 lin. lata. *Umbellæ* 40–50-floræ, 2 poll. diam., spathæ valvis membranaceis rubellis cuspidatis 5–6 lin. longis, pedicellis strictis rubellis demum 6–9 lin. longis. *Perianthium* campanulato-cylindricum 4½ lin. longum, segmentis lanceolatis acuminatis pallidis costa saturate rubella percursis. *Stamina* perianthio distincte breviora, filamentis basi in cupulam coalitis et cum perianthio adnatis. *Ovarium* oblongum, stylo ovario æquilongo.

Flores *A. tatarici*, Linn. f., folia *A. senescentis*, Linn.

Badghis: 384, May 3, 20, 1885. Native name *Sir-piaz-ak*. In large quantities, though local, in the Badghis. The natives look upon this as wild garlic, and its abominable odour probably proves its right to a relationship.

Muscari racemosum, Mill.; Boiss. Fl. Or. v. p. 295.

Badghis: 117, March 7, 12, 19, 1885, May 22, 1885. Common throughout the Badghis, in loamy soil; flowering in early spring.

Hyacinthus ciliatus, Cyr.—*Bellevalia ciliata*, Boiss. Fl. Or. v. p. 302.

Badghis: 135, March 23, 1885; Hari-rud valley: April 12, 1885. Not common; a plant here and there in clayey and loamy soil. Flowers inconspicuous, of a grey-blue colour.

Fritillaria Karelini, Baker in Journ. Linn. Soc. xiv. p. 268; Boiss. Fl. Or. v. p. 188.

Badghis: 137, March 19, 1885; Hari-rud valley: April 3, 7, 1885. Extremely common in sandy soil. A very handsome species when in good flower; but it may have from only one to twenty flowers on a stem.

Tulipa montana, Lindl.; Boiss. Fl. Or. v. p. 192.

Hari-rud valley: 151, April 2; 193, April 7, 3, 11, 21, 1885. Native names: *Lala*, *Lale*; bulbs, *Gol-i-Lale*. In early spring the plains between Chashma-sabz pass and Tirphul are coloured with this species, which varies from every shade of red to pure yellow, the base of the perianth always deep purple. The natives collect and eat the bulbs, which are rather nice in flavour.

Tulipa humilis, Herb.; Boiss. Fl. Or. v. p. 199.

Badghis: 131, March 18, 19, 1885; Hari-rud valley: April 6, 7, 15, 1885. This small Tulip, very like an *Anemone*, was common everywhere in moist clayey soil, especially in localities where there had once been cultivation. Usually the scape is only one-flowered, but not unfrequently it is two- or even three-flowered.

Gagea chlorantha, Roem. & Schult.; Boiss. Fl. Or. v. p. 209.

Hari-rud valley: 1130, April 15, 1885. Common in sandy soil, bordering the beds of streams.

Gagea amblyopetala, Boiss. et Heldr.; Boiss. Fl. Or. v. p. 206.

Badghis: 116, March 7, 18, 1885. The sandy soil in many localities is consolidated by this minute plant into a turf.

Gagea persica, Boiss. Fl. Or. v. p. 210.

Badghis: 1131, April 1, 1885. Common on the low hills of the Badghis.

Gagea reticulata, Roem. & Schult.; Boiss. Fl. Or. v. p. 208.

Badghis: 127, March 15, 1885; 136, March 19, 1885; Hari-rud valley: April 6, 1885. In sandy soil; common.

Colchicum speciosum, Stev.; Boiss. Fl. Or. v. p. 159.

Khorasan: 1132, June 17, 18, 1885. Occasional throughout the Badghis, Hari-rud valley, and Khorasan.

Merendera sobolifera, C. A. Mey.; Boiss. Fl. Or. v. p. 167.

Badghis: 112, February 14, 1885. Abundant in wet clayey meadow-land, creeping amongst the roots of grassy turf. In bright sunshine during winter, when the sun is melting the snow, the flowers appear like stars on the surface of the withered turf.

Merendera persica, Boiss. Fl. Or. v. p. 169; Aitch. in Trans. Pharm. Soc. ser. iii. xvii. 1887, p. 468.

Badghis: 113, February 17, 1885; Hari-rud valley: April 12, 1885. On low sand-hills, very common. Flowers pale pink to pure snow-white, usually several in a cluster. The corms are collected and employed in native medicine under the name of *Shambalit*.

JUNCACEÆ.

Juncus glaucus, Ehrh.; Boiss. Fl. Or. v. p. 353.

Khorasan: 662, June 17, 1885. At an altitude of 5000 feet, near running water.

Juncus maritimus, Linn.; Boiss. Fl. Or. v. p. 354.

Northern Baluchistan: 62, October 1884; Hari-rud valley: August 18, 1885. Native name *Chab*. Common in beds of streams.

Juncus acutiflorus, Ehrh.; Boiss. Fl. Or. v. p. 358.

Khorasan: 663, June 17, 1885. On the banks of streams at an altitude of 5000 feet.

Juncus lampocarpus, Ehrh.; Boiss. Fl. Or. v. p. 358.

Hari-rud valley: 777, August 18, 1885. Common, near water, forming a turf.

Juncus Gerardi, Loisel, var. condensatus, Boiss. Fl. Or. v. p. 356.

Badghis: 523 (2nd), May 20, 1885; Paropamisus range: 557, May 24, 1885. In moist meadow-land, at an altitude of 4000 feet.

PALMÆ.

Phœnix dactylifera, Linn.; Boiss. Fl. Or. v. p. 47.

Northern Baluchistan. Native name for the Palm *Mach*; for the fruit *Khurma*. In our march through Baluchistan we occasionally encountered specimens of the Date Palm, as at Nushki, Koh-haja, &c. The most northern locality where it was seen was Zagin in the Harut basin; here was one good specimen; three others close to it had lately been killed, I supposed by the frost, as their stems were still standing *.

TYPHACEÆ.

Typha angustata, Bory & Chaub.; Boiss. Fl. Or. v. p. 50.

Khorasan: 803, August 25, 1885. Native name *Luhk*. In still water. This species is apt to bear male and female flowers on different plants, and is thus pseudo-dicœcious.

Typha, sp.

Locality and date of collecting unknown: 1133. Fruiting-spikes only.

AROIDEÆ.

Arum Griffithii, Schott; Boiss. Fl. Or. v. p. 38.

The specimens collected during this expedition are much larger than those collected in 1879 in the Kuram valley, the spathe being longer, the spadix longer and stouter; but these differences appear merely due to a more luxuriant growth.

Badghis: 354, May 1, 18, 1885. At the roots of bushes and amongst large stones; common. This is a favourite food of the wild hog.

Helicophyllum crassifolium, Engl. in DC. Monogr. Phanerog. vol. ii. p. 597 (excl. syn. *Biarum Lehmanni*, Bunge).

"I have not seen an authentic specimen of this species; but to judge from the descriptions given, and by Schott's figure of the plant, there seems no reason to doubt that the beautiful specimens collected by Dr. Aitchison are referable here; they differ only in having the leaves somewhat narrower, and less hastate at the base, than is represented by Schott; in other respects they quite agree with the figure. The crispulate edges of the leaves are blackish purple."—*N. E. Brown.*

* I should mention here that the seed figured (Journ. Linn. Soc. xix. pl. 26. figs. 9-12) as that of *Nannorhops Ritchieana* does not belong to that Palm, and there is some doubt as to what it is.

Hari-rud valley: 164, April 7, 1885. Native name *Phanar*. In the gravelly plains, between the Paropamisus range and the Hari-rud river in great abundance, and very conspicuous from its splendid deep-purple-coloured spathe.

CYPERACEÆ*.

CYPERUS GLABER, Linn.; Boiss. Fl. Or. v. p. 371.
Hari-rud valley: 775, August 18, 1885. Near running water; common.

CYPERUS LÆVIGATUS, Linn.; var. ALBIDUS, Boeck.; Boiss. Fl. Or. v. p. 366.
Hari-rud valley: 778, August 18, 1885.

CYPERUS LONGUS, Linn. var.; Boiss. Fl. Or. v. p. 375.—Forma *microstachya*.
Khorasan: 624, June 14, 1885.

CYPERUS ROTUNDUS, Linn.; Boiss. Fl. Or. v. p. 376.
Helmand: 85, October 25, 1884; Khorasan: August 27, 1885. In cultivated ground; very common.

CYPERUS PUNGENS, Boeck.—*Cyperus conglomeratus*, Rottb.; Boiss. Fl. Or. v. p. 369.
Northern Baluchistan: 36, October 4, 1884. In deep pure sand it develops curious spongy rootlets exactly like those of *Aristida plumosa* when in the same soil.

ELEOCHARIS PALUSTRIS, R. Br.; Boiss. Fl. Or. v. p. 386.
Hari-rud valley: 446, May 11, 1885. Near water, abundant.

SCIRPUS LACUSTRIS, Linn.; Boiss. Fl. Or. v. p. 383.
Khorasan: 689, June 18, 19, 1885. In deep, still water; common.

SCIRPUS MARITIMUS, Linn.; Boiss. Fl. Or. v. p. 384 (varietates).
Hari-rud valley: 776, August 18, 1885. Forming a turf on the sides of streams. Khorasan: 788, August 21, 1885. Common on the edges of streams and irrigation-channels.

SCIRPUS HOLOSCHŒNUS, Linn.; Boiss. Fl. Or. v. p. 381.
Khorasan: 660, June 17, 1885; Hari-rud valley: August 3, 5, 18, 1885. Extremely common and conspicuous over the whole country, by the side of running water, at altitudes above 3000 feet.

CAREX PHYSODES, Bieb.; Boiss. Fl. Or. v. p. 399.
Hari-rud valley: 1134 *c*, *d*, *e*, April 6, 10, 18, 21, 1885. Forms a turf in many localities, especially in the Badghis. Very striking, from its large, chocolate-coloured, inflated utricles.

CAREX STENOPHYLLA, Wahlb.; Boiss. Fl. Or. v. p. 400.
Badghis: 138 *a*, *b*, March 19, 1885, May 4, 1885. Forms, with *Carex physodes*, the turf of the Gulran meadows. This species was much affected by a fungus.

* I am indebted to Dr. O. Boeckeler for the determination of the species of this order.

Carex divisa, Huds.; Boiss. Fl. Or. v. p. 401.
Badghis: 523, May 20, 1885; Paropamisus range: 558, May 24, 1885; Khorasan: 661, June 17, 1885. In meadows, at an altitude above 3000 feet.

Carex punctata, Gaud., var. *utriculis impunctatis*, Boeck.; Boiss. Fl. Or. v. p. 427.
Badghis: 535, May 22, 1885; Paropamisus range: May 25, 1885. On the sides of streams, at an altitude above 4000 feet.

GRAMINEÆ.

Panicum miliaceum, Linn.; Boiss. Fl. Or. v. p. 441.
A cultivated grain in the Badghis: 1135. It is also extensively cultivated in India.

Panicum cruciforme, Sibth. & Smith; Boiss. Fl. Or. v. p. 437.
Khorasan: 794, August 23, 1885. On the sides of irrigation-channels; common.

Panicum Crus-Galli, Linn.; Boiss. Fl. Or. v. p. 435.
Khorasan: 814, August 29, 1885. In running water; common and vigorous.

Panicum antidotale, Retz., var.; Boiss. Fl. Or. v. p. 440.—Var. *spiculis majoribus* fide Munro.
Helmand: 82, October 25, 1885. In flooded clay-lands, forming meadows. On the rhizomes are nodules from one to two inches in length and half an inch thick, and covered densely with short silky hairs.

Setaria viridis, Beauv.; Boiss. Fl. Or. v. p. 443.—Syn. *Panicum viride*, Linn.
Khorasan: 1136, August 23, 1885.

Pennisetum dichotomum, Del.; Boiss. Fl. Or. v. p. 444.
Northern Baluchistan: 40, October 6, 8, 1884. Native name *Barshonk*. In the desert, in stony ground and amongst rocks, not in sand. Collected largely for fodder, and one of the most valuable of the desert plants. It grows here very differently from what it does as usually met with in the Punjab. Its stems are often three to four feet high, and resemble miniature bamboos; our horses, however, relished it.

Pennisetum spicatum, Del.—*Penicillaria spicata*, Willd.—*Pennisetum typhoideum*, Rich.; Boiss. Fl. Or. v. p. 447.
Occasionally seen cultivated in Khorasan. The *Bajza* of the Punjab.

Erianthus Ravennæ, Beauv.; Boiss. Fl. Or. v. p. 454.
Northern Baluchistan: 64, October 11, 1884; Khorasan: 816, September 1, 1885. Native name in Baluchistan *Kash*; Afghanistan *Kandur*, *Munj*. In stream-beds, along with *Tamarix*, common. It grows in great tussocks and helps to form the thickets in the stream-beds, where the wild hog finds its cover.

Erianthus ?
Khorasan: 795, August 23, 1885. Native name *Kalmi*. Cultivated in gardens, and employed in making pens.

ANDROPOGON LANIGER, Desf.; Boiss. Fl. Or. v. p. 465.

Northern Baluchistan: 59, October 11, 1884; Hari-rud valley: 762, August 4, 1885. Common in stony soil. Highly aromatic and lemon-scented.

SORGHUM VULGARE, Linn.

Khorasan: 800, August 23, 1885. Native names: *Iowur*, *Jowhri-Turkimani*. In the Badghis near Bala-morghab, cultivated extensively in fields; in Persia and the Hari-rud sparingly amongst other crops, as in melon- and tobacco-fields. There are white- and black-grained varieties.

PHALARIS MINOR, Retz.; Boiss. Fl. Or. v. p. 472.

Hari-rud valley: 220, April 13, 1885; Khorasan: June 21, 1885. Near irrigation and in cultivated land; common.

ALOPECURUS PRATENSIS, Linn.—*Alopecurus arundinaceus*, Poir.; Boiss. Fl. Or. v. p. 487.

Hari-rud valley: 316, April 25, 1885; Badghis: May 20, 1885. Forming turf in moist land and near irrigation-channels.

ARISTIDA PUNGENS, Desf.; Boiss. Fl. Or. v. p. 498.

Hari-rud valley: 756, August 1, 1885. On sand-hills, growing in the loose sand near Zindijan.

ARISTIDA PLUMOSA, Linn.; Boiss. Fl. Or. v. p. 495.

Northern Baluchistan: 11, 21, September 29, 1884; 29, October 3, 1884; Hari-rud valley; July 28, 29, 1885. Native name, in Baluchistan, *Mazj*. Common on the sand-hills of the desert and most characteristic of that country, growing in small bright green tufts, and most luxuriantly in localities where one would say nothing could possibly exist. In the pure sand it throws out long spongy rootlets an eighth of an inch thick, by means of which it seems to maintain a supply of moisture for itself. This is the chief fodder of the sheep that exist in these parts.

STIPA PENNATA, Linn.; Boiss. Fl. Or. v. p. 502 (varietates).

Hari-rud valley: 415, May 9, 1885; 1137, May 26, 1885, June 5, 1885. On the gravelly plains, at an altitude of 3000 feet; in great abundance between Kohtal-sangi and Dana-sanjiti. Khorasan: June 18, 1885. In the stony soil of the great gravelly plains, most characteristic; growing in large tufts.

ORYZOPSIS CÆRULESCENS, Benth. & Hook. f.—*Piptatherum cærulescens*, Desf.; Boiss. Fl. Or. v. p. 507.

Khorasan: 648, June 16, 1885. Near moisture, at an altitude above 5000 feet.

HELEOCHLOA SCHŒNOIDES, Host; Boiss. Fl. Or. v. p. 476.

Helmand: 86, October 25, 1884; Khorasan: 695, June 21, 1885. In wet clayey soil; common.

POLYPOGON MONSPELIENSE, Desf.; Boiss. Fl. Or. v. p. 520.

Northern Baluchistan: 63, October 11, 1884. In moist ground, near water.

POLYPOGON LITTORALE, Smith; Boiss. Fl. Or. v. p. 521.

Khorasan: 625, June 14, 1885. Native name *Ki-ak*. In cultivated ground, and along the banks of irrigation-channels. It is considered a good fodder-grass.

CALAMOGROSTIS NEPALENSIS, Nees; Steudel, Syn. Glum., Gram. p. 193. no. 82.

Badghis: 536, May 22, 1885. Growing in clayey soil, covered with two or three inches of water, and in habit like an *Arundinaria*.

AVENA FATUA, Linn.; Boiss. Fl. Or. v. p. 540.

Hari-rud valley: 221, April 13, 1885, May 11, 1885. Common in cultivated land, growing amongst wheat and barley.

ARRHENATHERUM KOTSCHYI, Boiss. Fl. Or. v. p. 550.

Khorasan: 651, June 16, 1885. In moist soil, near water, at an altitude of 5000 feet.

CYNODON DACTYLON, Pers.; Boiss. Fl. Or. v. p. 553.

Khorasan: 698, June 21, 1885. A rare grass in these districts.

BOISSIERA BROMOIDES, Hochst.; Boiss. Fl. Or. v. p. 560.

Badghis: 364, May 1, 1885; Hari-rud valley: May 9, 1885; Khorasan: June 30, 1885. A common grass.

ARUNDO DONAX, Linn.; Boiss. Fl. Or. v. p. 564.

Helmand: 1138, October 21, 25, 1884. Native name *Nal*. Growing in and near water in great masses.

PHRAGMITES COMMUNIS, Trin.; Boiss. Fl. Or. v. p. 563.

Hari-rud valley: 766, August 5, 1885. Everywhere on the margins of irrigation-channels and in wet ground. Collected largely for fodder.

PHRAGMITES COMMUNIS, Trin., var. *foliis pungentibus*.

Northern Baluchistan: 1139, October 12, 1884; Hari-rud valley: July 29, 1885. In saline soil, with harsh, needle-pointed leaves.

ERAGROSTIS POÆOIDES, Beauv.; Boiss. Fl. Or. v. p. 580.

Helmand: 84 (2), October 25, 1884. In cultivated wet clayey soil.

ERAGROSTIS CYNOSUROIDES, Beauv.; Boiss. Fl. Or. v. p. 583.

Northern Baluchistan: 39, October 6, 1884; Helmand: 68, October 20, 1884. Native names: *Kir-thag*, *Drab*. In loose sandy soil in the desert, growing in great tussocks. It is considered good fodder.

ERAGROSTIS CYNOSUROIDES, Beauv., var. PAUCIFLORA.

Northern Baluchistan: 1140, October 6, 1884. A reduced form, collected with the type.

MELICA CILIATA, Linn.; Boiss. Fl. Or. v. p. 589.

Badghis: 487, May 17, 1885. In great clumps in clefts of rocks, where there is some moisture, at an altitude of 3000 feet.

ÆLUROPUS LITTORALIS, Parl.; Boiss. Fl. Or. v. p. 594.

Hari-rud valley: 605 (2), June 5, 1885, July 29, 1885. Native name *Khan-dar*. Very common, especially in saline soil. In habit it is like *Cynodon Dactylon*, and often mistaken for it.

ÆLUROPUS LITTORALIS, Parl., var. β. REPENS, Coss.; Boiss. Fl. Or. v. p. 594.

Helmand: 1141, October 25, 1884.

Another species of *Æluropus* was collected. It appears to be the same as an Afghan plant to which Munro gave a manuscript name. 23?

Northern Baluchistan, where it was common.

SCHISMUS ARABICUS, Nees; Boiss. Fl. Or. v. p. 597.

Hari-rud valley: 295, April 21, 1885. In wet, clayey soil, on the islands in the river.

POA BULBOSA, Linn.; Boiss. Fl. Or. v. p. 605.

Hari-rud valley: 208, 330, April 12, 13, 27, 28, 1885; Badghis: April 29, 1885. Native name *Siah-li-weh*. In great luxuriance all over the plains of the country, especially near the Kambao pass and that region; highly valued as fodder.

POA TRIVIALIS, Linn.; Boiss. Fl. Or. v. p. 602.

Badghis: 542, May 22, 1885. In moist land, near water; abundant.

POA SOONGARICA, Boiss. Fl. Or. v. p. 611.

Paropamisus range: 563, May 25, 1885. In moist soil, at an altitude of 4500 feet.

FESTUCA OVINA, Linn.; Boiss. Fl. Or. v. p. 617.

Khorasan: 677, June 18, 1885. Forming extensive meadows, at an altitude exceeding 5000 feet.

FESTUCA MYURUS, Linn.; Steudel, Syn. Glum., Gram. p. 303. no. 22.

Paropamisus range: 559, 539 (2), May 24, 1885. Abundant, though local, at 4000 feet altitude.

BROMUS TECTORUM, Linn.; Boiss. Fl. Or. v. p. 647.

Hari-rud valley: 266, April 17, 18, 1885; Badghis: 1142, May 4, 1885. Inhabiting shady places in the early part of the season; common.

BROMUS CRINITUS, Boiss. et Hohenh.—*Bromus gracillimus*, Bunge; Boiss. Fl. Or. v. p. 647.

Hari-rud valley: 570, May 26, 1885.

BROMUS DANTHONIÆ, Trin.—*Bromus macrostachys*, Desf., var. γ. *triaristatus*, Hackel; Boiss. Fl. Or. v. p. 652.

Hari-rud valley: 439, May 11, 13, 1885. Common on dry gravelly soil. Awns deep purple.

BROMUS COMMUTATUS, Schrad.; Boiss. Fl. Or. v. p. 654.
Badghis: 1143, May 1, 1885.

LOLIUM PERSICUM, Boiss. et Hohenh.; Boiss. Fl. Or. v. p. 680.
Badghis: 502, May 18, 1885. Inhabiting meadow-land near water, in the shade of rocks and bushes; common.

