

NEW SPECIES OF RHODODENDRON.

BY

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II.

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[Notes, R.B.G., Edin., Nos. XLVII-XLVIII, November 1917.]

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***Rhododendron aganniphum*, Balf. f. et Ward.**

Frutex ad 1 m. altus ramis crassis. Ramuli annotini purpurei circ. 4 mm. diam. glaberrimi nitidi tandem grisei decorticantes. Alabastra ignota. Folia petiolata ad 9.8 cm. longa; lamina crasse coriacea oblonga vel elliptico-oblonga ad 9 cm. longa 4 cm. lata apicem versus paullo attenuata acuta corneo-mucronata margine cartilaginea recurvata basi lobis rotundatis subcordulata, supra atro-viridis opaca costa media sulcata sulco pilis longis albidis nunc rubidis sebaceis impleto venis primariis utrinsecus circ. 12 subsulcatis superficie in modum squali corii leviter rugulosa pilorum juvenilium vestigiis sparsissime notata et papillis epidermicis petasiformibus minutissime asperata, subtus albidula vel flavido-albida indumento laevi subcrasso compacto nitente persistente uniformi ubique vestita indumenti pilis floccosis aequilongis a pede brevi radiatim ramosis ramulis latis albidis vesiculosis prismaticis scintillantibus intricatim intertextis saepe (an semper?) fungorum mycelio albedo vel brunneo-colorato intermixtis costa media venisque primariis elevatis et indumento obtectis; petiolus ad 8 mm. longus crassus supra sulcatus glaber sulco pilorum vestigiis plus minusve pleno excepto. Flores in umbellam multifloram (circ. 10–12) terminalem vix racemosam dispositi; bracteae intimae oblongae vel obovato-oblongae membranaceae subflavae circ. 2.7 cm. longae 1 cm. latae extus intusque plus minusve sericeo-pilosae; bracteolae ignotae; pedicelli circ. 8 mm. longi stricti crassi carnosuli glabri sub calyce haud ampliati. Calyx cupularis carnosulus cupula glabra margine saepe lobatim undulata praeditus vel in lobos 5 carnosulos minutos rotundatos vel ovatos vel deltoideos acutos inaequales ad 2 mm. longos dorso glabros margine minutissime irregulariterque albido-floccosos divisus. Corolla infundibuliformi-campanulata circ. 3.5 cm. longa postice copiose coccineo-maculata extus glabra tubo postice subcarnosulo ibique puberulo, lobis 5 inaequalibus postico majore rotundatis circ. 1.4 cm. longis 1.8 cm. latis emarginatis crenulatis. Stamina 10 inaequalia longiora circ. 2.2 cm. longa breviora circ. 1.2 cm., filamentis cylindricis albidis vel pallide roseis basim versus sparse puberulis ima basi nudis, antheris pallide roseis (connectivo intensius) circ. 2 mm. longis. Discus lobulatus viridis glaber. Gynaecium circ. 2.5 cm. longum corolla multo brevius staminibus paullo longius; ovarium circ. 5 mm. longum

conoideum subatro-viride sulcatum glabrum laeve ; stylus ruber glaber ad apicem in cupulam evolutus stigma subspongiosum lobulatum gerens.

Species *Rh. taliensi*, Franch. affinis foliis plus minusve elliptico-oblongis, indumento subfoliari compacto albedo nitente, petiolo subglabro, pedicellis glabris certe distincta.

Tibeto-Yunnan frontier. Doker La. 14,000–15,000 ft. 2–3 ft. high. Dense scrub. F. Kingdon Ward. No. 768. July 1913.

Tibeto-Yunnan frontier. Ka-gwr-pw. 15,000 ft. Scrub rhododendron with dwarf species, etc. F. Kingdon Ward. No. 822. 19.7.13.

A distinct species of the Taliense series and near to *Rh. taliense*, Franch. itself. The white compact shining indumentum on the under side of the more elliptic and larger leaves enables one to differentiate the plants at sight, and then the nearly glabrous petioles and the glabrous pedicels confirm the diagnosis. In aspect the foliage recalls in miniature that of *Rh. Clementinae*, G. Forrest, but that is a plant which has 7 lobes to the corolla and stamens about 16, not as in the Taliense series 5 corolla-lobes and 10 stamens.

Rhododendron alutaceum, Balf. f. et W. W. Sm.

Frutex ad 4 m. altus ramis crassis. Ramuli annotini circ. 6 mm. diam. dense lanato-tomentosi, indumenti per annos persistentis pilis ex rhachi centrali longa in ramulos longos tenues obtusos intricato-intertextos ex toto deliquescente constructis et stratum glandularum capitatarum breviter stipitarum inferum occludentibus. Alabastrorum oblongo-ovoideorum eviscidorum perulae extimae fulvidae basi rotundatae crustaceo-coriaceae circ. 6 mm. longae late carinatae extus pilis sebaceis rufis brevibus dense floccoso-tomentosae intus sericeae margine floccoso-ciliatae in caudam recurvatam aequilongam dense puberulam productae, intermediae late ovatae vel obovatae mucronatae, intimae membranaceae sucino-coloratae ligulato-spathulatae ad 3.5 cm. longae 7 mm. latae apice rotundatae subapiculatae extus floccoso-pubescentes et prope apicem glandulis aurantiacis vel rufis paucis praeditae intus inferne glabrae superne sericeae margine verticeque floccoso-ciliatae ; folia juvenilia revoluta supra pilis mox deciduis dense albido-floccosa et glandulis clavatis breviter stipitatis aurantiacis praedita, subtus sucino-colorata indumento bistrato dense lanata strato infero ex floccis fere sessilibus breviterque radiatim ramosis (ramulorum cellulis latis vesiculososis) composito, strato supero ex pilis longis ab axe centrali iterum atque iterum ramosis (ramulis tenuibus obtusis late patentibus intertextis) aedificato.

Folia petiolata ad 15.5 cm. longa; lamina crasse coriacea oblonga vel late lanceolata ad 14 cm. longa 3.5 cm. lata sursum attenuata apice acuta corneo-tuberculata margine cartilaginea revoluta basi obtusa vel rotundata et subcordulata, supra olivacea vel nigro-olivacea opaca costa media sulcata venis primariis utrinsecus circ. 15 vix conspicuis caeteroquin reticulata rugulosa primo aspectu glaberrima sed ad costae mediae sulcum floccorum et glandularum juvenilium vestigiis plus minusve notata, subtus indumento alutaceo crasso lanato vestita sed costa media elevata nunc glabrescente venis venulisque caeteris occultis indumento bistrato ex pilis floccosis et glandulis ut ad laminam foliorum juvenilium aedificato; petiolus ad 1.5 cm. longus plerumque brevior crassus indumento laminae vestitus sed saepe strato supero plus minusve detersili. Flores in racemo-umbellam circ. 12-floram dispositi rhachi circ. 1.8 cm. longa sparsim floccosa et glandulosa; bracteae exteriores steriles fulvae late ovatae circ. 1.5 cm. longae 9 mm. latae apiculatae carinatae extus floccoso-tomentosae prope apicem glandulis paucis intermixtis apiculi pilis sebaceis kermesinis intus basi glabrae superne sericeae, fertiles oblongo-spathulatae circ. 2.5 cm. longae 9 mm. latae saepe subtruncatae apiculatae eglandulosae utrinque dense sericeae verticis apiculique pilis sebaceis kermesinis; bracteolae breves circ. 8 mm. longae membranaceae uninerviae pedicellis multo breviores adpresso-pilosae eglandulosae; pedicelli validi ad 2 cm. longi substraminei ad apicem obliqui glandulosi (glandulis capitatis kermesinis breviter stipitatis stipite albido) et pilis floccosis sparsim conspersi. Calyx minutus cupularis carnosulus circ. 1 mm. longus, cupulae glabrae atro-purpureae margine undulato-lobulato, lobulis integris subaurantiacis glandulis capitatis stipitatis paucissimis praeditis. Corolla rosea postice varo basali kermesino et maculis picta subcampanulata circ. 3.5 cm. longa genitalia longe superans extus glabra intus puberula basi 5-gibbosa retusa 5-lobata, lobis circ. 1.5 cm. longis 2 cm. latis rotundatis emarginatis. Stamina 10 inaequalia corolla et gynaeceo multo breviora longiora circ. 2 cm. longa breviora circ. 1 cm., antheris circ. 2 mm. longis, filamentis deorsum latioribus ima basi subnudis superne ad apicem ovarii et ultra pubescentibus eglandulosis. Discus nigricans glaber undulatus. Gynaeceum circ. 2.8 cm. longum; ovarium subovoideum circ. 6 mm. longum nigricans vel nigro-brunneum leviter sulcatum minutissime papillatum glandulosum glandulis laete rubris capitatis breviter albido-stipitatis; stylus glaber flavidus sub stigmatibus lobulato subcupulari vix expansus.

Species *Rh. taliensi*, Franch. affinis foliis multo longioribus, inflorescentia racemoso-umbellata, floribus majoribus roseis,

pedicellis capitato-glandulosis, calycis lobis glanduloso-ciliatis, ovario glanduloso facile distinguenda.

E.N.W. Yunnan. Kari Pass. Mekong-Yangtze divide. Alt. 12,000 ft. Lat. $27^{\circ} 40'$ N. In open thickets. Shrub of 12-14 ft. Flowers rose with crimson markings. G. Forrest. No. 13,098. Aug. 1914.

Rh. alutaceum is a well-marked species of the Taliense series. Its habit recalls *Rh. adenogynum*, Diels, and plants of its series, but there the calyx is always large and very different from that of *Rh. alutaceum*.

Rhododendron apodectum, Balf. f. et W. W. Sm.

Frutex ad 2 m. altus ramis rigidis crassiusculis. Ramuli hornotini circ. 2.5 mm. diam. nigro-purpurei pilis floccosis niveis e stipite brevissimo ramulisque plurimis vacuis vesiculosis radiatis aedificatis vestiti nec setulosi, annotini plerumque glabri tandem grisei decorticantes. Alabastrorum oblongorum acutorum perulae extimae late ovatae vel subrotundatae circ. 3 mm. diam. crustaceo-coriaceae brunneae carinatae extus plus minusve niveo-floccosae margine superne minute ciliatae, intimae lineari-lanceolatae circ. 1.7 cm. longae 3.5 mm. latae acutae extus ad apicem floccosae margine breviter ciliatae. Folia petiolata ad 8 cm. longa; lamina crasse coriacea oblonga vel oblongo-elliptica vel elliptica nunc obovata vel lanceolata ad 7 cm. longa 3.5 cm. lata apice rotundata vel obtusa vel acutiuscula margine cartilaginea basi subtruncata vel fere cordulata vel obtusa nec in petiolum angustata, supra convexa nigro-viridis nitida obscure bullata costa media venisque primariis utrinsecus circ. 12 anguste sulcatis glaberrima (in juventute revoluta pilis floccosis albis plus minusve oblecta) sed floccorum juvenilium vestigiis hic et illic notata superficie in modum squali corii leviter rugulosa, subtus concava sordide grisea vel subalbida vel pallide fulva costa media erubescens elevata glabrescente venis primariis fere occultis caeteroquin indumento unistrato tenui compacto laevi persistente e pilis albidis vel subfulvidis floccosis intertextis (eis ramulorum similibus) constructo vestita; petiolus circ. 1 cm. longus purpurascens supra sulcatus ibique tomentosus glabrescens (in juventute omnino albo-floccosus). Umbella vera in speciminibus nostris 2-3-flora terminalis; bracteae extimae crustaceo-coriaceae rotundatae acuminato-apiculatae ad 9 mm. longae (apiculo incluso) 6 mm. latae carinatae extus plus minusve albido-floccosae, fertiles subobovatae truncatae apiculatae circ. 1.7 cm. longae circ. 9 mm. latae submembranaceae extus sericeae; bracteolae parvae lineares pilosae circ. 1.2 cm. longae pedicellos superantes vel eos aequantes; pedicelli ad 1.2 cm. longi

indumento detersili dense fulvo-tomentosi tandem sparsim et floccosim pilosi et glabriusculi esetulosi. Calyx subgrandis circ. 8 mm. longus cupularis apertus in limbum membranaceum flavidum irregulariter 5-lobatum expansus extus glaber, lobis inaequalibus rotundatis vel subtruncatis saepe 2 mm. longis 4 mm. latis margine subciliatis. Corolla crassa intense rosea basi subaurantiaca tubuloso-campanulata circ. 3.5 cm. longa gibbosa utrinque glabra, lobis 5 erecto-patentibus rotundatis emarginatis circ. 1.1 cm. longis 1.2 cm. latis. Stamina 10 inaequalia longiora circ. 2.25 cm. longa breviora circ. 1.5 cm. longa, filamentis deorsum latioribus prope basim pubescentibus, antheris parvis intense purpureis circ. 2.5 mm. longis. Discus minute puberulus. Gynaeceum circ. 2.7 cm. longum; ovarium circ. 6 mm. longum nigro-purpureum sulcatum pilis fasciatis numerosissimis adscendentibus fuscis praecipue ad juga dense obtectum; stylus nigro-purpureus glaber staminibus longior sub stigmate lobulato haud expanso vix ampliatus. Capsula (vix matura) 1.5 cm. longa 6 mm. lata nigra rufo-floccosa recta vel paullo curvata.

Species ex affinitate *Rh. sanguinei*, Franch. foliis majoribus, indumento subfoliari densiore, calyce membranaceo majore staminumque filamentis pubescentibus bene distincta.

W. Yunnan. Western flank of the Shweli-Salween divide. Alt. 10,000–11,000 ft. Lat. 25° 20' N. Shrub of 4–8 ft. In fruit. Margins of rhododendron forest. G. Forrest. No. 8987. Aug. 1912.

W. Yunnan. Western flank of the Shweli-Salween divide. Alt. 10,000 ft. Lat. 25° 20' N. Shrub of 4–6 ft. In fruit. Open situations amongst rocks. G. Forrest. No. 9054. Aug. 1912.

W. Yunnan. Shweli-Salween divide. Alt. 10,000 ft. Lat. 25° 30' N. Shrub of 4–6 ft. Flowers deep crimson. In open scrub. G. Forrest. No. 11,896. June 1913.

W. Yunnan. Shweli-Salween divide. Alt. 10,000 ft. Lat. 25° 30' N. Shrub of 4–5 ft. Flowers deep rose, flushed orange towards base. Open situations amongst rock and scrub. G. Forrest. No. 11,968. June 1913.

This is a new species of that delightful series of rhododendrons which centres in *Rh. haematodes*, Franch., and it has the characteristic attractive features of the series in the firm foliage with pale under-surface indumentum, the thick tubular campanulate 5-lobed corolla of a rich orange-red tint and the deep purple anthers. From *Rh. sanguineum* its membranous calyx and pubescent staminal filaments separate it. From *Rh. dichroanthum*, Diels the rounded not tapered base of the leaf, the different indumentum of the ovary, and the larger capsule are distinctive marks. The plant is in cultivation.

Rhododendron bivelatum, Balf. f.

Frutex ramulis annotinis circ. 1.5 mm. diam. sordide furfuraceis lepidotis et puberulis, senioribus griseis vel nigricantibus decorticantibus. Alabastrorum angustorum fusiformium circ. 3 mm. diam. perulae extimae coriaceae triangulares extus lepidotae margine ciliatae, intimae spathulatae membranaceae pallide brunneae circ. 8 mm. longae 5 mm. latae dorso dense lepidotae margine ciliatae intus centro pubescentes; folia juvenilia convoluta utrinque dense imbricatim albido-lepidota supra in sulco costae mediae subtusque ubique puberula margine ciliata. Folia petiolata ad 4.5 cm. longa; lamina coriacea rigida oblongo-elliptica vel oblonga nunc anguste obovata ad 4 cm. longa et 2 cm. lata apice obtusa angustata mucrone tuberculato decurvato terminata margine cartilaginea subcrenulata et vestigiis ciliarum delapsarum notata basi obtusa vel cuneata, utrinque pallide viridis, supra subrugulosa subnitida costa media sulcata et puberula venis primariis utrinsecus circ. 6 paullo sulcatis caeteroquin squamarum peltatarum deciduarum foveolis vacuis vel squamarum vestigiis griseis vel nigricantibus notata, subtus puberula et dense lepidota squamis rufis nitidis discontiguis uniformibus ex umbone lato aurantiaco-vel rufo-annulato et instita angusta aedificatis intervallis epidermicis circ. 0.12 mm. diam. viridibus, costa media sparsim lepidota sed perspicue puberula venisque primariis elevatis; petiolus circ. 0.5 cm. longus erubescens supra sulcatus lepidotus et puberulus. Flores in umbellas paucifloras (2-?) ad apicem ramulorum fasciculatas dispositi; bractae sub anthesi plus minusve persistentes, exteriores steriles crustaceae pallide brunneae plus minusve rotundatae et ciliatae carinatae mucronulatae dorso lepidotae et ad basim praecipue plus minusve pilosae, interiores fertiles plus minusve membranaceae obovato-spathulatae truncatae emarginatae et in sinu breviter apiculatae circ. 1 cm. longae et supra 9 mm. latae intense brunneae vertice breviter albo-ciliatae margine piloso-ciliatae dorso lepidotae et puberulae intus plus minusve puberulae; bracteolae spadiceae filiformiter claviformes circ. 5 mm. longae pedicellis multo breviores extus sparsim lepidotae vertice albo-cristatae caeteroquin epilosae; pedicelli circ. 1 cm. longi lepidoti et puberuli stricti bracteis inclusi. Calyx minutus circ. 1.5 mm. longus dense lepidotus lobis vix 0.5 mm. longis brunneis latis semi-lunatis. Corolla rosea infundibuliformis circ. 2 cm. longa extus lepidota epilosa intus minute puberula et postice sparsim rubro-maculata, lobis subaequalibus ovalibus crenulatis apice rotundatis circ. 1 cm. longis et 8 mm. latis. Stamina 10 paullo inaequalia longiora circ. 2.1 cm. longa corollam subaequantia breviora circ. 1.5 cm., antheris parvis 1.5 mm. vel

1 mm. longis, filamentis basi vix latioribus glabris nunc pilis solitariis praeditis. Discus puberulus. Gynaecium circ. 2.4 cm. longum corollam et stamina superans; ovarium cylindrico-conoideum paullo sulcatum circ. 3 mm. longum nigro-tinctum dense imbricatim lepidotum vertice leviter pilosum; stylus glaber erubescens sub stigmate magno lobulato atro-purpureo paullo expansus.

Species *Rh. siderophyllum*, Franch. affinis foliis minoribus subtus puberulis, bracteolis pedicellis multo brevioribus, inter notas alias facile recognoscenda.

N.E. Yunnan. Dry hills behind Mo-tsou. Alt. 850 m. (*sic*?). Shrubby rhododendron with persistent leaves and small rose flowers. Maire. No. 137 in Herb. Edin.

A species akin to *Rh. siderophyllum*, Franch. which to our present knowledge does not spread out of East Yunnan. *Rh. bivelatum* has smaller leaves, which are not so thick as those of *Rh. siderophyllum*, and can be recognised at once by the somewhat unusual character in its type of leaf of a coating of hairs on the under-leaf surface intermixed with the peltate scales. The petiole shares the puberulous as well as lepidote character. Like *Rh. siderophyllum* our species retains the bracts during flowering and they completely envelop the pedicels, but the bracteoles in *Rh. bivelatum* are much shorter, only about half the length of the pedicels, whilst in *Rh. siderophyllum* they are longer than the pedicels.

I only know the plant in the single sheet of specimens which came to us from Abbé Maire, and there is not another plant in his collection for which it can be mistaken. Whilst the details of character especially of the flower take it to *Rh. siderophyllum*, yet it is not as like that species as is another West Yunnan species—*Rh. stereophyllum*, Balf. f. et W. W. Sm. (see p. 159). The three species can be recognised at sight thus:—

- Rh. siderophyllum* . Twigs stout red densely lepidote and becoming closely warted; leaves large pointed.
- Rh. stereophyllum* . Twigs stout red distantly lepidote and puberulous with short hairs and becoming distantly warted; leaves medium rounded.
- Rh. bivelatum* . Twigs thin scurfily lepidote and puberulous with long hairs, not becoming warted; leaves smaller pointed obtuse.

Rhododendron blandulum, Balf. f. et W. W. Sm.

Frutex ad 1.5 m. altus. Ramuli hornotini nigricantes circ. 3 mm. diam. pilis floccosis mox deciduis vestiti, annotini fulvidi pilorum vestigiis notati, vetustiores sordide grisei decorticantes. Alabastrorum oblongorum apice attenuatorum perulae exteriores brunneae crustaeo-coriaceae late ovatae vel subrotundatae mucronulatae extus intusque puberulae margine minute ciliatae circ. 7 mm. longae et latae, interiores longe obovatae spathulatae membranaceae circ. 2 cm. longae 8 mm. latae extus sericeo-puberulae apice mucronatae barbatae margine ciliatae. Folia aromatica petiolata ad 9.5 cm. longa; lamina oblonga ad 7.5 cm. longa 3.5 cm. lata apice obtusa apiculo triangulari corneotuberculato margine cartilaginea paullo revoluta basi subtruncatula vel lobis subrotundatis fere cordulata, supra atro-viridis opaca costa media venisque primariis utrinsecus circ. 13 paullo sulcatis glaberrima sed pilorum juvenilium vestigiis plus minusve vestita (lamina juvenilis revoluta pilis plurimis floccosis breviter vel longius stipitatis vestita est), subtus pallidior olivacea minute glanduloso-punctulata costa media suberubescence elevata venis primariis haud prominulis venularum reti conspicuo; petiolus circ. 2 cm. longus crassus pilis fasciatis et floccosis deterrentibus plus minusve obtectus. Flores in umbellam veram strictam ad 8-floram dispositi rhachi inter bracteas pedicellosque pilis rufis sebaceis nunc apice rubro-glandulosis dense induta; bracteae mox deciduae; bracteolae lineares circ. 9 mm. longae vix 0.5 mm. latae acutae pilosae; pedicelli ad 2.5 cm. longi olivacei floccis paucis brevibus pilosi et dense glanduloso-setulosi (glandulis ovoideis rubris longe stipitatis sebaceis saepe curvatis). Calyx ad 5 mm. longus cupularis extus dense glandulosus glandulis rubris stipitatis in lobos 5 inaequales (postero-laterales ovatos acutos ad 2.5 mm. longos anticos minutos semi-lunatos) divisus. Corolla alba roseo-suffusa campanulata ad 4 cm. longa utrinque glabra, lobis 5 rotundatis auriculatis crenulatis emarginatis circ. 1.5 cm. longis 2.5 cm. latis. Stamina 10 inaequalia longiora circ. 3 cm. longa breviora circ. 1.5 cm. longa, filamentis deorsum latoribus dense pubescentibus, antheris 2.5 mm. longis. Gynaeceum 3.5 cm. longum; ovarium sursum attenuatum 7 mm. longum vix 2 mm. latum nigricans glandulis rubris ovoideis longe stipitatis adscendentibus dense vestitum; stylus glaber sub stigmate lobulato vix latiore haud ampliatus.

Species *Rh. jucundo*, Balf. f. et W. W. Sm. et *Rh. rhaibocarpo*, Balf. f. et W. W. Sm. affinis, indumento et corolla 4 cm. longa intus glabra facile recognoscenda.

Mid. W. Yunnan. Western flank of the Tali Range. Alt. 11,000–12,000 ft. Lat. 25° 40' N. Margins of pine forests. Shrub of 4–6 ft. Foliage aromatic. Flowers white

flushed rose or pale rose. G. Forrest. No. 11,577. July 1913.

A species of the Selse series, perhaps the largest flowered in it.

Rhododendron brevitubum, Balf. f. et Cooper.

Frutex circ. 2.5 m. altus. Ramuli recti rigidi paucifolii, annotini circ. 3 mm. diam. grisei subnitidi squamis peltatis discontiguis adpressis ex umbone brunneo institaque albida aedificatis lepidoti, seniores nitentes squamis desiccatis nigropunctati. Alabastra foliorum ignota. Folia petiolata ad 12.5 cm. longa; lamina coriacea elliptica vel elliptico-oblonga vel obovata ad 11.5 cm. longa ad 4.8 cm. lata apice obtusa tuberculomucronata margine cartilaginea plana deorsum paullo attenuata obtusa vel subcuneata, supra opaca viridis costa media sulcata venis primariis circ. 8 occultis glabra sed squamarum juvenilium vestigiis obscurissime notata, subtus cinnamomea costa media elevata conspersim lepidota venis primariis vix prominulis caeteroquin squamis peltatis biformibus discontiguis rufo-coloratis induta squamis ex umbone secretionem rubra impleto et instita brunnea latiore integra constructis paucis majoribus conspersis, intervallis epidermicis glauco-viridibus quam squamis angustioribus et papillis petasiformibus numerosis vestitis; petiolus ad 1 cm. longus rufus imbricatim lepidotus. Flores fragrantēs in umbellas terminales 2-3-floras aggregati; bractee deciduae ignotae; bracteolae filiformes circ. 6 mm. longae pedicellis breviores plus minusve adpresso-pilosae; pedicelli vix 1 cm. longi furfuraceo-lepidoti. Calyx circ. 8 mm. longus, cupula circ. 3 mm. longa extus dense lepidota, lobis 5 inaequalibus ad 5 mm. longis 3 mm. latis membranaceis pilosis elepidotis vel (brevioribus) nunc leviter squameo-fimbriatis, longioribus elongato-triangularibus acutis brevioribus ovatis obtusis. Corollae pallide roseae extus lepidotae ad 4.5 cm. longae tubus brevis ad 1.5 cm. longus basi 5-gibbosus retusus intus puberulus sursum in limbum campanulatim explanatum 5-lobatum amplius, lobi rotundati undulati circ. 3 cm. longi 2.5 cm. lati. Stamina 20 inaequalia corolla breviora e tubo corollino longe exserta longiora circ. 3.5 cm. longa antheris 3 mm. longis breviora circ. 2.5 cm. longa antheris 3 mm. longis, filamentis filiformibus deorsum paullo expansis a basi 4-5 mm. nuda sursum fere ad medium puberulis. Discus perspicue puberulus. Gynaeceum corollam paullo superans circ. 5 cm. longum; ovarium ovoideum in stylum attenuatum 4.5 mm. longum 3 mm. latum paullo sulcatum imbricatim rufo-lepidotum; stylus crassus a basi sursum angustatus sub stigmate magno profuse lobulato paullo expansus fere ad medium lepidotus.

Species in sectionem *Maddeni* ponenda foliis subparvis, umbella pauciflora, pedicellis brevibus, calycis mediocris lobis elepidotis, corollae pallide roseae tubo brevi, staminum filamentis puberulis, stylo corolla longiore distinguenda.