LOLIUM PERENNE, Linn.; Boiss. Fl. Or. v. p. 679.
Hari-rud valley: 1144, June 3, 1885. In cultivated soil, on edges of fields, &c.; common.

AGROPYRUM AUCHERI, Boiss. Fl. Or. v. p. 664.
Badghis: 547, May 23, 1885; Khorasan, June 15, 1885. Forming extensive meadows, but local, and not intermixed with other grasses. This is a late grass, following *Poa bulbosa* and *Bromus* as a second crop.

AGROPYRUM REPENS, Beauv.; Boiss. Fl. Or. v. p. 663.
Khorasan: 1145, June 16, 17, 21, 1885. Common at altitudes above 5000 feet.

AGROPYRUM PILIFERUM, Benth.—*Heteranthelium piliferum*, Hochst.; Boiss. Fl. Or. v. p. 672.
Badghis: 490, May 17, 1885.

AGROPYRUM CRISTATUM, Boiss. Fl. Or. v. p. 667.
Hari-rud valley: 311, April 25, 1885, May 9, 1885. Common over the whole plains. This, with *Agropyrum Aucheri*, forms a second crop of grass during the season. The variety collected here is only from six to eight inches in height, with numerous spreading stems from the roots, and it is quite glabrous. Badghis: 511, May 19, 20, 25, 1885. Characteristic of the Badghis, at an altitude of 2500 feet, forming immense stretches of pasture on loamy soil. It grows in great clumps, each perennial root producing numerous annual, erect stems, 18 inches to two feet in height, with the inflorescence much longer than in the type.

AGROPYRUM PROSTRATUM, Eichw.; Boiss. Fl. Or. v. p. 667.
Hari-rud valley: 196, April 7, 1885.

SECALE CEREALE, Linn.; Boiss. Fl. Or. v. p. 671.
Hari-rud valley: 442, May 11, 1885. Native names: *Gandam-dar*, *Jow-thak-thak*; the Ergot, *Siah-khak*. A weed amongst wheat, in some fields in such quantity that there is as much rye as wheat. It is considered very hurtful to the system when a large amount of it is mixed with wheat-flour. Perfectly wild, and not grown anywhere as a distinct crop.

TRITICUM VULGARE, Linn.
Hari-rud valley: 443, May 11, 1885, June 3, 1885. Native name *Gandam*. Extensively cultivated, though requiring irrigation at altitudes under 3000 feet; above that altitude irrigation is not a necessity. All the wheat I saw was of poor quality.

TRITICUM TRIUNCIALE, Aitch. & Hemsl.—*Ægilops triuncialis*, Linn.; Boiss. Fl. Or. v. p. 674.

Badghis: 495, May 18, 20, 1885. In shady localities, common.

TRITICUM CRASSUM, Aitch. & Hemsl.—*Ægilops crassa*, Boiss. Fl. Or. v. p. 677.

Badghis: May 14, 1885.

TRITICUM SQUARROSUM, Roth.—*Ægilops squarrosa*, Linn.; Boiss. Fl. Or. v. p. 676.

Badghis: 1146, 461 (2), May 14, 16, 1885. Very common in the shade of shrubs.

TRITICUM PERSICUM, Aitch. & Hemsl.—*Ægilops persica*, Boiss. Fl. Or. v. p. 675.

Hari-rud valley: 1147, June 4, 1885. In gravelly soil; common.

LEPTURUS PERSICUS, Boiss. Fl. Or. v. p. 685.

Hari-rud valley: 409, May 9, 10, 1885.

HORDEUM CAPUT-MEDUSÆ, Benth. & Hook. f.—*Elymus Caput-Medusæ*, Linn.; Boiss. Fl. Or. v. p. 691.

Badghis: 473, May 16, 1885. In great abundance, on the downs of the Badghis, growing over two feet in height.

HORDEUM MURINUM, Linn.; Boiss. Fl. Or. v. p. 686.

Hari-rud valley: 224, April 13, 21, 1885. In cultivated land, and along the banks of irrigation-channels; common.

HORDEUM ITHABURENSE, Boiss. Fl. Or. v. p. 686.

Badghis: 359, May 1, 1885; 465, May 14, 21, 1885. Very characteristic of the rolling downs of the Badghis, growing in great clumps up to 3 feet in height. In habit it resembles cultivated barley.

HORDEUM VULGARE, Linn.

Khorasan: 1148, June 17, 1885. Native names: *Jao-tursh*, *Jao*. Barley is largely cultivated in the Hari-rud valley, Badghis, and Khorasan, with irrigation below 3000 feet altitude; above this altitude it can be grown without it. It is said to take only three months to ripen, and is therefore sometimes raised as a second crop.

HORDEUM HEXASTICHUM, Linn.

Hari-rud valley: 585, June 3, 1885; 586, June 3, 1885. Native name *Jao-shirin*. Extensively cultivated, and furnishing the barley that is chiefly used as food by the people. *H. vulgare* is used as fodder for their horses. This takes fully four months to ripen, and hence can never be raised as a second crop.

EQUISETACEÆ.

EQUISETUM ELONGATUM, Willd.—*Equisetum ramosissimum*, Desf.—*Equisetum ramosum*, Schl.; Boiss. Fl. Or. v. p. 742.

Hari-rud valley: 757, August 1, 1885. On the banks of the Hari-rud, common.

FILICES.

Cheilanthes Szovitzii, Fisch. et Mey.; Boiss. Fl. Or. v. p. 726.

Khorasan; 653, June 16, 1885. In the clefts of limestone rocks on the hills south of Bezd, at an altitude above 5000 feet; the only locality where it was seen.

Adiantum Capillus-Veneris, Linn.; Boiss. Fl. Or. v. p. 730.

Badghis, near Sim-koh: 496, May 18, 1885. On wet rocks below a waterfall, at an altitude of 3000 feet. The only Fern met with in North-west Afghanistan.

CHARACEÆ.

Chara fœtida, A. Br. in Ann. Sc. Nat. 2me série, i. p. 354, et in Flora, i. p. 63.

Badghis: 107, December 8, 1884. Plentiful in still water and pools of streams.

FUNGI.

Agaricus (Armillaria) rhizopus, Cooke, Grevillea, xiv. p. 89.

Hari-rud valley: 167, April 16, 1885.

Agaricus (Pleurotus) fossulatus, Cooke.

Badghis: 115, March 5, 1885.

"*A.* pileo carnoso, compacto, subdimidiato, areolato-diffracto, ochraceo-albo, glabro; stipite laterali, curvato, deorsum attenuato, longitudinaliter sulcato, subcrasso, solido, lamellis longe decurrentibus, sublatis, distantibus albis."—*M. C. Cooke.*

Pileus 2–3 in. broad, stem $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. thick.

Agaricus (Naucoria) Vervacti, Fries, Hym. Eur. p. 260.

Hari-rud valley: 270, April 18, 1885. In great masses, on the wet clayey soil left as a fresh deposit on islands on the receding of the river.

Agaricus (Psalliota) campestris, Linn.; Fries, Hym. Eur. p. 279.

Hari-rud valley: 171, April 6, 1885.

Agaricus (Stropharia) obturatus, Fries, Hym. Eur. p. 285.

Hari-rud valley: April 18, 1885. Collected along with No. 270, *A. Vervacti*, Fries.

Bolbitius mitræformis, Harv.; Hook. Journ. Bot. iii. (1844), p. 186, t. vi. B.

Badghis: 141, 173, March 24, 1885. This is a South-African and Australian species.

Polyporus fomentarius, Fries, Hym. Eur. p. 558.

Khorasan: 51, June 19, 1885.

Podaxon calyptratus, Fries, Syst. Myc. iii. p. 63.

Hari-rud valley: 165, April 6, 1885. Is common at the Cape and in India.

Xylopodium Aitchisoni, Cooke et Massee, Grevillea, xvi. p. 69. *X.* peridio clavato dein pyriformi, deorsum in stipitem rigidum attenuato, stipite æquali vel basim leniter bulboso, longitudinaliter sulcato-striato, squamuloso, solido. Sporis læte ochraceo-fuscis, globosis, asperulis 6–7 μ diam.

Hari-rud valley and Badghis. During the whole summer on clayey soil, chiefly near the hillocks of white ants' nests, sometimes six inches in circumference.

TULOSTOMA WIGHTII, Berk. in Herb. Kew.

Hari-rud valley: 178, 181, 203, April 7, 11, 1885.

"Peridium globosum (½–1 unc.) albidum, ore submammoideo pertusum, stipite rigido æquali, longitudinaliter striato (1½–3 unc.) initio squamoso, sporis capillitioque aureo-testaceis."—*M. C. Cooke.*

GEASTER STRIATUS, var. MINOR, Fries, Syst. Myc. iii. p. 14.

Hari-rud valley: 180, April 7, 1885.

USTILAGO URCEOLORUM, Tul. in Ann. Sc. Nat. 3me série, vii. p. 86, t. 4. f. 7–10.

Badghis: March 19, 1885. Affects the utricles of *Carex stenophylla*, which become like blue-black beads.

DESCRIPTION OF THE PLATES.

[Where not otherwise indicated the plants, or portions of plants, are represented natural size.]

PLATE I.

Ranunculus leptorrhynchus, Aitch. et Hemsl.

Fig. 1. Outside view of sepal, enlarged.
2. Inside view of sepal, enlarged.
3. A petal, enlarged.
4. A young carpel, enlarged.
5. Section of a nearly ripe carpel, enlarged.

PLATE II.

Nigella integrifolia, Regel.

Fig. 1. A flower with involucre, enlarged.
2. One bract of the involucre, enlarged.
3. A sepal, enlarged.
4. A petal, enlarged.
5. Front and back views of a stamen, enlarged.
6. Ripe follicles dehiscing, enlarged.
7. A seed, enlarged.

PLATE III.

Delphinium Zalil, Aitch. et Hemsl.

Fig. 1. Branchlet bearing ripe fruit, natural size.
2. Spurred sepal, natural size.
3. An anterior sepal, natural size.

Fig. 4. A lateral sepal, natural size.
5. A spurred petal, enlarged.
6. An anterior petal, enlarged.
7 and 8. Stamens, enlarged.
9. Pistil, enlarged.
10. Ripe fruit, enlarged.
11. A follicle dehiscing, enlarged.
12. A seed, enlarged.

Plate IV.

Crambe cordifolia, Stev.

Fig. 1. A flower, enlarged.
2. A petal, enlarged.
3. Androecium and gynæcium, enlarged.
4. Pistil, enlarged.
5. Ripe pod, one valve removed, enlarged.
6. Embryo, enlarged.
7. Section of the same, enlarged.

Plate V.

Figs. 1–10. *Ruta affinis*, Aitch. et Hemsl.

Fig. 1. Portion of a plant, natural size.
2. Branchlet bearing fruit, natural size.
3. Portion of a leaf, enlarged.
4. A flower, enlarged.
5. A petal, enlarged.
6. Stamens, enlarged.
7. Section of ovary, enlarged.
8. Fruit, enlarged.
9. A seed, enlarged.
10. Section of the same, enlarged.

Figs. 11–16. *Ruta rotundifolia*, Aitch. et Hemsl.

Fig. 11. A flowering branch.
12. Portion of a leaf, enlarged.
13. A flower, enlarged.
14. Stamens, enlarged.
15. Pistil, enlarged.
16. Section of ovary, enlarged.

Plate VI.

Astragalus heratensis, Bunge.

Fig. 1. Sketch of habit of the plant.
2. A flowering branch.
3. A flower, enlarged.
4. Keel-petals, enlarged.
5 and 6. Wing-petals, enlarged.

Fig. 7. Standard petal, enlarged.
8. Young fruit, enlarged.
9. Section of the same, enlarged.
10. Section of another with aborted ovules.

Plate VII.

Astragalus Lumsdenianus, Aitch. et Baker.

Fig. 1. A flower, enlarged.
2. Standard petal, enlarged.
3 and 4. Wing-petals, enlarged.
5. Keel-petals, enlarged.
6. Pistil, enlarged.
7. Section of ovary, enlarged.

Plate VIII.

Prunus calycosus, Aitch. et Hemsl.

Fig. 1. A flowering branch, natural size.
2. A branch bearing young fruit, natural size.
3. A leaf with stipules attached, enlarged.
4. A partially expanded flower, enlarged.
5. A fully expanded flower, enlarged.
6. A sepal, enlarged.
7. A pistil, enlarged.
8. The same in section, enlarged.

Plate IX.

Cotoneaster nummularia, Fisch. et Mey.

Fig. 1. Fruiting branch.
2. Flowering branch.
3. A flower, enlarged.
4. A petal, enlarged.
5. A fruit, enlarged.

Plate X.

Bryonia monoica, Aitch. et Hemsl.

Fig. 1. A male flower, enlarged.
2. Anthers, enlarged.
3. A female flower, enlarged.
4. Pistil of the same, enlarged.

Plate XI.

Trachydium Lehmannii, Benth. et Hook. f.

Fig. 1. A bract, enlarged.
2. A flower seen from below, enlarged.
3. A flower seen from above, enlarged.

Fig. 4. A petal, enlarged.
5. Fruit, enlarged.
6. Cross section of the same, enlarged.

Plates XII. and XIII.

Ferula fœtida, Regel.

Fig. 1. Stem reduced to one quarter of the natural size.
2. Portion of a radical leaf, natural size.
3. A branch of the inflorescence, consisting of a central female umbel and several male umbels, natural size.
4. A ripe fruit, enlarged.
5. A mericarp and carpophore, enlarged.
6. Section of a mericarp, enlarged.

Plate XIV.

Ferula fœtida, Regel.

Fig. 1. A young plant with undeveloped inflorescence enveloped in the large bracts, much reduced.
2. A cauline leaf and portion of stem, natural size.
3. Portion of inflorescence, natural size.
4. A male flower, enlarged.
5. A female flower, enlarged.
6. A stamen, enlarged.
7. A pistil, enlarged.

Plates XV. and XVI.

Ferula galbaniflua, Boiss.

Fig. 1. A cauline leaf attached to portion of hollow stem, natural size.
2. Ripe fruit, enlarged.
3. Mericarp and carpophore, enlarged.
4. Dorsal view of mericarp, enlarged.
5. Cross section of mericarp, enlarged.

Plate XVII.

Ferula galbaniflua, Boiss.

Fig. 1. Portion of a radical leaf, natural size.
2. Small portion of leaf, enlarged.
3. Portion of inflorescence, consisting of a central female umbel and two lateral male umbels, natural size.
4. A male flower, enlarged.
5. A petal from the outside, enlarged.
6. A petal from the inside, enlarged.
7. Young fruit, enlarged.

PLATE XVIII.

Ferula oopoda, Boiss.

Fig. 1. A plant, about one sixteenth natural size, drawn from Dr. Aitchison's sketch.
2. A cauline leaf, natural size.
3. A lateral inflorescence, from the axil of figure 2, consisting of a central female umbel, and three smaller male umbels springing from its base, natural size.
4. A male flower, enlarged.
5. A female flower, enlarged.
6. A petal, enlarged.
7. A pistil, enlarged.
8. Ripe fruit, natural size.
9. A mericarp, enlarged.
10. Inner face of the same, with a portion of the carpophore, enlarged.
11. Cross section of the same, enlarged.

PLATE XIX.

Ferula oopoda, Boiss.

Fig. 1. Lower portion of a small radical leaf, natural size.
2. Terminal portion of the same leaf.

PLATE XX.

Ferula suaveolens, Aitch. et Hemsl.

Fig. 1. A young plant, about one sixth of the natural size.
2. Portion of inflorescence, consisting of a central female umbel, and several lateral male umbels overtopping it, natural size.
3. A bract, enlarged.
4. A hermaphrodite flower, natural size.
5. A male flower, natural size.
6. A petal, natural size.
7. A very young fruit, natural size.

PLATE XXI.

Ferula suaveolens, Aitch. et Hemsl.

Fig. 1. An old stem, about one sixth natural size.
2. Portion of a young plant, natural size.
3. Terminal portion of a leaf, natural size.
4. Piece of leaf, much enlarged.

PLATE XXII.

Carum leptocladum, Aitch. et Hemsl.

Fig. 1. A plant, natural size.
2. A bract, enlarged.
3. A petal, enlarged.
4. Back view of same, enlarged.

Fig. 5. Young fruit, enlarged.
6. Ripe fruit, enlarged.
7. A mericarp and carpophore, enlarged.
8. Cross section of same, enlarged.

Plates XXIII. and XXIV.

Dorema Ammoniacum, D. Don.

Fig. 1. Old stem, reduced to one third of the natural size.
2. Portion of a leaf, natural size.
3. Portion of inflorescence, natural size.
4. A male flower, enlarged.
5. A female flower, enlarged. On account of the woolliness, the petals appear continuous with the calyx-tube.
6. A petal, enlarged.
7. A young fruit.

Plate XXV.

Dorema Ammoniacum, D. Don.

Fig. 1. Inflorescence, reduced to one third of natural size.
2. Portion of a radical leaf, natural size.
3. Fruiting branch, natural size.
4. A fruit, enlarged.
5. A mericarp, enlarged.
6. Section of the same, enlarged.

Plate XXVI.

Dorema glabrum, Fisch. et Mey.

Fig. 1. Portion of an old stem, about one eighth natural size.
2. Portion of infloresce, natural size.
3. A staminate flower, enlarged.
4. A petal, enlarged.
5. A pistil, enlarged.

Plate XXVII.

Dorema glabrum, Fisch. et Mey.

Fig. 1. A radical leaf, one third natural size.
2. A portion of the same, natural size.
3. Fruit, natural size.
4. A mericarp, enlarged.
5. The same attached to the carpophore, enlarged.
6. Cross section of the same, enlarged.

Plate XXVIII.

Dorema serratum, Aitch. et Hemsl.

Fig. 1. A radical leaf, natural size.
2. A cauline leaf, natural size.

Fig. 3. Branch bearing ripe fruit, natural size.
4. Portion of a leaf, enlarged.
5. A mericarp, enlarged.
6. The same attached to carpophore, enlarged.
7. Section of the same, enlarged.
8. Embryo, enlarged.

Plate XXIX.

Johrenia platypoda. Aitch. et Hemsl.

Fig. 1. Portions of plant, natural size.
2. A young plant, enlarged.
3. A ripe fruit, enlarged.
4. A mericarp and carpophore, enlarged.
5. A cross section of the same, enlarged.

Plate XXX.

Gaillonia dubia, Aitch. et Hemsl.

Fig. 1. A node with petioles and stipules, enlarged.
2. A corolla laid open, enlarged.
3. Pistil, enlarged.
4. Ripe fruit dehiscing into mericarps, enlarged.
5. Section of mericarp, showing attachment of seed, enlarged.
6. Section of seed, showing embryo, enlarged.

Plates XXXI. and XXXII.

Codonocephalum Peacockianum, Aitch. et Hemsl.

Fig. 1. A radical leaf, natural size.
2. Portion of inflorescence, natural size.
3. A capitulum, with the flowers and some of the bracts removed, showing the receptacle, enlarged.
4. Bracts of the involucre, enlarged.
5. A flower, enlarged.
6. A bristle of the pappus, enlarged.
7. Stamens, enlarged.
8. Part of style and stigma, enlarged.

Plate XXXIII.

Anthemis caulescens, Aitch. et Hemsl.

Fig. 1. Portion of a leaf, enlarged.
2. An involucral bract, enlarged.
3. Chaff of the receptacle, enlarged.
4. A flower, enlarged.
5. Stamens, enlarged.
6. Part of style and stigma, enlarged.

Plate XXXIV.

Jurinea variabilis, Aitch. et Hemsl.

Fig. 1. An involucral bract, enlarged.
2. Chaff of the receptacle, enlarged.
3. A flower, enlarged.
4. A plume of the pappus, enlarged.
5. Stamens, enlarged.
6. Part of style and stigma, enlarged.

Plate XXXV.

Acantholimon speciosissimum, Aitch. et Hemsl.

Fig. 1. Portion of a leaf, enlarged.
2. A spikelet, enlarged.
3. A calyx, enlarged.
4. Pistil, enlarged.

Plate XXXVI.

Acantholimon Ecæ, Aitch. et Hemsl.

Fig. 1. A leaf, enlarged.
2. A spikelet, enlarged.
3. A bract, enlarged.
4. A calyx, enlarged.
5. Stamens, enlarged.
6. Pistil, enlarged.

Plate XXXVII.

Apocynum venetum, Linn.

Fig. 1. A leaf, enlarged.
2. A flower-bud, enlarged.
3. A corolla, laid open, enlarged.
4. Androecium and pistil, enlarged.
5. An anther, enlarged.
6. Pistil, enlarged.

Plate XXXVIII.

Hyoscyamus Senecionis, Willd., var. *multifidus*, Aitch. et Hemsl.

Fig. 1. A flower, corolla removed, enlarged.
2. Stamens, enlarged.
3. Fruiting calyx, enlarged.
4. Capsule, enlarged.
5. Section of the same, enlarged.
6. Seeds, enlarged.

Plate XXXIX.

Cistanche Ridgewayana, Aitch. et Hemsl.

Fig. 1. A bract, enlarged.
2. Calyx and pistil, enlarged.
3. Corolla, laid open, enlarged.
4. Ovary, enlarged.
5. Cross section of the same, enlarged.

Plate XL.

Cistanche laxiflora, Aitch. et Hemsl.

Fig. 1. Corolla laid open, enlarged.
2. Stamens, enlarged.
3. Pistil, enlarged.
4. Cross section of the ovary, enlarged.

Plate XLI.

Nepeta Sewerzowii, Regel.

Fig. 1. Portion of a leaf, enlarged.
2. A flower, enlarged.
3. Stamens, enlarged.
4. Pistil, enlarged.
5. Fruiting calyx, enlarged.
6. Ripe fruit, enlarged.
7. Interior face of a nutlet, enlarged.

Plate XLII.

Figs. 1–6. *Chamæsphacos persicus*, Aitch. et Hemsl.

Fig. 1. A plant, natural size.
2. A flower, enlarged.
3. Pistil, enlarged.
4. Fruit, enlarged.
5 & 6. Nutlets from different positions, enlarged.

Figs. 7–11. *Chamæsphacos afghanicus*, Aitch. et Hemsl.

Fig. 7. A plant, natural size.
8. A flower, enlarged.
9. Calyx, laid open, enlarged.
10. Stamina, enlarged.
11. Pistil, enlarged.

Figs. 12–18. *Chamæsphacos ilicifolius*, Schrenk.

Fig. 12. A plant, natural size.
13. A flower, enlarged.
14. Fruiting calyx, enlarged.
15. Ditto, attached, enlarged.
16. Pistil, enlarged.
17. Fruit, enlarged.
18. A nutlet, enlarged.

Plate XLIII.

Stachys trinervis, Aitch. et Hemsl.

Fig. 1. Portion of a leaf, enlarged.
2. Calyx, enlarged.
3. Stamens, enlarged.
4. Nutlets, enlarged.

Plate XLIV.

Atriplex Moneta, Bunge.

Fig. 1. A male flower, enlarged.
2. A female flower, enlarged.
3. Fruit in section, enlarged.
4. Seed, enlarged.
5. Section of the same, enlarged.

Plate XLV.

Rheum tataricum, Linn.

Fig. 1. Portion of a leaf, natural size.
2. Portion of inflorescence, natural size.
3. Branch bearing fruit, natural size.
4. A flower, enlarged.
5. Pistil, enlarged.
6. Achene, enlarged.
7. Section of the same, enlarged.
8. Embryo, enlarged.

Plate XLVI.

Ficus Carica, Linn. ♂ and ♀.

Fig. 1. A leaf from a barren branch, natural size.
2. Section of a male receptacle, enlarged.
3. A male flower, enlarged.
4. A gall-flower, enlarged.
5. Pistil of a gall-flower, enlarged.
6. Pistil of a gall-flower containing larva, enlarged.
7. Section of a female receptacle, enlarged.
8. A female flower.
9. Achene.

Plate XLVII.

A and B, figs. 1–10. *Ephedra pachyclada*, Boiss. ?

A. Portion of a male plant, natural size.
B. Portion of a female plant, natural size.
Fig. 1. Portion of a branch, enlarged.
2. Male inflorescence, enlarged.
3. A bract, enlarged.
4. A male flower, enlarged.
5. A female flower, enlarged.
6. A fruit, enlarged.
7. A fruit, bracts removed, enlarged.
8. A seed, enlarged.
9. Longitudinal section of same, enlarged.
10. Cross section of same, enlarged.

PLATE XLVII. (*continued*).

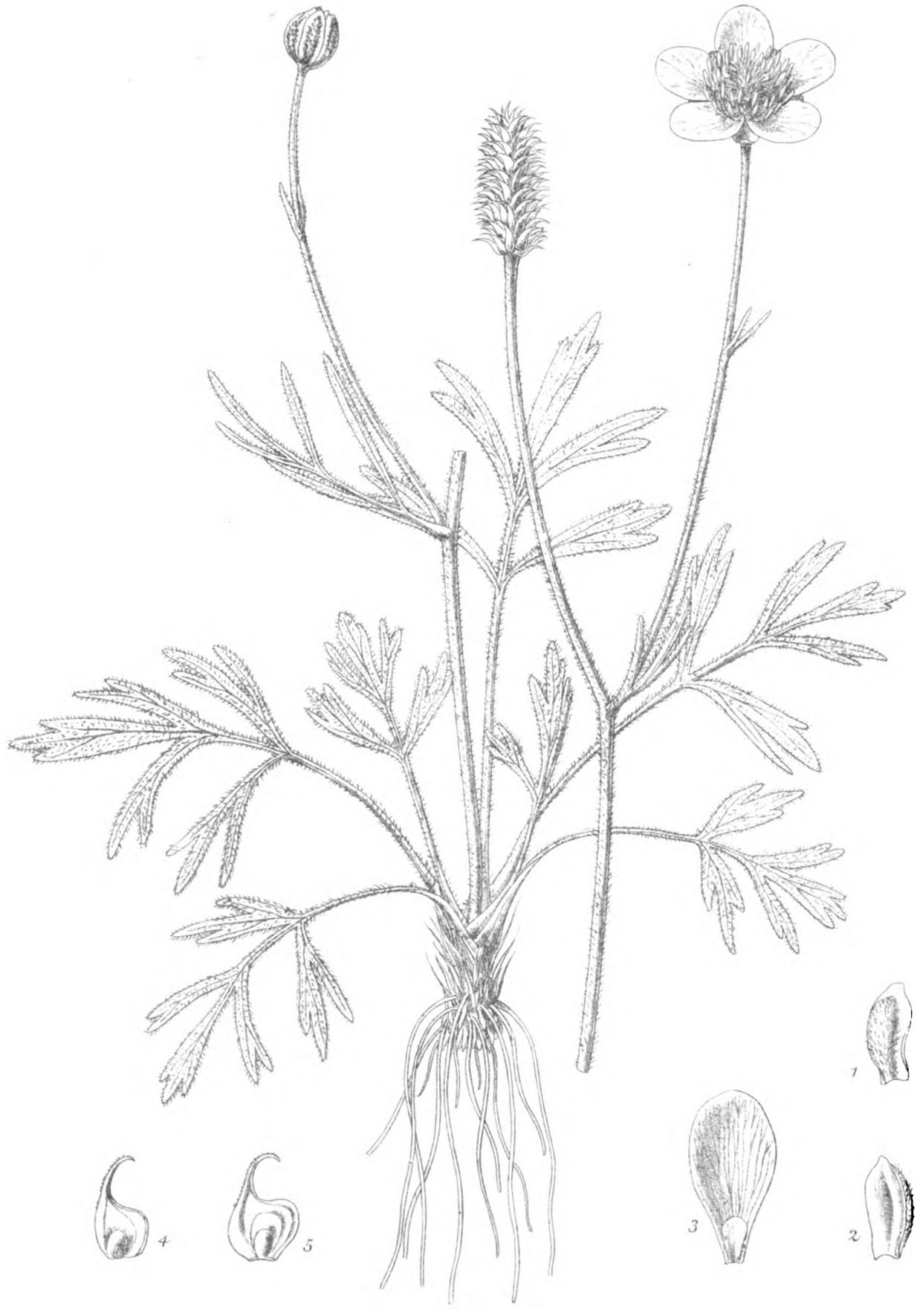
C, figs. 11–15. ***Ephedra sarcocarpa***, Aitch. et Hemsl., ♀.

Fig. 11. Fleshy bract, enlarged.
12. Fruit, enlarged.
13. Seed, enlarged.
14. Longitudinal section of same, enlarged.
15. Cross section of same, enlarged.

PLATE XLVIII.

Allium xiphopetalum, Aitch. et Baker.

Fig. 1. A plant, natural size.
2. An inflorescence at a late stage, natural size.
3 and 4. Segments of perianth, enlarged.
5. Stamens, enlarged.
6. Pistil, enlarged.
7. The same in section, much more enlarged.



M. Smith del. et lith. W. J. Allen imp.

W. B. Hemsley del.

Hanhart imp.

RANUNCULUS LEPTORRHYNCHUS, *Aitch. et Hemsl.*

M. Smith del. J. Allen lith

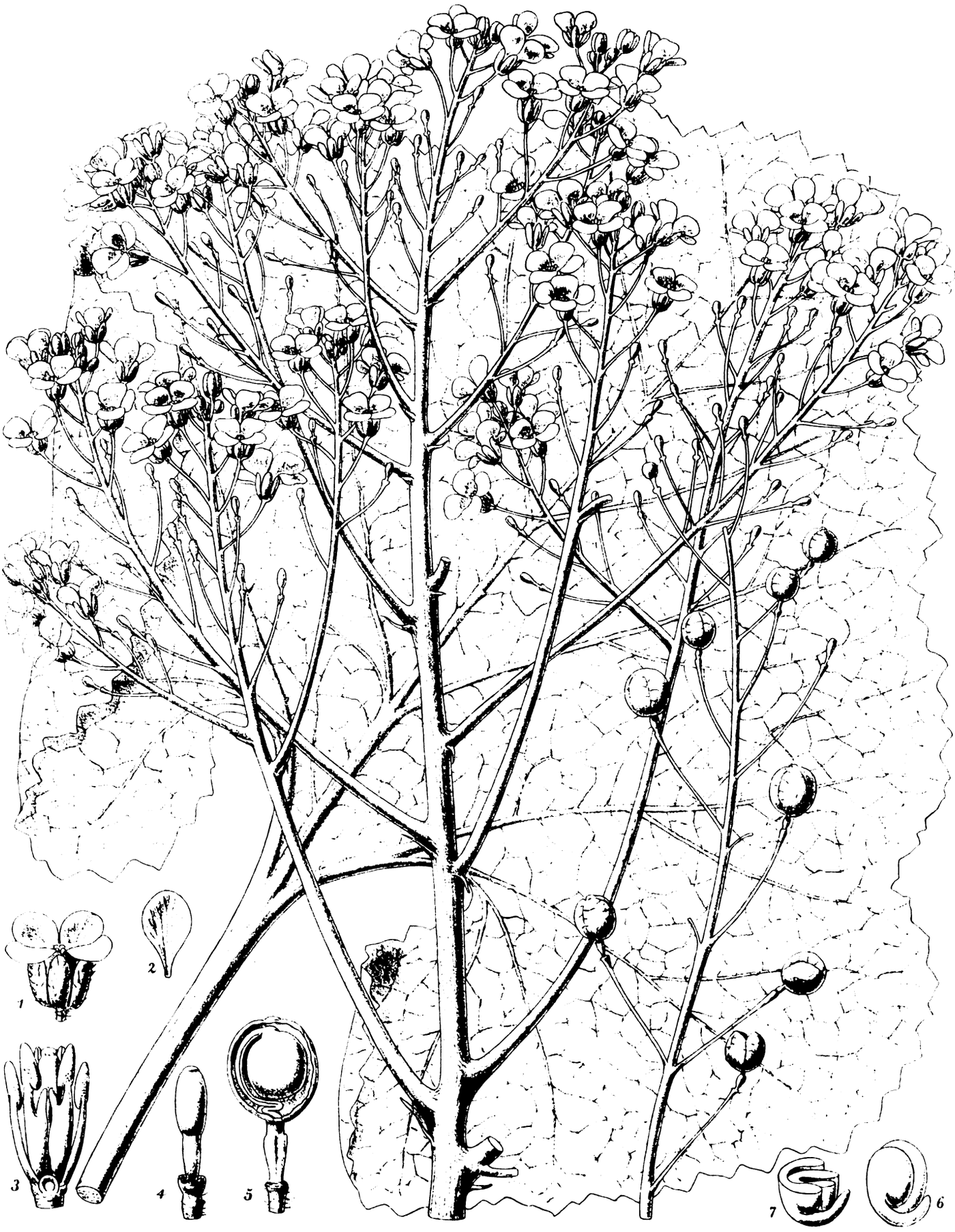
W. B. Hemsley dir.

NIGELLA INTEGRIFOLIA, *Regel*.

Hanhart imp.

W. B. Hemsley del.

DELPHINIUM ZALIL, *Aitch. et Hemsl.*



M. Smith del. J. Allen lith. W. B. Hemsley dir. Hanhart imp.

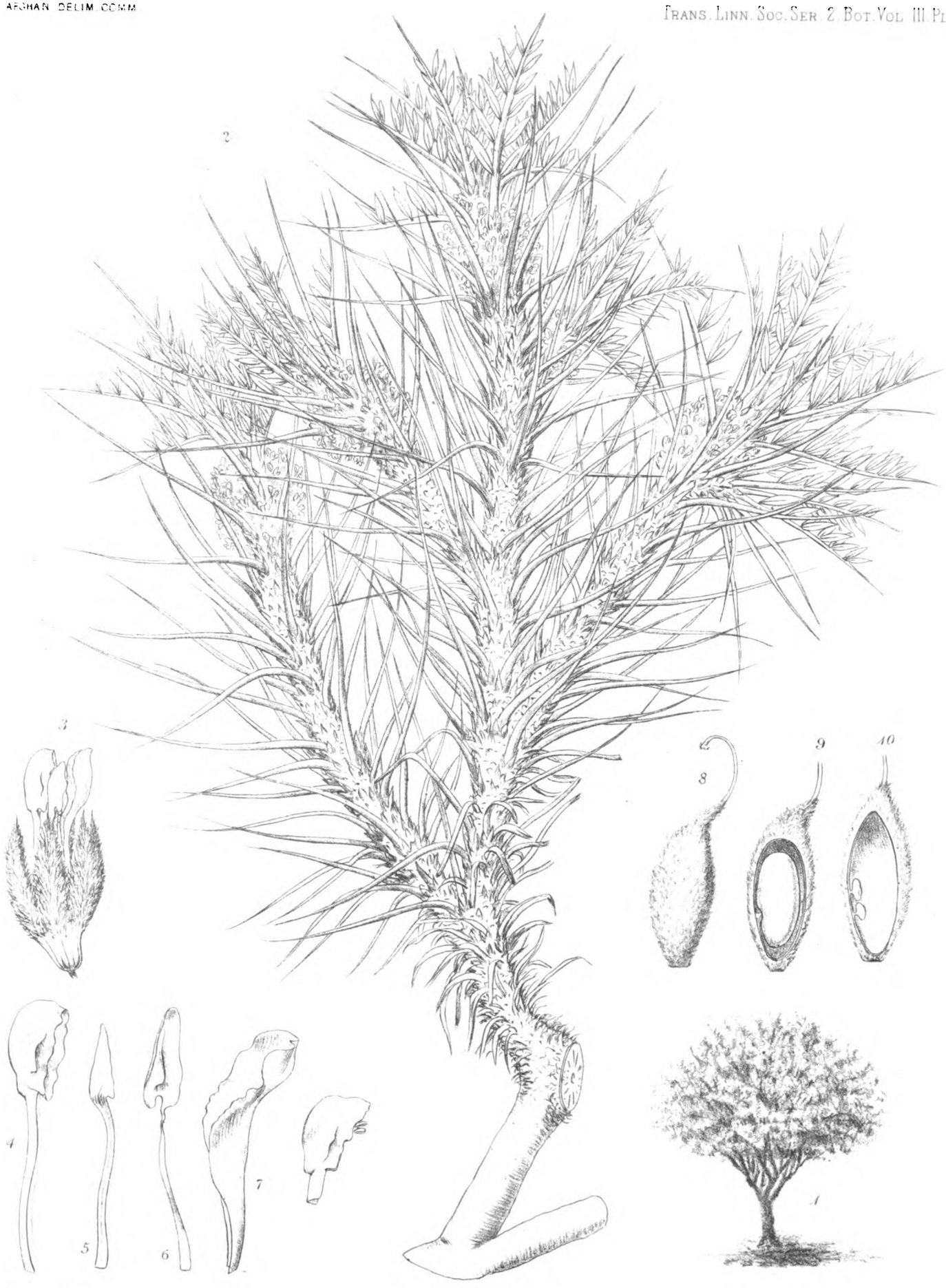
CRAMBE CORDIFOLIA, *Stev.*

M. Saunders del. et Allen lith.

W. B. Hemsley dir.

Hanhart imp.

1–10 RUTA AFFINIS, *Aitch. et Hemsl.*
11–16 RUTA ROTUNDIFOLIA, *Aitch. et Hemsl.*

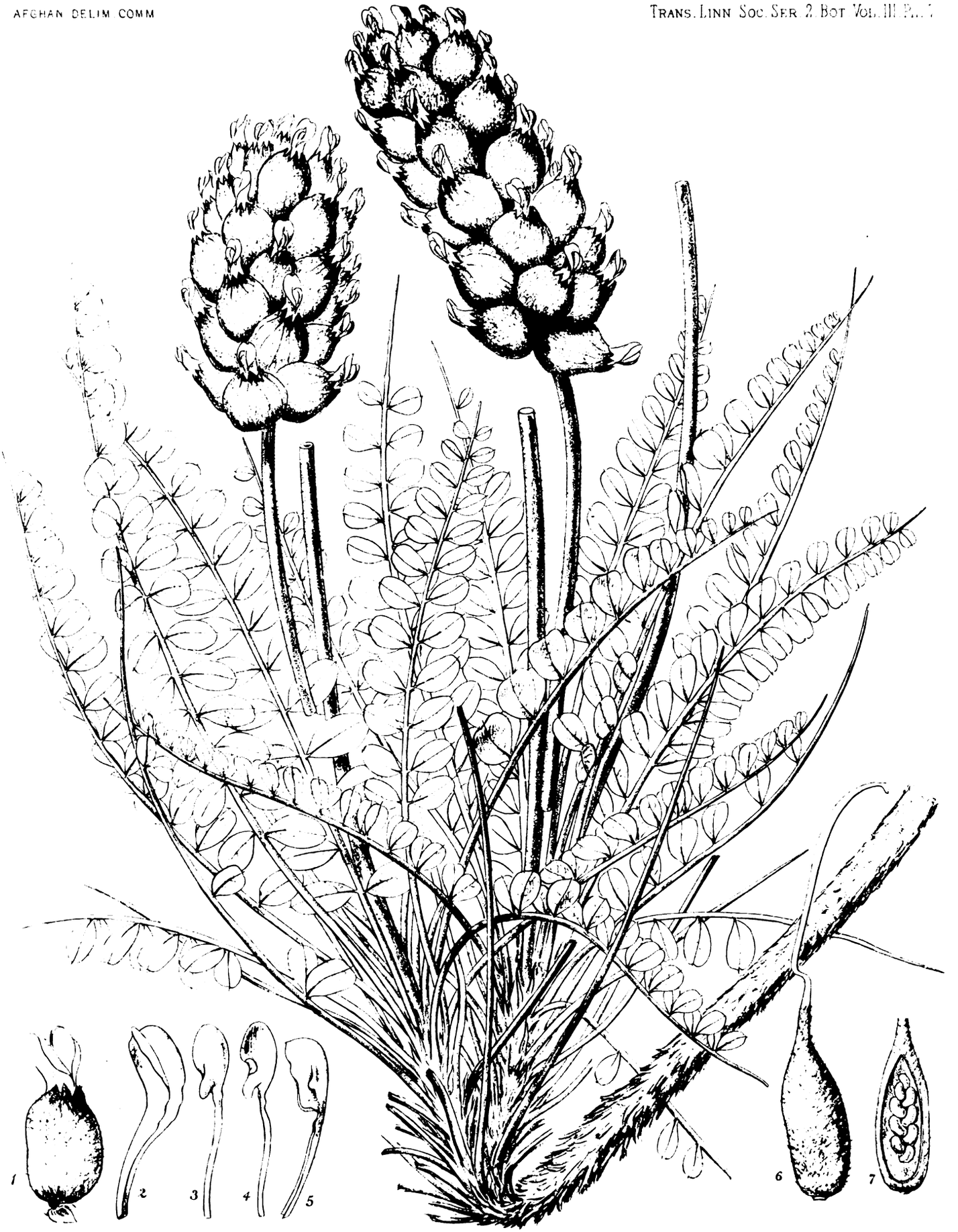


J. Allen del. et lith.

W. B. Hemsley dir.

ASTRAGALUS HERATENSIS, *Bunge*.

Hanhart imp.

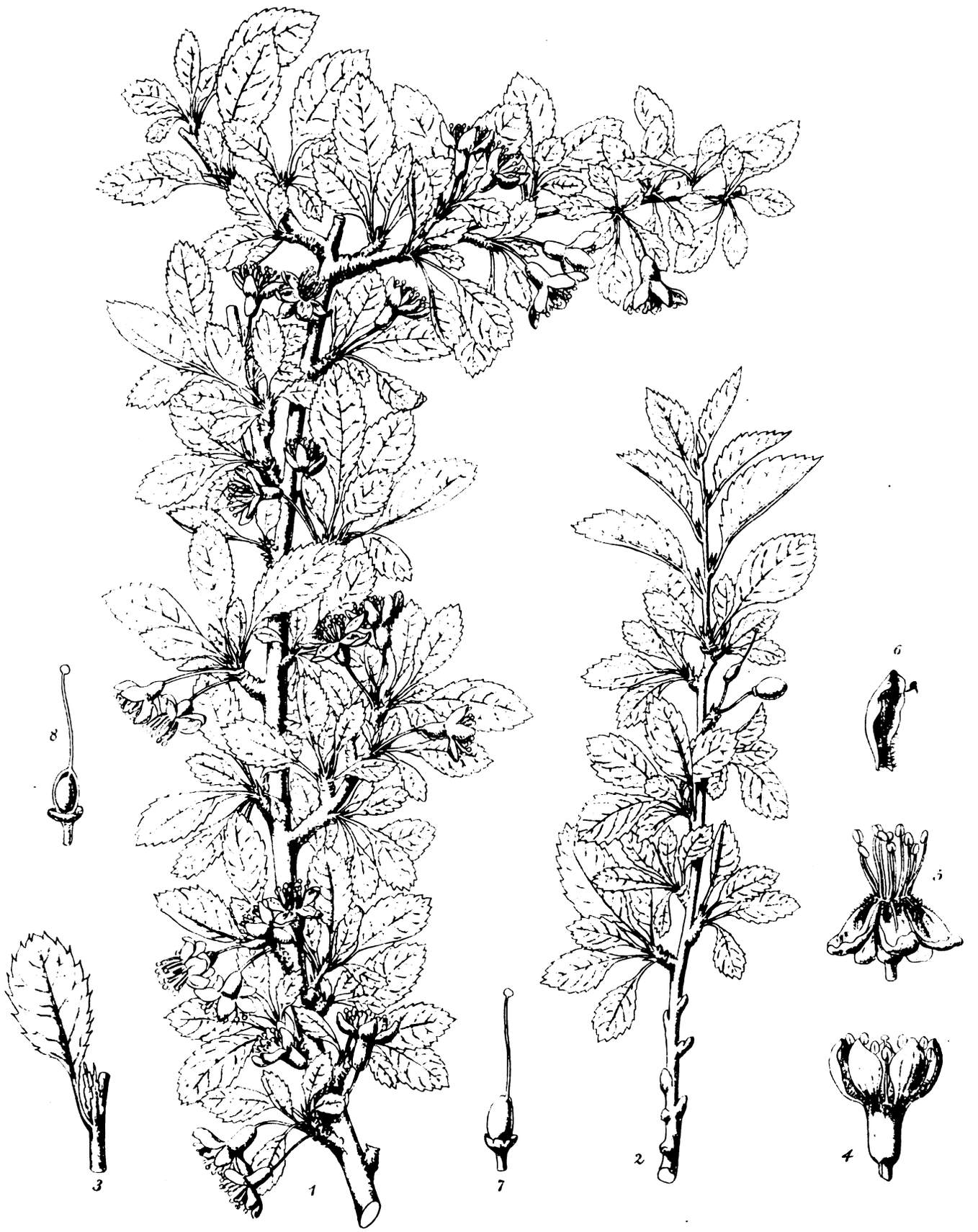


J. Allen del. et lith.

W. B. Hemsley dir.

ASTRAGALUS LUMSDENIANUS, *Aitch. et Baker.*

Hanhart imp.