Bhutan. Punakka. Alt. 6000–7000 ft. 8 ft. bush on steep dry hillside with pink and scented flower. R. E. Cooper. No. 3936. 27th May 1915.

Whether this plant may be the same as one of the forms of *Rh. Jenkinsii*, Nutt. allied to *Rh. Maddeni*, Hook. f. named by Nuttall * from Bhutan I will not discuss. It is possible that one or more of these forms found by Booth may be distinct species, but the descriptions are altogether insufficient to enable one to say what Booth's plants really were. Foliage alone in this series of rhododendrons is an unsafe guide to species unless leaf structure is examined microscopically—and neither the corolla nor stamens—critical characters in the series—of *Rh. Jenkinsii* and the forms included under it were known to Nuttall. Cooper's plant here described is a distinct one in the *Maddeni* series. The most easily seen diagnostic mark is the small corolla with short tube a little over a centimeter long. From *Rh. Maddeni* and from *Rh. calophyllum*, Nutt. it is distinguished also by the larger calyx and by the puberulous not glabrous stamens, and then the leaves are obtuse and relatively to length much wider. Like *Rh. manipurens*, Balf. f. et Watt in its stamens it has a smaller calyx and corolla and the foliage also is much smaller.

Mr. Cooper collected his plant in May and obtained no fruit, so that this species is one that remains to be introduced to cultivation by some future explorer.

Rhododendron callimorphum, Balf. f. et W. W. Sm.

Frutex ad 3 m. altus plerumque pseudodichotome ramosus. Ramuli recti, annotini circ. 4 mm. diam. virides glandulis rubris crassis stipitatis obtecti, vetustiores grisei glandularum vestigiis verruculosi mox decorticantes. Alabastra ovoidea squamis fulvidis imbricatis oblecta. Folia petiolata ad 6.5 cm. longa; lamina coriacea rotundata vel late elliptica circ. 5 cm. longa 4 cm. lata apice corneo-mucronata margine cartilaginea basi cordulata vel subtruncatula lobis latis, supra atro-viridis nitida glabra sed vestigiis pilorum sebaceorum conspersa costa media venisque primariis utrinsecus ad 8 sulcatis, subtus glauca papillis ceriferis epidermicis petasiformibus oblecta et glandulis rubris pluribus conspersa costa media suberubescente elevata venis primariis et venarum reti intricato conspicuis haud elevatis; petiolus circ. 1.5 cm. longus 2 mm. diam. subrubidus glandulis

* Nuttall in Hook. Journ. Bot. v (1853), 361.

rubris stipitatis viscidus. Flores in umbellas ad 7-floras terminales dispositi; bracteae mox deciduae ignotae; bracteolae parvulae lineares circ. 5 mm. longae dense pilosae et glandulis rubris stipitatis praeditae; pedicelli stricti divaricati ad 2 cm. longi validi erubescentes glandulis rubris perspicue stipitatis dense instructi superne sub calyce oblique expansi. Calyx minutus circ. 1.5 mm. longus glandulis rubris longi-stipitatis vestitus, lobis 5 subaequalibus late triangularibus vel oblongis postero-lateralibus majoribus circ. 1 mm. longis. Corolla ad 3.5 cm. longa rosea basi postice extus bifoveolata intus varo basali kermesino notata a basi aperte campanulata 5-lobata extus glabra intus minutissime pulverulentim puberula, lobis rotundatis emarginatis circ. 1.2 cm. longis 1.8 cm. latis. Stamina 10 inaequalia 5 longiora ad 2.4 cm. longa 5 breviora ad 1.8 cm. longa, antheris circ. 2 mm. longis, filamentis albis teretibus deorsum latioribus primo intuitu glabris sed minutissime punctulatum puberulis. Discus viridis lobulatus glaber. Gynaeceum circ. 3.2 cm. longum corollam fere aequans staminibus longius; ovarium viride circ. 4 mm. longum glandulis capitatis rubris albo-stipitatis crebre adscendentibus dense obtectum; stylus flavo-viridis basi glandulis rubris stipitatis sparsim praeditus caeteroquin glaber sub stigmate parvo viridi et rubro-tincto lobulato paullo expansus et curvatus cupulam rubram faciens.

Species ex affinitate *Rh. Souliei*, Franch. a qua foliis subtus glandulis rubris pluribus praeditis, calycis lobis minoribus ex toto glanduliferis, corolla minus aperta, stylo glandulis sparsis basi solum notato inter alia differt.

W. Yunnan. Shweli-Salween divide. Alt. 10,000 ft. Lat. 25° 20' N. Open rocky slopes. Shrub of 6-9 ft. Flowers rose. G. Forrest. No. 12,019. June 1913.

The foliage of this species recalls the charming *Rh. Souliei*, Franch. and it is a member of the *Souliei* series. Unfortunately Mr. Forrest's specimens are not abundant, and we have as yet inadequate material for a complete comparative analysis of the two species, but we have enough to bring out definite differences between them. *Rh. Souliei* is now a familiar plant of cultivation, thriving at Edinburgh in any situation, and *Rh. callimorphum*, introduced by Mr. J. C. Williams, has flowered (May 1917) and appears to be as desirable a species as *Rh. Souliei*. By the character of foliage the two plants are easily diagnosed. *Rh. callimorphum* has abundance of red glands appearing as minute dark points distributed over the under surface of the leaf and the petiole is clad with sessile globular glands. *Rh. Souliei* has no glands on the leaf under side and the petiole bears more or fewer stalked red glands which often extend to the margin of

the lamina at the base. Franchet* has it: "petiolo crasso 15 mm. longo, subtus glandulis consperso caeterum glabro," but I do not find such restriction of glandular surface in our cultivated plants. These glands tend to disappear as the leaf oldens but their traces remain visible. In the text accompanying the figure of *Rh. Souliei* in the Botanical Magazine (1915), t. 8622, there is an obvious misprint—the Latin diagnosis and description gives the lamina as eglandular whilst the English description says glandular. It is true that on the upper surface of the lamina as it opens from the bud there is a sprinkling of stalked red glands, but they have disappeared from the fully expanded lamina, which is eglandular both above and below. In the calyx characters there is much difference from *Rh. Souliei*, for we miss in *Rh. callimorphum* the large membranous gland-margined lobes of *Rh. Souliei* and find only small unequal glandular projections as is the case in *Rh. Williamsianum*. Then the style in *Rh. callimorphum* has long-stalked glands at the very base only and is not glandular throughout as in *Rh. Souliei*.

Rhododendron Cooperi, Balf. f.

Frutex epiphyticus circ. 1 m. altus. Ramuli hornotini tenues circ. 1 mm. diam. brunneo-purpurei foliorum rosulam apicalem et cataphylla membranacea ligulata setoso-ciliata inter se distantia gerentes lepidoto-furfuracei squamis peltatis pedicellatis ad 0.75 mm. latis plus minusve imbricatis facile deter-silibus ex umbone plerumque rufescente et instita integra membranacea duplo latiore albedo vel rufescente aedificatis, annotini subnitentes squamarum vestigiis notati, deinde grisei decorticantes. Alabastra foliorum ignota; folia juvenilia convoluta epilosa utrinque lepidota, supra squamis planis contigu-
is superficialibus mox deter-silibus fere omnibus ex umbone rufescente institaque albida rufescente constructis, subtus squamis similibus densius aggregatis sed vix coloratis persistentibus grisea. Folia petiolata ad 11 cm. longa; lamina coriacea oblonga vel oblongo-elliptica vel subobovata ad 10 cm. longa ad 3 cm. lata apice obtusa nunc subrotundata perspicue corneo-mucronata margine plana basim versus paullo attenuata obtusa, supra olivacea vel subatro-viridis vix nitens glabra costa media anguste sulcata venis primariis utrinsecus circ. 8 inconspicuis caeteroquin subrugulosa et squamarum vestigiis notata, subtus cinnamomea costa media pallidiore elevata squamis brunneis conspersa, venis primariis et venularum reti indumento lepidoto biformi occultis, squamis latis contigu-
is vel fere contigu-
is ex umbone secretione kermesina impleta scintillante institaque brunneo-tincta aedificatis paucis majoribus longius stipitatis

* Franchet in Journ. de Bot. ix (1895), 351.

quasi papillis inter alias minores distributis; petiolus ad 1 cm. longus crassus lepidoto-furfuraceus. Flores pauci 1-2 in umbellam veram terminalem dispositi, inflorescentiae rhachi lepidota; bracteae et bracteolae mox deciduae; pedicelli crassi decurvi circ. 6 mm. longi purpurei plus minusve furfuraceo-lepidoti squamis magnis albidis vel umbone rufescentibus. Calyx pro flore magnus ad 1 cm. longus, cupula subcarnosula circ. 2.5 mm. longa dense furfuraceo-lepidota squamis rufescentibus, lobis 5 oblongis ad 7.5 mm. longis et 4 mm. latis obtusis membranaceis virescentibus vel subrubris intus glabris extus lepidotis margine leviter ciliatis. Corolla carnosula rubra vel intus alba et extus pallide rosea circ. 2 cm. longa subrotata extus ubique lepidota, tubo lato circ. 8 mm. longo fauce dense villosa in limbum patentem expanso, limbi disco circ. 2 mm. lato, lobis 5 ellipticis vel oblongo-ellipticis apice rotundatis circ. 1 cm. longis et 8 mm. latis. Stamina 14 inaequalia e tubo corollae exserta longiora circ. 1.5 cm. longa breviora circ. 1 cm. longa, antheris brunneis magnis ad 4 mm. longis, filamentis crassis carnosulis basi latioribus supra basim glabram intra tubum corollinum dense villosis. Discus pubescens. Ovarium circ. 4 mm. longum petasiforme squamis albidis et subroseis dense lepidotum; stylus validus circ. 1 cm. longus stamina subaequans deflexus glaber sub stigmathe depresso discoideo paullo expansus quare labium cingens evenit.

Species *Rh. camelliaefloro*, Hook. f. affinis corollae fauce dense villosa certe distincta.

Bhutan. Ridang, Angduphorang. Alt. 9000 ft. Small bush. Epiphyte on big trees in moss. Flowers red. R. E. Cooper. No. 3959. 8.6.15.

Bhutan. Vatola Ridge, Tongsa. Alt. 9000-10,000 ft. Epiphytic bush 3-4 ft. on Abies. Flowers open, white inside, pink outside. R. E. Cooper. No. 4083. 1.7.15.

A species which appears to resemble closely *Rh. camelliaeflorum*, Hook. f., but the rose or red corolla villous at the throat is a sufficiently distinctive mark of difference. Nuttall described* briefly two species—*Rh. sparsiflorum* and *Rh. lucidum*—upon imperfect material collected by Booth in Bhutan which he regarded as nearly allied to *Rh. camelliaeflorum*. *Rh. sparsiflorum* is treated as a synonym of *Rh. camelliaeflorum* by C. B. Clarke,† who mentions (p. 475) *Rh. lucidum* as an imperfectly known species. There is the possibility that Cooper's plant may be one or other of Nuttall's species, but there is no certainty, for Nuttall's descriptions were taken from specimens not in flower and the flower character is a dominant one in *Rh. Cooperi*.

* Nuttall in Hooker's Journ. Bot. v (1853), 363.

† Clarke in Hook. f. Fl. Brit. Ind. iii (1882), 470.

Cooper obtained a third plant of this alliance in fruit only, the field ticket of which runs: "Parshong Timpu. Alt. 10,500 ft. Bush 6 ft. Golden glands under leaf. No. 3506. 29.10.14." The fruit and seed may be described thus: Capsula recta circ. 1 cm. longa circ. 8 mm. diam. fulva squamis scintillantibus lepidota calycis lobis adpressis basi inclusa ab apice valvis 5 dehiscens. Semina spadiceo-brunnea fusiformia exalata ad extremitates ambas aequaliter caudatim prolongata circ. 3 mm. longa (sine caudis 2 mm.). It has a strong resemblance to *Rh. Cooperi*, but there are slight differences in foliage that make me hesitate over identifying it with that species. It may be only *Rh. camelliaeflorum*. We have seedlings raised from seed taken from Cooper's specimens, and when they flower a decision of the point will be possible. If the plant is *Rh. Cooperi* the description of fruit which I have given will attach to the diagnosis of *Rh. Cooperi*.

Rhododendron croceum, Balf. f. et W. W. Sm.

Frutex ad 7 m. altus. Ramuli hornotini (siccitate) nigri rubro-glandulosi glandulis globosis vel ovoideis sessilibus, annotini glandularum vestigiis notati rubido-virides subnitentes, vetustiores sordide grisei decorticantes. Alabastrorum ovoid-eorum fulvorum perulae extimae parvae oblongae brunneae coriaceae ad 7 mm. longae 3 mm. latae dorso eglandulosae haud viscidae apice rotundatae cum margine breviter glandulosae interiores membranaceae flavido-virides ad 1.5 cm. longae circ. 3.5 mm. latae subligulatae apice acutae pilisque ciliatae. Folia petiolata ad 13 cm. longa plerumque breviora; lamina chartacea vel subcoriacea oblonga ad 11 cm. longa ad 6 cm. lata apice obtusa nunc rotundata corneo-mucronulata margine cartilaginea plana basi subtruncato-cordulata, supra atro-viridis costa media erubescens paullo sulcata venis primariis utrinsecus circ. 15 inconspicuis caeteroquin paulo rugulosa glabra subopaca pilorum juvenilium vestigiis plus minusve notata (in juventute revoluta pilis sebaceis contortis simplicibus vel ramosis floccosis subrubidis dispersa), subtus pallidior viridis vel olivacea vel fulvido-glauescens costa media erubescens elevata venisque primariis rubidis impressis venularum reti conspicuo rubido superficie glandulis rubris punctulata (in juventute subcaesia venularum reti atro-purpureo pilis caulifloris plurimis rubidis vel luteis omnino oblecta); petiolus ad 2 cm. longus rubro-purpureus glaber (in juventute niger et pubescens). Flores in inflorescentiam racemoso-umbellatam ad 7-floram dispositi rhachi ad 1.5 cm. longa plus minusve rubro-glandulosa; bractae exteriores crustaceo-coriaceae ad 1 cm. longae a basi subrotundatae circ. 5 mm. latae caudatae extus plus minusve

glandulosae et viscidae intus laete stramineae nitidae puberulae et pilis contortis sebaceis praeditae, interiores late ovatae circ. 7.5 mm. longae et ad 6 mm. latae cucullatae extus glandulosae viscidissimae; bracteolae mox deciduae; pedicelli purpurascens vel atro-purpurei ad 4 cm. longi glandulis rubris breviter stipitatis plus minusve laxe vestiti ad apicem in calycis cupulam suboblique expansi ibique ceraceo-glauci et dense glandulosi. Calyx (persistens et sub fructu paulo auctus) grandis ad 1.3 cm. longus in limbum membranaceum flavido-viridem extus glandulis rubris breviter stipitatis conspersum inaequaliter irregulariterque 5-lobatum expansus, lobis postero-lateralibus ad 7.5 mm. longis et latis (nunc 5 mm.) anterioribus nunc 2.5 mm. margine glandulis capitatis vel ovoideis rubris albido-stipitatis semper lineatim ciliatis. Corolla carnosula lutea intus postice varo basali coccineo maculata a basi aperte campanulata vel subpateriformis ad 3.5 cm. longa extus plus minusve rubro-glandulosa intus glabra, lobis 5 semi-lunatis auriculatis emarginatis circ. 1.5 cm. longis 2.8 cm. latis. Stamina 10 inaequalia longiora ad 2 cm. longa breviora circ. 1 cm., filamentis deorsum latioribus glabris, antheris brunneis 2.5 mm. longis. Discus pubescens. Gynaeceum circ. 2.5 cm. longum corolla brevius staminibus longius; ovarium circ. 6 mm. longum nigro-purpureum glandulis rubris longistipitatis adscendentibus dense obtectum; stylus purpureus glandulis capitatis rubris sessilibus ex toto vestitus; stigma stylo latius subdisciforme lobulatum. Capsula nigra brevis et crassa paulo asymmetrica et curvata ad 2.2 cm. longa circ. 7 mm. diam. pilis setaceis fuscis glandula rubra terminatis praedita basi calyce obliquo spathaceo inclusa; semina albidula 1 nearia circ. 3 mm. longa ad extremitates caudato-arillata.

Species haec *Rh. Wardii*, W. W. Sm. valde affinis foliis oblongis obtusis nec rotundatis, inflorescentia racemoso-umbellata, calyce et corolla extus plus minusve rubro-glandulosis, ovario glandulis longistipitatis adscendentibus oblecto, capsula breviori recedens.

E.N.W. Yunnan. Mountains in the N.E. of the Yangtze bend. Alt. 12,000 ft. Lat. 27° 45' N. In rhododendron thickets. Shrub of 14-20 ft. Flowers slightly fleshy, bright yellow with the faintest touch of crimson on interior base. G. Forrest. No. 10,428. July 1913. In full fruit. G. Forrest. No. 11,466. Oct. 1913.

E.N.W. Yunnan. Mountains of the Chungtien plateau. Alt. 11,000-12,000 ft. Lat. 27° 55' N. In thickets. Shrub of 20-25 ft. Flowers fleshy, bright canary yellow. G. Forrest. No. 10,680. July 1913.

E.N.W. Yunnan. Mountains in the N.E. of the Yangtze bend. Lat. 27° 45' N. Shrub of 15-20 ft. Flowers yellow. G. Forrest. No. 11,317. Sept. 1913.

E.N.W. Yunnan. Mountains west of Fengkow. Alt. 14,000 ft. Lat. $27^{\circ} 40'$ N. Flowers clear pure yellow. G. Forrest. No. 12,697. June 1914.

E.N.W. Yunnan. Mountains of the Chungtien plateau. Alt. 13,000 ft. Lat. $27^{\circ} 30'$ N. G. Forrest. No. 12,731. July 1914.

E.N.W. Yunnan. Kari Pass, Mekong-Yangtze divide. Alt. 13,000 ft. Lat. $27^{\circ} 40'$ N. In rhododendron and mixed thickets. Shrub of 9-16 ft. Flowers (yellow?). G. Forrest. No. 12,969. Aug. 1914.

The rhododendron phylum which is represented on the Mekong-Salween Divide by *Rh. Wardii*, W. W. Sm. finds expression to the East on the Mekong-Yangtze divide, the Chungtien plateau, and in the N.E. of the Yangtze bend in the plant here described as *Rh. croceum*, which diverges so much—in some characters clearly in relation to the drier environment—that on the evidence it must be kept distinct from the western type. Mr. Forrest has specimens from several localities, and they all agree in the characters which differentiate *Rh. croceum* from *Rh. Wardii*, near one another though these plants are. We want more of the Mekong-Salween plant for completion of the differential diagnosis, but the following characters suffice for recognition of the two species:—

Rh. Wardii has adult leaves typically nearly elliptic with rounded summit in middle of which lies the horny mucro; *Rh. croceum* has always oblong leaves which slightly taper at the apex into the mucro and are not usually rounded.

The inflorescence in *Rh. Wardii* is quite umbellate; in *Rh. croceum* racemosely umbellate with a rhachis of about 1.5 cm. long.

The caudate outer bracts of *Rh. croceum* are not visible on any of the buds of *Rh. Wardii*.

Both the calyx lobes and the outside of the corolla in *Rh. croceum* are gland-dotted; in *Rh. Wardii* the calyx is more sparingly glandular and the corolla is eglandular.

The ovary in *Rh. Wardii* has many almost sessile red glands covering it; in *Rh. croceum* the glands which form an even denser covering to the ovary have long stalks and they are turned upwards to the top of the ovary.

The capsule in *Rh. Wardii* is shorter and thicker and is sprinkled with short glands; in *Rh. croceum* the longer thinner capsule is densely covered with long-stalked glands.

Rh. croceum belongs to a type of rhododendron which is presented in several species throughout Western China and the adjoining countries and which also appears in the Himalaya. The general features of the series may be briefly stated thus:—

Shrubs or small trees bearing oblong rounded to orbicular leaves, obtuse or rounded at top, rounded or cordate at base, when mature usually convex above and often coated there with wax bloom and showing the submerged reticulate venation conspicuously on the under side, more or less glabrous but with vestiges particularly below and on the petiole of juvenile short-stalked glands or sebaceous hairs; pedicels glandular; calyx large or small glandular; corolla 5-lobed open campanulate or deep saucer-shaped glabrous inside; stamens 10 unequal glabrous or puberulous; ovary glandular and style glandular. The following table gives the names and distribution (with name of the discoverer) of the species that seem to fall into the series :—

<i>Rh. Bonvaloti</i> , Bur. et Franch. (1891).	W. Szechwan : Tatsienlu. (Pr. Henri d'Orleans and Bonvalot.)
<i>Rh. callimorphum</i> , Balf. f. et W. W. Sm. (1917).	W. Yunnan : Shweli-Salween divide, 10,000 ft. (Forrest.)
<i>Rh. campylocarpum</i> , Hook. f. (1849).	Sikkim : Bhutan, 11,000– 14,000 ft. (Hooker f.)
<i>Rh. cordatum</i> , Léveillé (1914).	N.E. Szechwan : Io Chow, 10,500 ft. (Maire.)
<i>Rh. croceum</i> , Balf. f. et W. W. Sm. (1917).	E.N.W. Yunnan : In N.E. of Yangtze bend, 11,000– 14,000 ft. (Forrest.)
<i>Rh. dasycladum</i> , Balf. f. et W. W. Sm. (1917).	E.N.W. Yunnan : In N.E. of Yangtze bend, 12,000 ft. (Forrest.)
<i>Rh. puralbum</i> , Balf. f. et W. W. Sm. (1916).	E.N.W. Yunnan : In N.E. of Yangtze bend, 11,000– 14,000 ft. (Forrest.)
<i>Rh. Souliei</i> , Franch. (1895).	W. Szechwan : Tatsienlu, 10,000–12,000 ft. (Soulie.)
<i>Rh. Wardii</i> , W. W. Sm. (1914).	S.E. Tibet : Doker La, 13,000– 14,000 ft. (Ward.)
<i>Rh. Williamsianum</i> , Rehd. et Wils. (1913).	W. Szechwan : Wa-shan, S.E. of Tatsienlu, 8000 ft. (Wilson.)

If this be a natural phylum its name should be *Campylocarpum* after the longest known species. I say if, because whilst the species have a marked resemblance and have more or less developed the technical character of a glandular style, the longer thin curved capsule of *Rh. campylocarpum* is very different from the short more nearly straight capsule of *Rh. Wardii* and *Rh. Williamsianum*, and those are the only fruits I

know in the series. I do not however know at what value to appraise fruit and seed character in rhododendron, for I have seen too few of them in fruit.

I may note here that there is another series of rhododendrons with somewhat similar distribution to which may be given the name of *Selense*, presenting general features very like those of the *Campylocarpum* series but distinguished at once by a glabrous style on top of the glandular ovary. The species belonging to it are :—

<i>Rh. blandulum</i> , Balf. f. et W. W. Sm. (1917).	Mid. W. Yunnan : Tali Range, Western flank, 11,000– 12,000 ft. (Forrest.)
<i>Rh. Fargesii</i> , Franch. (1895).	E. Szechwan : Chenkow (Farges.) W. Hupeh, 6500– 9500 ft. (Wilson.)
<i>Rh. jucundum</i> , Balf. f. et W. W. Sm. (1916).	Mid. W. Yunnan : Tali Range, Western and Eastern flank, 10,000–12,000 ft. (Forrest.)
<i>Rh. pagophilum</i> , Balf. f. et Ward (1916).	S.E. Tibet : Doker La and Ka-gwr-pw Glacier Valley, 14,000–16,000 ft. (Ward.)
<i>Rh. panteumorphum</i> , Balf. f. et W. W. Sm. (1916).	W.N.W. Yunnan : Mekong- Salween divide, 11,000– 12,000 ft. (Forrest.)
<i>Rh. rhaibocarpum</i> , Balf. f. et W. W. Sm. (1917).	E.N.W. Yunnan : Mekong- Yangtze divide and Chung- tien plateau, 11,000–12,000 ft. (Forrest.)
<i>Rh. selense</i> , Franch. (1898).	W.N.W. Yunnan : Mekong- Salween divide, Mt. Sela. (Soulié.)
<i>Rh. Stewartianum</i> , Diels (1912).	W.N.W. Yunnan : Mekong- Salween divide, 10,000– 11,000 ft. (Forrest.)

In the *Selense* series there appears the same contrast in fruits as in the *Souliei* series. *Rh. rhaibocarpum* has a capsule in all characters like that of *Rh. campylocarpum* and it contrasts with the short, nearly straight capsule of *Rh. Souliei*.

It is convenient for the time to segregate these species in the series I have named and thus to link together some of the now numerous species of rhododendron. But I think that hereafter it may be found that natural relationships call for a regrouping of the species, and that they all belong to and may be arranged by their affinities within a series for which we may

take the name *Thomsoni*, after the well-known Himalayan *Rh. Thomsoni*. At present I take the *Thomsoni* series as a separate one distributed in the Himalaya and Western China, and distinguished by the tubular campanulate corolla and the usually glabrous ovary and glabrous style, whilst in foliage and other characters its species closely resemble some of those of the *Campylocarpum* series and approach the *Selense* series. The *Thomsoni* series I speak of includes :—

<i>Rh. candelabrum</i> , Hook. f. (1849).	Sikkim, 10,000–11,000 ft. (Hooker f.)
<i>Rh. cyanocarpum</i> , Franch. (1895).	Mid. W. Yunnan: Tali, 10–12,000 ft. (Delavay.)
<i>Rh. eriphyllum</i> , Balf. f. et W. W. Sm. (1917).	Mid. W. Yunnan, 11,000 ft. (Forrest.)
<i>Rh. Hookeri</i> , Nutt. (1853).	Bhutan, 8000–9000 ft. (Booth.)
<i>Rh. rotundifolium</i> , David (1872).	W. Szechwan: Muping, 12,500 ft. (David.)
<i>Rh. Thomsoni</i> , Hook. f. (1849).	Sikkim, 11,000–13,000 ft. (Hooker f.)

In support of the suggestion that all the species here named belong to one phylum and that their separation in the three series of *Campylocarpum*, *Selense*, *Thomsoni* is more artificial than natural, I would point out that the gland coating of the gynaeceum—the chief technical diagnostic mark of the series—shows some variation. *Rh. callimorphum* and *Rh. dasycladum* of the *Campylocarpum* series have the glands confined to the base of the style and not covering the whole—a step as it were towards the glabrous style of the *Selense* series. And then *Rh. candelabrum* and *Rh. eriphyllum* are microforms respectively of *Rh. Thomsoni* and *Rh. cyanocarpum* and in them the ovary has some glands and shows thus a step towards the completely glandular ovary in the *Selense* and *Campylocarpum* series. It is of special interest to note that this variation occurs in both the Himalayan and the Yunnan representative species.