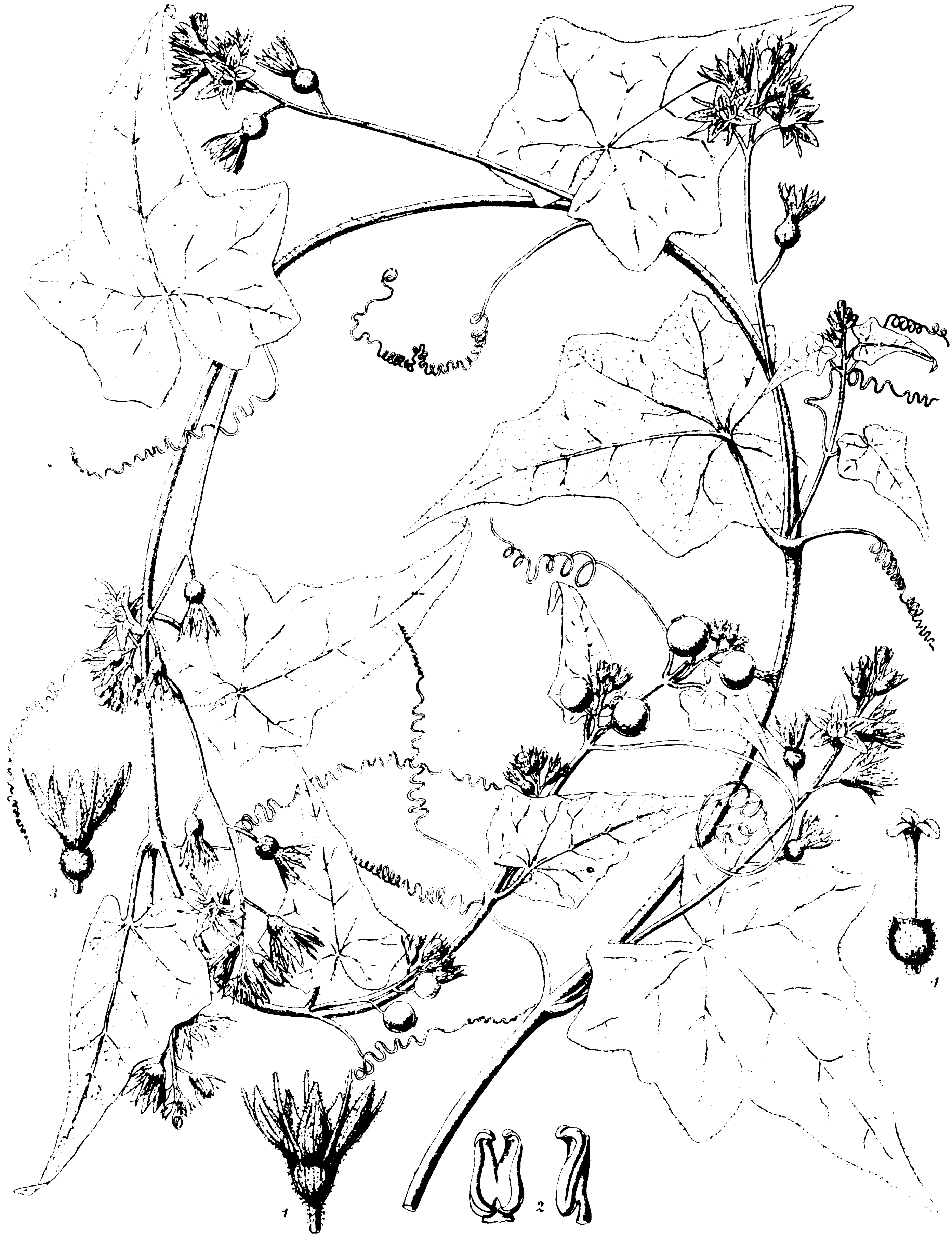


W. B. Hemsley del.

PRUNUS CALYCOSUS, *Aitch. et Hemsl.*

Hanhart imp.

COTONEASTER NUMMULARIA

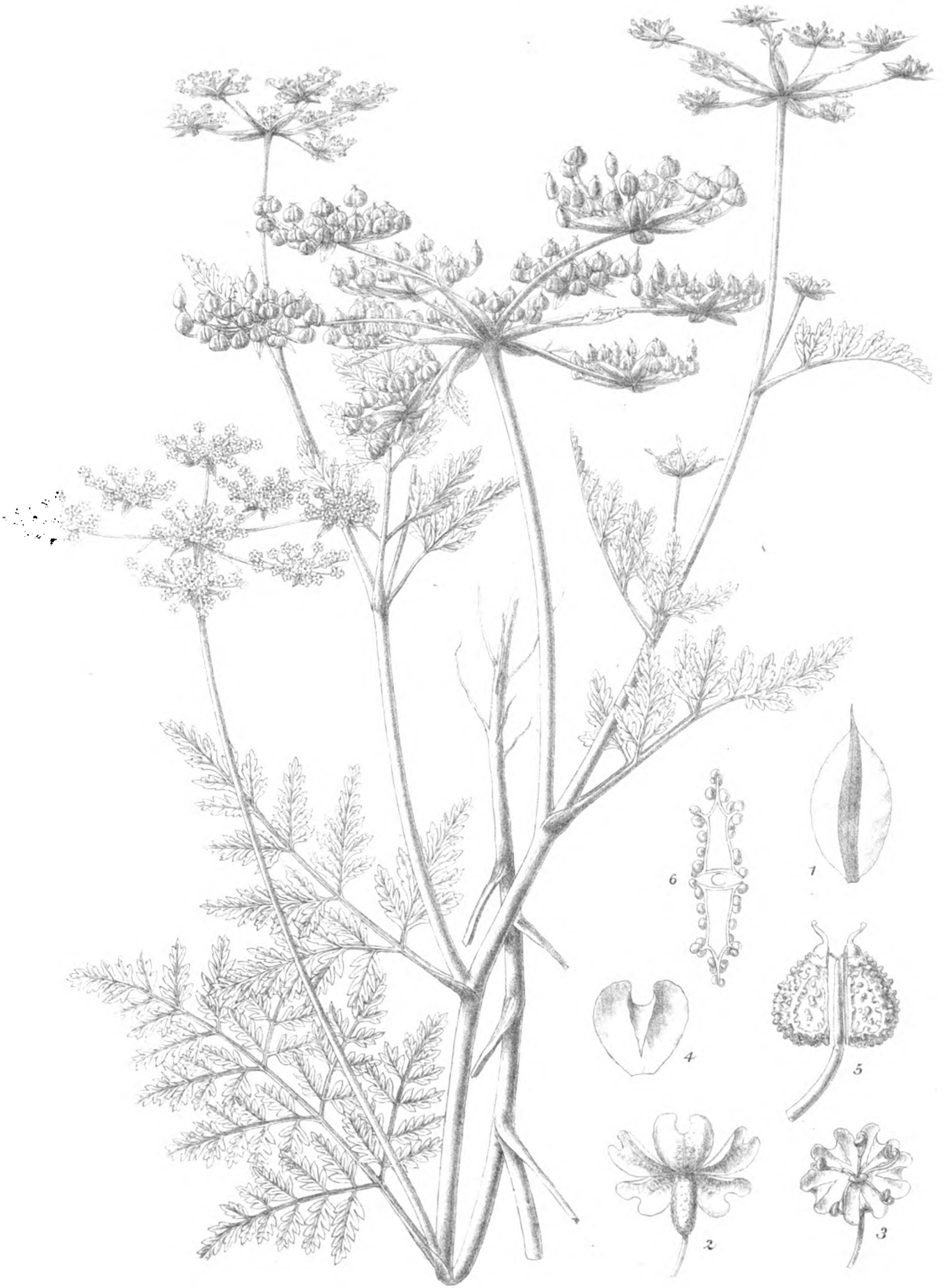


M. Smith del. J. Allen lith.

W. B. Hemsley dir.

Hanhart imp.

BRYONIA MONOICA, *Aitch. et Hemsl.*

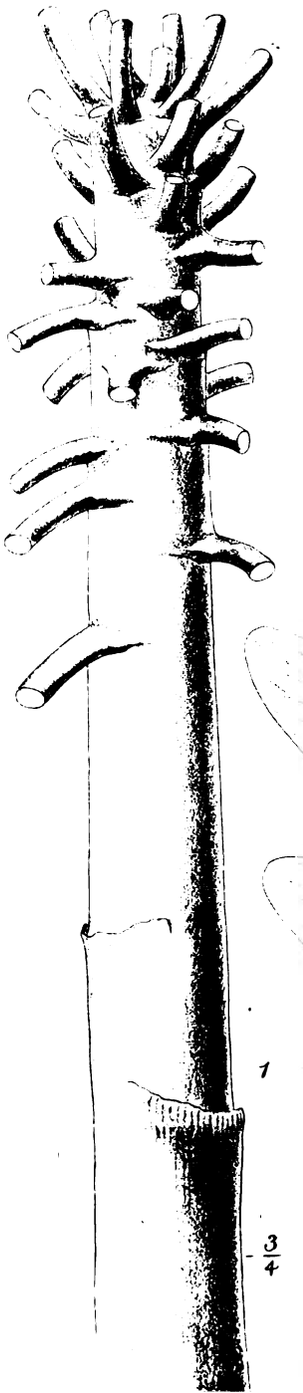


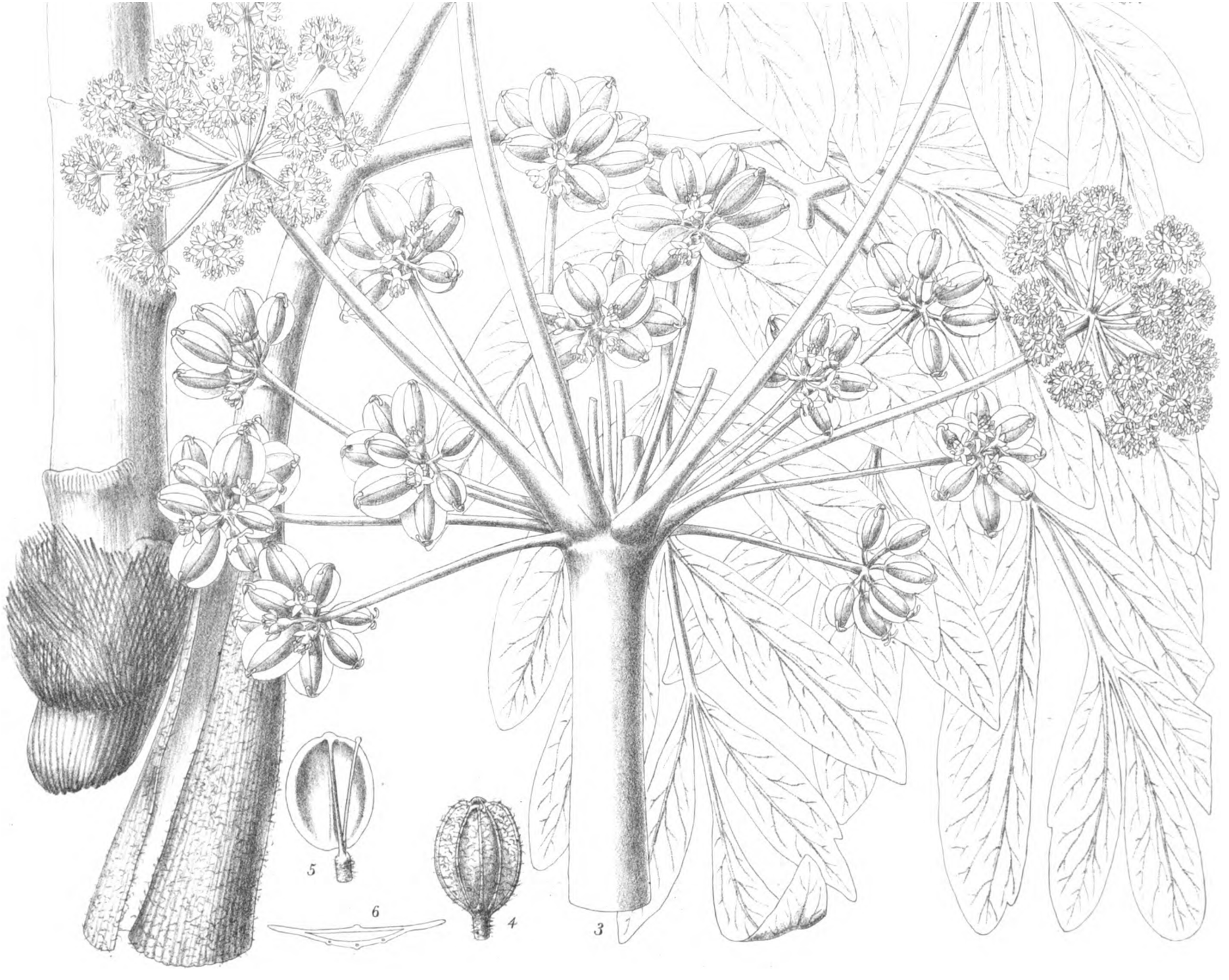
J. Allen del. et lith.

W. B. Hemsley dir.

Harbutt imp.

TRACHYDIUM LEHMANNII, *Fenzl et Regel*.



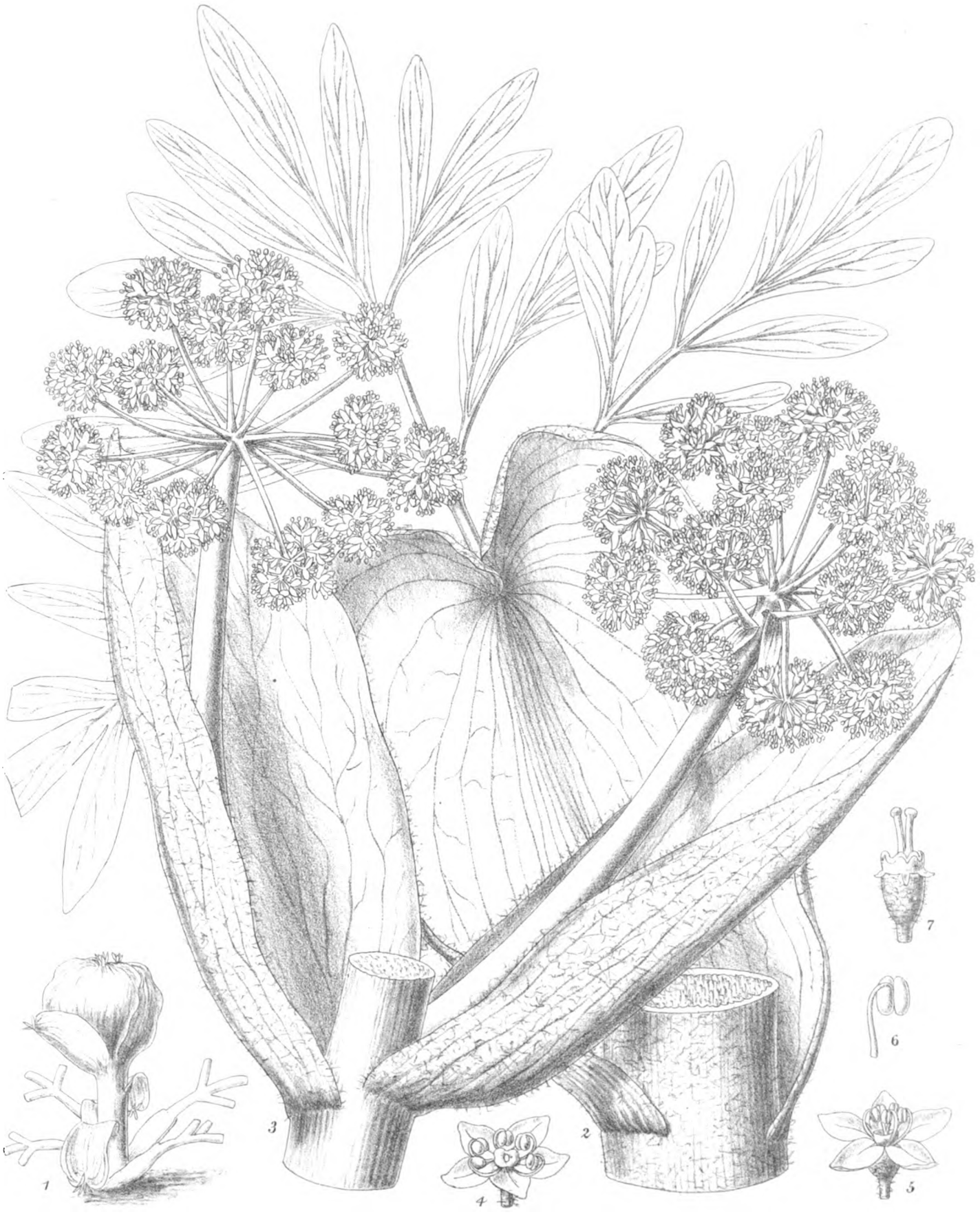


M.Smith del. J.Allen lith.

W.B.Hemsley dir.

FERULA FŒTIDA, *Regel*.

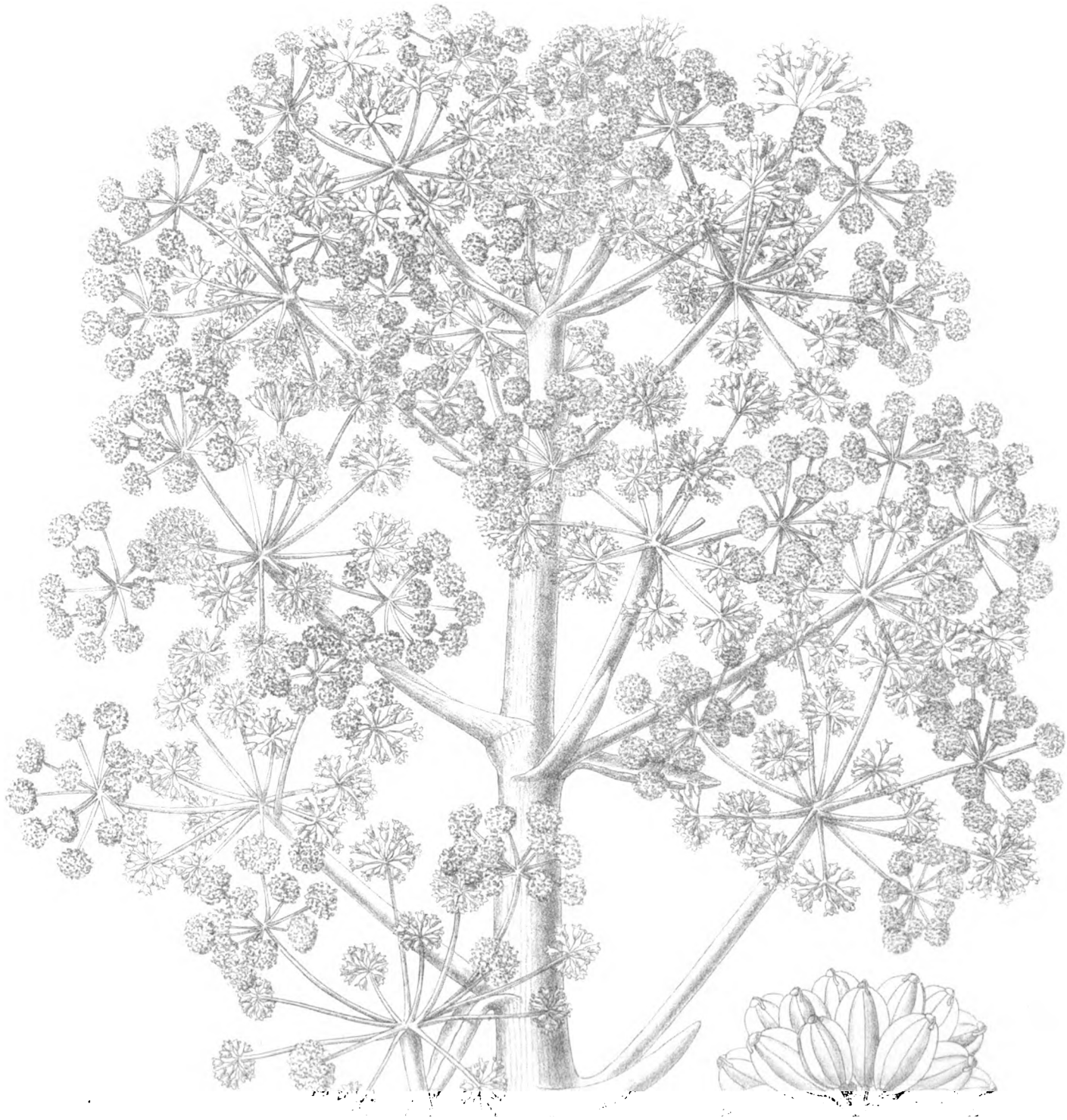
Hanhart imp.