***Rhododendron dasycladum*, Balf. f. et W. W. Sm.**

Frutex ad 3 m. altus tenuiter ramosus ramis strictis. Ramuli hornotini circ. 2 mm. diam. nigricantes indumento heteromorpho fulvido viscido vestiti, indumento e setulis sebaceis glandulis rubidis clavatis vel capitatis terminatis et e pilis breviter stipitatis similiter glandulosis etiam e pilis floccosis sebaceis eglandulosis vix stipitatis multo radiatimque ramosis vel longius

stipitatis et fasciatim ramosis composito, post annos duos vel tres glabrescentes deinde grisei decorticantes. Alabastrorum subfloralium lateralium oblongorum acutorum perulae exteriores crustaceae brunneae rotundatae circ. 3 mm. longae extus intusque puberulae tenuissime ciliatae, interiores flavidae elongato-oblongae acutae circ. 1.5 cm. longae 4 mm. latae membranaceae plus minusve puberulae et glandulosae ciliatae, intimae saepe longiores viridescentes. Folia petiolata ad 10 cm. longa; lamina coriacea oblonga nunc oblongo-elliptica ad 8 cm. longa 3.8 cm. lata in triente supero sursum attenuata tuberculo corneo terminata margine plana anguste cartilaginea basi cordulata lobis rotundatis, supra opaca olivacea costa media paullo sulcata erubescens sparsim puberula venis primariis utrinsecus circ. 13 indistinctis superficie caeteroquin in modum squali corii rugulosa et glaberrima sed indumenti juvenilis vestigiis notata, subtus pallidior costa media elevata erubescens glabra vel ad basim rubro-glandulosa venis primariis immersis et venularum reti subpurpureo immerso ubique glandulis rubris sparsis et pilis plurimis sebaceis solitariis vel floccosis vel caulifloris aurantiacis vel rubris punctulata (in juventute utrinque dense rubro-glandulosa et colorato-floccosa); petiolus circ. 2 cm. longus supra canaliculatus (sulco pube plus minusve impleto) nigro-purpureus primo setuloso-glandulosus et floccosus vel glandulis brevioribus indutus deinde glabrescens. Flores in umbellam ad 8-floram dispositi; bracteae deciduae ignotae; bracteolae circ. 1.5 cm. longae lineares albido-pilosae; pedicelli purpurei glandulis rubris longe et breviter stipitatis viscidis circ. 1.7 cm. longi ad apicem obliqui. Calyx parvus circ. 1.5 mm. longus cupularis 5-lobatus, lobis inaequalibus postero-lateralibus majoribus rotundatis dense glandulosis glandulis ex parte maxima breviter stipitatis nunc longius. Corolla rosea? infundibuliformis 3 cm. longa extus plus minusve glandulosa intus basi puberula, lobis 5 circ. 1 cm. longis 1.5 cm. latis rotundatis emarginatis undulatis. Stamina 10 inaequalia longiora circ. 3 cm. longa breviora 2 cm., filamentis purpureis supra basim et infra medium pubescentibus, antheris magnis 4 mm. longis. Gynaeceum circ. 3.7 cm. longum; ovarium tenue sursum attenuatum 7 mm. longum glandulis rubris breviter stipitatis dense vestitum vertice pilorum crista coronatum; stylus longus corollam staminaque superans basi plus minusve rubro-glandulosus sub stigmate discoideo lobulato haud ampliatus.

Species *Rh. rhaibocarpo*, Balf. f. et W. W. Sm. valde affinis sed foliis longioribus, corolla extus glandulosa, stylo basi glanduloso differt.

E.N.W. Yunnan. Mountains in the N.E. of the Yangtze bend. Alt. 12,000 ft. Lat. 27° 45' N. In open thickets.

Shrub of 6-10 ft. Flowers probably rose. G. Forrest. No. 10,430. July 1913.

This fine plant is of special interest, because whilst resembling in many characters the rhododendrons of the series that centre around *Rh. selense*, Franch., it differs from them in its character of glandular style, which takes it nearer those of the Souliei series, from which series it is excluded by the shape of its corolla. Its nearest ally is certainly *Rh. rhaibocarpum*, Balf. f. et W. W. Sm. They are members of a complex of which Mr. Forrest has collected other members, but not in complete enough state to supply material for estimation of their relationship and title to specific rank. The special attention he will give to that group during his present exploration of Yunnan will furnish data, I hope, which will show us more than one new species in this beautiful set of rhododendrons.

Rhododendron diaprepes, Balf. f. et W. W. Sm.

Frutex ad 3 m. altus. Ramuli annotini glaberrimi crassi circ. 7 mm. diam. recti virides nitentes. Alabastra terminalia ignota. Folia petiolata ad 22 cm. longa; lamina coriacea elliptico-oblonga ad 19 cm. longa 8 cm. lata apice rotundata mucronata margine cartilaginea basi plerumque obliqua lobis subrotundatis nunc subauriculatis subdecurrentibus, supra glaberrima subnitenti-viridis costa media parum sulcata venis primariis utrinsecus ad 22 et nervulorum reticulo (in sicco) paullo elevatis, subtus pallidior sublutescens vel glaucescens papillis ceriferis epidermicis petasiformibus ex toto obiecta et glandulis rubris sebaceis punctulata costa media straminea elevata venis primariis paullo prominulis reticulo ultimo obscurato; petiolus circ. 3 cm. longus viridis glaber subnitens. Flores fragrantis magni inter se distantes in umbellam breviter racemosam ad 7-floram terminalem dispositi inflorescentiae rhachi vix 1.5 cm. longa plus minusve rubro-glandulosa; bracteae ignotae; bracteolae parvae lineari-subulatae circ. 5 mm. longae albedo-hirsutae; pedicelli circ. 3.5 cm. longi crassi stricti pilosi rubro-glandulosi glandulis parvulis brevissime stipitatis nunc glabrescentes superne in calycis cupulam oblique dilatati. Calycis plus minusve rubro-glandulosi cupula brevis in limbum circ. 5 mm. longum tenuiter coriaceum inaequaliter et irregulariter lobulatum expansa, lobis integris vel laceratis et margine plus minusve ciliatis vel glandulosis. Corolla alba extus roseo-suffusa circ. 10.5 cm. longa e tubo infundibuliformi in limbum tubatum 7-lobatum explanata, tubo extus piloso eglanduloso intus pubescente, lobis rotundatis emarginatis nunc subcrenulato-undulatis circ. 3 cm. longis 4 cm. latis. Stamina ad 18 inaequalia longiora circ. 7.5 cm. breviora circ. 5 cm., filamentis

basi latoribus et pubescentibus sursum filiformibus, antheris circ. 4 mm. longis. Gynaeceum circ. 10 cm. longum corolla paullo brevius; ovarium nigro-purpureum conoideum circ. 1 cm. longum glandulis luteis breviter stipitatis dense obtectum; stylus glandulis luteis breviter stipitatis ex toto praeditus sub stigmatate late lobulato curvatus et dilatatus.

Species *Rh. discolori*, Franch. affinis sed foliis latoribus brevioribusque apice rotundatis, inflorescentiae rhachi brevior, corolla majore, staminum filamentis pubescentibus recognoscenda.

W. Yunnan. Shweli-Salween divide. Alt. 9000 ft. Lat. 25° 10' N. Margins of mixed forests. Shrub of 10 ft. Flowers fragrant white flushed rose exterior. G. Forrest. No. 11,958. June 1913.

A species with flowers about a third larger than those of *Rh. discolor*, Franch., to which it is nearly allied. The two species are quite distinct. *Rh. discolor* has narrower and longer leaves which are pointed at the tip and the whiter under surface wants the red glands which punctulate the leaf in *Rh. diaprepes*. The pale colouration of the leaf under-surface in both species is due to the dome-shaped epidermal papillae coated with wax. Then *Rh. discolor* has a really racemose inflorescence the rhachis of which is as much as 4 cm. in length whilst in *Rh. diaprepes* the flowers are distant on a rhachis only 1.5 cm. long. Franchet describes the pedicels in *Rh. discolor* as quite glabrous—were that constant it would readily differentiate the species from *Rh. diaprepes* where they are always glandular. But Rehder and Wilson say that the pedicels are "occasionally sparsely glandular" in *Rh. discolor*, and Wilson's specimens—Nos. 586 and 1077—bear out their statement. In both of these the pedicels are glandular. In addition to the size of flower the very pubescent stamens of *Rh. diaprepes* separate it from *Rh. discolor*, where they are glabrous. From *Rh. rasile*, Balf. f. et W. W. Sm. the absence of glands from the outside of the corolla readily distinguishes *Rh. diaprepes*.

Rhododendron eriogynum, Balf. f. et W. W. Sm.

Frutex ad 3 m. altus ramis validis strictis erectis pauciramosis. Ramuli annotini circ. 4 mm. diam. erubescens glauci glabri vetustiores grisei decorticantes. Alabastrorum fusiformium circ. 2 cm. longorum 7 mm. diam. perulae exteriores rufo-brunneae crustaceae rotundatae ecarinatae emucronulatae extus centro floccosae et glandulosae fimbriato-ciliatae, intimae ligulato-spathulatae flavido-brunneae circ. 2 cm. longae et 5 mm. latae submembranaceae apice truncatae saepe emarginatae extus floccoso-pubescentes et glandulosae intus fere glabrae

marginē floccosae et glanduloso-ciliatae; folia juvenilia revoluta ubique pilis floccosis adpressis glandulas pauciores obtegentibus tomentosa. Folia petiolata ad 16 cm. longa; lamina crasse coriacea lanceolata vel oblongo-lanceolata utrinque angustata ad 13.5 cm. longa ad 6 cm. lata apice acuta rubro-mucronata marginē plana cartilaginea basi obtusa vel late cuneata, supra viridis glabra squali corium subsimulans (in siccitate), pilorum glandularumque juvenilium cicatricibus obscure notata costa media anguste sulcata venis primariis utrinsecus circ. 16 obscure sulcatis, infra pallidior glabrescens glandularum pilorumque detersilium pedibus punctulata costa media erubescēte elevata venis primariis venulisque ultimis purpureis immersis; petiolus crassus circ. 2.5 cm. longus erubescens subglaucus corrugatus supra sulcatus. Flores in umbellas compactas terminales paucifloras aggregati; bracteae intimae fertiles late spatulatae circ. 1.7 cm. longae et 9 mm. latae subtruncatae mucronatae extus intusque pilis longis albidis adpressis dense vestitae; bracteolae circ. 4 mm. longae clavatae dense pilosae; pedicelli circ. 6 mm. longi validi glandulosi et pubescentes. Calyx cupularis circ. 4.5 mm. longus, cupula extus floccosa et glandulosa, lobis triangularibus submembranaceis circ. 3 mm. longis copiose glandulosis marginē glanduloso-fimbriatis. Corolla kermesina postice multimaculata circ. 2.5 cm. longa tubuloso-campanulata subcarnosula extus intusque glabra 5-lobata, lobis rotundatis circ. 1.2 cm. longis et latis integris subpatentibus. Stamina 10 corolla breviora inaequalia longiora circ. 2 cm. longa antheris atro-purpureis subovoideis circ. 1.75 mm. longis, breviora circ. 1.4 cm. longa antheris circ. 1.25 mm. longis, filamentis subcrassis ab ima basi ad medium vel ultra pubescentibus. Discus pubescens. Gynaeceum corollam fere aequans; ovarium cylindricum sulcatum circ. 4.5 mm. longum pilis floccosis dense tomentosum eglandulosum; stylus circ. 2 cm. longus sub stigmatē haud clavatus fere ad apicem dense floccoso-tomentosus ex toto glandulosus glandulis crassis rugulosis aurantiacis baculiformibus sub tomento stratum facientibus (apice etomentoso excepto), floccorum stipite crasso apice pilos plurimos unicellulares strictos divaricatos congestos gerente; stigma atro-purpureum lobulatum stylo haud latius.

Species *Rh. faceto*, Balf. f. et Ward affinis, foliis lanceolatis crassioribus, pedicellis brevioribus, corolla et staminibus dimidio minoribus dignoscenda.

Mid. W. Yunnan. Ghi-shan. East of Tali Lake. Open thickets. Alt. 9000 ft. Lat. 25° 48' N. Shrub of 10 ft. Flowers crimson. G. Forrest. No. 13,508. July 1914.

This species with its compact truss of small crimson flowers borne at the end of stout twigs—much in the same form as in

Rh. niveum—should be a valuable garden plant. It is now in cultivation from seeds collected by Mr. Forrest.

The species is apparently one of the *Irroratum* series. The material for examination is not abundant and I had not appreciated the true affinity of the plant when I dealt with the *Irroratum* series (see *Trans. Bot. Soc. Edin.*, vol. xxvii (1916-1917), 157.

***Rhododendron euanthum*, Balf. f. et W. W. Sm.**

Frutex 3-6 m. altus. Ramuli hornotini glauco-purpurei glandulis breviter stipitatis rubris conspersi, seniores albidogrisei glandularum vestigiis obscure notati. Alabastra ignota. Folia longe petiolata ad 10 cm. longa; lamina chartaceo-coriacea oblongo-elliptica ad 7.5 cm. longa 3.7 cm. lata apice obtusa tuberculo-mucronata margine cartilaginea plana basi glandulis vel earum vestigiis obsita basi rotundata vel late obtusa vel subtruncatula nec cordulata plerumque inaequilateralis, supra viridis opaca costa media erubescens paullo sulcata venis primariis utrinsecus ad 14 haud prominulis glabra sed pedibus glandularum obscure notata interdum in foliis junioribus praecipue ad basim circa costam mediam glandulis rubris sparsissime conspersa, subtus pallide fulva glabra costa media elevata venis primariis et venularum reti conspicuis sed haud elevatis papillis epidermicis petasiformibus inter venulas areolata; petiolus ad 2.5 cm. longus validus erubescens supra sulcatus glandulis rubris plus minusve conspersus. Flores racemoso-umbellati; umbella terminalis ad 12-flora rhachi ad 1 cm. longa puberula et rubro-glandulosa; bractee bracteolaeque mox deciduae ignotae; pedicelli circ. 3 cm. longi recti rigidi rubidi rubro-glandulosi et obscure puberuli apice sub calyce oblique explanati. Calyx parvus circ. 3 mm. longus carnosulus ad medium 7-lobatus, lobis irregularibus rotundatis vel semilunatis rubro-glandulosis. Corolla rosea vel roseo-lavendulacea kermesinomaculata aperto-campanulata ad 5 cm. longa tenuis extus intusque glabra 7-lobata, lobis explanatis circ. 2.5 cm. longis 3 cm. latis rotundatis emarginatis. Stamina 14 inaequalia longiora circ. 3 cm. longa antheris circ. 3.5 mm. longis breviora circ. 2.2 cm. longa antheris 2.5 mm. longis, filamentis deorsum latoribus glabris. Discus brevissime puberulus. Gynaeceum circ. 4 cm. longum corolla brevius stamina superans; ovarium circ. 7 mm. longum conoideum truncatum dense rubro-glandulosum glandulis breviter albedo-stipitatis; stylus validus glandulis rubris capitatis breviter stipitatis ex toto obtectus sub stigmatate discoideo-lobulato labio stylari cincto expansus.

Species haec *Rh. Souliei*, Franch. affinis foliis chartaceo-coriaceis haud cordulatis, calyce parvo carnosulo ubique

glanduloso, corolla profundius concava majore, staminibus 14, ovarii glandulis clare stipitatis recedens.

E.N.E. Yunnan. Western flank of the Lichiang Range. In rhododendron forests. Alt. 11,000–12,000 ft. Lat. 27° 30' N. Shrub or tree of 15–20 ft. Flowers bright rose with crimson markings. G. Forrest. No. 5880. June 1910.

E.N.E. Yunnan. Eastern flank of the Lichiang Range. Open situations on the margins of pine forests. Alt. 11,000 ft. Lat. 27° 20' N. Shrub of 10–20 ft. Flowers rose-lavender with crimson markings. G. Forrest. No. 5881. June 1910.

This is a fine species and should be an ornamental plant in gardens. It has been raised from seeds collected by Mr. Forrest under No. 5881 for Bees Ltd. but has not yet flowered in cultivation.

It has all the aspect of plants of the Selense and Souliei series. Its style, glandular throughout, denies it a place in the Selense series. Of the members of the Souliei series the species nearest to it are *Rh. callimorphum*, Balf. f. et W. W. Sm., *Rh. puralbum*, Balf. f. et Ward, and *Rh. Souliei*, Franch., but they are easily distinguished. It recalls by its foliage *Rh. puralbum*, Balf. f. et Ward, but that species has a pure white corolla, large membranous calyx glandular at margin only, and puberulous staminal filaments. *Rh. callimorphum*, Balf. f. et W. W. Sm. has cordulate leaves and puberulous staminal filaments. *Rh. Souliei*, Franch. has also cordulate leaves and the calyx is large and membranous.

The 7-lobed corolla and 14 stamens suggest the Fortunei series as its affinity, but the leaf form is hardly that of the series and the character of the under-leaf surface is entirely that of *Rh. Souliei*.

Rhododendron facetum, Balf. f. et Ward.

Arbor parva tenuis 5–6 m. alta. Ramuli annotini purpurei 3 mm. diam. stricti plus minusve floccoso-tomentosi et glandulosi, floccis stipitatis stipite longo ad apicem ramulis brevibus rectis acutis radiatis plus minusve sebaceis coronato, glandulis sebaceis stipitatis, glabrescentes, seniores calvi pallide cinnamomei. Alabastra foliorum ignota. Folia petiolata ad 21 cm. longa; lamina chartaceo-coriacea oblonga vel oblanceolata ad 19 cm. longa 5.5 cm. lata apice breviter subrostratim acuta margine cartilaginea obscure undulata vix recurva pilorum deterrentium pedibus notata deorsum attenuata basi late cuneata nunc inaequilateralis, supra opaca haud nitens olivacea glaberrima plana costa media paullo sulcata sulco nudo venis primariis utrinsecus circ. 14 occultis, subtus rubido-brunnea subnitens glaberrima ubique pedibus glandularum vel pilorum deterrentium

minute rubro-punctulata costa media elevata rubra venis primariis venularumque reti paullo prominulis rubris; petiulus ad 2 cm. longus crassus purpureus supra sulcatus corrugatus glabrescens floccorum vestigiis plus minusve indutus. Flores racemoso-umbellati circ. 8 in quaque inflorescentia, rhachi brevi circ. 1.3 cm. longa floccosa et glandulosa; bracteae mox deciduae ignotae; bracteolae parvae circ. 5 mm. longae pedicellis multo breviores filiformes pilosae; pedicelli 1.3 cm. longi floccosi et glandulosi glabrescentes. Calyx ad 5 mm. longus carnosulus ad medium 5-lobatus, cupula dense floccosa et glandulosa, lobis semilunatis vel late triangularibus margine integris vel subfimbriatis dorso glabris vel plus minusve glandulosis. Corolla coccinea tubuloso-campanulata circ. 4.5 cm. longa, tubo postice varo parvo notato et maculato basi 5-retuso-gibboso intus glabro et septis petalinis imperfectis diviso extus basi nunc floccis consperso, lobis brevibus circ. 1.5 cm. longis 2 cm. latis emarginatis. Stamina 10 inaequalia longiora circ. 3.7 cm. longa antheris atro-purpureis 3.5 mm. longis breviora circ. 2.7 cm. longa antheris 2.5 mm. longis, filamentis deorsum dilatatis ab ima basi ad medium vel ultra pubescentibus. Discus superne puberulus. Gynaeceum circ. 4.5 cm. longum corollam aequans; ovarium conoideum circ. 9 mm. longum sulcatum nigricans eglandulosum strato crasso denso pilorum scopiformium floccosorum obtectum; stylus pilis similibus et glandulis rubris clavatis longe stipitatis dense vestitus basim versus pilis numerosissimis, apicem versus glandulis dominantibus, sub stigmate parvo lobulato haud dilatatus.

Species in gregem *Irroratum* ponenda ramis glandulosis floccigerisque, foliis longis chartaceo-coriaceis lanceolatis supra opacis infra subnitentibus, petiolo floccoso, floribus racemoso-umbellatis, inflorescentiae rhachi pedicellisque calycibusque glandulosis et floccigeris, corolla tubuloso-campanulata 5-lobata coccinea variculosa maculata intus et plerumque extus glabra, staminibus 10 ad medium vel ultra pubescentibus eglandulosis, ovario dense tomentoso, stylo glanduloso et floccigero notata.

E. Burma. Feng-shin-ling Camp. 8000-9000 ft. Tree of 15-20 ft. of slender growth in rain forest. Flowers scarlet, in small trusses, just coming into flower. F. Kingdon Ward. No. 1569. 9th Jan. 1914.

A species of the *Irroratum* series marked by its floccose and glandular twigs with large leaves, the under side of which is made somewhat glossy by a wax-coating. The 5-lobed corolla is glabrous inside and out but sometimes is slightly floccose at the base outside, the 10 stamens are pubescent to the middle and beyond it, and the floccose-tomentose ovary bears a glandular and floccose style. These characters separate it from other

species of the series. The conspicuous style-character is shared by *Rh. pogonostylum*, Balf. f. et W. W. Sm. alone in the series, and in that species perhaps *Rh. facetum* finds its nearest ally. The corolla hairy on the outside in *Rh. pogonostylum* and the glands beneath the tomentum on the ovary separate it readily.

Rh. facetum carries farther westwards into Burma the distribution of the *Irroratum* series. *Rh. tanastylum*, Balf. f. et Ward found at Hpimaw is the only species outside Yunnan hitherto assigned to the series, which occupies a much wider geographical area than I knew of when I read an account of the series before the Botanical Society of Edinburgh in 1917. I have since that date found amongst collections made by Mr. R. E. Cooper in Bhutan specimens under Nos. 4086, 4160, 4978 of *Rh. Kendrickii*, Nutt. corresponding in all respects with Mr. Griffith's Bhutan specimens of the species under No. 2235. Analysis of the new Bhutan material of this little-known species suggests that *Rh. Kendrickii* is an Eastern Himalayan representative of the West Chinese forms assembled in the series *Irroratum*. Nuttall,* and following him C. B. Clarke,† thought the affinity of *Rh. Kendrickii* was with *Rh. arboreum*, Sm., from which it differed, as Clarke says, "by the very narrow capsule." The general outward resemblance of dried specimens of *Rh. Kendrickii* to those of *Rh. arboreum* naturally tempts to the

* Nuttall's description runs:—

Rhododendron Kendrickii.—Frutex ramosus; foliis oblongo-lanceolatis, acuminatis, glabris, concoloribus, margine leviter undulatis, junioribus pubescentibus; corymbis multifloris; laciniis calycinis minutis, acuminatis; (staminibus 10?) filamentis glabris; capsulis arcuatis, glabris, 6-locularibus; seminibus lanceolatis, utrinque acutis.

Mountains of Bootan (Mr. Booth). About 7000 ft. elevation, accompanying *Rh. Edgeworthii*, and found lower down than *Rh. Hookeri* and *Rh. Falconeri*, but above *Rh. serotinum*.

This fine species, having some affinity with *Rh. arboreum*, forms lofty thickets (after the manner of *Rh. ponticum*), through which the traveller finds dark and difficult paths. The stem attains the diameter of 7 or 8 inches, with a smooth pale bark. The leaves, 4 to 6 inches long, are scarcely more than an inch wide, elegantly waved on the margin in small plaits, so as to appear almost crenate, disposed partly in whorls, equally green and smooth on both surfaces when adult, the petiole less than half an inch in length; the young leaves and stems, in young plants, more or less clothed with reddish glutinous hairs; beneath, shining, with the pubescence chiefly confined to the midrib. Flower-cone oval, the scales smooth, rounded and obtuse; innermost scales or bracts silky. Corymb 10- to 12-flowered. Flowers large, deep red. Stamens 10? smooth. Stigma 5-lobed. Calyx small, as in *Rh. arboreum*, the segments broad, ovate, acuminate. Capsule 1 to 1½ inch long, incurved, 6-celled, smooth and dark brown. Seeds small, darkish brown, lanceolate, oblique, acute at both extremities.

It grows promiscuously with the very hardy *Pinus excelsa*, and with several kinds of undescribed oaks. Found to be hardy in the climate of England. Fresh flowers have not yet been seen, but from the appearance of dried fragments they seem to be of a deep red.

According to the herbarium of my friend Sir William Hooker, it appears that this species was observed in Bootan by the late Mr. Griffith. The specimens referred to are branches without flowers or fruit.

Dedicated to the memory of my much-revered friend and botanist, the late Dr Kendrick of Warrington.

† In Hook. f. Fl. Brit. Ind. iii (1882), 466.

association of the two species. My overlooking Cooper's specimens when dealing with the *Irroratum*s of W. China was a consequence of my placing them at a first sorting amongst forms of *Rh. arboreum*. But *Rh. arboreum* and *Rh. Kendrickii* assuredly belong to different phyla. The whole indumentum and other characters of the *Arboreum* series typified in *Rh. arboreum* are different from those of *Rh. Kendrickii*, which conform with those of *Rh. irroratum*, Franch. and its allies.

Rh. Kendrickii is not common in cultivation. We have no plant at Edinburgh notwithstanding endeavours to obtain it. Nuttall's description * is very slight, and that in the Botanical Magazine is derived from a cultivated plant. I therefore give here for reference an account of the plant based upon Cooper's Bhutan specimens :—

Rh. Kendrickii, Nutt. in Ann. Mag. Nat. Hist. xii (1853), 10; id. in Hook. Journ. Bot. v (1853), 358.

Rh. Kendrickii var. *latifolium*, Hook. Bot. Mag. (1859), t. 5129.

Shrub 6–8 m. high of spare habit. Branches stiff straight divaricate epilose about 2 mm. in diam. when a year old, reddish soon becoming whitish-grey and shedding the cortex. Leaf-buds ovoid blunt, bud-scales rounded brown crustaceous carinate mucronulate ciliate glabrous or with a few dorsal hairs. Leaves few petiolate about 14 cm. long; lamina firm coriaceous as much as 13 cm. long and 3 cm. broad oblong-lanceolate or lanceolate acuminate ending in a tuberculate mucro, margin broadly cartilaginous recurved undulate slightly warty by vestiges of fallen glands and hairs, base narrowly cuneate; upper surface smooth olive-green paler beneath, on both sides glabrous but marked by scars of fallen hairs and glands sometimes on under surface a few red glands persist, midrib often slightly reddened deeply grooved above raised beneath, primary veins 20 or more on each side hardly visible above slightly raised beneath where ultimate reticulation is conspicuous (when dry); petiole at most 1 cm. long wrinkled glabrous somewhat furfuraceous. Inflorescence of many (15 or more) flowers in a raceme, rhachis as much as 4 cm. long glandular and densely adpressedly tomentose the hairs greasy pale-coloured floccose; outer bracts rounded hooded hardly keeled crustaceous 1.5 cm. or more long 1 cm. or more broad, outside densely adpressedly floccose-tomentose, inside red-glandular with a few basal hairs and many apical hairs, more or less ciliate, innermost bracts ligulate or ligulate-spathulate obtuse or subtruncate and erose 2.5 cm. long by 6 mm. broad hairy outside and glandular, inside nearly glabrous, margin

* See note on previous page.

obscurely ciliate; bracteoles thread-like about 1 cm. long adpressedly hairy longer than pedicel; pedicel very short about 5 mm. long more or less pubescent with floccose greasy often reddish hairs. Calyx very minute about 1.5 mm. long a few floccose greasy hairs outside, lobes half its length triangular fleshy red with a few short greasy cilia. Corolla tubular-campanulate about 3 cm. long pink red-spotted including both stamens and style, fleshy, glabrous outside and inside 5-gibbous and retuse with septal infolding of petals between glandular areas of base of corolla-tube, lobes broad shallowly or deeply emarginate crenulate about 7 mm. long by 1.8 cm. broad. Stamens 10 (11) shorter than corolla unequal, longest 2.2 cm. long with anthers (? purple) 2 mm. long, shortest about 1.3 cm. long with anthers 1.5 mm. long; filaments thin not widened to base, glabrous. Gynaecium about 2.5 cm. long, longer than stamens, shorter than corolla; ovary narrow cylindrico-conoid grooved about 5 mm. long by 1.75 mm. broad sparingly clad with floccose greasy often reddened hairs; style glabrous thin not swollen at the point on which sits a much lobulate stigma not broader than style. Capsule brown slightly warted all over and shallowly grooved about 3 cm. long and 3 mm. in diam. crescentically curved dehiscent by 5 valves from apex. Only unripe seed seen.

Bhutan. Kyertsu Pumthang. Alt. 9000 ft. 15-20 ft. bush, spare habit under mixed moist forest;—in dried flowers and fruit. Clay soil. Flowers said to be pink, red spots. R. E. Cooper. No. 4086. 1.7.15.

Bhutan. Pima Kurted. Alt. 7000 ft. 25 ft. shrub, fruit only. Mixed forest. R. E. Cooper. No. 4160. 23.7.15.

Bhutan. Pumthang. Alt. 9000 ft. 15-20 ft. bush under Picea in clayey soil. R. E. Cooper. No. 4978. -9.15.

Rhododendron Fittianum, Balf. f.

Frutex parvus sempervirens aromaticus. Ramuli juveniles saepe virgati a basi foliati pallide virides lepidoti squamis discontiguis peltatis saepe perspicue stipitatis. Folia petiolata ad 3.5 cm. longa; lamina elliptico-oblonga ad 3 cm. longa 0.5 cm. lata coriacea subcrassa obtusa breviter mucronulata margine tenuis paullo recurva basi obtusa, supra convexa atro-viridis sed indumento paulum griseo vel subfulvo squamarum peltatarum superficialium induta squamis ex umbone lato et instita horizontali constructis primo albidis deinde secretionem fulva vel rufa impletis costa media sulcata venis primariis utrinsecus ad 7 occultis, infra pallidior flavido-viridis concava costa media et venis primariis elevatis ubique squamis peltatis uniformibus fere contiguis deinde aurantiacis vestita; petiolus circ. 5 mm.

longus copiose ut laminae superficies inferior lepidotus. Flores in umbellas semper terminales 4-5-floras dispositi; ramuli umbelliferi plures breves paucifoliati ex axillis foliorum rami floriferi viridium orientes infimi inter se distantes supremi circa umbellam rami floriferi ipsius terminalem fasciculati; bractee parvae circ. 6 mm. longae 3.5 mm. latae exteriores steriles coriaceae ovatae griseo-fulvae cucullatae paullo carinatae mucronulatae intus sericeae extus lepidotae et puberulae margine ciliatae apiceque piloso-cristatae, interiores fertiles membranaceae brunneae spathulatae circ. 8 mm. longae 4 mm. latae indumento similiter indutae; bracteolae filiformes circ. 8 mm. longae pedicellis breviores brunneae haud clavatae basi sparsim pilosae apice cristatae; pedicelli circ. 1 cm. longi crassiusculi stricti divaricati pallide virides squamis superficialibus contiguis viridi-albis perspicue stipitatis dense lepidoti. Calyx parvus cupularis circ. 1.5 mm. longus viridis squamis contiguis viridi-albis contiguis dense lepidotus, limbo sub-obsolete margine subfimbriato et pilis paucis contortis longis ciliato. Corollae circ. 1.6 cm. longae pallide violaceae extus glabrae tubus basi subventricosus intus puberulus circ. 3.5 mm. longus sursum in limbum ex disco infundibulari et lobis 5 ellipticis vel oblongis 9 mm. longis et 7 mm. latis obtusis subcrenulatis auriculatis subaequalibus subpatentibus aedificatum expansus. Stamina 10 paullo inaequalia longiora circ. 1.6 cm. longa corollam aequantia breviora circ. 1.2 cm. longa, antheris rubro-brunneis circ. 1 mm. longis, filamentis pallide violaceis basi haud dilatatis supra basim ad ovarii apicem albido-villosis. Discus viridis puberulus. Gynaeceum corollam et stamina paullo superans; ovarium conoideum vix sulcatum circ. 2 mm. longum viride squamis peltatis superficialibus albido-viridibus lepidotum; stylus subpurpureus vel basi viridi-albidus apiceque violaceus glaber substigmatate vix clavatus; stigma lobulatum erubescens stylo haud latius labio rubro stylari cinctum.

Species *Rh. daurico*, Linn. affinis sed floribus in umbellas solitarias ad apicem ramulorum foliatorum lateralium dispositis distinguenda.

E.N.W. Yunnan. G. Forrest.

Rh. Fittianum, Balf. f. appeared as a "rogue" in seed-pans of the Chinese *Rh. radinum*, Balf. f. et W. W. Sm.* at Werrington Park, where is so well grown under the care of Robert Frank Fitt—from whom this species takes its name—a portion of the unique collection of rhododendrons owned by Mr. J. C. Williams of Caerhays. *Rh. radinum* was found by Mr. Forrest on high slopes of the Likiang Range in Yunnan, and we may assume that *Rh. Fittianum* grows in com-

* See Notes, R.B.G., Edin., x (1916), 268.

pary with it and that seeds of the two collected together have been mixed. We have no record in Mr. Forrest's dried collections of a plant like *Rh. Fittianum*.

Rh. Fittianum promises to be a valuable horticultural plant, and is also of interest from the botanical standpoint.

It belongs to the *Dauricum* series of rhododendrons which is typified in *Rh. dauricum*, Linn., a familiar and decorative plant of our shrubberies which has been in cultivation since 1780. *Rh. dauricum* is a plant of considerable range in N.W. Asia. Its distribution, as given by Maximowicz in 1870,* is:—Siberian Altai to the extreme east, Kamtschatka, Davuria, Russian Manchuria to the mouth of the Amur, and the confines of Corea. Hemsley † records a remarkable extension of its range into Chili and Shantung. It is now known from Yezo in the extreme north of Japan. From West China there is no record.

The most striking feature of *Rh. Fittianum* is its floriferousness. This is due to the development of flower-shoots in the axils of the leaves throughout the length of the shoots. This free flower-formation is not common in rhododendrons. The most familiar example is perhaps that of *Rh. racemosum*, Franch., a plant commonly cultivated in gardens nowadays. The West Himalayan *Rh. virgatum*, Hook. f. and its Chinese representative *Rh. oleifolium*, Franch. show it also. But the branching in *Rh. Fittianum* is not quite the same as in these species. In them each axillary flower-shoot is that and no more—it begins with sterile bracteal scale-leaves covering the flower-bud and ends in the inflorescence. In *Rh. Fittianum* the axillary shoots are vegetative in the first instance, produce a few green leaves and then end in the flower-bud covered by its bracts. In *Rh. dauricum* the lateral flowering shoots are axillary to the last-formed leaves only, and are therefore clustered at the end of the mother shoot and they may or may not begin with foliage-leaves.

Rhododendron fulvum, Balf. f. et W. W. Sm.

Frutex 3-6 m. altus. Rami crassi ad 7 mm. diam. fulvotomentosi tomento per annos plures persistente. Alabastra ignota. Folia petiolata ad 18 cm. longa sub anthesi deflexa; lamina coriacea ad 15.5 cm. longa ad 6 cm. lata elongata anguste obovata vel late oblanceolata apice breviter et acuminatim corneo-apiculata margine plana basi obtusa haud rotundata, supra glabra sed pilorum juveniliū vestigiis minute notata opaca laevis epapillata costa media et venis primariis

* Maxim. *Rhodod. Asiae Orient.* (1870), 43.

† Hemsley in *Journ. Linn. Soc.* xxvii (1889), 22.

utrinsecus ad 13 sulcatis, subtus rufo-cinnamomea costa media plus minusve rufo-floccosa elevata venis primariis suboccultis vel paullo prominulis ubique indumenti strato uno tenui haud scintillante persistente rufo vestita indumenti pilis in modum peniculi capitati floccosis pilo quoque ex stipite sublongo pluricellulari ad apicem disco rufo-colorato terminato et in ramulos plures longos haud latos contortos vesiculosos radiatim deliquescente composito; petiolus supra sulcatus ad 2.5 cm. longus indumento eodem dense praeditus. Flores plurimi (ad 20) in umbellam veram globosam dispositi; bracteae fertiles deciduae oblongo-spathulatae ad 2.5 cm. longae extus intusque sericeae apice subtruncatae et nunc apiculatae; pedicelli subaequales ad 2 cm. longi stricti graciles plus minusve floccoso-pubescentes glabrescentes. Calyx minutus dentibus 5 deltoideis brevissimis glabris. Corolla rosea infundibuliformi-campanulata ad 4 cm. longa basi paullo et regulariter gibbosa intus glabra basi intense rubescens, lobis 6 rotundatis emarginatis circ. 1.5 cm. longis 2.2 cm. latis. Stamina 10 inaequalia longiora ad 2.7 cm. longa breviora 1.7 cm. tubo corollino breviora, filamentis basi paullo latioribus et minute puberulis. Gynaecium circ. 3.2 cm. longum corolla brevius; ovarium atro-purpureum conoideum glabrum angustum circ. 7 mm. longum 2.5 mm. latum; stylus glaber; stigma stylo vix latius.

Species habitu *Rh. Beesiani*, Diels sed indumento omnino diverso, petiolo indumento vestito, pedicellis brevioribus, ovario glabro, stigmatibus vix expanso recedit.

W. Yunnan. Western flank of the Shweli-Salween divide. Alt. 10,000–11,000 ft. Lat. 25° 20' N. Rhododendron forest. Shrub of 20–25 ft. In fruit. G. Forrest. No. 8989. August 1912.

W. Yunnan. Western flank of the Shweli-Salween divide. Alt. 10,000–11,000 ft. Lat. 25° 20' N. Rhododendron forest. Shrub of 12–18 ft. In fruit. G. Forrest. No. 9001. August 1912.

W. Yunnan. Shweli-Salween divide. Alt. 9000 ft. Lat. 25° 30' N. In mixed thickets and on the margins of forests. Shrub of 20 ft. Flowers pale rose flushed deeper shade exterior. G. Forrest. No. 11,842. May 1913.

W. Yunnan. Shweli-Salween divide. Alt. 10,000 ft. Lat. 25° 30' N. In open thickets. Shrub of 10–20 ft. Flowers bright rose. G. Forrest. No. 11,940. June 1913.

A fine species, with smaller flower trusses than *Rh. Beesianum*, Diels, which it resembles much in general features and of which—a Likang plant—it is the West Yunnan representative. It is easily distinguishable from *Rh. Beesianum*. The

shoots are always fulvous tomentose not glabrous. Its under-leaf indumentum does not appear to be deciduous, and the structure of the indumental hairs is very different. Here they are relatively large dense flocks, each with a somewhat long stipe of many cells branching off at the top into many long twisted threads which do not in dried specimens seem to interlace to form a surface wool-like layer but stand out like strands of a mop, giving a sort of powdery aspect to the whole surface of the indumentum. The hair-branches are of medium diameter, neither filiform nor broadly vesicular. In *Rh. Beesianum* the indumentum-hairs are true flocks also, but of rosette-type. The basal stipe is very short and only some 5 or 6 short broad vesicular hair-branches radiate from it, spreading out more or less flatly, their walls often beautifully striate. These branches are so interlaced as to give rise to a smooth suède general surface, which is most characteristic. Then the flocks are deciduous. Other distinctive characters from *Rh. Beesianum* are:—the leaves are not rugulose on the upper surface, the petioles not glabrous but coated with indumentum, the inflorescence umbellate not racemosely umbellate, the shorter more delicate pedicels, the smaller flowers, the narrower glabrous ovary and the less expanded stigma.

***Rhododendron fumidum*, Balf. f. et W. W. Sm.**

Frutex circ. 2 m. altus. Rami annotini circ. 2 mm. diam. rubri epilosi squamis peltatis brunneo-rufis fere contiguis lepidoti, seniores squameo-verruculosi. Alabastrorum fusiformium perulae exteriores brunneae coriaceae rotundatae vel late ovatae, interiores spathulatae circ. 1.1 cm. longae 4.5 mm. latae membranaceae truncatae mucronulatae dorso plus minusve lepidotae et puberulae intus puberulae et squamis paucis obsitae ciliatae; folia juvenilia convoluta utrinque lepidota supra laevia ad costam mediam puberula. Folia petiolata ad 9 cm. longa; lamina subcrasse coriacea oblonga vel oblongo-ovalis ad 7.5 cm. longa sursum attenuata subacuminata mucrone longo (1 mm. vel ultra) ad extremitatem rubro-tuberculato terminata margine cartilaginea paullo recurvata basi late rotundata nunc cordulata interdum inaequalis, supra atroviridis opaca squali corium subsimulans squamarum vestigiis griseis vel nigricantibus notata costa media sulcata puberula venis primariis utrinsecus circ. 8 vix conspicuis, infra fulva squamis peltatis uniformibus discontiguis ex umbone lato convexo secretionem rubra impleto institaque angusta brunnea aedificatis intervallis epidermicis squamarum diametro minoribus costa media elevata erubescence sparsim lepidota venis primariis occultis; petiolus 1-1.5 cm. longus ruber lepi-

dotus supra sulcatus sulco puberulo. Flores in racemo-umbellae terminales 5-7-floras dispositi rhachi circ. 7 mm. longa lepidota et puberula; bracteae ignotae; bracteolae lineari-clavatae subaristatae brunneae circ. 8 mm. longae pedicellis breviores dense pilosae sparsim lepidotae; pedicelli 1-1.5 cm. longi stricti erecti epilosii dense lepidoti. Calyx crateriformis circ. 2 mm. longus extus dense lepidotus, lobis 5 circ. 1 mm. longis late triangularibus vel semilunatis plus minusve ciliatis. Corolla campanulata circ. 2.4 cm. longa atro-violacea postice viridi-maculata extus dense lepidota intus dense puberula, lobis circ. 1.2 cm. longis 1 cm. latis subovalibus apice rotundatis crenulatis interdum emarginatis. Stamina 10 inaequalia longiora 2.2 cm. longa corolla paullo breviora antheris circ. 2.5 mm. longis breviora circ. 1.2 cm. longa antheris 1.5 mm. longis, filamentis basi nuda vix 1 mm. longa expansis sursum ad apicem tubi corollini villosis superne glabris. Discus puberulus circ. 1 mm. longus. Gynaeceum circ. 1.7 cm. longum staminibus longissimis brevius; ovarium cylindrico-conoideum sulcatum circ. 4.5 mm. longum dense imbricatim lepidotum epilosum; stylus ruber glaber circ. 1.2 cm. longus apice sub stigmate atro-purpureo lobulato clavatus. Capsula oblonga circ. 1.5 cm. longa 4 mm. diam. lepidota.

Species *Rh. brevistylus*, Franch. et *Rh. pholidoto*, Balf. f. et W. W. Sm. affinis ab illa foliis subcrasse coriaceis basi rotundatis vel cordulatis, calyce extus epiloso, corolla viridi-maculata, ovario epiloso, stylo glabro distinguenda, ab hac foliis majoribus, pedicellis brevioribus, calyce extus epiloso, corolla viridi-maculata, ovario epiloso recedit.

N.E. Yunnan. Plateau of Te-ma-Tchouan. Alt. 3200 m. Flowers violet. July. Maire. No. 224. In Herb. Edin.

N.E. Yunnan. Summit of Io-chow. Alt. 3400 m. Flowers sombre violet. June. Maire. No. 62. In Herb. Edin.

This is a representative in N.E. Yunnan of the *Heliopsis* series, which is spread in several species over regions more to the west, as the following table shows:—

<i>Rh. brevistylum</i> , Franch. (1898).	W.N.W. Yunnan: Mekong Valley, Mt. Sela. (Soulié.) S.E. Tibet: Doker La, 11,000-12,000 ft. (Ward.)
<i>Rh. fumidum</i> , Balf. f. et W. W. Sm. (1917).	N.E. Yunnan: Te-ma-Tchouan and Io-chow, 10,000 ft. (Maire.)
<i>Rh. heliopsis</i> , Franch. (1887).	E.N.W. Yunnan: Hoking, 8000 ft. (Delavay); Kouala-po, 11,000 ft. (Delavay.)

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| | E.N.W. Yunnan: Mts. in N.E. of Yangtze bend, 11,000 ft.; Likiang Range, N.W. flank, 12,000–13,000 ft. (Forrest.) |
| <i>Rh. invictum</i> , Balf. f. et Farrer (1917). | Kansu: Siku-Satanee Ranges, 8000–9000 ft. (Farrer and Purdom.) |
| <i>Rh. oporinum</i> , Balf. f. et Ward (1917). | E. Upper Burma: Wulaw Pass, Valley of Naung-Chaung, 11,000–12,000 ft. (Ward.) |
| <i>Rh. pholidotum</i> , Balf. f. et W. W. Sm. (1917). | Mid. W. Yunnan: Tali Range, E. flank, 10,000–12,000 ft. (Forrest.) |
| <i>Rh. plebeium</i> , Balf. f. et W. W. Sm. (1917). | W. Yunnan: Shweli-Salween divide, 10,000–11,000 ft. (Forrest.) |
| <i>Rh. rubiginosum</i> , Franch. (1887). | Mid. W. Yunnan: Tali Range, 8000–11,000 ft. (Delavay); Likiang Range, 10,000–12,000 ft. (Forrest.) |

The list does not include all the forms of the series. Both from Western and Eastern Yunnan there are specimens which do not come within the limits of described species. Their position remains for future investigation to determine. *Rh. rubiginosum* seems to be variable, and probably its specific boundary will have to be redrawn when we get to know more of the plants of which there is at present available for study inadequate material. In the list given above I have cited for its distribution only areas from which the type or undoubtedly typical specimens have been brought.

Rh. fumidum belongs to the set within the *Heliopsis* series, in which the uniform scales on the under-leaf surface are discontinuous but separated by intervals less than the diameter of the scales. Its nearest ally seems to be *Rh. pholidotum*, in which the pedicels are longer, the calyx puberulous outside, and the ovary hair-crested. The glabrous style of *Rh. fumidum* is a character which it shares in the series with *Rh. rubiginosum*. *Rh. pholidotum* is exceptional in having the style sometimes glabrous sometimes pilose.

Rhododendron herpesticum, Balf. f. et Ward.

Frutex ad 30 cm. altus ramis decumbentibus intertextis late patentibus bambusetum alpinum et montium summorum

rhododendreti tapeta incolens. Ramuli hornotini ad 2 mm. diam. indumento bistrato vestiti, pilis strati inferi floccosis niveis e stipite brevissimo ramulisque plurimis vacuis vesiculosus radiatis aedificatis mox deciduis, strati superi setiformibus longis crebris sebaceis fulvis ad apicem rubro-glandulosus per annos 2-3 plus minusve persistentibus, annotini et bimi et trimi fulvi et setulis plus minusve obtecti vel earum vestigiis verruculosi dein albedo-grisei et decorticantes. Alabastrorum angustorum acutorum perulae extimae anguste semilanceolatae acutae ad 5 mm. longae circ. 2 mm. latae subnigrae extus intusque niveo-floccosae, intimae ad 9 mm. longae 3.5 mm. latae oblongae acuminatae extus niveo-floccosae margine ad apicem fimbriatae intus glabrae. Folia petiolata ad 8 cm. longa; lamina crasse coriacea oblanceolata vel oblonga vel oblongo-elliptica ad 7 cm. longa 3 cm. lata apice rotundata vel subtruncata vel subretusa tuberculato-mucronata margine paullo recurvata cartilaginea nunc erubescens basi cuneata rarius obtusa, supra atro-viridis glabra sed pilorum juvenilium vestigiis plus minusve notata (lamina juvenilis revoluta pilis floccosis niveis supra oblecta est) costa media et venis primariis utrinsecus ad 12 paullo sulcatis caeteroquin in modum squali corii leviter rugulosa, subtus costa media erubescens vel nigrescente minute puberula et glabrescente caeteroquin indumenti strato uniformi laevi compacto persistente venas primarias fere celante (indumenti pilis floccosis brevissime stipitatis ramulos vesiculosos vacuos quoquo versus intertextos gerentibus) vestita; petiolus circ. 1 cm. longus nigro-purpureus glaber vel indumenti juvenilis densi nivei floccosi vestigiis obtectus. Umbella terminalis 2-4-flora; bractae et bracteolae mox deciduae ignotae; pedicelli nigro-purpurei validi stricti circ. 2 cm. longi cum inflorescentiae rhachi floccosim fulvi et dense glanduloso-setulosi ad apicem haud obliqui. Calyx subgrandis cupularis (cupula nigro-purpurea) apertus extus plus minusve glanduloso-setulosus in limbum membranaceum flavido-viridem 5-lobatum expansus circ. 8 mm. longus (sub fructu auctus), lobis semi-lunatis circ. 2 mm. longis 6 mm. latis margine glandulis stipitatis ciliatis. Corolla opaco-lutea vel aurantiaco-rubra tubuloso-campanulata ad 3.5 cm. longa utrinque glabra, lobis 5 fere rotundatis circ. 1.1 cm. longis 1.3 cm. latis erecto-patentibus emarginatis. Stamina 10 inaequalia longiora ad 2.5 cm. longa breviora circ. 1.8 cm. longa, filamentis deorsum latioribus basi puberulis, antheris atro-purpureis parvis circ. 2.5 mm. longis. Gynaecium circ. 2.75 cm. longum; ovarium 5 mm. longum nigro-purpureum sulcatum pilis fasciatis fuscis et glandulis setulosis praecipue ad juga dense obtectum; stylus nigro-purpureus glaber sub stigmate lobulato haud expanso vix ampliatus.

Species ex affinitate *Rh. sanguinei*, Franch. indumento sebaceo-setuloso bene distincta.

Eastern Upper Burma. Nwai Divide. Ridge of Naung-Chaung. Alt. 12,000–13,000 ft. Dwarf shrub forming tangled growths covering a good deal of ground and rising to a height of about a foot. Amongst bamboo growth on the ridge near tree limit and amongst rhododendron carpet at the summit of the mountain (N. slope). Flowers dull yellow and orange-red. F. Kingdon Ward. No. 1793. 16.7.14.

This is a pretty species allied to *Rh. sanguineum*, Franch. This series of rhododendrons is characterised by the white or grey under-leaf indumentum forming a crusty uniform stratum composed of floccose hairs with very short stalks from which radiate long empty vesicular branches which by interweaving form the smooth often crust-like surface; by the tubular campanulate 5-lobed corolla; by the 10 stamens; by the ovary densely coated with ascending chestnut-coloured fasciate hairs often mixed more or less with greasy setae with club-shaped ends; by the glabrous style and narrow stigma. The series seems to be well developed along the Burma-Yunnan frontier from Tibet southwards. *Rh. herpesticum* is readily separated from *Rh. sanguineum* by the setulose twigs and petioles on which there is also a lower indumental stratum of white floccose hairs. Also the calyx-lobes are well developed. The indumentum-characters also separate it from *Rh. dichroanthum*, Diels and from *Rh. apodectum*, Balf. f. et W. W. Sm.

Rh. invictum, Balf. f. et Farrer.

Frutex tenuiramosus ad 2 m. altus ubique lepidibus peltatis magnis plus minusve vestitus, lepidibus ex umbone magno tandem secretionem auream tincto institaque aequilata integra aedificatis. Ramuli annotini rubro-purpurei circ. 1.5 mm. diam. plus minusve puberuli et lepidoti demum griseo-decorticales. Alabastrorum lateralium oblongorum circ. 3 mm. diam. acutorum perulae exteriores tenuiter coriaceae pallide brunneae rotundatae circ. 4 mm. diam. leviter carinatae mucronatae extus minute puberulae et centro lepidotae intus glabrae (costa media prope apicem adpresso-puberula excepta) margine minute ciliatae, interiores pallide virides spatulatae circ. 1 cm. longae 3.5 mm. latae submembranaceae apice rotundatae mucronulatae extus epilosae centro lepidotae minute ciliatae; folia juvenilia convoluta subtus squamulis imbricatis dense flavido-lepidota (costa media plus minusve excepta) supra puberula fere elepidota costae mediae sulco dense puberulo. Folia petiolata ad 5.5 cm. longa; lamina coriacea elliptica vel oblongo-elliptica circ. 4.5 cm. longa 2.5 cm. lata apice obtusa mucrone conspicuo, margine

leviter cartilaginea fere plana, basi late obtusa vel rotundata, supra atro-viridis leviter rugulosa plus minusve minute puberula et squamulis paucissimis marcidis albidis praecipue ad basim notata costa media erubescence sulcata sulco pilis impleto venis primariis utrinsecus circ. 6 vix conspicuis, subtus olivacea vel olivaceo-brunnea epilosa costa media elevata rubra squamulis paucis scintillantibus obducta, caeteroquin squamulis uniformibus discontiguis latis flavidis (umbone secretion aureo-annulato instita albida membranacea) praedita intervallis squamulis angustioribus; petiolus ad 1 cm. longus dense lepidotus supra sulcatus et puberulus. Flores 2 (v. plures) in umbellam veram terminalem dispositi; bracteae mox deciduae ignotae; bracteolae spadiceo-brunneae lineares acutae dense et breviter puberulae elepidotae; pedicelli atro-purpurei minute puberuli squamulis albidis vel fulvis peltatis conspersi stricti circ. 8 mm. longi. Calyx parvus ad 2 mm. longus cupularis, cupula dense lepidota et sparsim puberula, lobis 5 ovatis circ. 1 mm. longis dense puberulis (squamulis paucis intermixtis) ciliatis et squamoso-fimbriatis. Corolla purpurea infundibuliformi-campanulata circ. 2.2 cm. longa extus postice lepidota caeteroquin glabra intus puberula, lobis oblongis integris circ. 1.3 cm. longis 9 mm. latis antero-lateralibus longioribus. Stamina 10 inaequalia longiora circ. 2.5 cm. longa corollam superantia breviora circ. 1.5 cm. longa, antheris circ. 2 mm. longis, filamentis deorsum latioribus basi nudis sursum per 2.5 mm. ultra ovarii apicem pubescentibus. Discus lobulatus circ. 1 mm. longus puberulus. Gynaecium circ. 2.8 cm. longum corollam staminaque superans; ovarium breve circ. 3 mm. longum conoideum leviter sulcatum dense imbricatum flavido-lepidotum ad apicem nunc piloso-cristatum; stylus ipse circ. 2.5 cm. longus ruber basi pilosus apice paullo clavatus ampliatus et sub stigmate lobulato purpureo cupularis. Capsula nigro-brunnea squamulis albidis discontiguis peltatis sigillata circ. 1.2 cm. longa 4 mm. diam. ab apice valvis 5 dehiscens basi calycis cupula cincta.