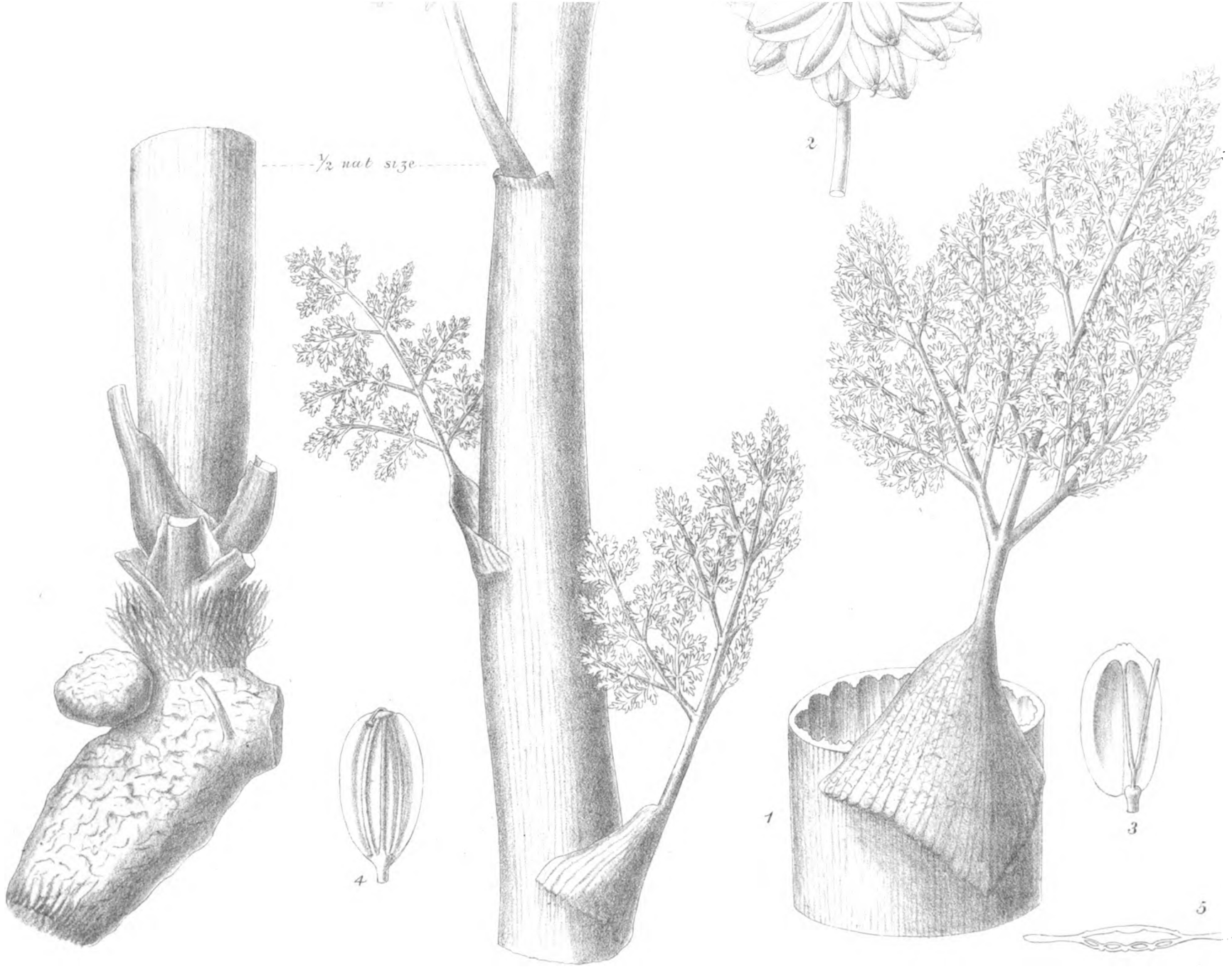


M. Smith. del. J. Allen lith.

W. B. Hemsley. chr.

FERULA FOETIDA. Regel.





W B Hemsley del

FERULA GALBANIFLUA, Boiss.

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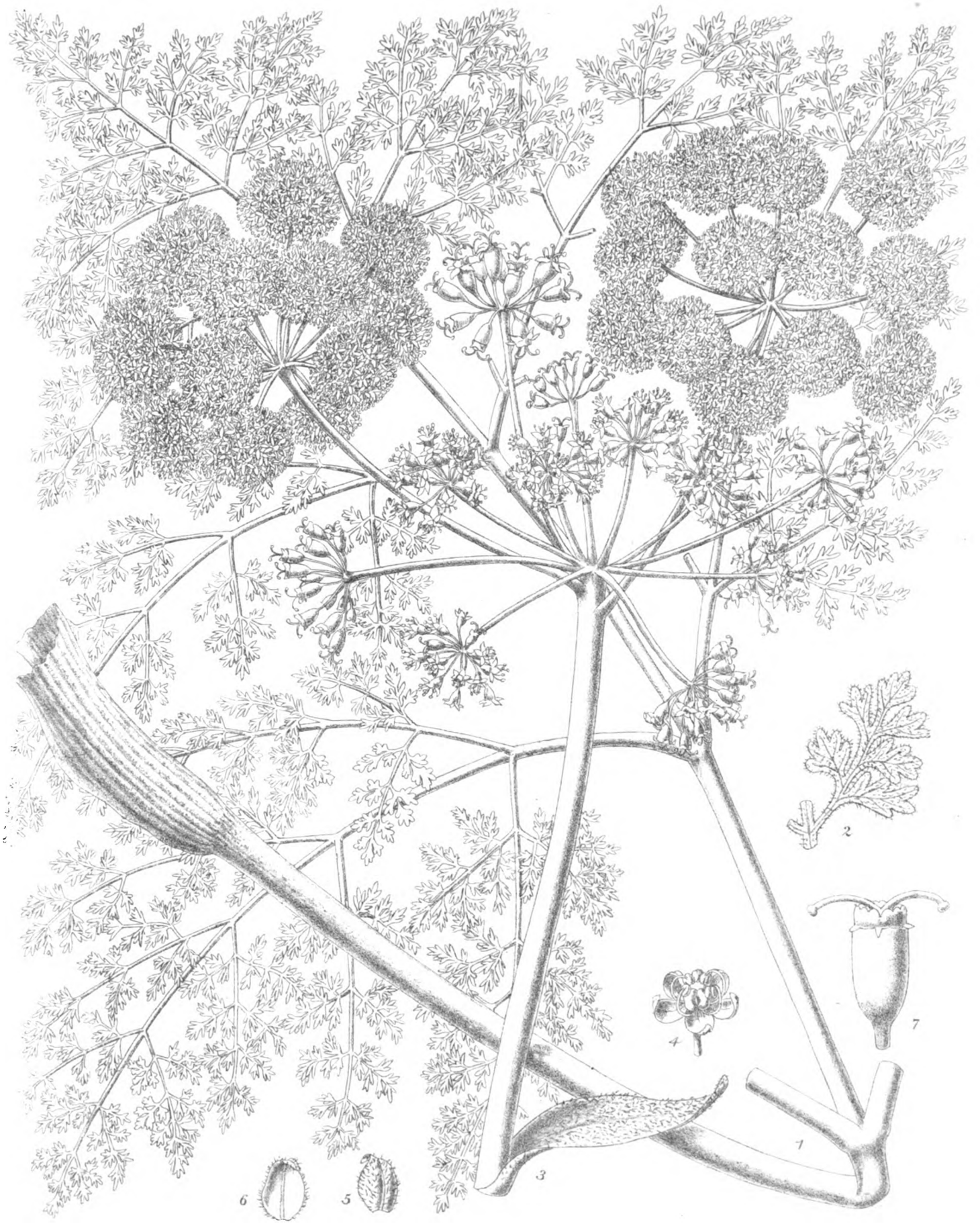


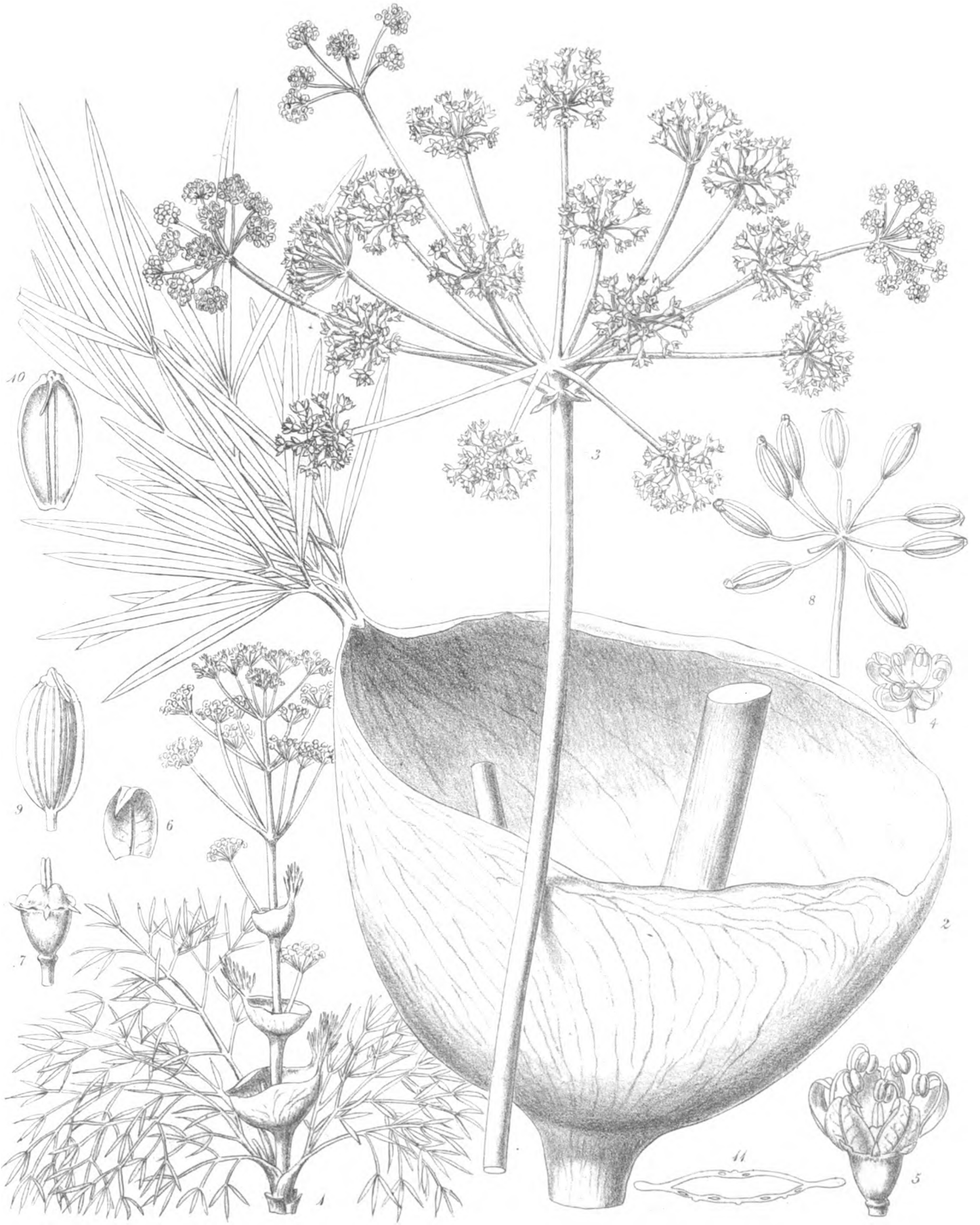
M. Smith del. et lith.

W. B. Hemsley imp.

Hanhart imp.

FERULA GALBANIFLUA, *Boiss.*

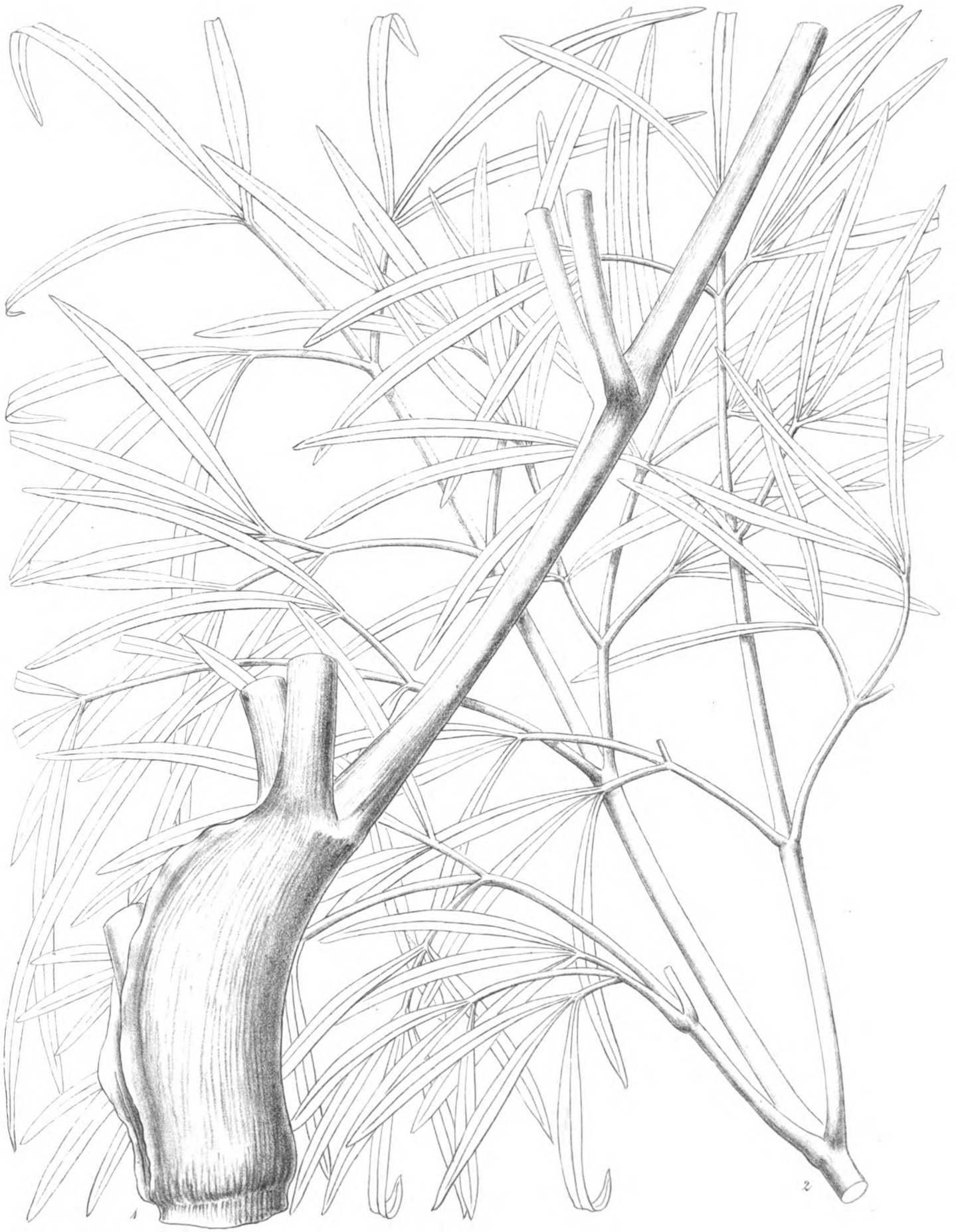
TRANS. LINN. SOC. SER. 2 BOT VOL. III PL. 18.



W. B. Hemsley del.

FERULA COPIDA. Aitch.

Hanhart imp.



W B Hemsley del.

FERULA OOPODA, *Boiss.*

TRANS. LINN SOC. SER. 2. BOT. VOL. III. PL. 20.

M. Smith del. J. Allen lith.

W. B. Hemsley chr.

FERULA SUAVEOLENS, *Aitch. et Hemsl.*

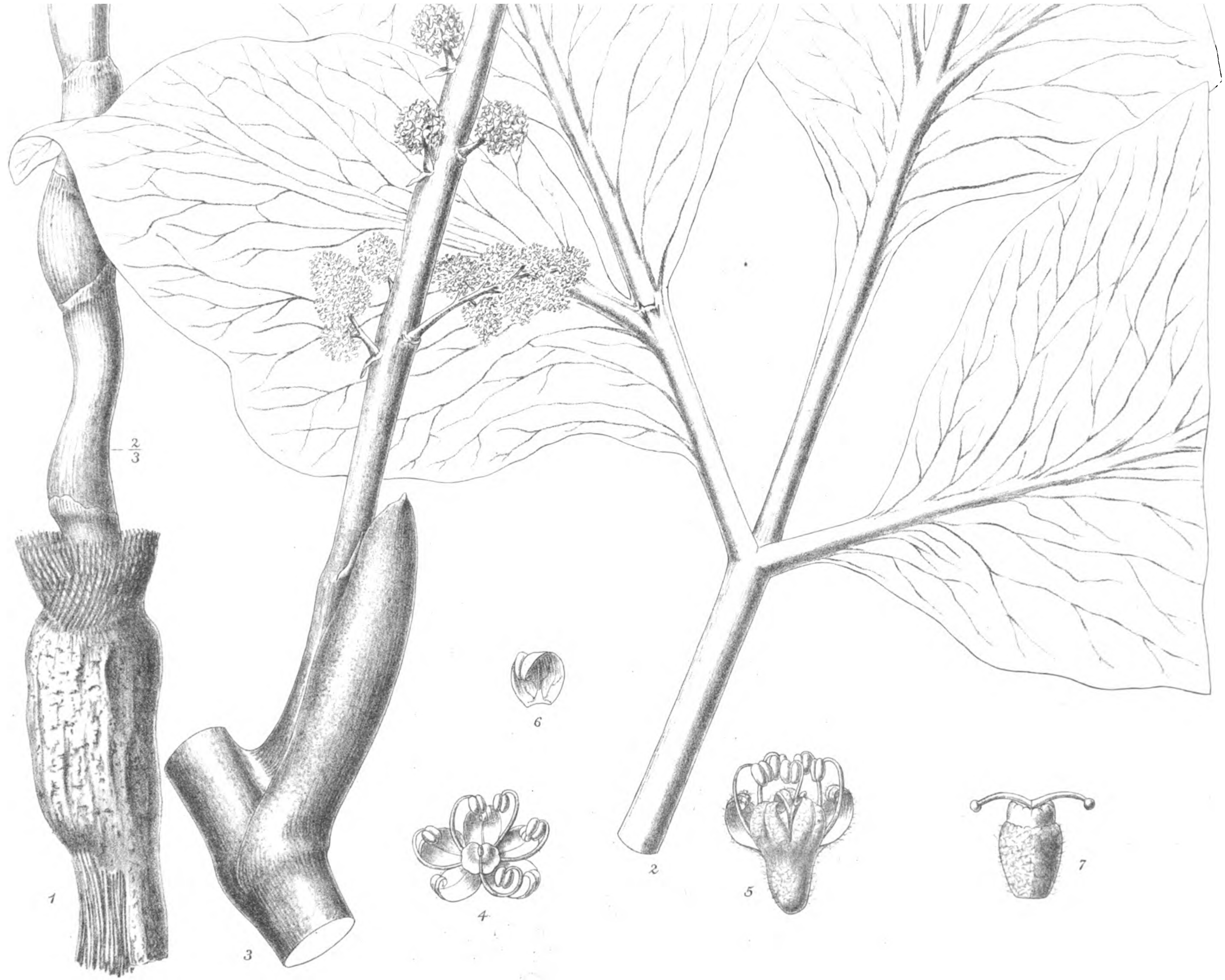
Harrison imp.

M. Smith del. J. Allen lith.
W. B. Hemsley de
Hanhart imp.

FERULA SUAVEOLENS, *Aitch. et Hemsl.*

W.B. Hemsley, del.