Species *Rh. pholidoto*, Balf. f. et W. W. Sm. affinis foliis obtusis ellipticis subtus squamulis haud fere contiguis praeditis supra puberulis, bracteolis elepidotis, pedicellis puberulis et lepidotis, calycis lobis dense puberulis, corolla staminibus et stylo breviori postice solum lepidota, stylo staminibus longiore, ovario breviori late separata.

Kansu. A frail bush of 4-7 ft., not uncommon in the alpine coppice of the Siku-Satanee Ranges at 8000-9000 ft. Farrer and Purdom. April-May.

We have here a species which, without doubt, belongs to the *Heliolepis* section, but it shows certain divergences which break in upon the uniformity which the series

otherwise exhibits. One notes that the upper surface of the young leaves produces but few peltate scales and these chiefly near the base of the lamina where it is about to join the petiole and, as if by way of substitute protection the whole surface becomes shortly puberulous. One may say that there is over the whole plant a tendency to a development of hairs alongside of and taking the place in part of peltate scales—on the pedicels along with the scales, supplanting the scales on the bracteoles, profusely covering the calyx-lobes associated with but a few scales. Then the style and stamens are both slightly longer than the corolla, and the style is longer than the longest stamens—only slightly so but clearly.

Rh. invictum has its nearest ally perhaps in *Rh. pholidotum*, but the pointed leaves, umbels with more flowers, closer-set scales of that species are superficial diagnostic characters to take along with the special features already mentioned which are shown by *Rh. invictum*. In *Rh. invictum*, as in *Rh. pholidotum*, the slight zygomorphy of the flower is marked. I am not sure but that the character really marks all the species in the series, but I have insufficient material and observation for a precise statement.

Rhododendron mallotum, Balf. f. et Ward.

Arbor macera 3-5 m. alta. Rami crassi annotini 6 mm. diam. indumento tomentoso crasso persistente primo fulvo mox griseo-nigricante omnino involuti, indumenti pilis scopiformibus multiramosis ramis longis aseptatis acutis ab apice stipitis longi nudi multicellularis erecto-patentibus haud intertextis nunc stipitem ex toto induentibus. Folia petiolata ad 9.3 cm. longa; lamina crasse coriacea elliptico-oblonga vel obovata ad 8 cm. longa 4 cm. lata apice rotundata tuberculo-mucronata margine cartilaginea paullo recurva basi late obtusa vel subrotundata, supra atro-viridis subbullata costa media basi crassa subelevata sursum sulcata tomentosa sed glabrescente venis primariis utrinsecus ad 10 sulcatis caeteroquin glabra, subtus indumento crasso fulvo ei ramorum simili venas occludente ubique vestita; petiolus crassus ad 1.3 cm. longus 3 mm. diam. indumento fulvo ex toto involutus. Flores in racemo-umbellam terminalem multifloram (ad 20-) dispositi; bractee bracteolaeque ignotae; pedicelli breves crassi circ. 7 mm. longi indumento fulvo involuti sub flore obliqui. Calyx obsoletus omnino indumento obtectus dentes 5 minutos exhibens. Corolla kermesina tubuloso-campanulata carnosula circ. 3.5 cm. longa omnino glabra basi 5-gibbosa retusa et intus septis incompletis petalinis divisa 5-lobata, lobis obcordatis circ. 1 cm. longis 2 cm. latis subcrenulatis. Stamina 10 inaequalia longiora circ. 2.8 cm. longa corolla

breviora antheris atro-purpureis circ. 3 mm. longis breviora circ. 2 cm. longa antheris circ. 2.5 mm. longis, filamentis kermesinis basi vix dilatatis glabris. Discus circ. 1.3 mm. longus glaber. Gynaeceum circ. 3.5 cm. longum corollam subaequans; ovarium parvum circ. 4 mm. longum sulcatum indumento crasso tomentoso fulvo pilorum scopiformium ascendentium involutum; stylus ruber glaber sub stigmate haud expansus; stigma parvum lobulatum stylo haud latius.

Species ex affinitate *Rh. lanati*, Hook. f. corolla kermesina staminibusque glabris facile distinguenda.

E. Upper Burma. Hpimaw. On open hillsides above the pass, 11,000–12,000 ft. Scraggy tree 10–15 ft. Flowers crimson. F. Kingdon Ward. No. 1567. 19th May 1914.

This is one of these interesting forms which Mr. Kingdon Ward has brought from East Upper Burma, carrying the types of East Himalayan rhododendrons farther eastward. The affinity of *Rh. mallotum*, Balf. f. et Ward is with the Sikkim and Bhutan *Rh. lanatum*, Hook. f. Ward's plant may be spoken of as a crimson-flowered *Rh. lanatum*. The two species are alike in their very thick persistent indumentum, the hairs of which in *Rh. lanatum* are rather tree-like (dendriform) than besom-like (scopiform) as they are in *Rh. mallotum*, and the hair-branches of *Rh. lanatum* are also slenderer, curl more, and interlock, are not stiff erect and patent. In addition to its yellow corolla, the densely villous staminal filaments give a character separating *Rh. lanatum*.

Rhododendron manipurense, Balf. f. et Watt.

Rh. Maddeni var. *obtusifolium*, Hutchinson in Bot. Mag. (1908), t. 8212.

Frutex epilosus multiramosus tortuosus. Rami hornotini furfuraceo-lepidoti squamis imbricatis, basi perulis extimis aggregatis alabastrorum cincti, sursum perulis intimis inter se distantibus induti, annotini circ. 6 mm. diam. atro-rubentes squamis rubiginosis obtecti, seniores glabrescentes. Alabastrorum foliarum perulae omnes extus lepidotae extimae semifoliaeae, intermediae cataphylloideae rotundatae vel ovato-rotundatae coriaceae eciliatae, intimae submembranaceae ligulato-spathulatae circ. 2 cm. longae 5 mm. latae; folia juvenilia convoluta utrinque cum petiolo imbricatum argenteo-lepidota. Folia petiolata ad 20 cm. longa; lamina crasse coriacea oblonga vel elliptico-oblonga ad 18 cm. longa et 8 cm. lata apice obtusa vel acutiuscula nunc subrotundata tuberculo-mucronata margine cartilaginea vix revoluta basi attenuata obtusa vel sub-cuneata supra laete viridis nitens nunc rubiginoso-tincta venulosa costa media sulcata venis primariis utrinsecus ad 12 haud conspicuis

squamis rubiginosis vel nigricantibus conspersa, subtus cinnamomea costa media prominente venisque primariis vix elevatis ubique squamis rufis peltatis biformibus discontinuis quasi punctulatum lepidota, squamis crasse stipitatis in foveolas profundas immersis (paucis majoribus conspersis) ex umbone convexo scintillante institaque integra latiore pallidiore aedificatis, intervallis epidermicis conspicuis papillatis papillis conoideis; petiolus ad 3 cm. longus crassus imbricato-lepidotus vel foveolatus et squamoso-furfuraceus. Alabastra florum magna ovoidea glutinosa bracteis extimis semifoliaceis reflexis interioribus late ovatis vel rotundatis intense rubris dorso lepidotis oblecta. Flores magni in umbellam terminalem 4-5-floram laxam dispositi; bracteolae lineares acutae circ. 1.8 cm. longae pedicellis longiores; pedicelli crassi breves ad 1 cm. longi 3 mm. diam. lepidoti in cupulam calycinam expansi. Calyx fere ad basim 5-partitus, cupula circ. 2 mm. longa extus dense lepidota, lobis oblongis apice rotundatis subfoliaceis membranaceis flabelliveniis ad 1.5 cm. longis 1 cm. latis elepidotis inaequalibus postero-lateralibus minoribus. Corolla magna puralba ad 10 cm. longa, tubo angusto infundibuliformi circ. 6.5 cm. longo extus lepidoto piloso intus pubescente in limbum campanulatum 5-lobatum ampliato, lobis rotundatis circ. 3.5 cm. longis 3 cm. latis undulatis. Stamina 18-20 subaequalia longiora ad 8 cm. longa stylo breviora, filamentis filiformibus basi paullo latioribus a basi ad medium pubescentibus, antheris circ. 5 mm. longis. Ovarium ovoideum circ. 8 mm. longum imbricatum rufolepidotum; stylus corolla paullo brevior fere ex toto lepidotus; stigma discoideum lobulatum. Capsula recta magnitudine variabilis nunc 2 cm. nunc 4 cm. longa 1 cm. lata squamosa valvis ab axi deciduis.

Species notabilis a *Rh. Maddeni*, Hook. f. et *Rh. calophyllo*, Nutt. calyce magno staminumque filamentis pubescentibus, a *Rh. Dalhousiae*, Hook. f. corolla extus lepidota staminibusque 18-20 recedens.

Manipur. Japvo. Alt. 8000-10,000 ft. An extremely common plant, forming a dense jungle with much branched and kneed stems. Leaf elliptic bright shining above dotted below and becoming deep rufous with age. Flower-buds large ovate embraced by ovate acute deep red scales, the outer 2-3 of which become green and reflexed. Fruits 12-carpelled, leaving a central axis with style 3 inches long. Calyx at bottom free long. G. Watt. No. 6461. 9th March 1882.

Manipur. Sirohifurar. Alt. 8000 ft. A common rhododendron on the smaller peak. Collected large supply of seeds. Fruit when burst open spreads rotate with the long persistent style arching away for 3 inches. Evidently a late-flowering

species. Flower-buds small, will expand three or four months hence. Leaves large ovate oblong elliptic bright shining green above with rufous spots below quite glabrous. Young twigs stout dark red glabrous, leaf horizontal. Watt. No. 6461. 12th April 1882.

Manipur. Ching Sow. Alt. 8500 ft. Only in foliage, old fruits and flower-buds. Leaves broader with stouter petioles than No. 6513, but probably the same; both forming large bushes with few long ascending branches. Watt. No. 6512. 16th April 1882.

Manipur. Ching Sow. Alt. 8000 ft. Under surface of leaf unusually green but no doubt same as No. 6512. Watt. No. 6513. 14th April 1882.

Manipur. Keyang. Alt. 9000 ft. Common. Watt. No. 6703. 22nd April 1882.

Manipur. Japvo, Naga Hills. Alt. 10,000 ft. In consequence of an appeal from me, my friend Dr. W. Coury, Surgeon to the 42nd N.I., then stationed at Kohima, paid a visit to Japvo to collect some plants for me. Of these perhaps the most successful was re-gathering of my No. 6461 in full flower. Flowers large pure white, about 3-4 inches long. Calyx of 5 free teeth, 2 half the length of the other 3, oblong obtuse membranous. Near to but I think quite distinct from *Rh. Maddeni*, Hook. f. Have referred this point to Kew. Watt. No. 7333. 22nd July 1882.

In Sir George Watt's Herbarium I found some sheets of this rhododendron about the precise identity of which he was uncertain, but which, as his field tickets show, appeared to him to be more or less related to *Rh. Maddeni*, Hook. f. yet different. These Manipur plants are all of them related to *Rh. Maddeni*, Hook. f. and its immediate microforms *Rh. calophyllum*, Nutt. and *Rh. Jenkinsii*, Nutt., but they have diverged from the typical *Rh. Maddeni*, Hook. f. by enlargement of the calyx and by development of hairs on the filaments of the stamens. These two characters the Manipur plants possess in common with the West Chinese, *Rh. crassum*, Franch. and its immediate allies *Rh. excellens*, Hemsl. et Wils. and *Rh. megacalyx*, Balf. f. et Ward.

As regards the calyx-enlargement, it is to be noted that in the dried specimens there is a slight irregularity in the calyx lobes of *Rh. manipurens*. All of them are enlarged, but two are commonly smaller than the others. Sir Joseph Hooker points out that in the small calyx of *Rh. Maddeni* the lobes are unequal and the "upper lobe is often elongated." This is, however, a very different condition from what appears in *Rh. manipurens*—although indicative of calycine enlargement as a feature in the phylum.

I must point out also that in *Rh. manipurens* the androecium has in numerical symmetry and length of stamens and anthers the character of *Rh. Maddeni*. Hooker gives the number of stamens in *Rh. Maddeni* as 17–20, and they are as long as the tube. I find the same number and length in *Rh. manipurens*. In this *Rh. manipurens* approaches *Rh. Maddeni* more nearly than it does *Rh. crassum* and its allied forms named above, which all have 10–12 stamens.

I wrote to Sir George Watt about his Manipur rhododendrons, and he has been so good as to send to me the manuscript of his descriptions of all the species he met with during his journeying in Manipur. The manuscript came to Europe with his specimens in the eighties of last century but was not published. I give here a transcription of what Sir George Watt says about these forms which with reluctance he placed under *Rh. Maddeni* :—

“This is perhaps the most abundant bush on Japvo, Ching Sow, and other hills above 7500 feet in altitude.

“On the young shoots its elliptical lanceolate leaves are very much larger and broader than on the flowering branches, bright shining green above and green with brown scales, becoming almost ferruginous, below. Under the microscope these spots are seen to be round peltate scales depressed like minute cups; in the bottom of each is placed a round dark brown shining glandular body surrounded by a thin striated pale-coloured membrane. Flower-buds round, acute, solid, large, dark red and coated with a sticky substance; bracts reniform broader than long sometimes suddenly and shortly apiculate and having along the centre a band of closely packed scales.

“Flowers appear in June to August and fruit ripens in September. They were described to me as white, and as this together with all the other characters agrees admirably with Hooker's figure xviii [in Sikkim Rhododendrons] and description of *Rh. Maddeni*, I have most reluctantly had to renounce my first impression that this lovely plant was a new species.

“Fruit not 10-celled (as described by Hooker) but 12-celled, bursting into 4–6 portions of one or more carpels and dehiscing from the 12 placental plates which after a time separate upwards from the central axis.

“Seeds very large for a rhododendron. Hooker in his Rhododendrons of the Sikkim Himalaya states that this species is confined to ‘the inner ranges, very rare, in thickets of the Lachen and Lachoong rivers at Choongtam.’ It is therefore extremely interesting to find that ‘this truly superb plant’ is by no means so rare as it has hitherto been thought, and that, although it has taken thirty years to discover the fact, *Rh.*

Maddeni is one of the most abundant bushes in the higher Manipur Hills and in our Naga Hill district. It may be said to make its appearance in the eastern corner of Sikkim and to be spread eastward to the higher Naga Hills and North-Eastern Manipur.

"It was gathered in the Duphla Hills by Mr. Lister (a collector sent out from the Botanic Gardens, Calcutta, in 1875), very imperfect specimens being received. Griffith's Bhotan specimens No. 3507 most probably belong to this species, as also those gathered by Simmons in 1855. Through the want of interest taken in botanical science in India it is to be deplored that the history and distribution of so exceedingly interesting a plant should have practically remained unknown from the date of its original discovery in 1849 to the present day.

"It is very probable that my plants are nearer to the plant introduced by Booth from Bhotan and figured by Hooker in Bot. Mag. t. 5002—*Rh. calophyllum*. Not having seen the flowers of that plant I rely upon foliage entirely, and as far as one can judge from such material it might be better to regard the Manipur plant as *calophyllum*. It seems likely, however, that this species may be regarded as being a Bhotan form of *Maddeni* and not a distinct species, and for both these reasons I have considered it advisable to refer my plants to the more typical and best known form."

Note added 1915.—"I sent to Kew seeds of all the rhododendrons I was able to collect. One grown under the name *Rh. Elliottii*, Watt proved to be *Rh. Maddeni*, and I was assumed to have made a mistake. But here I describe *Rh. Maddeni* as a separate species from *Rh. Elliottii*. I had never any doubt, and so the labels on the seeds must have got changed either by me or the staff at Kew. The Kew plant has been figured and described as *Rh. Maddeni*, var. *obtusifolium* (Bot. Mag. No. 8212).

"G. W."

With reference to Sir George Watt's note :—*Rh. Elliottii* is a plant very different from *Rh. Maddeni*, Hook. f., and its characters have been presented recently by Lace and Smith in Notes from the Royal Botanic Garden, Edinburgh, viii (1914), 214. The *Rh. Maddeni*, var. *obtusifolium*, Hutchinson of the Bot. Mag. t. 8212 does not appeal to me as a form of *Rh. Maddeni*, Hook. f., and I note that Mr. Watson, writing of its cultivation, says: "It differs in habit and several other characters from the Himalayan *Rh. Maddeni* as represented in gardens." As described it differs from *Rh. Maddeni*, Hook. f. in the two distinctive characters to which I have referred on a previous page

—the large calyx about 1.5 cm. or more long and the pubescent filaments of the stamens. The "10 stamens" of the description (both Latin and English) is a misprint; 17-20 stamens are shown in the drawing and are present in specimens which the Director of Kew kindly sent to me. I read no character that would deny Sir George Watt's identification of *Rh. Mad-deni*, var. *obtusifolium*, with the plant here described as *Rh. manipurensis*.

Rhododendron nematocalyx, Balf. f. et W. W. Sm.

Frutex compactus ad 4 m. altus ramis crassiusculis virgatis folia ad apicem quasi verticillata gerentibus. Rami annotini circ. 4 mm. diam. glabri rubri mox grisei. Alabastra foliaria ignota. Folia petiolata ad 12 cm. longa; lamina crasse coriacea rigida oblonga vel lanceolato-oblonga ad 10.5 cm. longa 3 cm. lata apice acuminata tuberculato-mucronulata margine crasse cartilaginea integra vix recurvata basi breviter cuneata, utrinque glaberrima concolor olivacea et opaca laevis supra concava lateribus a costa media sursum versis venis primariis utrinsecus ad 10 occultis ascendentibus intra marginem curvatis, infra costa media erubescens elevata venis primariis paullo prominulis venularum reticulo ultimo occulto; petiolus ad 1.5 cm. longus erubescens supra anguste sulcatus glaberrimus. Flores in umbellas veras 2-3-floras dispositi; umbellae axillares ad apicem ramorum 3-5-fasciculatae, rhachi ad basim crassa multibracteata; bractee bracteolaeque forma ignota; pedicelli crassi vix 2 cm. longi stricti divaricati glabri. Calycis cupula parva glabra circ. 1 mm. longa, lobi 5 membranacei brunnei aequales vel subaequales lineari-ligulati longiores ad 1.3 cm. longi 1 mm. lati apice obtusi albo-ciliati vel subaristati breviores saepe longe triangulares. Corolla circ. 4.5 cm. longa infundibuliformis, tubo angusto circ. 1.5 cm. longo extus glabro intus minute puberulo, limbo ampliato 5-lobato, lobis circ. 2.5 cm. longis 1.8 cm. latis subaequalibus oblongo-ovalibus. Stamina 10 inaequalia corolla styloque breviora, longiora circ. 3.8 cm. longa antheris circ. 2.5 mm. longis, filamentis filiformibus basi paullo latioribus et glabris sursum ad apicem tubi corollini pilis vesiculosus indutis eglandulosis. Ovarium glabrum in stylum attenuatum; stylus glaber circ. 2 cm. longus sub stigmate haud expansus; stigma latum discoideum lobulatum. Capsula longa tenuis stylo persistente coronata circ. 3 cm. longa 3 mm. diam. nigro-brunnea glabra.

Species *Rh. oxyphylo*, Franch. affinis sed staminibus styloque eglandulosis differt; a *Rh. stamineo*, Franch. staminibus inclusis recognoscenda. *Rh. stenaulum*, Balf. f. et W. W. Sm. folia chartacea margine scabrido et venis primariis subpatulis

notata, calycis lobos rarissime ligulatos, corollam majorem, stylum multo breviorum possedit.

W. Yunnan. Hills north of Tengyueh. Open situations in thickets. Alt. 7000 ft. Lat. 25° 15' N. Compact shrub of 8-12 ft. In fruit. Foliage coriaceous. G. Forrest. No. 7673. May 1912.

The rigid foliage and stiff branches of this species in the dried state recall *Rh. siderophyllum*, Franch., but it is far removed from that species and belongs to an altogether different phylum in the genus. *Rh. nematocalyx* is one of the Stamineum series, and its nearest ally seems to be *Rh. oxyphyllum*, Franch., a plant collected by Prince Henri d'Orleans in South Yunnan between "Muonglé et Keu-ma-tzé," and as yet not known from elsewhere. I have not seen dried specimens of Franchet's *Rh. oxyphyllum* which is said to be in cultivation. None of the living plants that have come to me match the description of his species given by Franchet.

Rhododendron niphargum, Balf. f. et Ward.

Frutex ad 8 m. altus ramis crassis. Ramuli hornotini circ. 5 mm. diam. niveo-tomentosi, annotini glabrescentes vel tomenti vestigiis nigricantibus induti tandem sordide grisei decorticantes. Alabastrorum in tomento immersorum perulae fulvae dorso argenteo-tomentosae margine dense ciliatae intus pilis adpressis plus minusve indutae exteriores circ. 7.5 mm. longae in dimidio inferiore subrotundatae sursum caudatae caudae apice revolutae, interiores ecaudatae subrotundatae circ. 4 mm. diam. Folia breviter petiolata ad 21 cm. longa sub anthesi deflexa; lamina coriacea late oblanceolata vel oblongo-oblanceolata vel oblongo-obovata ad 19.5 cm. longa 6.5 cm. lata apice obtusa corneo-mucronata margine plana perspicue cartilaginea deorsum a quadrante supremo in petiolum gradatim attenuata supra subatro-viridis vix nitens in modum squali corii rugulosa costa media subrubide colorata sulcata venis primariis utrinsecus circ. 15 subsulcatis pinnatim adscendentibus superficie caeteroquin subplana pilorum juvenilium vestigiis plus minusve notata (in juventute pilorum strato niveo tenui integro vestita, pilis ex axi centrali saepe multo elongato a basi ex toto multo atque iterum ramosis ramis tenuibus intertextis floccos mox post evolutionem alabastrorum deterrentes facientibus), subtus nivea costa media elevata primo nigro-purpurea puberula deinde straminea glabrescente caeteroquin indumento persistente compacto scintillante subnitente laevi haud favoso bistrato venularum rete occludente et venas primarias elevatas tegente vestita, strati inferi pilis ab apice stipitis brevis horizontaliter et radiatim ramosis ramis pilorum contiguorum vesiculosis brevibus latis plus minusve agglutinatis, strati superi pilis e ramulis

longis tenuibus contortis ab axi communi orientibus et supra stratum inferum late patentibus et extensis haud intertextis constructis (indumentum subfoliare adultum saepe fusco-variculatum est ubi fungorum mycelium brunneum in pilos penetravit); petiolus brevis circ. 1.5 cm. longus crassus suberubescens glabrescens sed tomenti juvenilis vestigiis albidis plus minusve praeditus (in juventute ex toto niveo-tomentosus). Flores plurimi (12 vel plures) in umbellam veram vel brevissime racemosam dispositi rhachi plus minusve floccosa; bracteae interiores submembranaceae fulvae obovato-spathulatae ad 3 cm. longae 8 mm. latae apice cucullatae subtruncatae extus intusque sericeo-pilosae; bracteolae lineares ramentaceae circ. 1 cm. longae 0.5 mm. latae adpresso-pilosae; pedicelli 2 cm. longi saepe breviores validi purpurascens pilis niveis floccosis plus minusve induti glabrescentes ad apicem obliqui. Calyx subobsoletus glaber cupularis angustus crassus carnosulus vix 1.5 mm. longus margine undulatus vel 5-rotundato-lobulatus. Corolla tubuloso-campanulata pallide rosea circ. 4 cm. longa extus sparsim floccoso-pilosa vel glabrescens intus postice varo uno et maculis coccineis notata minute puberula basi sub-5-gibbosa, lobis 5 subrotundatis emarginatis circ. 1.5 cm. longis 2 cm. latis. Stamina 10 inaequalia longiora circ. 3 cm. longa breviora circ. 1.4 cm., filamentis deorsum latioribus basi minute puberulis, antheris ochraceis circ. 2.5 mm. longis. Gynaeceum circ. 3.3 cm. longum corolla brevius staminibus longius; ovarium olivaceum angustum sursum attenuatum obliquum circ. 7 mm. longum 2 mm. latum nigricans a basi pilis brevibus simplicibus minutissimis albidis nunc sucino-coloratis quasi in glandulas transeuntibus puberulum; stylus glaber in stigma angustum lobulatum paullo expansus. Capsula falciformis circ. 5 cm. longa 3 mm. lata nigro-purpurea glabra subsulcata valvis 5 ab apice dehiscens. Semina sucino-colorata linearia complanata ad 3 mm. longa 0.5 mm. lata ad extremitates cristato-carunculata ad latera tenuissime alata.

Species *Rh. uvarifolio*, Diels affinis sed foliis latioribus obtusis nec acutis nec acuminatis, pedicellis et floribus majoribus corolla intus puberula diversa.

Yunnan. Bei-ma-shan. 12,000–13,000 ft. In fir forests. Irregular tree of 15–20 ft. Flowers pink or very white with one blotch. F. Kingdon Ward. No. 324. June 1913.