CARUM LEPTOCLADUM, *Aitch. et Hemsl.*

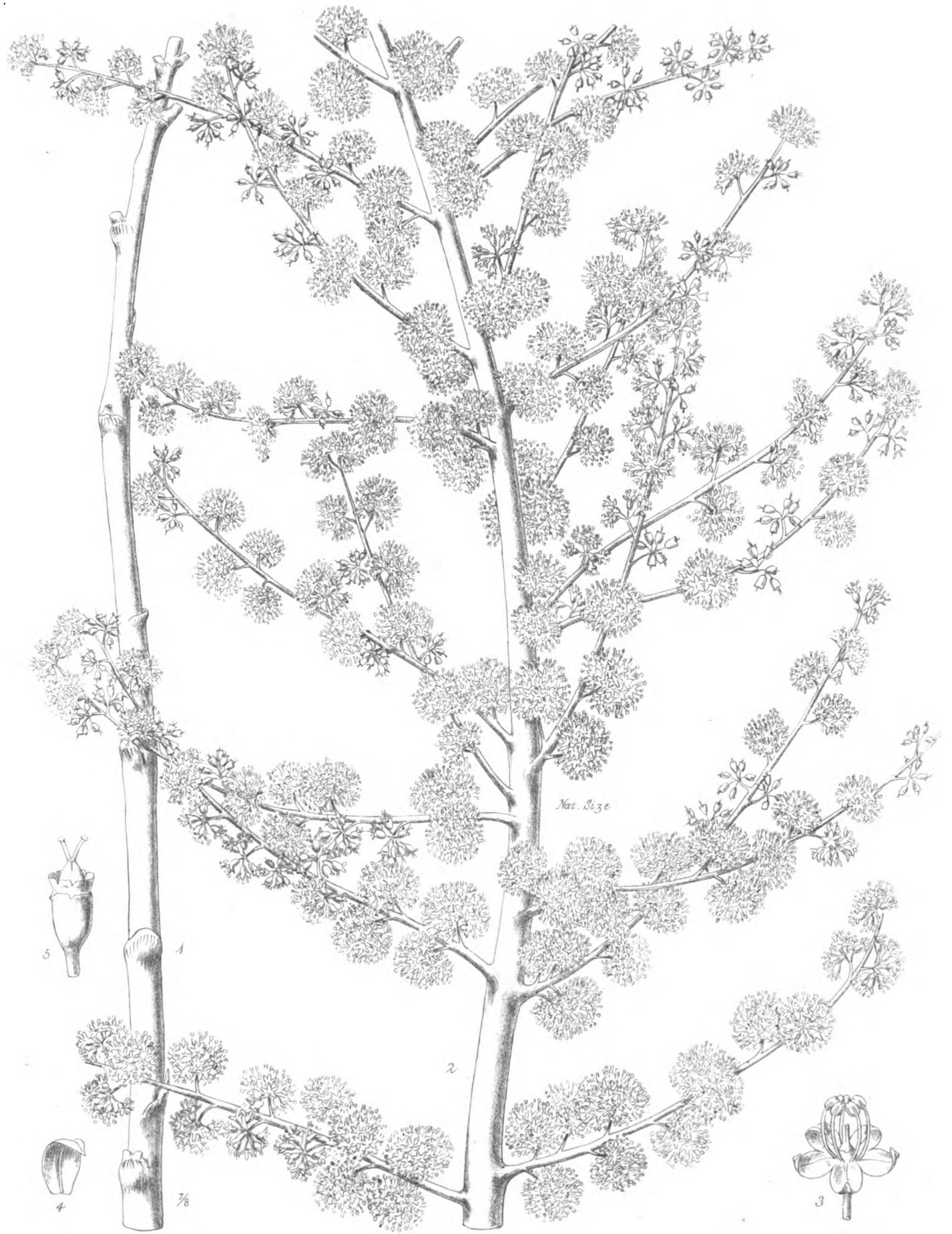


M. Smith del. J. Allen lith. W. B. Hemsley dir. Hanhart imp.

DOREMA AMMONIACUM, *D. Don.*

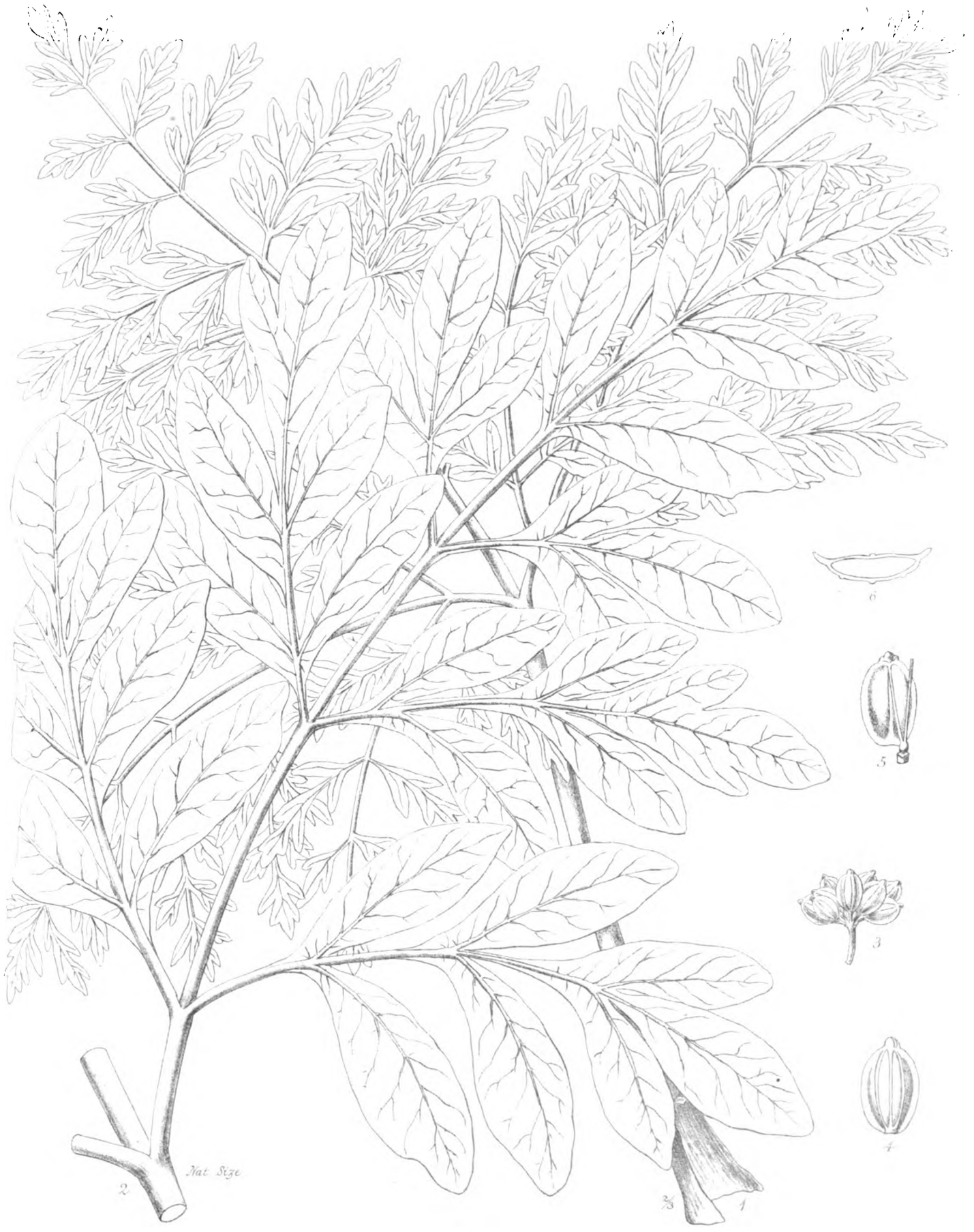
LOREMA AMMONIACUM. *Decne.*

Trans. Linn. Soc. Ser. 2. Bot. Vol. III. Pl. 26



W.B. Hemsley del.

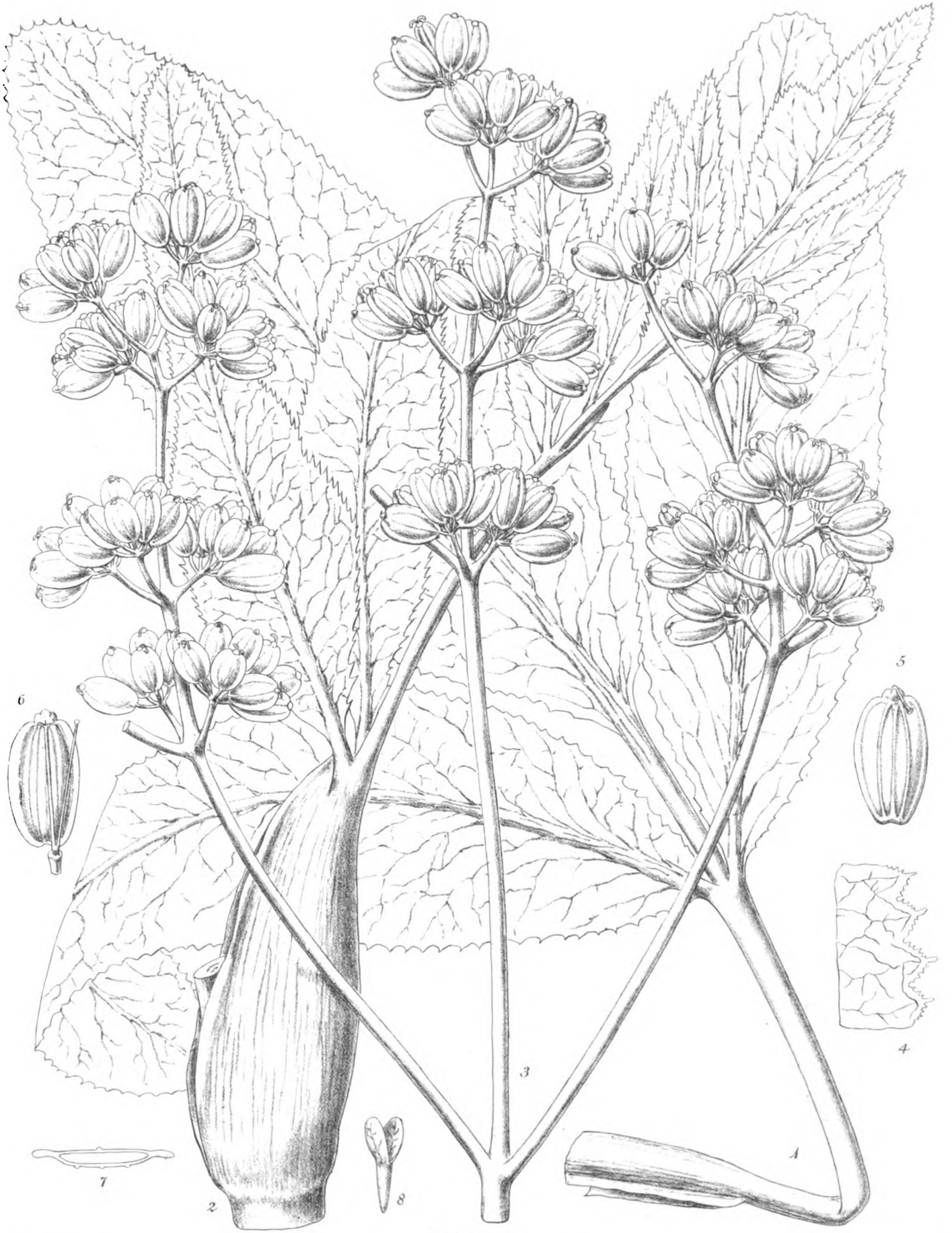
DOREMA GLABRUM, *Fisch. & C. Mey.*



M. Smith del. et lith.

W. B. Hemsley del.

DOREMA GLABRUM, *Aitch. et Hey.*

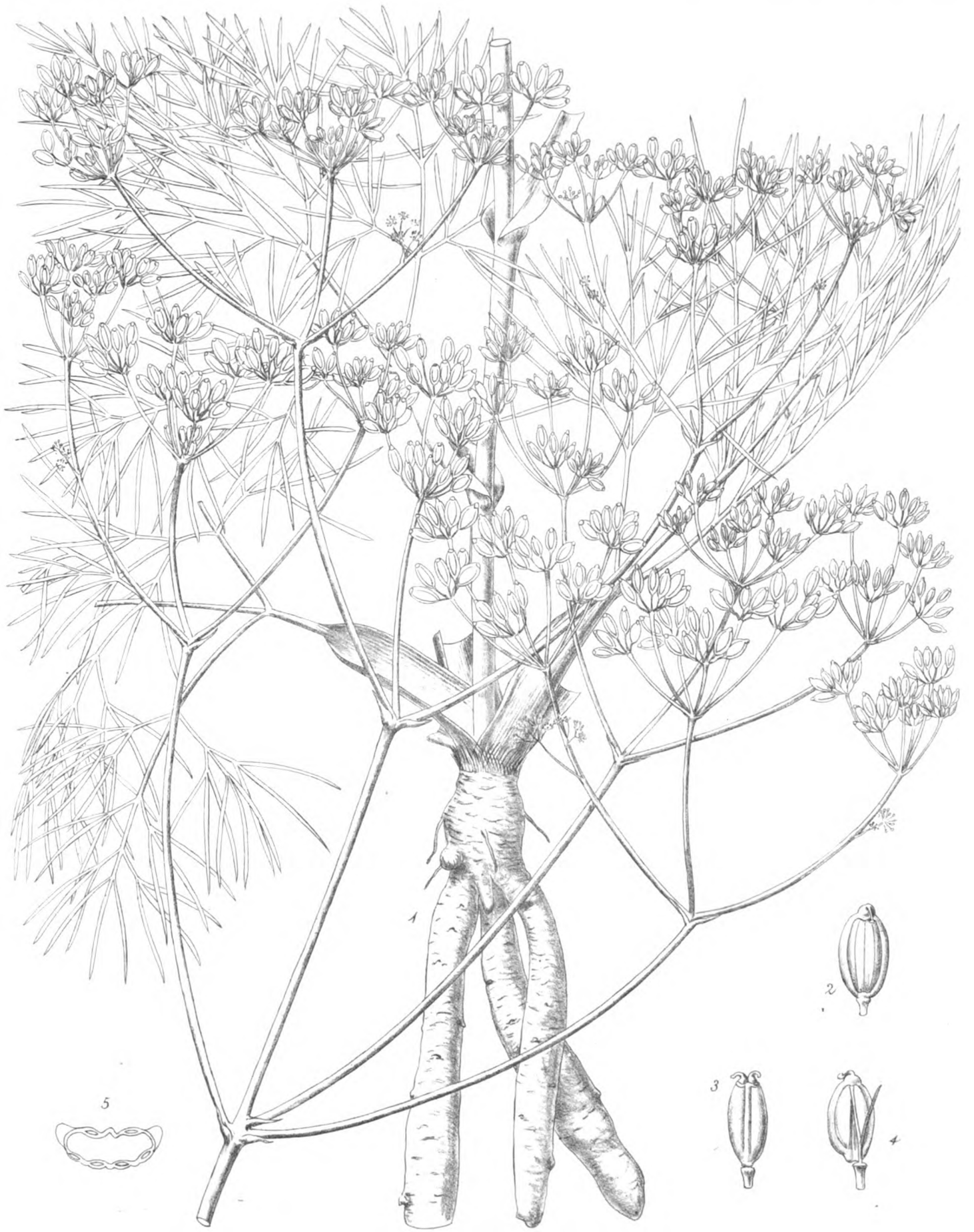


W. B. Hemsley dir.

M. Smith del. J. Allen lith.

DOREMA SERRATUM, *Aitch. et Hemsl.*

Hanhart imp.



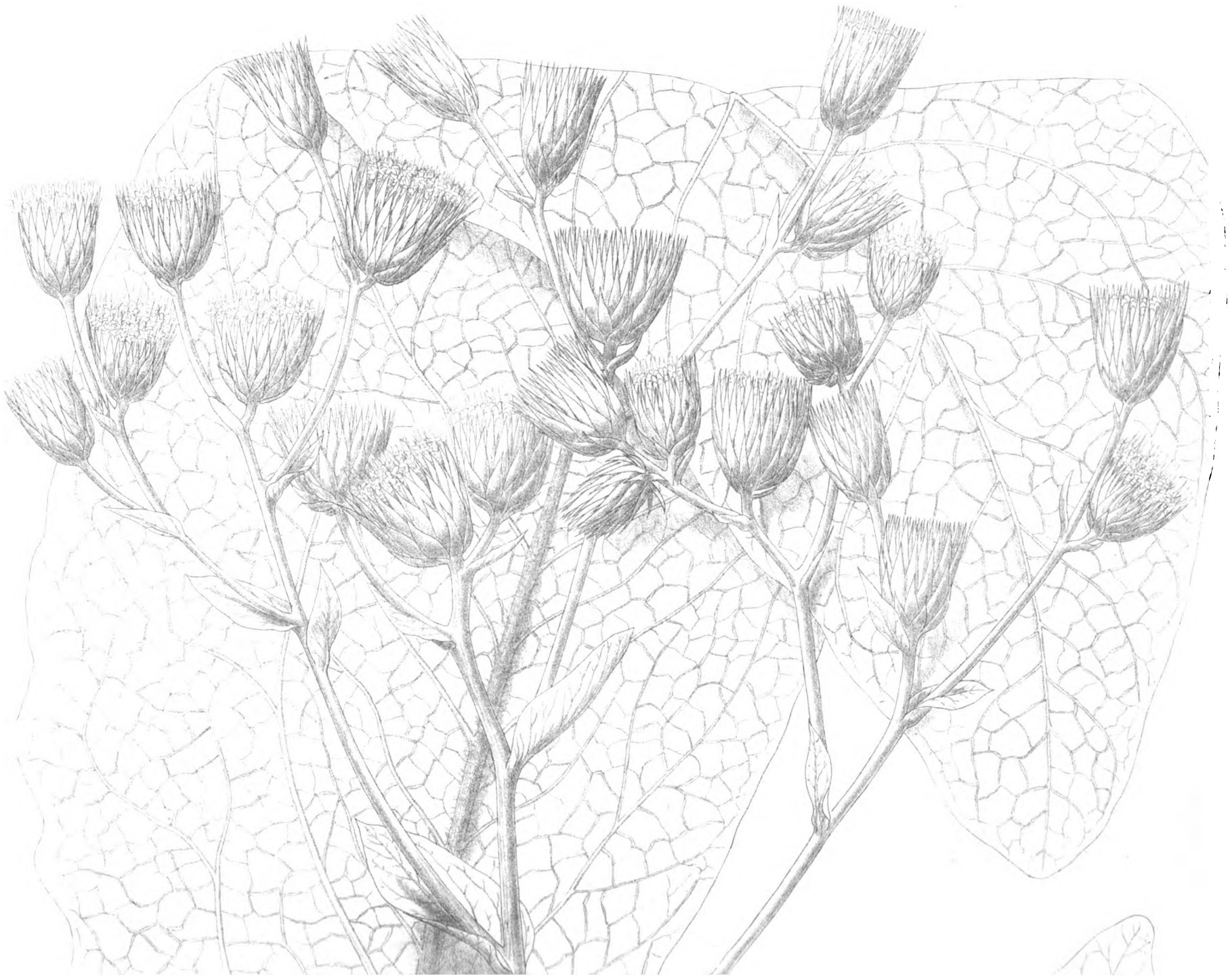
M. Smith del. J. Allen lith.

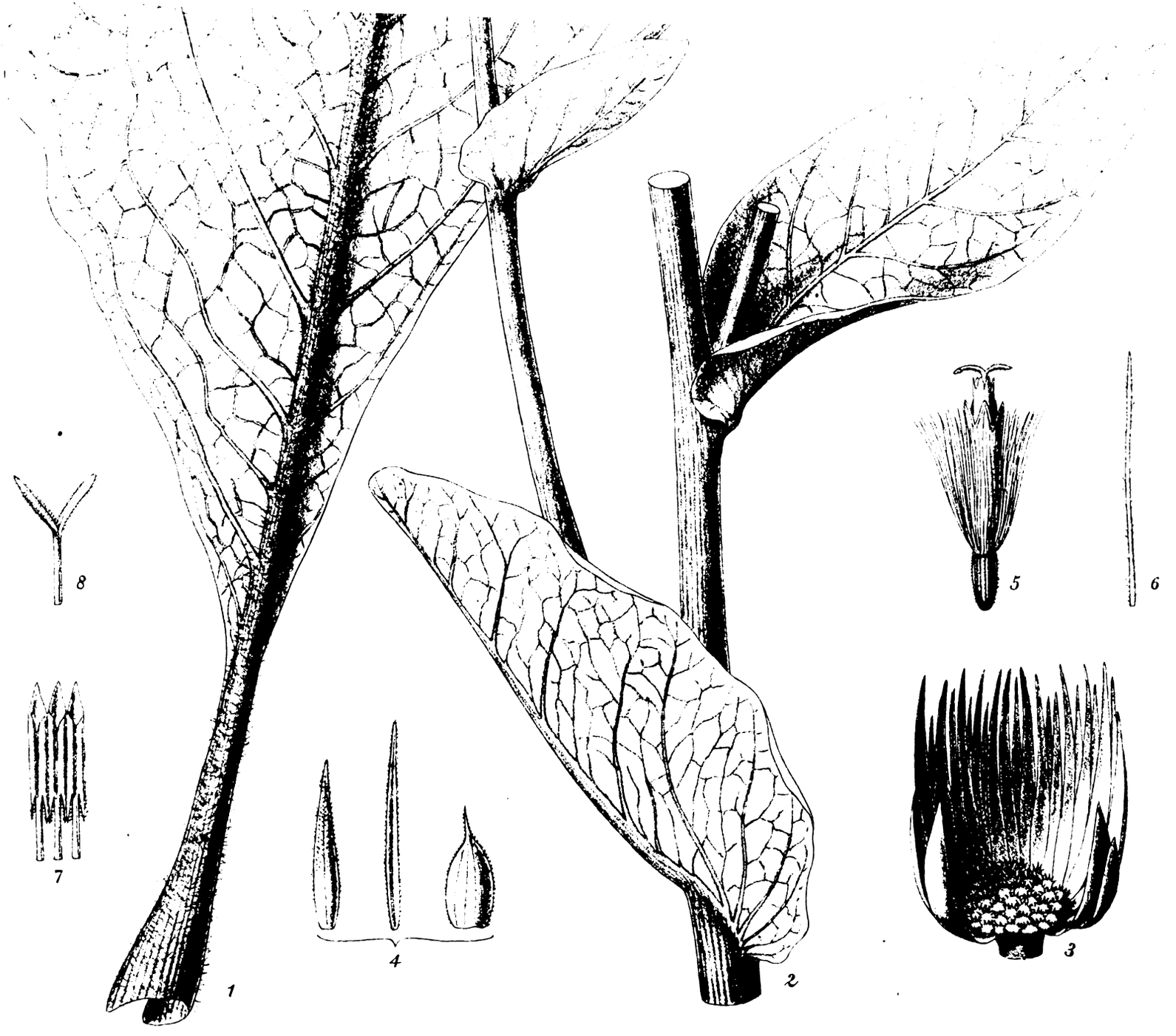
W. B. Hemsley dir.