Yunnan. Mountains in the N.E. of the Yangtze divide. Alt. 12,000–13,000 ft. Lat. 27° 45' N. In rhododendron thickets. Shrub of 20–25 ft. Flowers dried, probably crimson. G. Forrest. No. 10,292. July 1913; Alt. 11,000 ft. In pine and rhododendron forests. Shrub of 25 ft. In fruit. G. Forrest; also 10,639. July 1913.

Yunnan. Mountains of the Chungtien plateau. Alt. 11,000–12,000 ft. Lat. 27° 55' N. In thickets. Shrub of 20 ft. In fruit. G. Forrest. No. 10,914. Aug. 1913; Lat. 27° 35' N. In open thickets. Shrub of 20–30 ft. Flowers pale lavender-rose or white flushed rose with deep red markings. G. Forrest. No. 12,435. April 1914.

Yunnan. G. Forrest. No. 11,421. Sept. 1913.

Yunnan. Lichiang Range. Alt. 11,000–12,000 ft. Lat. 27° 40' N. G. Forrest. No. 11,738. Oct. 1913.

Yunnan. Mountains N.W. of Chien Chuan. Alt. 10,000–11,000 ft. Lat. 26° 30' N. Flowers? Open pine forests. Shrub of 10 ft. G. Forrest. No. 13,035. July 1914.

This is one of the rhododendrons which attracts attention by the snow-white under-surface of the rather long mature leaves. Many of the leaves show a dingy spotting and may take on a brown colour. This is due to the attack of an ascomycetous fungus which spreads all through the indumentum. The hairs of the upper stratum of indumentum are often very long, and the delicate branches ascend as loose not interwoven threads above the lower stratum, which forms a typical roof over the epidermis. The short stalks of the hairs appear as so many pillars supporting the vesicular branches spreading out horizontally from the top, and the branches of adjacent hairs becoming agglutinated form the smooth scintillating indumental surface. In the chamber covered by these matted branches the stomata project as domes above the epidermal surface.

In this indumental character of the mature leaves *Rh. niphargum* resembles *Rh. uvarifolium*, Diels (1912),* as it does in such other features as the many-flowered compact globose truss of flowers at the end of thick branches encircled by a rosette of more or less deflexing leaves, the small glabrous calyx, 5-lobed campanulate corolla, 10 unequal stamens with puberulous filaments, thin dark-coloured ovary puberulous with very short vesicular pointed hairs, the style glabrous slightly longer than stamens, shorter than corolla, and ending in a stigma hardly wider than the style itself which does not expand clavately beneath it. *Rh. niphargum* has the foliage-buds and all young parts enclosed in a snow-white indumentum—and I take it that in nature these show up after the fashion of those of the East Himalayan *Rh. niveum*, Hook. f. and the Szechwan *Rh. floribundum*, Franch.—the striking beauty of which matches if it does not surpass that of their flowers. Whether this is the

* *Rh. Monbeigi*, Rehd. et Wilson, *Plantae Wilsonianae*, i (1913), 536, is this species. Specimens of it came to Edinburgh from Père Monbeig in 1907, and I have compared them with those from the same source in Kew Herbarium under the numbers cited by Rehder and Wilson.

case also in *Rh. uvarifolium* we do not know, because specimens of young shoots of this species have not yet come to Europe. The fruit of *Rh. niphargum* is of the narrow curved type of capsule, and in the absence of direct evidence I think we may conclude from the form of the ovary that the same form marks the fruit of *Rh. uvarifolium*. My reference to *Rh. niveum* and *Rh. floribundum* must not be interpreted as necessarily meaning that these species are of the immediate alliance of the one I am speaking of. Passing observation might suggest such a relationship, but analysis brings out characters which in the present state of our appreciation of phyletic marks in the genus seem to question a connection, for the leaf-indumentum of *Rh. niveum* as well as of *Rh. floribundum* is unistrate, composed of hairs branching somewhat loosely from the base upwards—of different shape in the two species—and constituting a somewhat woolly surface, the pedicels are woolly, as is the small calyx, the staminal filaments are glabrous, the ovary is coated with fasciated long erect white hairs in *Rh. niveum*, with solitary long pointed white stiff hairs in *Rh. floribundum*, and then the capsule is a short straight stout one. At the same time I may note that the Western Szechwan *Rh. Hunnewellianum*, Rehd. et Wilson has the same general form of elongated leaf (only smaller), with snow-white indumentum constructed like that of our two species—*Rh. niphargum* and *Rh. uvarifolium*—but the calyx is glandular and pubescent, the widely campanulate 5-lobed corolla is glandular outside, the 10 staminal filaments are puberulous and glandular, the ovary densely covered with fasciate hairs, the style glandular and pubescent at the base. Apart from the character of the glands, which nowhere shows in any of the species previously mentioned, *Rh. Hunnewellianum* seems to be a form somewhere intermediate to *Rh. niveum* (its ovarian covering taking it to this species rather than to *Rh. floribundum*) and *Rh. niphargum* and its fellows. Neither *Rh. niveum* and *Rh. floribundum* nor *Rh. uvarifolium* and *Rh. niphargum* show any glands, and this eglandulose character serves as a definite diagnostic mark from the Himalayan *Rh. arboreum*, Wall. and Yunnan *Rh. Delavayi*, Franch., two species which by their bullate leaves with pale-coloured indumentum and the small compact trussed flowers, the short tomentose pedicels, the small more or less floccose calyx, 5-lobed tubular-campanulate corolla, 10 stamens with glabrous filaments, ovary tomentosely covered with fasciate hairs, glabrous style, short stout thick capsule take us towards *Rh. niveum* and *Rh. floribundum*.

Seedlings of *Rh. niphargum* have been raised from Forrest's seeds and are very different from the mature plant. They show not a trace of the white indumentum even when three years

old, and the under-surface of the leaves is a brilliant red coated with glands of a particularly sticky character. See what I say in Trans. Bot. Soc. Edin., xxvii (1917), 224.

Rhododendron oporinum, Balf. f. et Ward.

Frutex multiramosus floribus serotinis ubique plus minusve lepidotus squamis peltatis magnis fere ad 0.5 mm. diam. breviter stipitatis ex umbone magno institaque integra fere aequilata aedificatis primo niveis tandem aurantiacis vel rubro-resinosis ultimo brunneis et nigrescentibus. Ramuli hornotini et annotini circ. 2 mm. diam. nigricantes contiguo-lepidoti epilosi seniores sordide grisei squamarum vestigiis nigris verruculosi deinde decorticantes. Alabastrorum oblongorum angustorum circ. 3.5 mm. diam. perulae pallide brunneae exteriores crustaceae ovatae vel subrotundatae 3.5 mm. longae carinatae obtusae vel subtruncatae mucronulatae dorso lepidotae et puberulae interiores membranaceae obovato-spathulatae circ. 1.5 cm. longae 5 mm. latae carinatae truncatae mucronulatae obscure denticulatae minutissime ciliatae dorso lepidotae et puberulae; folia juvenilia convoluta utrinque squamis albidis latis imbricatis lepidota costa media supra dense puberula. Folia ad 8.5 cm. longa petiolata; lamina coriacea late lanceolata vel oblongo-lanceolata ad 7.5 cm. longa 3 cm. lata apice longe corneo-apiculata (apiculo circ. 2 mm. longo) margine anguste cartilaginea paullo recurva basi obtusa vix rotundata vel truncatula nec angustata, supra atro-viridis subvernicioso-nitida in modum squali corii rugulosa ubique squamulis marcidis griseo-albidis vel rubro-resinosis vel nigricantibus oblecta costa media subrubida paullo sulcata sulco pilis albidis strictis brevibus simplicibus vel stellatim ramosis cum squamis marcidis obducto venis primariis utrinsecus circ. 12 occultis, subtus pallidior fulva epilosa squamis uniformibus persistentibus bicoloratis—albidis et brunneis—fere contiguis lepidota intervallis epidermicis nudis olivaceis papillis depresso-petasiformibus praeditis, costa media elevata rubida plus minusve lepidota epilosa venis primariis et venularum reti occultis; petiolus circ. 1.5 cm. longus crassus contiguo-lepidotus supra sulcatus sulco puberulo ubique inter squamas plus minusve conspersas pilis obductus. Flores racemo-umbellam ad 6-floram terminalem construentes rhachi circ. 7 mm. longa lepidota et puberula; bracteae fulvidae crustaceo-coriaceae dorso lepidotae intus adpresso-puberulae margine breviter albo-ciliatae, steriles late ovatae vel rotundatae carinatae apiculatae, fertiles obovato-spathulatae cucullatae circ. 1 cm. longae 4 mm. latae subtruncatae; bracteolae ramentaceae lineari-subclavatae acutae uninerviae brunneae circ. 1.2 cm. longae 1 mm. latae intus

glabrae extus lepidotae et breviter adpresso-pilosae; pedicelli ad 1.7 cm. longi graciles nigricantes albido-lepidoti epilosii apice haud obliqui. Calyx cupularis parvus patens circ. 2 mm. longus carnosulus in lobos 5 deltoideos vel subrotundatos vel ovatos circ. 1 mm. longos extus dense imbricatim lepidotos et apicem versus puberulos margine plus minusve albido-ciliatos et squameo-fimbriatos divisus. Corolla pallide rosea intus postice varo coccineo notata eleganter campanulata circ. 2.3 cm. longa extus puberula et ex toto lepidota intus puberula in lobos 5 rotundatos circ. 1 cm. longos et latos subcrenulatos divisus. Stamina 10 inaequalia corolla breviora, longiora circ. 2.1 cm. longa breviora 1.2 cm., filamentis deorsum dilatatis ima basi (1 mm.) nuda sursum ad medium villosis in parte suprema glabris, antheris purpureis circ. 2.5 mm. longis. Discus 1 mm. longus puberulus. Gynaeceum circ. 2 cm. longum staminibus longioribus brevius; ovarium circ. 5 mm. longum conoideum nigrum lepidibus aurantiacis omnino vestitum epilosum; stylus ad basim pilosus sub stigmate purpureo lobulato fere subdiscoideo vix expansus.

Species *Rh. pholidoto*, Balf. f. et W. W. Sm. affinis, foliis supra subverniosis viscidis, corolla pallide rosea extus pilosa distinguenda.

E. Upper Burma. Wulaw Pass. Valley of Naung Chaung. 11,000–12,000 ft. On open ridge amongst several of scrub rhododendrons. Flowers rose-pink with a dark-red patch at base of corolla. Leaves glandular. F. Kingdon Ward. No. 1906. 27.8.14. Very late for a rhododendron.

This species resembles most nearly *Rh. pholidotum*, Balf. f. et W. W. Sm., from the eastern flank of the Tali Range. From it and from all others in the *Heliopsis* series (see p. 113) it should be distinguishable by the glutinous upper surface of the leaves—Mr. Ward makes special reference to the glandular leaves, but it is a feature that is not conspicuous in dried material—and by the corolla, which is pilose as well as lepidote on the outside. I do not discover any special glands on the leaves. There are the lepidote scales which become full of red secretion as they olden and might be the organs which cause the stickiness. This would not be a common phenomenon on the leaf in species of rhododendron, although the scales on the ovary frequently seal together by their secretion the surface of the corolla-tube in dried specimens. Mr. Tagg tells me that he has failed so far to obtain evidence that there is natural exudation from the peltate scales. He suggests that exudation is probably always the result of pressure from the outside. If this be so some other origin for the stickiness of the leaf must be searched for in *Rh. oporinum*.

Rhododendron phaeochrysum, Balf. f. et W. W. Sm.

Frutex ad 4.5 m. altus ramis crassis. Ramuli juveniles pilis floccosis multo ramosis pilorum ramulis brevibus latis albidis vel secretionem rubra vel lutea impletis nunc sebaceis dense vestiti, annotini fere glabri subnitentes circ. 5 mm. diam. Albastrorum longorum ovoideorum acutorum haud viscidorum perulae extimae latae ovatae circ. 1.2 cm. longae pergamentaceae flavido-virides carinatae breviter apiculatae extus fere glabrae intus sericeo-pilosae margine apicem versus ciliatae, interiores membranaceae elongatae circ. 3 cm. longae 1 cm. latae vel ultra convolutae obovato-spathulatae saepe petiolatae flavidae, intimae fulvae; folia juvenilia revoluta utrinque floccis albidis et rubris saepe sebaceis dense vestita. Folia petiolata ad 13 cm. longa sub anthesi deflexa; lamina coriacea oblonga vel anguste ovato-oblonga ad 12 cm. longa vix 5 cm. lata apice angustata obtusa corneo-mucronulata margine cartilaginea plana basi late obtusa vel subrotundata, supra atro-viridis glabra indumenti juvenilis vestigiis minutissimis notata costa media venisque primariis utrinsecus circ. 13 sulcatis caeteroquin reticulatis rugulosa papillis minutis epidermicis subasperata, subtus laete aureo-brunnea costa media elevata venis primariis obscuratis ubique indumento unistrato persistente compacto (sed superficie quasi coactilim subasperata) e pilis floccosis a stipite subbrevis ramos plures latiusculos et longiusculos radiantes implexos haud late patentes emittentibus constructo vestita; petiolus crassus circ. 1 cm. longus supra sulcatus primo floccosim tomentosus tandem fere glaber. Flores racemoso-umbellati circ. 15 in quaque inflorescentia rhachi circ. 1.5 cm. longa glaberrima; bractae exteriores mox deciduae ignotae, interiores fertiles sub anthesi plus minusve persistentes obovato-oblongae circ. 3.5 cm. longae 1.5 cm. latae cucullatae extus intusque dense albo-sericeae; bracteolae parvae circ. 7 mm. longae filiformes sericeo-puberulae cristaque apicali notatae; pedicelli circ. 2 cm. longi validi olivacei glabri vel floccis paucis conspersi. Calyx minutus circ. 1 mm. longus cupularis margine vix 5-dentatus glaber. Corolla infundibuliformi-campanulata alba roseo-suffusa et postice maculis parvulis numerosis notata circ. 4.5 cm. longa extus glabra intus profuse pubescens basi 5-gibbosa, lobis 5 rotundatis circ. 1.5 cm. longis 2.4 cm. latis emarginatis undulato-crenulatis. Stamina 10 (-11) inaequalia, 5 multo minora circ. 1.2 cm. longa antheris 2.5 mm. longis, 5 longiora corolla breviora circ. 2.3 cm. longa antheris 3.5 mm. longis, filamentis infra dilatatis dense pubescentibus. Gynaecium circ. 3.2 cm. longum staminibus longius corolla brevius; ovarium conoideum sulcatum nigrescens minutissime papillatum glaberrimum circ. 7 mm. longum 3.5 mm. latum;

stylus glaber flavido-ruber sub stigmatе grosse lobulato cupularis.

Species *Rh. Beesiano*, Diels et *Rh. fulvo*, Balf. f. et W. W. Sm. affinis, ab ambobus foliis oblongis vel ovato-oblongis, indumenti subfoliaris superficie coactilim asperata, petiolo brevi, corolla intus pubescente multi-maculata, filamentis staminum dense pubescentibus recedens; etiam ab hoc foliis supra rugulosis et minute papillatis subtus pilis haud in modum peniculi capitati constructis vestitis, petiolo glabrescente, inflorescentia racemosa; et ab illo alabastris eviscidis, costa media infra tomentosa indumento pilorum implexorum persistente, ovario glabro bene distincta.

E.N.W. Yunnan. Mountains in the N.E. of the Yangtze bend. Alt. 11,000–12,000 ft. Lat. 27° 45' N. In thickets. Shrub of 6–10 ft. Flowers white flushed rose exterior with deep crimson markings. G. Forrest. No. 10,547. July 1913.

E.N.W. Yunnan. Mountains of the Chungtien plateau. Alt. 12,000 ft. Lat. 27° 30' N. In rhododendron thickets. Shrub of 10–15 ft. Flowers white flushed rose with minute crimson markings. G. Forrest. No. 12,651. June 1914.

The rich golden-brown tint of the under-leaf indumentum is a conspicuous distinctive character of *Rh. phaeochrysum* amongst like forms, of which the likest are *Rh. Beesianum*, Diels and *Rh. fulvum*, Balf. f. et W. W. Sm. These three species cannot be mistaken one for the other. *Rh. lacteum*, Franch., which is also an ally, has the rosette-haired indumentum of *Rh. Beesianum* not the matted-haired type of *Rh. phaeochrysum*, and then it has broad obovate leaves, yellow and creamy-yellow flowers. The only other species which I mention here as an ally is *Rh. Traillianum*, Forrest et W. W. Sm., and it has the powder-like indumentum of *Rh. Beesianum* not the felted indumentum of *Rh. phaeochrysum*; also the indumentum of *Rh. Traillianum* is at first grey-green and turns to red-brown in the older leaves.

Rhododendron pholidotum, Balf. f. et W. W. Sm.

Frutex ad 2.5 m. altus ubique plus minusve lepidotus lepidibus peltatis magnis circ. 0.75 mm. latis breviter stipitatis ex umbone magno convexo institaque integra aequilata aedificatis primo niveis tandem ex parte brunneo-coloratis. Ramuli hornotini atro-purpurei circ. 2.5 mm. diam. epilosi subcontiguo-lepidoti seniores nigrescentes lepidum vestigiis subverruculosi tandem sordide grisei decorticantes. Alabastrorum oblongorum angustorum acutorum circ. 3 mm. diam. perulae exteriores fulvae vel pallide brunneae crustaceo-coriaceae late ovatae vel subrotundatae cucullatae circ. 3 mm. longae dorso lepidotae

minutissime ciliatae, interiores saepe virides oblongo-spathulatae truncatae membranaceae circ. 1.5 cm. longae 4 mm. latae dorso lepidotae et puberulae intus adpresso-puberulae margine hirsuto-ciliatae; folia juvenilia convoluta utrinque squamis contiguis albidis induta. Folia petiolata ad 7 cm. longa; lamina coriacea, crassa anguste ovata vel oblongo-ovata vel oblonga vel ovato-lanceolata ad 6 cm. longa 2.3 cm. lata ad apicem acutam longe corneo-mucronatam attenuata margine anguste cartilaginea basi late obtusa nunc subtruncatula, supra atro-viridis subopaca subrugulosa pseudoglaberrima squamarum vestigiis griseis marcidis praedita costa media subrubida paullo sulcata sulco pilis albidis strictis simplicibus vel stellatis cum squamis peltatis marcidis plus minusve impleto venis primariis utrinsecus circ. 10 vix conspicuis, subtus olivaceo-brunnea ad maturitatem punctulata costa media erubescens elevata sparsim lepidota epilosa caeteroquin squamis peltatis uniformibus superficialibus persistentibus numerosis vix contiguis bicoloribus ex parte maxima ad umbonem solum brunneo-coloratis, paginae intervallis nudis olivaceis papillis epidermicis depresso-petasisiformibus praeditis; petiolus circ. 1 cm. longus dense lepidotus vel squamarum foveolis notatus supra sulcatus sulco pilis strictis impleto. Flores leviter zygomorphi ad 5 racemoso-umbellati rhachi brevi circ. 4 mm. longa lepidota et puberula; bracteae mox deciduae ignotae; bracteolae pubescentes lepidotae et ciliatae ramentaceae ad 9 mm. longae circ. 2 mm. latae in dimidio infero filiformes in dimidio supero oblongae; pedicelli stricti divaricati circ. 2 cm. longi atro-purpurei laxe albido-lepidoti epilos. Calyx cupularis ad 5 mm. longus extus puberulus, cupula atro-purpurea carnosula extus dense lepidota, lobis 5 submembranaceis rubris deltoideis vel ovatis vel oblongis vel sublinearibus ad 3.5 mm. longis obtusis vel acutis elepidotis vel sparsim vel dense lepidotis margine eciliatis vel minutissime cilatis vel pilis contortis hirsuto-ciliatis. Corolla parva rosea vel roseo-purpurea postice rubro-maculata aperte campanulata ad 3 cm. longa sed saepe vix 2 cm. extus ex toto lepidota intus dense puberula, lobis 5 rotundatis posterioribus circ. 1 cm. longis et latis. Stamina 10 inaequalia longiora ad 2.3 cm. longa breviora 1 cm., filamentis deorsum latioribus ima basi glabris sursum ad verticem ovarii pilis strictis horizontaliter patentibus copiose obtectis, antheris circ. 2 mm. longis. Gynaecium ad 2 cm. longum; ovarium conoideum circ. 5 mm. longum nigricans squamis pallido-viridibus dense lepidotum ad apicem albido-pilosum; stylus ruber staminibus longioribus brevior, brevioribus longior, nudus nunc basi sparsim pilosus ad apicem subclavatus; stigma discoideum lobulatum stylo latius.

Species *Rh. brevistylus*, Franch. affinis quod differt perulis

interioribus ligulatis vel ligulato-spathulatis intus dense puberulis margine minute ciliatis, foliis majoribus basi cuneatim vel obtuse angustatis neque rotundatis subtus ad maturitatem haud punctulatis, racemo-umbellae rhachi longiore, pedicellis calyceque genitalibusque brevioribus, calyce sparsim puberulo, corolla roseo-alba, ovario pilis paucis coronato, stylo ad medium piloso.

E.N.W. Yunnan. Tali Range. Eastern flank. Open situations amongst scrub. Lat. $25^{\circ} 40'$ N. Alt. 10,000–11,000 ft. Shrub of 3–5 ft. Flowers rose-purple. G. Forrest. No. 4162. Aug. 1906.

E.N.W. Yunnan. Tali Range. Eastern flank. Rhododendron scrub. Alt. 12,000 ft. Lat. $25^{\circ} 40'$ N. Shrub of 4–8 ft. Flowers rose with few markings. G. Forrest. No. 6762. July 1910.

Yunnan. Alt. 11,000 ft. Lat. $25^{\circ} 40'$ N. Dupl. of 1906–1910. G. Forrest. No. 11,657. July 1913.

Rh. pholidotum is like *Rh. invictum*, but the puberulous bases of the exerted style and stamens of that species are very different. Its nearest ally is perhaps *Rh. brevistylum*. There should be no danger of confusion of *Rh. pholidotum* with any other species in the *Heliolepis* series (see p. 113). Apart from flower-colour distinction, it wants the viscid upper-leaf surface and the hairs outside the corolla of *Rh. oporinum*; it has not the narrow-based leaves of *Rh. brevistylum*; it has not the large leaves and distantly placed scales of *Rh. heliolepis*; the size of leaf as well as the small campanulate—not tubular-campanulate—corolla tell it at once from *Rh. plebeium*; *Rh. fumidum* has a green spotted corolla, a calyx epilose outside and an epilose ovary; *Rh. rubiginosum* has conspicuously biform under-leaf scales. It is the Middle West Yunnan (Tali) representative of the series, and is in cultivation.

Rhododendron pilovittatum, Balf. f. et W. W. Sm.

Frutex robustus ad 3 m. altus. Ramuli juveniles circ. 5 mm. diam. dense glanduloso-lanati testacei rubro-punctati indumento e pilis copiose et dendriformiter ramosis intertextis aedificato pilorum ramis aliis albidis vel rubris brevibus acutis aliis in glandulam oblongo-ovoideam vel clavatam rubram nitentem mutatis, vetustiores per annos plures indumento marcescente nigricante notati tandem glabrescentes fulvidi decorticantes. Alabastra acuta juvenilia in indumentum testaceum persimile immersa. Folia petiolata ad 10 cm. longa (in speciminibus nostris forsitan vix typica); lamina ad 8.5 cm. longa 4 cm. lata oblonga acutiuscula corneo-mucronata margine plana cartilaginea rubida basi obtusa vel subtruncatula, supra olivacea

vel pallide viridis costa media rubro-purpurea anguste sulcata sulco floccis fuscis plus minusve impleto venis primariis utrinsecus ad 15 venularumque reti immersis caeteroquin laevis pilorum floccis fulvidis deterrentibus ramulis saepe rubro-glandulosis plus minusve obtecta, subtus indumento bistrato persistente albido favoso piloso et glanduloso venas primarias et venularum rete occludente vestita, strati superi pilis dendriformibus laxe ramosis, inferi rosulatis implexis, glandulis clavatis rubris nitentibus inter pilos conspersis, costa media erubescente elevata; petiolus circ. 1.5 cm. longus crassus testaceus glanduloso-lanatus. Flores intense sanguinei plures racemoso-umbellatim dispositi rhachi copiose rubro-glandulosa glandulis breviter stipitatis; bracteae exteriores magnae ovatae obtusae cucullatae coriaceae fulvidae ad 2.5 cm. longae circ. 1.5 cm. latae extus intusque pilis longis simplicibus undulatis dense sericeae, interiores angustiores dense rubro-glandulosae viscidae; bracteolae claviformes circ. 1 cm. longae rubro-glandulosae; pedicelli purpurei circ. 2 cm. longi (post anthesin aucti) rubro-glandulosi et floccosim pilosi. Calyx parvus circ. 3 mm. longus in lobos 5 inaequales postero-laterales majores ovatae circ. 1.5 mm. longos extus dense glandulosos et pilis floccosis obtectos divisus. Corolla intense sanguinea carnosula tubuloso-campulata circ. 3 cm. longa intus glabra extus vittis quinque pilorum contortorum intertextorum deterrentium centropetalis lineata, lobis 5 rotundatis profunde emarginatis circ. 1.3 cm. longis et latis. Stamina 10 inaequalia longiora circ. 2.5 cm. longa, filamentis glabris, antheris parvis circ. 1.5 mm. longis. Gynaeceum circ. 2.8 cm. longum; ovarium nigricans circ. 5 mm. longum tunica crassa subglobosa glandulosa lanata albida occultum; stylus glaber staminibus paullo longior corolla paullo brevior; stigma lobulatum vix stylo latius.

Species forsitan ex affinitate *Rh. sanguinei*, Franch. foliorum indumento ex parte glanduloso, corolla extus pilo-vittata notata.

W. Yunnan. On the Yung-peh Mountains. Alt. 9000 ft. Lat. 26° 45' N. Open dry situations. Shrub of 10 ft. Flowers deep crimson. G. Forrest. No. 12,745. June 1914.

This fine species is one of the rhododendrons with fairly large leaves, the under-surface of which is clad with a bright white indumentum. The conspicuous character for diagnosis of *Rh. pilovittatum* is that which gives it the name. The middle line of each petal is occupied by a band of curled hairs which run right down from the free lobe to the base of the corolla-tube. The hairs often fall off early.

Rhododendron plebeium, Balf. f. et W. W. Sm.

Frutex ad 3.5 m. altus pauciramosus sigillato-lepidotus. Ramuli hornotini circ. 2 mm. diam. rubro-purpurei lepidibus albis magnis fere contiguis vestiti epilosii mox nigricantes lepidumque vestigiis notati tandem sordide grisei decorticantes. Alabastrorum perulae exteriores fulvidae crasse coriaceae plus minusve rotundatae circ. 4 mm. longae et latae carinatae submucronatae extus lepidotae intus apicem versus sericeae margine ciliatae per gradus in perulas intimas virescentes membranaceas lanceolatas petiolatas acuminatas tuberculo-terminatas circ. 2.5 cm. longas 7 mm. latas haud mox deciduas intus copiose pubescentes extus lepidotas margine pilis mollibus ciliatas transeuntes; folia juvenilia convoluta utrinque lepidibus latis albidis contiguis subimbricatis induta (lepidum umbone convexo instita integra) costa media supra puberula. Folia petiolata ad 10 cm. longa; lamina chartacea oblonga vel elliptico-oblonga vel ovato-oblonga ad 8.5 cm. longa 4 cm. lata saepe multo minor apice acuminata mucrone corneo circ. 1 mm. longo terminata margine angustissime cartilaginea plana basi rotundata nunc subtruncata, supra atro-viridis lepidum fere contiguum juvenilium vestigiis membranaceis griseo-furfuracea costa media leviter sulcata sulco puberulo nervis primariis utrinsecus ad 8 vix distinctis, subtus olivacea lepidota lepidibus magnis albidis et sucino-coloratis vel brunneis intermixtis discontiguis persistentibus intervallorum papillis petasiformibus subscentillantibus, costa media erubescence dense lepidota epilosa venularum reti occulto; petiolus circ. 1.5 cm. longus crassus albo-lepidotus sulco puberulo. Flores circ. 5 in umbellam brevissime racemosam inter folia ramulorum subfloralium praecocium immersam dispositi rhachi ad 8 mm. longa lepidota et puberula; bractae caducae steriles extimae crassae pallide brunneae a basi subamplexicauli acuminatae apice recurvae circ. 1.2 cm. longae carinatae dense imbricatim griseo-lepidotae, interiores late ovatae cucullatae et acuminatae, intimae oblongae subobovatae pallide brunneae cucullatae truncatae circ. 1.5 cm. longae 8 mm. latae extus lepidotae dense albo-ciliatae; bracteolae bracteas paullo superantes lineares acuminatae uninerviae plus minusve pilosae superne latiores ibique dorso lepidotae; pedicelli stricti validi grosse albo-lepidoti circ. 1.8 cm. longi epilosii. Calyx cupularis extus lepidotus et puberulus circ. 2 mm. longus margine undulatus vix 5-lobatus, lobis submembranaceis rubidis extus plus minusve puberulis margine squameo-fimbriatis et pilis brevibus sparsissime ciliatis. Corolla rosea coccineo-notata subtubuloso-campanulata sursum ampliata circ. 3 cm. longa extus copiose lepidota, tubo intus ex toto dense pubescente, lobis 5 suberectis ovatis vel oblongo-

ovatis subcrenulatis apice obtusis vel rotundatis circ. 1.1 cm. longis. 9 mm. latis. Stamina 10 inaequalia, longiora circ. 2.7 cm. longa antheris 3 mm. longis breviora circ. 1.7 cm. longa antheris 1.5 mm. longis, filamentis deorsum latioribus a basi ima nuda sursum ad medium profuse hirsutis. Discus ad 1 mm. longus puberulus. Gynaeceum circ. 2.7 cm. longum corolla paullo brevius staminaque longiora subaequans; ovarium 4 mm. longum conoideum dense albido-lepidotum epilosum; stylus in dimidio infero pilosus ad apicem in stigma lobulatum clavatum amplius. Capsula oblonga subcylindrica vel sursum paullo attenuata brevis crassa cinereo-olivacea albo-lepidota circ. 1.1 cm. longa 5 mm. diam. 5-sulcata calyce paullo aucto basi cincta ab apice valvis 5 dehiscens. Semina rubro-brunnea fusiformia circ. 1.25 mm. longa exalata vix carunculata.

Species *Rh. heliolepidi*, Franch. affinis foliorum lepidibus haud distantibus corolla tubuloso-campanulata recognoscenda.

W. Yunnan. Shweli-Salween divide. Western flank. Lat. 25° 20' N. Alt. 10,000 ft. In rhododendron forest. Shrub of 4-8 ft. In fruit. No. 8938; alt. 10,000 ft. Open rocky situations. Shrub of 4-6 ft. Flowers rose. No. 8976; alt. 10,000-11,000 ft. In rhododendron forest. Shrub of 5-9 ft. Flowers rose. No. 9060. G. Forrest. Aug. 1912.

W. Yunnan. Shweli-Salween divide. Western flank. Lat. 25° 30' N. Alt. 10,000 ft. In mixed scrub and rhododendron thickets. Shrub of 10-12 ft. Flowers rose with deep crimson markings. G. Forrest. No. 11,970. June 1913.

A well-distinguished species, the most southerly of the *Heliolepis* series, finding perhaps its nearest relation within the series in *Rh. heliolepis* itself. Like that plant it has broad leaves, but the surface scales are much more numerous and much closer set and give a diagnostic mark at sight. Another easily seen differential character is the tubular-campanulate corolla and the shorter ovary. Altogether *Rh. plebeium* is a more lepidote plant than *Rh. heliolepis*.

The plant is in cultivation, raised by Mr. J. C. Williams of Caerhays Castle from seed collected by Forrest.

***Rhododendron rarasquameum*, Balf. f.**

Frutex ad 1 m. altus. Rami annotini rubri subglaucoceracei epilosii elepidoti circ. 1.5 mm. diam. Alabastrorum foliarium angustorum fusiformium acutorum circ. 2.5 mm. diam. perulae exteriores sub evolutione deciduae crustaceae brunneae late ovatae acutae vel elongatae subspathulatae mucronulatae carinatae dorso puberulae et lepidotae intus apicem versus adpresso-sericeae margine ad apicem ciliatae, interiores diu persistentes inter se distantes membranaceae

viridi-flavidae ligulatae vel anguste spathulatae circ. 1.1 cm. longae 2 mm. latae subapiculatae dorso lepidotae margine ciliatae intus paullo puberulae superne pilis adpressis praeditae; folia juvenilia convoluta supra pilosa (costa media basi pilis paucis brevibus excepta) et squamis paucis peltatis rufo-coloratis lepidota, infra pilosa elepidota (costa media squamis paucis magnis peltatis translucentibus excepta); petiolus juvenilis supra elepidotus sulcatus sulco sparsim puberulo subtus lepidotus. Folia petiolata ad 6.2 cm. longa; lamina coriacea rigida variabilis a forma lanceolata ad ellipticam et elliptico-oblongam transiens ad 5.5 cm. longa 2 cm. lata apice rotundata vel obtusa vel attenuata et acuta vel acuminata mucrone hydathodali terminata vel subapiculata apiculo 0.5 mm. longo margine cartilaginea recurva basi cuneata vel obtusa vel rotundata, supra laete viridis subnitida glaberrima nunc squamarum juvenilium vestigiis obscure notata costa media paullo sulcata venis primariis utrinsecus circ. 8 paullo conspicuis, subtus pallidior griseo-viridis subglauca costa media elevata straminea elepidota venarum reti obscuro caeteroquin squamis peltatis haud scintillantibus brunneis 0.5–1 mm. vel ultra distantibus lepidota squamis ex umbone concavo institaque angusta aedificatis; petiolus circ. 7 mm. longus supra sulcatus sulco piloso (vel sparsissime piloso) subtus squamarum vestigiis obsitus. Flores in umbellas solitarias terminales 4–5-floras dispositi; bractee deciduae ignotae; bracteolae brunneae anguste clavatae circ. 7 mm. longae pedicellis breviores puberulae dorso elepidotae ciliatae et albido-cristatae; pedicelli erubescens stricti circ. 1 cm. longi epilosii et elepidoti vel squamis paucissimis conspersi. Calyx minutus glaber circ. 1 mm. longus cupula margine brunnea undulata semilunatim 5-lobatula. Corolla obliqua pallide violacea postice maculata circ. 2.5 cm. longa extus elepidota pilosa, tubo infundibuliformi antice circ. 5 mm. longo intus puberulo sursum in limbum 5-lobatum expanso, lobis inaequalibus ellipticis vel elliptico-oblongis apice rotundatis subcrenulatis postico minore circ. 1.5 cm. longo 9 mm. lato antero-lateralibus majoribus. Stamina 10 inaequalia longiora circ. 2.8 cm. longa corollam superantes antheris pallide roseis oblongis circ. 2 mm. longis, breviora circ. 1.7 cm. longa antheris subglobosis circ. 1.25 mm. diam., filamentis filiformibus tenuibus deorsum paullo dilatatis supra basim nudam paullo annulatim puberulis. Discus minute puberulus. Gynaeceum circ. 3 cm. longum corollam staminum superans; ovarium atro-rubens conoideum circ. 2.5 mm. longum dense lepidotum; stylus longus tenuis ruber glaber sub stigmate atro-purpureo discoideo lobulato parvo paullo expansus.

Species notis sequentibus recognoscenda:—ramulis elepidotis, foliis parvis, squamis subfoliaribus paucis distantibus, costa media supra epilosa, umbellis terminalibus solitariis, corolla extus elepidota, staminibus 10 longioribus exsertis, stylo longissimo tenui.

E.N.E. Yunnan. Back of Io-chow. Alt. 3200 m. Shrub about 0.60 m. high with small leaves and pale violet flowers. Maire. May. In Herb. Paris, Edin., Léveillé.

E.N.E. Yunnan. Io-chow. Alt. 3200 m. Rhododendron about 1 m. high with small leaves. Flowers blue. May. Maire. In Herb. Edin. No. 63.

E.N.E. Yunnan. Rocks on Mountains of Se-long-tsin. Alt. 3200 m. Shrub of 0.70 m. Maire. May. In Herb. Edin. No. 33.

E.N.E. Yunnan. Rocks of the Mountains at Pa-long-tsin. 0.80 m. Flowers violet. Maire. June. In Herb. Edin. No. 34.

E.N.E. Yunnan. Mountains of Mo-tsou. Alt. 2890 m. Shrub. Flowers violet. Maire. April. In Herb. Edin. No. 139.

E.N.E. Yunnan. Rocks of Ma-hong. Alt. 2800 m. Shrub. Flowers blue. Maire. May. In Herb. Edin. No. 220.

E.N.E. Yunnan. Near Niou Ko Tien. Shrub 0.60–1 m. Flowers violet. Maire. May 1911. In Herb. Léveillé.

This seems to be a widespread species of rhododendron in the N.E. of Yunnan, and it shows much variation in form of foliage. Specimens with acuminate leaves certainly look very different from those with leaves rounded at the apex, but the considerable number of specimens I have had for examination show all stages of transition. The somewhat isolated brown peltate scales on the glaucous green under-leaf surface is characteristic, and then the nonfasciculate inflorescence, the elepidote corolla, the slender filaments of the stamens and long slender style give a combination of characters that I find nowhere else. The species I take to be one of the small-flowered ones which are more or less allied to *Rh. rigidum*, Franch., some of which have not been described. I am not yet in a position to fix precisely its relationships.

Rhododendron rasile, Balf. f. et W. W. Sm.

Frutex ad 2.5 m. altus. Ramuli annotini glaberrimi crassi circ. 7 mm. diam. recti purpurei ceraceo-glauci nitentes. Alabastrorum terminalium globosorum circ. 8 mm. diam. perulae exteriores atro-purpureae, extimae ovato-acuminatae circ. 7 mm. longae 5 mm. latae dorso rubro-glandulosae vernicosae, interiores latiores rotundatae apiculatae et ciliatae. Folia petiolata ad 20

chartacea vel chartaceo-coriacea, pagina superiore longe sparse sed conspicue setosa, inferiore ad costam nervos nervulosque sparse setosa, subtus lutescentia, 7-nervia, nervis usque ad basem inter se liberis supra parum immersis subtus prominentibus, nervis transversis plus minusve laxe reticulatis subtus prominulis, petiolo usque ad 3 mm. longo sed plerumque brevior et haud rarius subnullo suffulta. Flores in paniculas terminales angustas dispositi et etiam axillares et rarius ramulos breves laterales terminantes; pedunculi communes 1-2 cm. longi, indumento ut caules tecti; pedicelli perbreves; bractae deciduae dorso sparse setosae, ciliatae. Receptaculum 14 mm. longum, extra appendiculis longe setosis sed haud glanduloso-capitatis laxius instructum. Calycis tubus 1 mm. longus, segmenta 7-9 mm. longa, inferne 1.5 mm. lata, dorso margineque longe sparse setosa, appendiculis setiferis ad 4 mm. longis alternantia. Petala 4, obovata vel orbiculari-obovata, apice rotundata vel subtruncata, brevissime acuminata vel sinuata, 22 mm. longa, 18-20 mm. lata, ciliata. Stamina 8; antherae 18 mm. longae, basi haud setosae, filamentis 14 mm. longis suffultae. Ovarium cum apice conico setoso 9 mm. longum, stylo 23-24 mm. longo glabro vel setulis perpaucis inferne instructo.—*O. crinita*, Benth., var. *yunnanensis*, Cogn. in DC. Mon. Phan., vii, p. 324.

China:—Yunnan, dry stony pasture, eastern flank of Tali Range, 6500-8000 ft. Flowers bright magenta-rose. G. Forrest. No. 7140; Ibid. Flowers bright purplish-rose. G. Forrest. No. 4395.

Yunnan, loco haud indicato, Delavay.

Pentapanax Forrestii, W. W. Sm. Sp. nov.

Species ex affinitate *P. verticillati*, Dunn a quo ex descriptione foliolis multo majoribus membranaceis subtus haud glaucis inter alia differt.

Frutex 6 m. altus ramulis inermibus glabris. Folia petiolo ad 20 cm. longo ad vaginam pilosulo ceterum glabro suffulta, 3-foliolata; petioluli laterales brevissimi 1-2 mm. longi, terminalis longissimus ad 8 cm., ad insertionem inferiorem rufo-tomentello-pulvinati; lamina ad 15 cm. longa, ad 7 cm. lata, oblonga vel ovato-oblonga, apice abrupte atque breviter acuminata, basi rotundata, margine integra, siccando membranacea, supra viridis glabra infra paulo pallidior glabra nisi ad insertionem petioluli saepe rufo-tomentella; nervi nervulique utrinque conspicui bene reticulati. Inflorescentiae quoad formam et magnitudinem eis *P. Leschenaultii* similes; paniculae circ. 12, umbellulis 3-4 plerumque praeditae; pedunculi circ. 5 cm. longi, secundarii circ. 2 cm., subdense rufo-pilosuli; pedicelli 5-8 mm. longi articulati glabri. Calycis margo brevissimus

color, Franch. and *Rh. diaprepes*, Balf. f. et W. W. Sm., having larger flowers than the former and smaller ones than the latter. It differs from both of them in its under-leaf surface, which always shows the purple reticulum of the ultimate venation although this is submerged in the leaf-lamina. In both the other species the epidermal papillae are developed to a degree sufficient to mask the venation, and it is this which gives the very white aspect to the under-leaf, particularly in *Rh. discolor*. *Rh. rasile* is likeliest to *Rh. diaprepes*, and is readily distinguished by the eglandular under-leaf surface and the very glandular outer surface of the corolla.

Rhododendron rhabdotum, Balf. f. et Cooper.

Arbor parva ad 4 m. alta. Ramuli hornotini circ. 2.5 mm. diam. squamis peltatis dense imbricatis membranaceis pallide fulvidis furfuracei et pilis longis stramineis setosi, annotini circ. 3 mm. diam. rubidi fere esquamati setarum vestigiis vestiti. Alabastrorum perulae intimae in folia gradatim transeuntes ad ramos inter se distantes diu persistentes spathulatae subpetiolatae 2.5 cm. longae 8 mm. latae vel majores membranaceo-coriaceae apice obtusae mucronulatae dorso squamis peltatis rufo-furfuraceae; folia juvenilia margine setosa utrinque lepidota supra squamis fere sessilibus latis uniformibus mox deterrentibus ex umbone fulvo parvo instituae multo latiore membranacea alba aedificatis induta subtus squamas fulvas bifformes gerentia; petiolus lepidotus et setosus. Folia petiolata ad 15.5 cm. longa; lamina coriacea oblonga ad 14 cm. longa 4.7 cm. lata apice obtusa tuberculo-mucronata margine anguste cartilaginea paullo recurva setarum deterrentium pedibus subasperata deorsum in basim obtusum attenuata utrinque concolor pallide viridis opaca, supra costa media basim versus elevata apicem versus sulcata venisque primariis utrinsecus circ. 10 paullo sulcatis pinnatim et curvatim adscendentibus notata caeteroquin laevis glabra sed squamarum juvenilium vestigia exhibens, subtus costa media lepidota venisque primariis elevatis, superficie rufo-lepidota et setis paucis dispersa, squamis breviter stipitatis secretionem rufam ex toto impletis umbone lato instituae angusta constructis bifformibus (magnis paucis dispersis) discontiguis, areis intersquameis epidermicis squamarum diametro multo latioribus et papillis longis baculiformibus ceriferis plurimis dense obtectis; petiolus circ. 1.5 cm. longus vix sulcatus rubidus glabrescens sed squamis setisque vestigiatis notatus. Flores magni per paria ad apicem ramorum orientes; bracteae bracteolaeque ignotae; pedicelli crassi circ. 1.7 cm. longi 2 mm. lati rubri rufo-lepidoti et puberuli. Calyx circ. 1.2 cm. longus fere ad basim 5-lobatus, cupula lepidota et

puberula, lobis foliaceis submembranaceis oblongo-ovalibus apice rotundatis pallide viridibus elepidotis extus intusque et ad marginem praecipue ad apicem pilis albidis hirtis plus minusve praeditis. Corollae lacteae vittis 5 rubris circ. 5 mm. latis medio-petalis lineatae infundibuliformis crassae ad 11 cm. longae tubus extus pubescens elepidotus intus glaber basi angustus 5-gibbosus, 5-lobatus, lobis rotundatis circ. 2.5 cm. longis 4 cm. latis subundulatis nunc emarginatis. Stamina 10 subaequalia circ. 9.5 m. longa corollae tubum paullo superantia, filamentis deorsum explanatis in parte triente infero longe villosis, antheris oblongis circ. 1 cm. longis 3 mm. latis atrobentibus. Discus sub ovario pilis erectis dense vestitus. Gynaecium corollae aequilongum stamina superans; ovarium ovoideo-conoideum in stylum attenuatum circ. 8 mm. longum 4 mm. diam. squamis peltatis dense imbricatis rufo-furfuraceum vix sulcatum; stylus fere ad medium sigillato-lepidotus sub stigmate magno lobulato ampliatus et labium stylare formans.

Species sectionis Maddeni aspectu primo corollae vittis latis rubris medio-petalis recognoscenda.

Bhutan. Punakka. Alt. 8000 ft. On dry rock faces. Tree 12 ft. Flowers long cream with red lines outside. R. E. Cooper. No. 3987. 29th May 1915.

A magnificent plant. Without doubt a microform of the type of *Rh. Dalhousiae*, Hook. f., but it has a much larger corolla and then the broad red bands on the outside of the corolla and in the median of the petals mark the plant at sight. These flower features are not the only differential ones. I find no trace of the surface bristles of the young leaves of *Rh. Dalhousiae* on those of *Rh. rhabdotum*, the upper surface of the mature leaves is smoother in *Rh. rhabdotum*, and the indumental scales are much more numerous. Specimens of what I take to be the true *Rh. Dalhousiae*, gathered in Bhutan by Cooper, are from a lower altitude—none over 6000 ft.—than are those of *Rh. rhabdotum*, which was found at 8000 ft. We have no fruit on Cooper's specimens which were collected in May, and the introduction to cultivation of *Rh. rhabdotum* awaits the effort of some explorer in the future.

***Rhododendron rhaibocarpum*, Balf. f. et W. W. Sm.**

Frutex circ. 1.5 m. altus parvifolius ramis tenuibus strictis. Ramuli hornotini circ. 2 mm. diam. nigro-purpurei dense glanduloso-setosi quasi viscidè hirsutissimi subtrigiliosi, indumento ex elementis biformibus composito primo e setulis plurimis longis et pilis brevibus sebaceis fuscis vel rubris vel aurantiacis glandula rubra clavata vel obovoidea terminatis, secundo e pilis eglandulosis aurantiacis vel rubris nunc longe stipitatis plus

minusve fasciatim ramosis, nunc floccosis brevissime stipitatis radiatim et breviter ramosis, post annum secundum glabri albido-grisei deinde decorticantes. Alabastrorum terminalium ovoideorum ruforum setulorum perulae extimae elongatae circ. 1.1 cm. longae a basi circ. 2 mm. lata gradatim attenuatae dense glanduloso-setulosae et floccosae, intermediae in triente infero circ. 3.5 mm. latae orbiculares superne strictae caudatae omnino glanduloso-setulosae et floccosae, intimae ovatae circ. 5 mm. longae fulvae cucullatae obtusae utrinque plus minusve floccosae. Folia petiolata ad 9 cm. longa; lamina coriacea oblonga nunc elliptico-oblonga rarius fere elliptica ad 7 cm. longa 3 cm. lata apice obtusa rubro-mucronulata margine cartilaginea plana basi subtruncata vix cordulata nec attenuata, supra opaca viridis glaberrima nunc floccorum juvenilium laxe conspersorum vestigiis notata costa media paulo sulcata venis primariis utrinsecus ad 12 vix conspicuis superficie in modum squali corii rugulosa, subtus pallidior venularum reti ultimo purpureo submerso costa media elevata erubescens glabra vel ad basim setulosa et floccosa venis primariis purpureis vix prominulis caeteroquin pilis minutis simplicibus solitariis nunc floccosis vel caulifloralibus aurantiacis vel rubris omnino punctulata; petiolus ad 2 cm. longus primo setulosus et floccosus indumento biformi ei ramulorum simili obtectus quasi viscido hirsutissimus tandem plus minusve glabrescens vel glaber et laete rubens. Umbella vera ad 8-flora terminalis; bractae et bracteolae deciduae ignotae; pedicelli circ. 1.5 cm. longi nigro-purpurei glandulis rubris stipitatis vestiti. Calyx parvus glandulosus 5-lobatus, lobis inaequalibus postero-lateralibus majoribus rotundatis circ. 2 mm. diam. Corolla rosea? infundibuliformis ad 2 cm. longa (in flore marcido) extus glabra intus puberula, lobis 5 semi-lunatis circ. 7 mm. longis 1.2 cm. latis crenulatis. Stamina 10 inaequalia longiora circ. 2 cm. longa breviora 1 cm. longa, filamentis puberulis, antheris atro-purpureis 2 mm. longis. Ovarium angustum sursum tenuius 7 mm. longum 1.5 mm. diam. glandulis rubris stipitatis dense vestitum; stylus staminibus corollaque longior ipse ad 2.5 cm. longus glaber sub stigmatate lobulato angustus haud expansus. Capsula angusta falciformis circ. 2.5 cm. longa 4 mm. diam. nigro-purpurea glandularum vestigiis asperata valvis 5 ab apice dehiscens. Semina pallide straminea circ. 1.5 mm. longa 0.5 mm. lata complanata oblonga ad extremitates attenuata ibique vesiculoso-carunculata.

Species elegantissima *Rh. jucundo* affinis indumento glanduloso-strigilloso et floccoso distincta.

E.N.W. Yunnan. Mountains in the N.E. of the Yangtze bend. Alt. 11,000 ft. Lat. 27° 45' N. Open rocky situations.

Shrub of 6-7 ft. In fruit. G. Forrest. No. 11,312. Sept. 1913.

E.N.W. Yunnan. Mountains of the Chungtien plateau. Alt. 11,000 ft. Lat. $27^{\circ} 30'$ N. Shrub of 6 ft. Flowers rose? Open scrub in side valleys. G. Forrest. No. 12,667. July 1914.

E.N.W. Yunnan. Kari Pass. Mekong-Yangtze divide. Alt. 12,000 ft. Lat. $27^{\circ} 40'$ N. On the margins of pine and rhododendron thickets. Shrub of 4 ft. In fruit. G. Forrest. No. 12,932. Aug. 1914.

This species, of which seedlings have been raised from Forrest's seeds, is one of the Selense series, and promises to be an acquisition to our gardens. It is a low-growing shrub with small neat leaves and bears many-flowered trusses of flowers, the colour of which is probably pink, and it produces narrow sickle-shaped dark purple fruits. Forrest's specimens are all in fruit or passing into fruit, and the flowers available are shrivelled around the ovaries beginning to develop into fruit. Some modification of the description given above may be necessary, therefore, when more satisfactory flowers are forthcoming.

In Forrest's collection are two plants which resemble *Rh. rhaibocarpum*, but which in default of better illustration I hesitate to identify with it. They are ticketed:—

E.N.W. Yunnan. Kari Pass. Mekong-Yangtze divide. Alt. 11,000 ft. Lat. $27^{\circ} 40'$ N. Amongst mixed scrub. Shrub of 4-6 ft. In fruit. G. Forrest. No. 12,950. Aug. 1914.

E.N.W. Yunnan. Shweli-Salween divide. Alt. 12,000 ft. Lat. $28^{\circ} 10'$ N. Open rhododendron forest. Shrub of 8-10 ft. Foliage only. G. Forrest. No. 13,560. Oct. 1914.

Both of them have leaves approaching more nearly the elliptic, and the remarkable biform indumentum of shoot and leaf-petiole seen in *Rh. rhaibocarpum* does not show on them. There are, however, no young spring shoots, and we know this indumentum soon falls off. No. 12,950 wants the yellow cauliflower-glands of the leaf under-surface. No. 13,560 is specially noticeable because of the russet autumn-tint of the older leaves. Coming from the Kari Pass, as does *Rh. rhaibocarpum*, No. 12,950 may be merely a local divergent from the type. No. 13,560 as a Shweli-Salween divide plant is more likely to be distinct. From the specimens of both of them good seeds have been extracted and one may hope for germination.

There is yet another plant represented in Forrest's collection by two sets of specimens (in foliage only) which also belong to the Selense series. The tickets on the specimens run:—

W. Yunnan. Western flank of the Shweli-Salween divide.

Alt. 10,000–11,000 ft. Lat. 25° 20' N. Open rocky mountain pasture. Shrub of 2–4 ft. G. Forrest. No. 8988. Aug. 1912.

W. Yunnan. Western flank of the Shweli-Salween divide. Alt. 10,000 ft. Lat. 25° 20' N. On the margins of rhododendron thickets. Shrub of 4–6 ft. G. Forrest. No. 9055. Aug. 1912.