JOHRENIA PLATYPODA, *Aitch. et Hemsl.*

Harrison imp.

GAILLONIA DUBIA





W.B. Hemsley dir.

Hanhart lith.

CODONOCEPHALUM PEACOCKIANUM, *Arech et Hemsl.*

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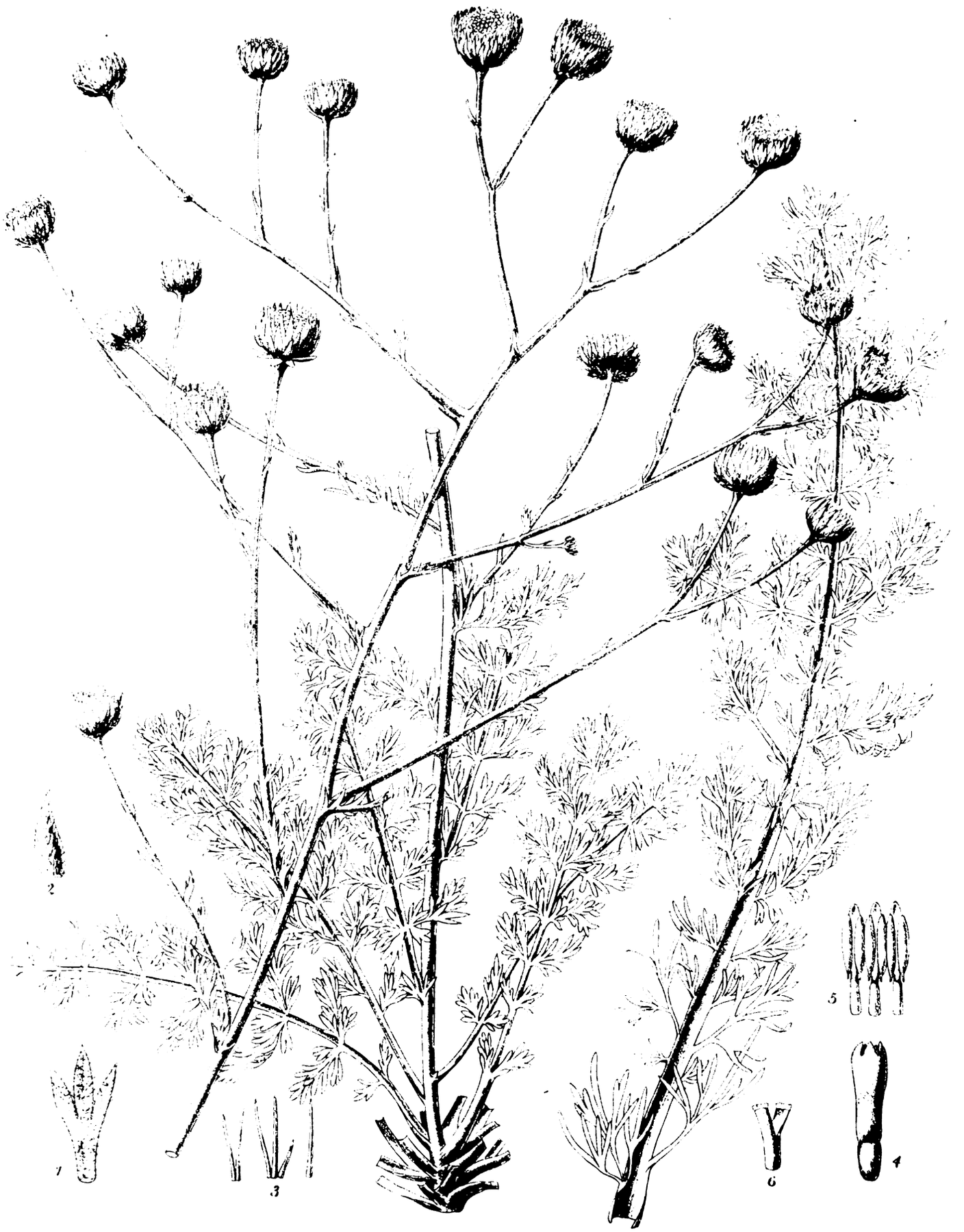


M. Smith del. J. Allen lith. W. B. Hemsley dir. Hanhart imp.

ANTHEMIS CAULESCENS, *Aitch. et Hemsl.*

M. Smith del. et lith.

W. B. Hemsley dir.

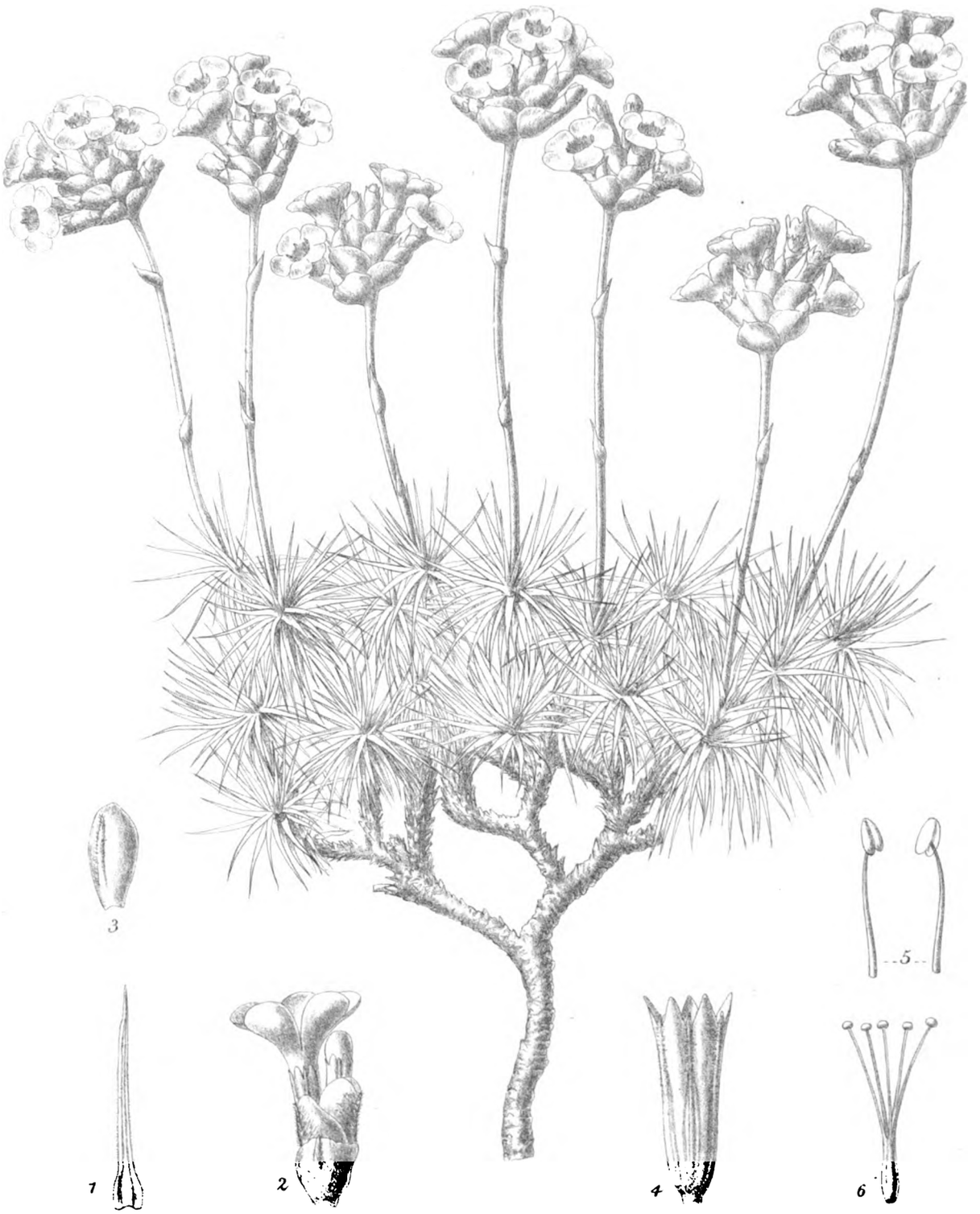
Hanhart imp.

JURINEA VARIABILIS, *Aitch. et Hemsl.*

W. B. Hemsley lit.

Hanhart imp.

ACANTHOLIMON SPECIOSISSIMUM, Aitch. et Hemsl.



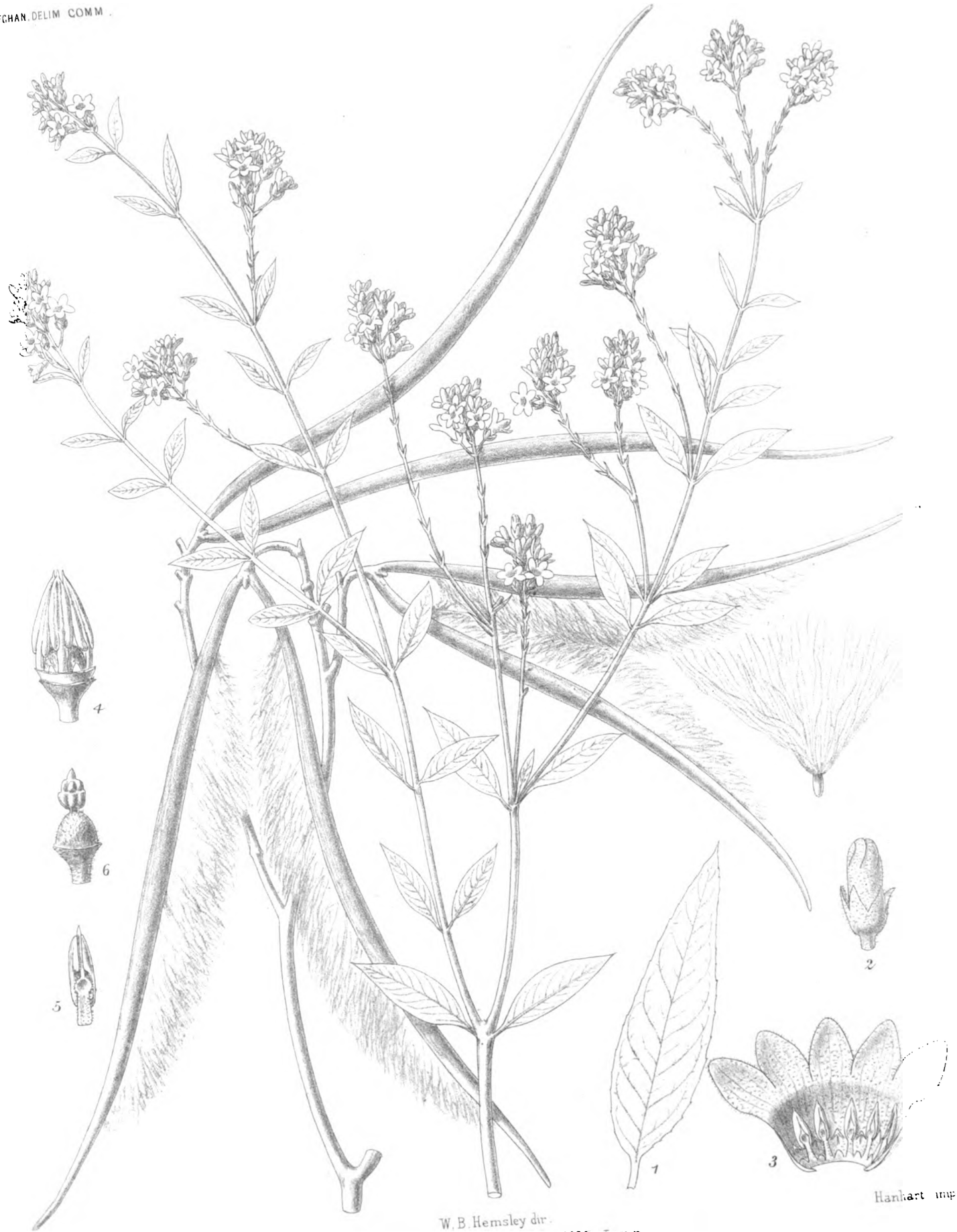
M. Smith del. J. Allen lith.

W. B. Hemsley dir.

Hanhart imp.

ACANTHOLIMON ECÆ, *Aitch. et Hemsl.*

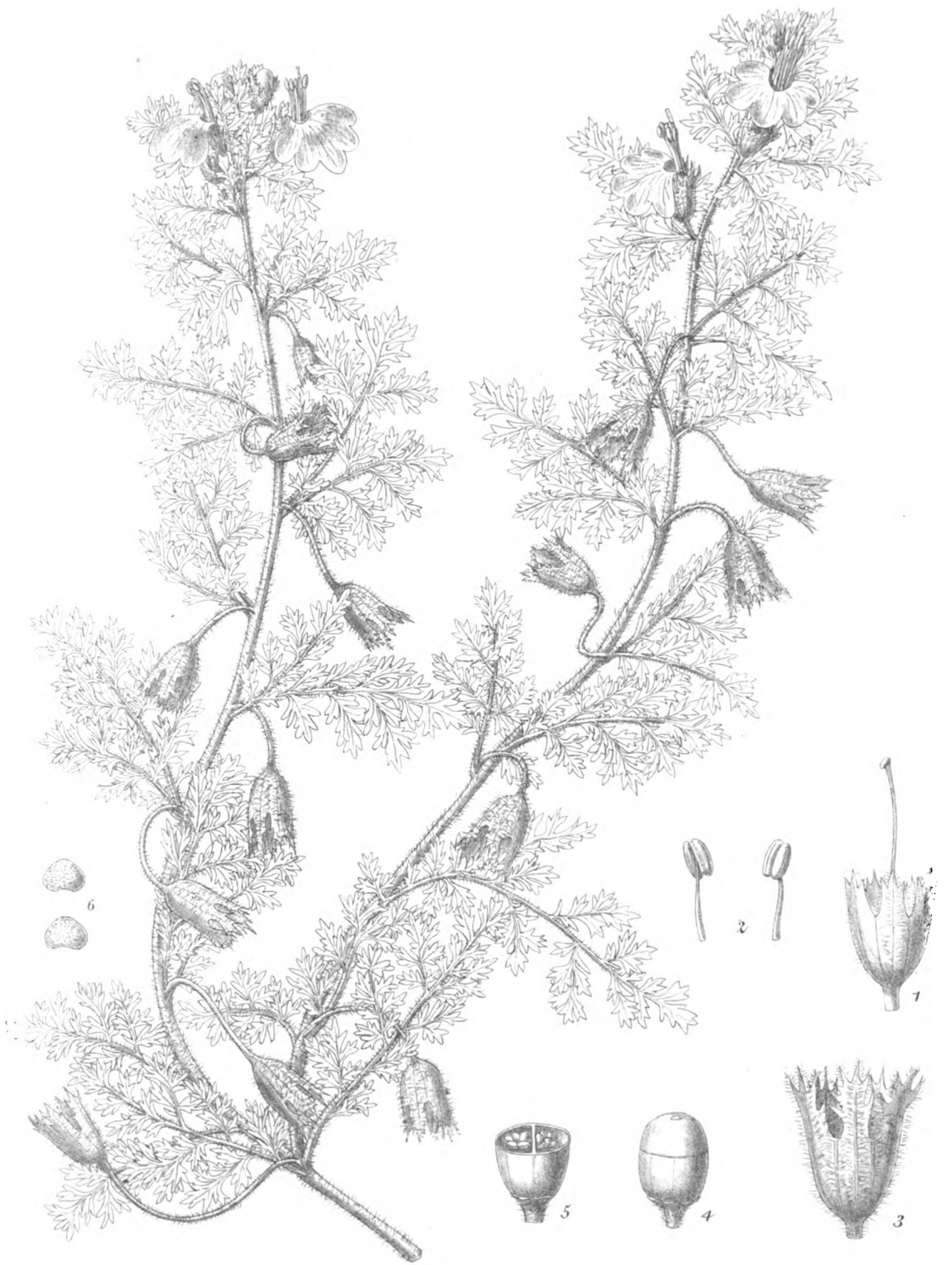
AFGHAN. DELIM. COMM.



W. B. Hemsley dir.

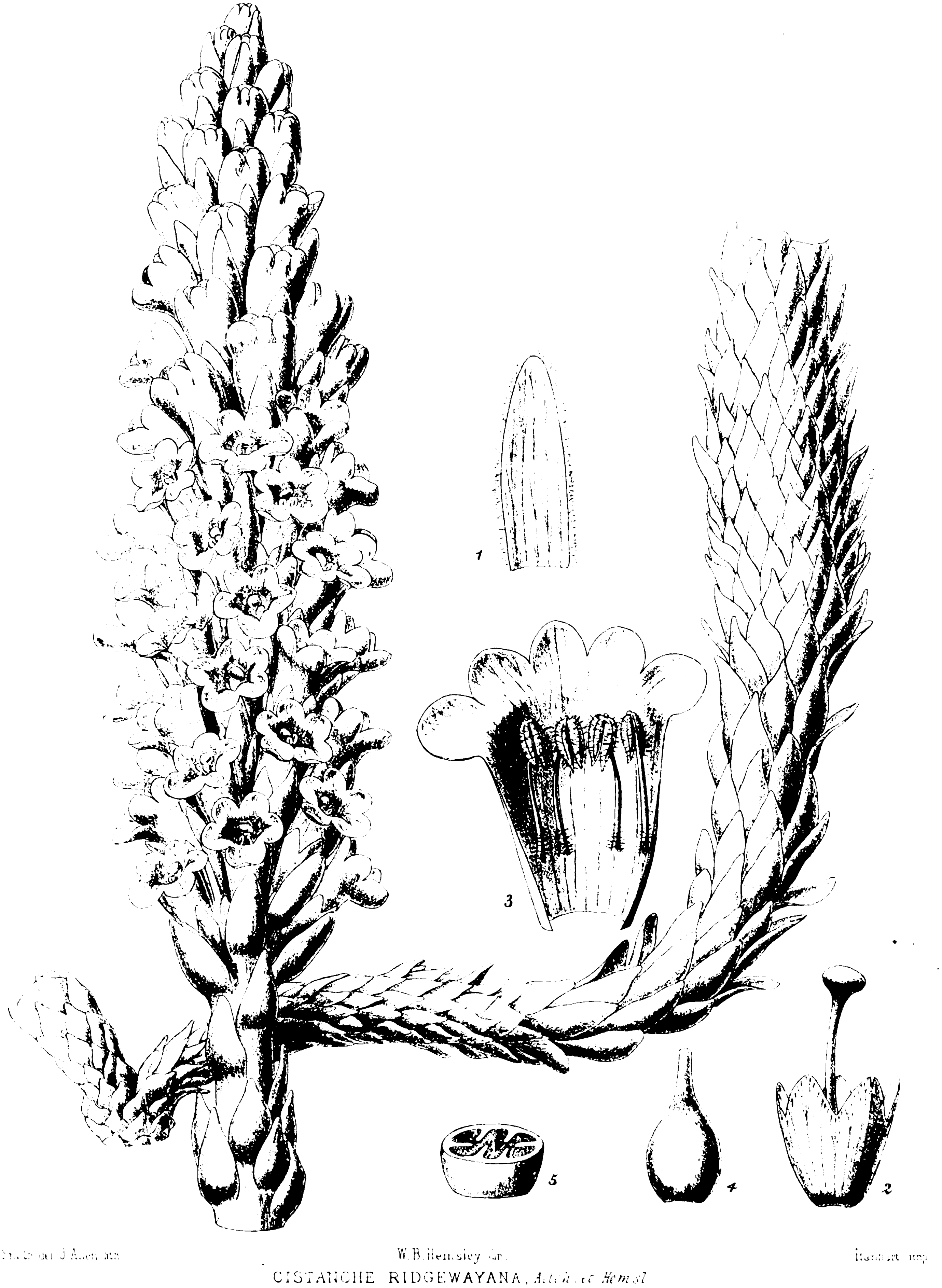
Hanhart imp.

APOCYNUM VENETUM, *Linn.*



W. B. Hemsley, del.

HYOSCYAMUS SENECIONIS, *Wall. var.* MULTIFIDUS, *Aitch. et Hemsl.*



M. Smith del. J. Allen lith. W. B. Hemsley dir. Hanhart imp.

CISTANCHE RIDGEWAYANA, Aitch. et Hemsl.

W. B. Hemsley del.

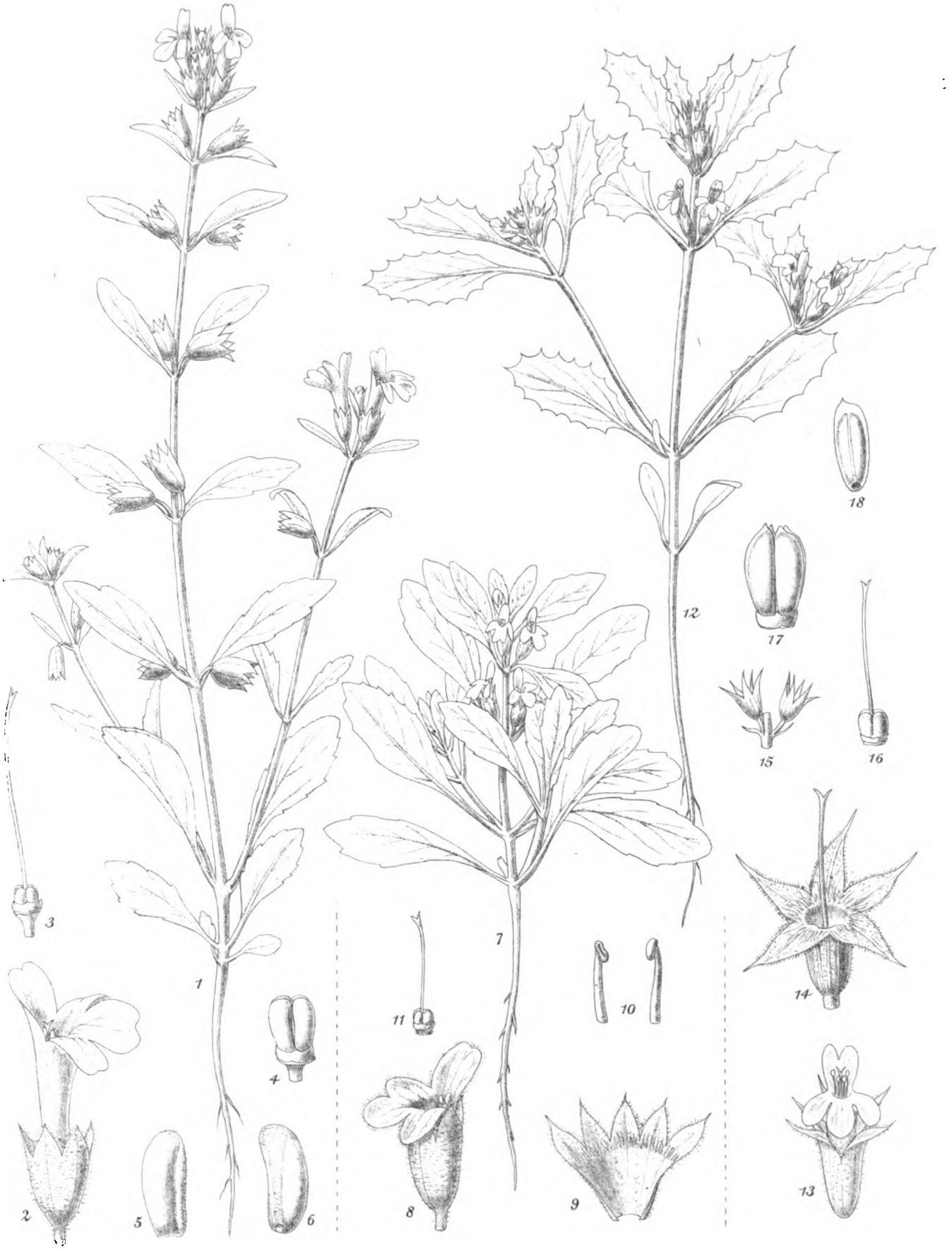
CISTANCHE LAXIFLORA, Aitch. & Hemsl.

M. Smith del. J. Allen lith.

W. B. Hemsley dir.

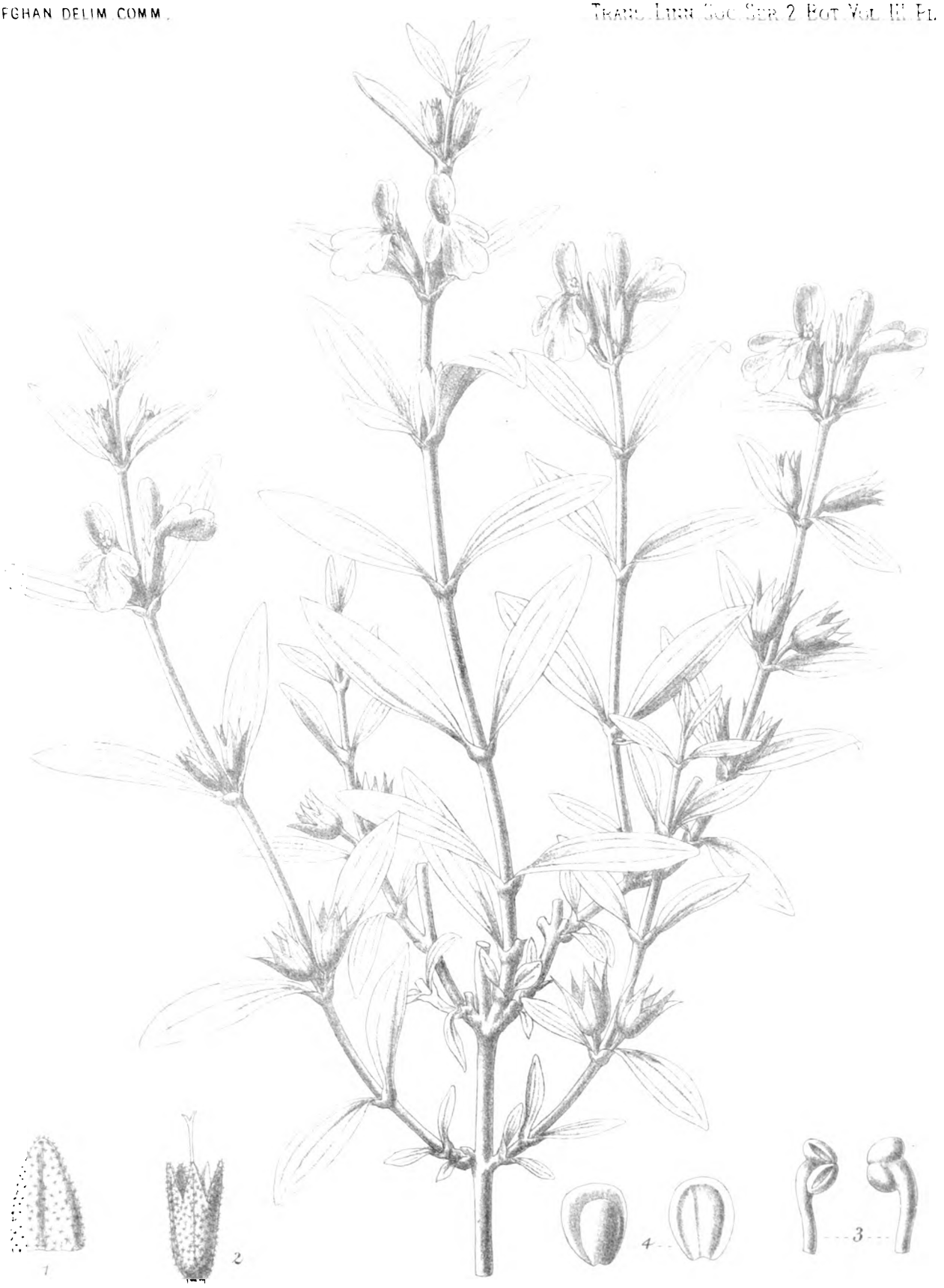
Hanhart imp.

NEPETA SEWERZOWII, *Regel*.



M. Smith del. J. Ayton lith. W. B. Hemsley dir. Hanhart imp.

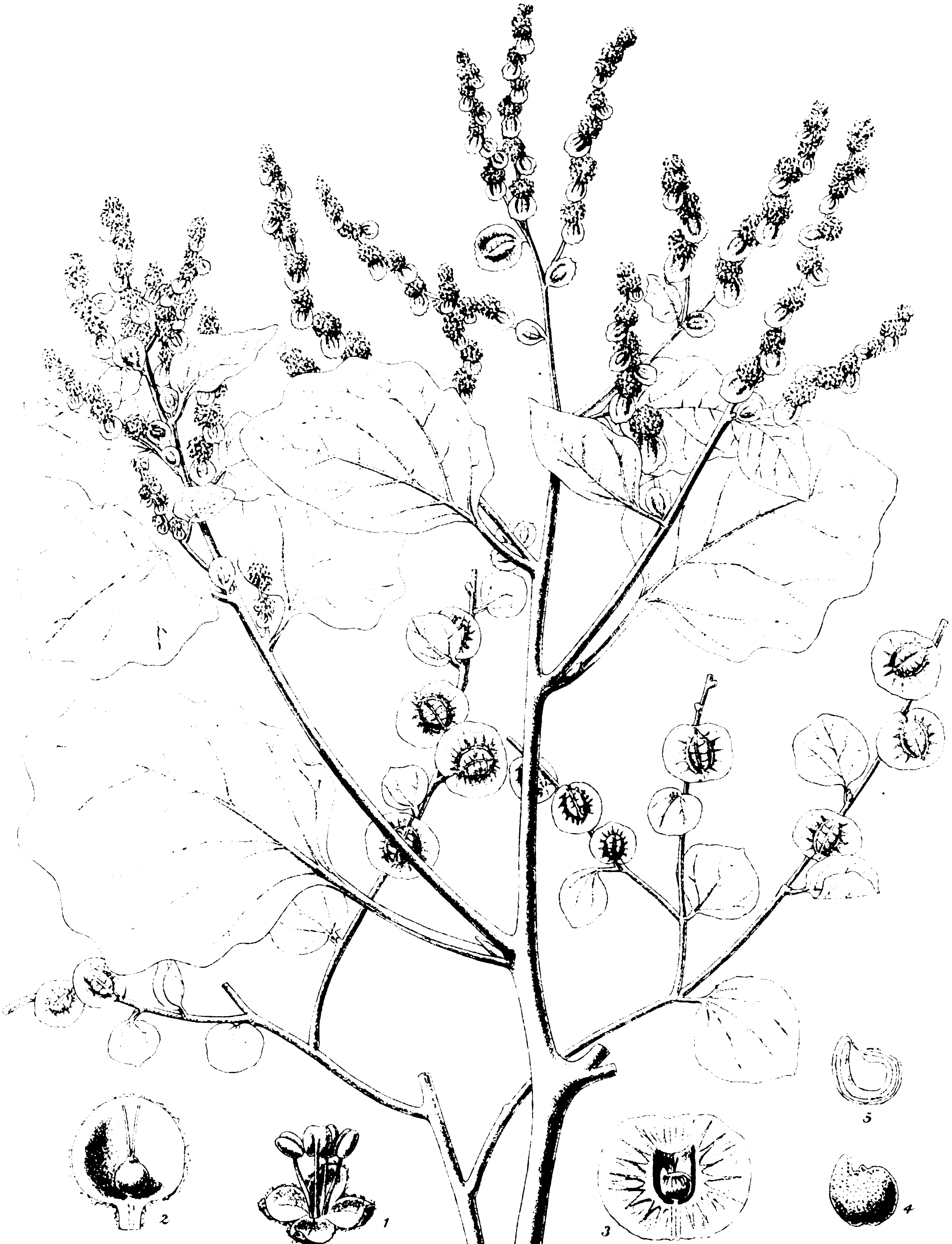
1–6 CHAMÆSPHACOS PERSICUS, *Aitch. et Hemsl.*
7–11 „ AFGHANICUS, *Aitch. et Hemsl.*
12–18 „ ILICIFOLIUS, *Schrenk.*



W. B. Hemsley del.

Hanhart imp.

STACHYS TRINERVIS, *Aitch. et Hemsl.*



W. B. Hemsley dir. Hanhart imp.

ATRIPLEX MONETA, *Bunge.*

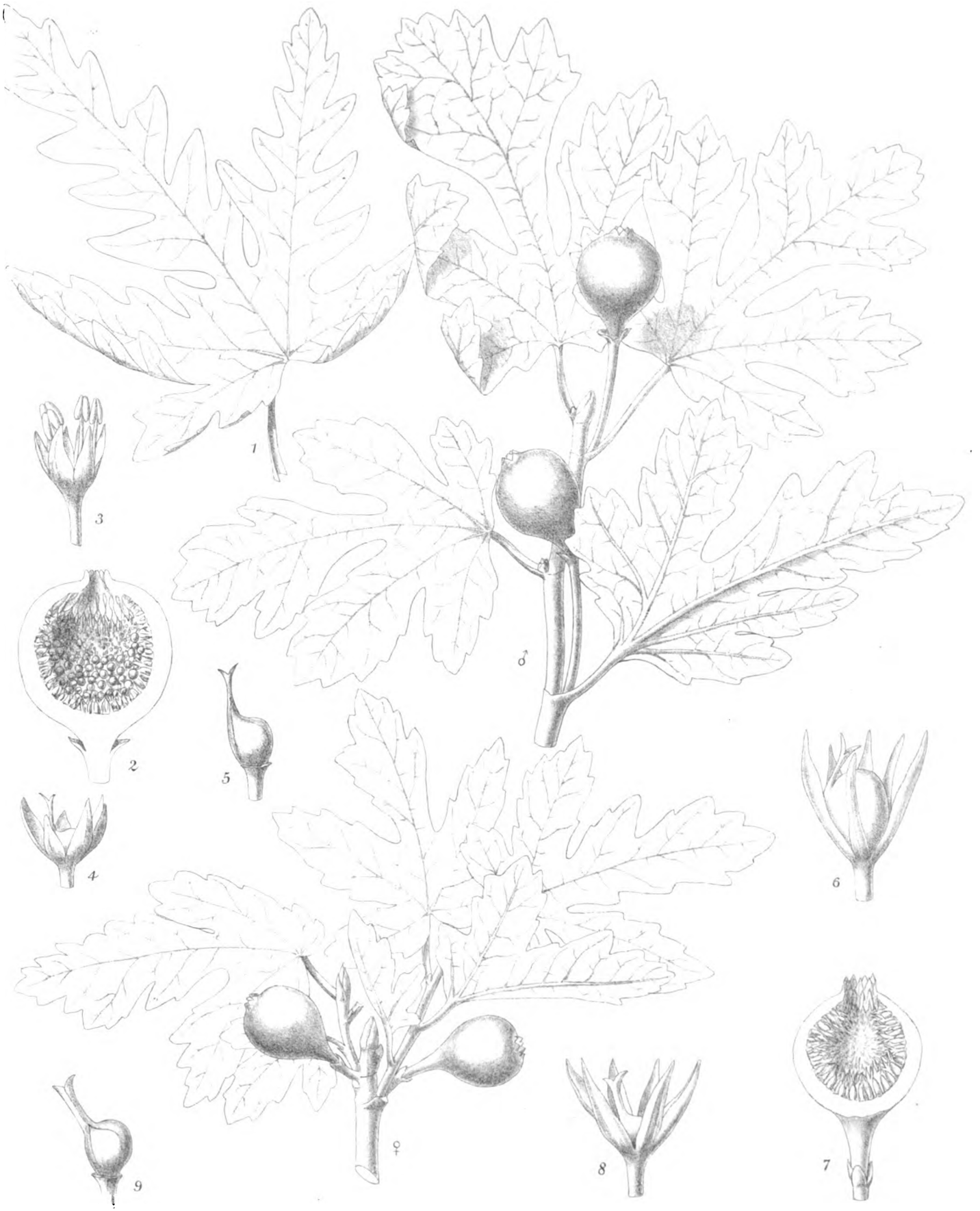
M. Smith. del. J. Allen. lith.

W. B. Hemsley, dir.

Hanhart. imp.

RHEUM TATARICUM, Linn. f.

TRANS. LINN. SOC. SER. 2 BOT. VOL. III PL. 46



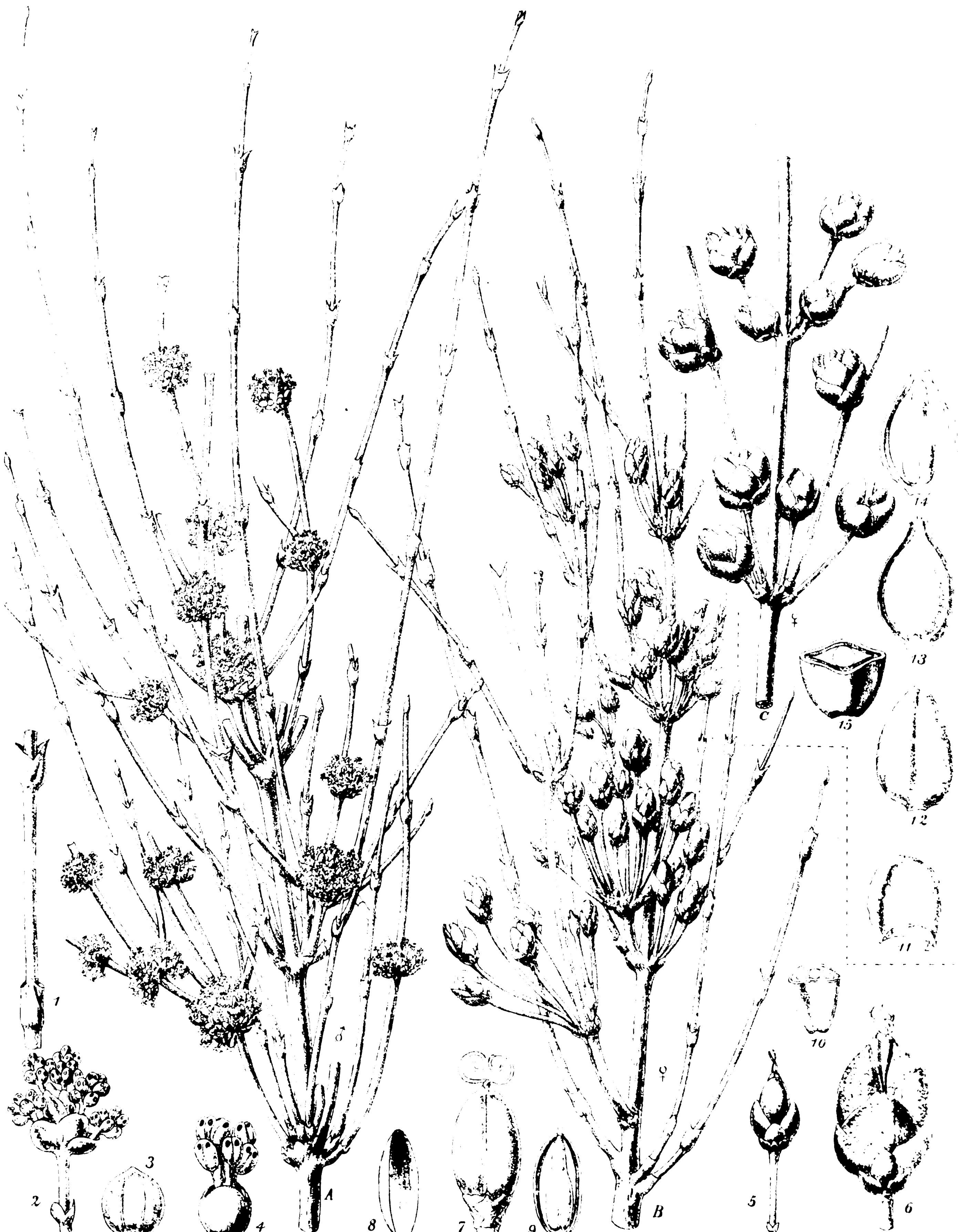
M. Smith del. J. Allen lith.

W. B. Hemsley del.

Hanhart imp.

FICUS CARICA, *Linn.*

 Trans. Linn. Soc. Ser. 2 Bot. Vol. III. Pl. 47



W. Smith del. J. Allen lith. W B Hemsley dir

A B Figs. 1-10 EPHEDRA PACHYCLADA, *Boiss ?*
C. „ 11-15 „ SARCOCARPA, *Aitch et Hemsl.*

W. B. Hemsley del.

ALLIUM XIPHOPETALUM, *Baker et Baker f.*

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Part	VII. 1883.	0	5	0	0	3	9
Part	VIII. 1883.	0	3	0	0	2	3
Part	IX. 1883.	0	3	0	0	2	3
Part	X. 1884.	0	4	6	0	3	6
Part	XI. 1884.	0	10	0	0	7	6
Part	XII. 1885.	0	6	0	0	4	6
Part	XIII. 1884.	0	6	0	0	4	6
Part	XIV. 1885.	0	6	0	0	4	6
Part	XV. 1885.	0	4	6	0	3	6
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	SECOND SERIES.—ZOOLOGY (*continued*).						
III. Part	I. 1884.	1	14	0	1	5	6
Part	II. 1884.	1	12	0	1	4	0
Part	III. 1885.	1	10	0	1	2	6
Part	IV. 1885.	0	8	0	0	6	0
Part	V. 1887.	0	8	0	0	6	0
Part	VI. 1888.	0	6	0	0	4	6
IV. Part	I. 1886.	1	4	0	0	18	0
Part	II. 1887.	1	8	0	1	1	0
	SECOND SERIES.—BOTANY.						
I. Part	I. 1875.	0	8	0	0	6	0
Part	II. 1875.	0	16	0	0	12	0
Part	III. 1876.	0	12	0	0	9	0
Part	IV. 1876.	0	10	0	0	7	6
Part	V. 1878.	1	4	0	0	18	0
Part	VI. 1879.	1	6	0	0	19	6
Part	VII. 1880.	1	4	0	0	18	0
Part	VIII. 1880.	1	1	0	0	16	0
Part	IX. 1880.	1	0	0	0	15	0
II. Part	I. 1881.	0	12	0	0	9	0
Part	II. 1882.	0	5	0	0	3	9
Part	III. 1883.	0	10	0	0	7	6
Part	IV. 1883.	0	3	0	0	2	3
Part	V. 1883.	0	3	0	0	2	3
Part	VI. 1884.	0	13	6	0	10	0
Part	VII. 1884.	0	9	6	0	7	0
Part	VIII. 1884.	0	10	0	0	7	6
Part	IX. 1886.	0	7	0	0	5	0
Part	X. 1887.	0	3	4	0	2	6
Part	XI. 1886.	0	6	0	0	4	6
Part	XII. 1886.	0	8	0	0	6	0
Part	XIII. 1887.	1	7	0	1	0	0
Part	XIV. 1887.	0	7	0	0	5	0
Part	XV. 1887.	0	10	0	0	7	6
III. Part	I. 1888.	3	12	0	2	14	0