These are of the same species, but I cannot match them with any one as yet described, and their identification must await further exploration.

Rhododendron rhanthum, Balf. f. et W. W. Sm.

Frutex ad 8 m. altus. Ramuli hornotini purpurei glandulis rubris paucis mox evanidis conspersi annotini glabri circ. 3 mm. diam. virides deinde sordide grisei tandem desquamantes. Alabastrorum oblongo-conoideorum acutorum circ. 3 mm. diam. perulae extimae fulvae suborbiculares subcarinatae cucullatae vix mucronatae coriaceo-crustaceae circ. 6 mm. latae dorso rubro-glandulosae et vernicosae, intimae spathulatae tenuiores spadiceae circ. 1.8 cm. longae prope apicem fimbriatae 6 mm. latae rubro-glandulosae vernicosae. Folia petiolata ad 12 cm. longa; lamina crasse coriacea oblonga ad 8 cm. longa ad 3.5 cm. lata apice obtusa vel subrotundata mucrone corneo conspicuo notata margine cartilaginea basi late obtusa vel subrotundata nec cordulata utrinque glabra, supra atro-viridis laevis vix nitens costa media sublutescente sulcata pennivenia venis primariis utrinsecus ad 16 vix sulcatis, subtus pallidior subflavescens vel glaucescens costa media conspicua elevata venis primariis et venarum reti obscuratis (lamina juvenilis supra pilis floccosis deciduis paucis praedita subtus ex toto glabra); petiolus circ. 4 cm. longus glaber viridis in juventute purpureus et glandulis globosis rubris paucis conspersus. Umbella terminalis ad 7-flora; bractae et bracteolae ignotae; pedicelli ad 7 cm. longi striati copiose rubro-glandulosi glandulis brevissime stipitatis in calycis cupulam oblique expansi. Calycis cupula atro-purpurea circ. 1.5 mm. longa dense rubro-glandulosa, lobi 7 aequales deltoidei obtusi vix 0.5 mm. longi plus minusve rubro-glandulosi. Corolla pallide rosea postice rubro-maculata infundibulari-campanulata 5 cm. longa extus glabra, tubo intus puberulo, lobis 7 rotundatis vel semi-lunatis ad 2.5 cm. longis et 3 cm. latis emarginatis subcrenatis. Stamina 14 inaequalia declinata breviora intra tubum corollinum inclusa longiora circ. 3 cm. longa exserta, filamentis deorsum paullo expansis glabris, antheris pallide ochraceis. Ovarium oblongo-conoideum nigro-purpureum circ. 5 mm. longum glandulis rubris globosis breviter stipitatis dense obtectum; stylus declinatus validus ex toto

rubro-glandulosus staminibus longior corolla brevior; stigma discoideum lobulatum.

Species ex affinitate *Rh. Sheltonae*, Hemsl. et Wils. sed altior, foliis juvenilibus supra sparsim et floccosim pilosis, adultis ex toto glabris, pedicellis floribusque majoribus, corolla maculata divergens.

E.N.W. Yunnan. Lichiang Range. Alt. 10,000–11,000 ft. Lat. 27° 30' N. Open situations in pine forests. Shrub 9–25 ft. Flowers pale rose. G. Forrest. No. 10,075. June 1913.

E.N.W. Yunnan. Lichiang Range. Alt. 11,000–12,000 ft. Lat. 27° 30' N. In pine and mixed forest. Shrub 6–18 ft. Flowers rose-pink. G. Forrest. No. 10,114B. June 1913.

A larger plant than *Rh. Sheltonae*, Hemsl. et Wils. in all its parts. Apart from size it differs in the complete glabrousness of the older leaves. The young leaves have on their upper surface as they open from the bud a few scattered hair tufts which soon disappear leaving no trace; on the under surface there are no hairs or glands. Consequently, the older leaves have both surfaces entirely bare of appendages. In *Rh. Sheltonae* the under surface always shows red or yellow glands as minute points all over the surface. The lobes at the base of the leaf are not so rounded here as they are in *Rh. Sheltonae*. Then the corolla is always red-spotted in *Rh. rhantum*—hence its name. The species is one of a difficult complex, which will require much examination of living plants before its legitimate microforms can be accurately diagnosed. We have seedlings of *Rh. rhantum* (No. 10,075) raised from Forrest's seed, presented by Mr. J. C. Williams, Caerhays Castle, and we may look to having flowers of the species in a few years.

***Rhododendron sciaphilum*, Balf. f. et Ward.**

Frutex nanus circ. 0.5 m. altus sub tegmine silvarum pluvialium profundo truncis arborum prostratis mortuis nunc solo innascens. Rami internodiis elongatis notati late patentes, hornotini circ. 4 mm. diam. cinnamomei tomentosi indumento crasso bistrato induti, strato supero e pilis fibrillosis longis pauciramosis spiraliter tortuosis et intertextis constructo, strato infero occulto e squamis peltatis angustis parvis conspersis primo albis translucetibus deinde plus minusve secretionem rubra impletis aedificato, post annos 2–3 glabrescentes deinde grisei decorticantes. Alabastra foliorum ignota. Folia petiolata ad 16 cm. longa; lamina crasse coriacea elliptico-oblonga vel anguste obovata ad 14 cm. longa 5.3 cm. lata apice acuminata tuberculo rubro sphaerico terminata margine cartilaginea recurva basi rotundata nunc subcordulata, supra opaca pallide viridis subplana vel paullo grosse rugulosa haud bullata costa media

profunde sulcata sulco pilis longis spiraliter curvatis impleto venis primariis utrinsecus ad 10 vix conspicuis, pilis paucis longis contortis praecipue prope marginem vestita et squamis peltatis rufis conspersa, subtus dense et uniformiter cinnamomeo-tomentosa indumento persistente bistrato ei ramorum simili costam mediam venasque primarias elevatas obtegente; petiolus circ. 2 cm. longus indumento similiter ut laminae superficies infera omnino inclusus. Flores haud fragrantés 2-3 in umbellam terminalem dispositi; bracteae interiores ovatae subcrustaceae circ. 1.3 cm. longae 7 mm. latae extus puberulae et centro apiceque pilis longis tortuosis dense tomentosae intus basi glabrae apice adpresso-puberulae; bracteolae lineari-ligulatae subtruncatae pedicellos subaequantes brunneae pilis paucis indumenti sublinearis praeditae; pedicelli ut petioli indumento inclusi ad 1.2 cm. longi sub calyce turbinatim expansi. Calyx membranaceo-foliaceus pallide roseus 1.2 cm. longus ultra medium 5-partitus extus sparsim lepidotus et pilis indumenti conspersus, lobis rotundatis flabelliveniis inaequalibus (maximo circ. 1 cm. lato) margine pilis indumenti spiraliter intertextis ciliatis. Corolla alba obscure 5-vittata tubuloso-campanulata circ. 4.5 cm. longa extus albo-lepidota intus glabra, 5-lobata, lobis rotundatis circ. 2 cm. longis 2.5 cm. latis margine undulatis. Stamina 10 (-11) inaequalia longiora circ. 4 cm. longa antheris oblongis atro-purpureis circ. 7 mm. longis, breviora circ. 2.2 cm. longa antheris circ. 5 mm. longis, filamentis aurantiacis a basi paullo dilatato ad medium albo-pubescentibus. Gynaeceum circ. 4.3 cm. longum corolla paullo brevius stamina superans; ovarium globosum circ. 5 mm. diam. sulcatum indumento denso bistrato (superstrato aureo-piloso et substrato lepidoto) similiter ac folia indutum; stylus basi indumento simili obtectus caeteroquin glaber sub stigmate magno atro-purpureo lobato paullo expansus et labium circulare formans.

Species *Rh. bullato*, Franch. affinis foliis majoribus haud bullatis, corolla haud fragrante distincta.

E. Burma. Htawjaw. Valley of Naung Chaung. Lashi country. 7000-8000 ft. Dwarf shrub of 18 in. to 2 ft. on dead fallen tree-trunks or on the ground; deep shade of rain forest. Flowers white not scented. Calyx pink. F. Kingdon Ward. No. 1629. 4th June 1914.

A species nearly allied to *Rh. bullatum*, Franch. and to *Rh. Edgeworthii*, Hook. f., but its leaves suffice to distinguish it at a glance from these species. They are larger and want the bullation of the surface which is so marked a feature in the leaves of these allied forms. The bullation is due to the pouching upwards of the lower leaf-surface between the veins which appear on the upper surface to be below the level of the leaf-surface at

the bottom of a groove. In *Rh. sciaphilum* there is sometimes, particularly towards the margin and top of the leaf, a suggestion of this, but generally the surface is smooth and the primary veins have no groove above them. And then *Rh. sciaphilum* is wanting, as Mr. Kingdon Ward tells us, in the character which is so strongly developed in the allied species—fragrance of the flower.

The discovery of *Rh. sciaphilum* in the Naung Chaung Valley in E. Upper Burma establishes an interesting geographical link between the Himalayan and the West Chinese flora. The series to which it belongs we may speak of as the Edgeworthii series, after the well-known Himalayan *Rh. Edgeworthii*, the first described of the species now placed in it.

The description by Franchet in 1887 of Delavay's specimens of *Rh. bullatum* and *Rh. Bureavi* put on record that the type of *Rh. Edgeworthii*, before then known only from Sikkim and Bhutan through the explorations in the middle of last century of Sir Joseph Hooker, of Griffith, and of Booth, had a spread far eastwards in the western region of Yunnan. Then the distribution was carried farther eastwards by the discovery by Maire of *Rh. cruentum* in N.E. Yunnan, and now Ward's plant *Rh. sciaphilum* comes to show us that the type is to be found in the region between the Himalayas on the west and Yunnan on the east, and suggests that there may be other forms of it yet to be discovered over this broad unexplored area. In the following list I give the names of the five known species of the Edgeworthii series, the general distribution of each species, and the name of its discoverer :—

- Rh. bullatum*, Franch. (1887). Mid. W. Yunnan : Tali, 8000 ft. (Delavay, 1889.)
W.N.W. Yunnan : Tseku. (Soulié, 1903.)
E.N.W. Yunnan : Chungtien Plateau, 12,000–13,000 ft. (Forrest, 1904.)
W. Yunnan : Tengyueh and Shweli - Salween divide, 8000–10,000 ft. (Forrest, 1912–1913.)
- Rh. Bureavi*, Franch. (1887). Mid. W. Yunnan : Langkiung, 10,000 ft. (Delavay, 1886.)
E.N.W. Yunnan : Sungkwei and in N.E. of Yangtze bend, 10,000–12,000 ft. (Forrest, 1904.)

- Rh. cruentum*, Lév. (1913). N.E. Yunnan: Ta-hai-tze Plateau, 10,000 ft. (Maire, 1911.)
- Rh. Edgeworthii*, Hook. f. E. Himalaya: Sikkim, 7000–9000 ft. (Hooker f. 1848); Bhutan. (Griffith.) (1849).
- Rh. sciaphilum*, Balf. f. et E. Upper Burma: Naung Ward (1917). Chaung Valley, 7000–8000 ft. (Ward, 1914.)

To *Rh. Edgeworthii*, which has been in cultivation since 1849, we now can add *Rh. bullatum* and *Rh. Bureavi* as plants in our gardens.

The *Edgeworthii* series is marked by vegetative and floral characters illustrative of a true natural phylum. The plants seem to be frequently though not always epiphytic. Probably in their case, as in that of others, altitude may determine habitat of the plants and there can be little doubt that their epiphytism is favoured by their partnership with a fungal symbiont.

The striking feature of all the *Edgeworthii* series is the golden brown or red indumentum which completely encloses with a thick felt every aerial radial organ of their bodies—stem—pedicels—petioles—ovary—base of style—fruit—and covers the under surface of the mature foliage-leaves and more or less that of the calyx. This indumentum in all the forms to a casual observation seems to consist of closely interlocking hairs which can be readily removed. But similarity in general form is arrived at by different paths. Closer examination shows that this superficial "wool" layer is not always made of the same kind of thread, and, moreover, that it does not constitute the whole indumentum, which is bistrate. C. B. Clarke* has noted the bistrate character of the indumentum of the leaves of *Rh. Edgeworthii*. He says: "There are round glandular scales beneath the wool of the leaves."

There are really two modifications of bistrate indumentum in the series. One found in *Rh. bullatum*, *Rh. Edgeworthii*, and *Rh. sciaphilum*, and we may designate it A. form; the other in *Rh. Bureavi* and *Rh. cruentum*, and we may call it B. form:—

A. form.—The upper stratum in this indumentum consists of many very long unbranched hairs, each tapering from a thicker base to a fine point. The base is composed of many elongated narrow cells, each with a thickish wall, lying parallel and forming a cord—fasciated, as it were—often with a core and a peripheral sheath; the number of these component cells

* Clarke in Hook. f. Fl. Brit. Ind. iii. (1882), 469.

in a transverse section diminishes upwards until towards the top there is but one cell. Almost from the base the hair curls upon itself in the same way as a tendril curls when it fails to find a support, and it is the intercurling of the several hairs that gives the peculiar resilient character to the whole superstratum of indumentum. Beneath this upper stratum of hairs lies an under stratum of stalked peltate scales on every part where hair-indumentum is found. They are not confined to the under-leaf surface. These peltate scales, at first white and translucent, become infiltrated later with red secretion, and they look like a series of *Peziza*-cups spread on the epidermis. And then beneath the peltate scales is to be found a remarkable development of long rod-shaped epidermal papillae, each rod being coated outside by large wax-granules.

B. form.—The hairs of the upper stratum of indumentum are somewhat different. They are fewer, very thick-walled, quite fibre-like. Each has a stout multicellular base, and then extends with a curious jointed character sooner or later branching into long fibre-like threads which do not curl so definitely as those in Form A. yet are conspicuously interwoven. In the under stratum we miss entirely the peltate scales. These are replaced by glands which have multicellular stalks short or long and rounded or oblong heads. And then there are no epidermal papillae.

The contrast is interesting. In both a layer of still air is secured by a thick covering of hairs, in one case unbranched and many, in the other branched and fewer; and then, as a check to the transpiration, are peltate scales and wax-coated epidermal papillae associated with the unbranched hairs, glands and no papillae with the branched hairs; the latter combination perhaps allowing more perfect distribution between fewer hair-stalks of the emanation from the glands.

I am not prepared to maintain that all the plants cited in the table under *Rh. bullatum* are really that species. Their distribution is against identity. It is rare to find a species running from the dry Chungtien Plateau south to the moist region of Tengyueh, and the specimens themselves show difference which lack of material alone makes it difficult to appraise. I do no more here than point out the possibility of more than one species being included under the name, and leave over discussion of the forms until after additional illustrative specimens have been obtained.

Rh. cruentum has not been described adequately, and I therefore give a description of it here, bringing in also one of its ally *Rh. Bureavi*, so that their relationships may be appreciated:—

Rhododendron cruentum, Lévl.* in Fedde Repert. xii (1913), 284.

Small tree with thick short branches fully 5 mm. in diameter, when a year old clad with dense thick rusty wiry bistrate indumentum of long-branched thick-walled fibril-like interlocking hairs with intermixed glands which have multicellular stalks, indumentum persistent as a grey-black coating on older branches. Foliage-leaf buds unknown. Leaves shortly petiolate very thick and leathery, as much as 10 cm. long; lamina oval-lanceolate, as much as 7.5 cm. long 3 cm. broad, narrowed to the triangularly acute tip which has a short red hydatheal mucro, margin recurved, base obtuse or somewhat wedge-shaped; upper surface dark green somewhat glossy with a grooved midrib lined with tomentum especially at base, rest of surface smooth glabrous, primary veins about 8 on each side of midrib hardly visible; under surface bright rusty-red covered all over with a thick bistrate persistent indumentum like that of the young stems concealing the leaf epidermis completely—the stalked glands intermixed are fewer apparently than in *Rh. Bureavi*; petiole stout, as much as 2.5 cm. long and 4 mm. in diameter, somewhat swollen and expanded at base, coated with a thick indumentum like that of the leaf under-side. Inflorescence of some 10 flowers in a true umbel, the rachis shortly woolly and apparently eglandular; outer sterile bracts caudate, the tail ensheathed in a dense cloak of rufous indumentum arises from top of and is a little longer than a broad ovate or rounded base about 5 cm. long 7 mm. broad, this base is glabrous inside rufously hairy and eglandular outside, inner fertile bracts more or less persistent during flowering oblong spatulate submembranaceous subtruncate and apiculate about 1.8 cm. long and 7 mm. broad densely clad with adpressed branched rufous hairs, there are no glands; bracteoles about 5 mm. long filiform clavate at top apparently not glandular, at the tip coated with adpressed whitish hairs; pedicels medium-stout stiff about 1.4 cm. long completely enclosed in a sheath of rusty-red indumentum with which are intermixed many red clavate stalked glands. Calyx about 4 mm. long fulvous cut to near the base into 5 subequal lobes; cup densely lanate with grey hairs mixed with orange-coloured clavate stalked glands; lobes coriaceous not translucent, about 2.5–3.5 mm. broad, outside clad throughout like the cup, margin

* Lévillé's description runs:—

Rh. cruentum, Lévl.—Folia griseo-viridia nitida valde crassa subtus tomento cruento induta; pedunculi, bractee, petioli aequae tomentoso-cruea; flores albi roseo-tincti.

Yun-Nan: Brousse du plateau de Ta-Hai-Tse, 3200 m., mai 1912. E. E. Maire.

glandular-ciliate. Corolla tubular-campanulate white or white flushed rose, not spotted, about 2.5 cm. long, outside glabrous; tube inside densely pubescent eglandular; lobes rounded crenate emarginate, about 1.5 cm. long by 2 cm. broad, often much less, more or less erect. Stamens 10 unequal, longest as much as 2.2–3 cm. long, shortest about 1.5 cm. long; anthers 2.5–3.5 mm. long; filaments somewhat abruptly flattened and broadened at base and there densely whitely pubescent to a little above ovary or higher, above that glabrous. Gynaecium about equalling longest stamens; ovary 5 mm. long, in smaller flowers 3.5 mm. long, conoid grooved densely glandular, glands clavate and stalked mixed with branched more or less rufous hairs; style glandular through more than half its length, glands orange-coloured and stalked, mixed with some branched twisted hairs, apex of style clavate not much expanded into the lobulate stigma which is no wider than the style.

Specimens I have seen are :—

N.E. Yunnan. Scrub of the plateau of Ta-hai-tse [N. of Tungchwan]. 3200 m. Leaves persistent grey-green. Flowers white flushed rose. E. E. Maire. mai 1911. Herb. Léveillé.

N.E. Yunnan. Mountains of Laitowpo [S. of Tungchwan]. 3000 m. Small tree evergreen. Flowers white. Maire. In Herb. Edin. No. 219.

So far as Léveillé's description goes, there is nothing by which to distinguish his species *Rh. cruentum* from *Rh. Bureavi* and other members of the Edgeworthii series. M. Léveillé has, however, been so kind as to present a portion of his type *Rh. cruentum* to the Herbarium of the Royal Botanic Garden, Edinburgh, from which I have learned what was before him when he diagnosed his species. The plant is the same as one of which we obtained specimens from Abbé Maire in 1913, and from this material and M. Léveillé's gift I have drawn up the description given above.

Rh. cruentum is a very near ally of *Rh. Bureavi*, Franch., but shows divergences which forbid its inclusion in that species.

The foliage and shoots are quite alike in the two species, and are most characteristic in their red thick indumental covering—only in *Rh. cruentum* the leaves do not appear to reach the size of those of *Rh. Bureavi*, and the petioles are thinner and longer. The most easily seen distinction between the species is the calyx. In *Rh. Bureavi* the calyx has large membranous lobes with flabellate veins, and the tomentum is mainly formed at their base. In *Rh. cruentum* the calyx-lobes are much smaller, thick and leathery, and their outside surface is covered all over with the indumentum. Another apparently good diagnostic character is the style, which in *Rh. Bureavi* has at the base

dense hair tufts with some long-stalked glands; in *Rh. cruentum* the style is glandular and floccose throughout nearly its whole length. Then I find that in *Rh. cruentum* the corolla-tube is densely pubescent inside; in *Rh. Bureavi* there are fewer hairs but intermixed with them are many clavate glands. On the posterior side are many crimson spots which do not appear in *Rh. cruentum*.

The flowers as a whole of the two species differ in size—those of *Rh. cruentum* being much the smaller. At same time I find some variation in flower-size of this species, but the flowers never seem to attain the size of those in *Rh. Bureavi*.

The finding of *Rh. cruentum* in N.E. Yunnan gives an interesting extension of distribution to the *Bureavi* type. We have *Rh. Bureavi* from E.N.W. and *Rh. cruentum* from N.E. of Yunnan. The localities, separated though they are by the breadth of Yunnan, are within the Yangtze basin, and when we get to know more of the intervening area one or other of them or related forms may be found. Hemsley and Wilson* give a record for *Rh. Bureavi* in Szechwan under Wilson's number 3954. The number is not given in Wilson's list of the plants of the Veitchian expedition, and I have not seen the specimen. I should not expect *Rh. Bureavi* to occur in the area of Szechwan which Wilson explored; the occurrence of *Rh. cruentum* would conform with experience of other species.

Rhododendron Bureavi, Franch. in Bull. Soc. Bot. Fr. xxxiv (1887), 281.†

Small tree or shrub about 2–3 m. high. Branchlets thick short about 5 mm. in diam. when a year old and then clad with a dense thick rusty indumentum of long-branched hairs with intermixed stalked glands, indumentum persistent as a greyish covering for some years. Foliage buds unknown. Leaves stoutly petiolate, very thick and leathery; as much as 12 cm.

* Kew Bulletin (1910), 106.

† Franchet's description runs:—

Rhododendron Bureavi, Franch. — Arbuscula vel frutex 2–3 m. alta, tortuosa ramis hornotinis tomento rubiginoso densissimo obductis; folia ovato-lanceolata, 3–4 poll. longa, basi obtusa, apice breviter acuta, supra atro-viridia lucida, infra simul ac petiolus crassus ultra semipollicaris panno intense rubiginoso vestita, nervis secundariis haud conspicuis; gemmae floriferae fere pollice diam., squamis late orbiculatis margine ciliatis, extus rufo-tomentellis, intus sericeis; flores 7–10 arcte glomerati, breviter pedunculati, rosei vel rubescentes, purpureo-punctati; calyx membranaceus, 7–8 mill. longus, extus lanuginosus, lobis ovatis, obtusis, margine dense et breviter fimbriatis; corolla aperte campanulata, 4 cent. longa, extus glabra, intus ad tubum pubescens, 5-loba, lobis ovato-rotundatis; stamina 10, inclusa, filamenta basi simul ac ovarium et styli pars inferior lanuginosa.

Yunnan, ad collum Yen-tze-hay, prope Lankong. Alt. 3200 m. Delavay. No. 2213.

Très belle espèce, du groupe du *Rh. Edgeworthii*, bien caractérisée par l'épais tomentum d'un fauve rougeâtre qui recouvre la face inférieure des feuilles et les jeunes rameaux.

long; lamina ovate lanceolate, as much as 10.5 cm. long by 5 cm. broad, narrowed to the tip where is a red hydatodal conspicuous mucro, margin recurved, base obtuse or somewhat rounded; upper surface dark green somewhat glossy midrib grooved and lined with branched hairs, primary veins about 12 on each side of midrib slightly grooved, surface otherwise smooth and glabrous; under surface bright rusty-red altogether covered by thick wiry bistrate indumentum of long-branched thick-walled fibril-like curled interlocking hairs, shorter stalked glands are mixed with the hairs, venation completely hidden; petiole short and thick 1-1.5 cm. long by 5 mm. in diam., clad with indumentum like leaf under-surface. Inflorescence a shortly racemose umbel of 7-10 flowers, rhachis some 4 mm. long, red-glandular rufously hairy; outermost sterile bracts rounded base amplexicaul about 9 mm. long and broad nearly glabrous inside, outside enveloped in thick rufous indumentum, caudate, tail nearly twice the length of the base and like it enveloped in rufous indumentum, eglandular, inner fertile bracts oblong spatulate as much as 2.5 cm. long 1 cm. wide at top, longer than pedicels somewhat truncate and apiculate, on both sides clad with rufous or whitish adpressed branched interlocking hairs, no glands; bracteoles clavately filiform rufous tapered to a point, densely clad with adpressed hairs with some stalked glands at the tip, much shorter than pedicels about 1 cm. long; pedicels stout about 1.7 cm. long 2 mm. diam. completely enclosed in a hair-indumentum like the leaf under-side, intermixed with crimson long-stalked clavate glands. Calyx about 1 cm. long cut to near base or only to beyond the middle into 5 slightly unequal translucent lobes; tube cupular outside rufously lanate and densely glandular, the red glands stalked clavate; lobes oblong obtuse membranous, as much as 5 mm. broad, with flabellate venation, outside rufously lanate and red glandular particularly at the base, margin fringed with stalked clavate red glands. Corolla about 4 cm. long or a little more fleshy tubular-campanulate rose or reddish abundantly spotted crimson on posterior side; tube outside glabrous save for an occasional red gland, inside pubescent and glandular; lobes 5 sub-patent rounded about 1.5 cm. long by 2.5 cm. broad crenulate emarginate. Stamens 10 unequal, longest about 2.5 cm. long, shortest about 1.5 cm. long; anthers about 2.5 mm. long; filaments much flattened and widened towards base, densely pubescent to above the ovary and even to just below the anther. Disk glabrous. Gynaeceum about 3 cm. long; ovary about 4.5 mm. long thick somewhat ovoid grooved densely clad with rufous long-branched fibril-like hairs and many long-stalked red glands all more or less adpressed; style at very base with

a few glands and densely lanate, glabrous elsewhere, only slightly expanding into a slightly discoid lobulate stigma.

Specimens which I have seen of the species are :—

Yunnan. In collibus ad collum Yan-tze-hay supra Lankong. Alt. 3200 m. Delavay. No. 2213. 1st June 1886. This is the type-number of Franchet's description.

Yunnan. Col de Yan-tze-hay (Lankong) à 3200 m. d'altit. Arbrisseau ou arbre de 5 à 6 mètres lisière des bois. Fls. roses ou à peu près blanches. Delavay. 25 mai 1887.

Yunnan. Lisière des bois au col de Yan-tze-hay au dessus de Mo-so-yn entre 3200 et 3500 m. d'altit. Arbrisseau ou petit arbre. Fls. roses. Delavay le 7 juin 1888, id. le 8 août 1888.

Yunnan. Sungkwei-Langkiung divide, eastern slope. Alt. 11,000–12,000 ft. Lat. 26° N. Forrest. No. 506. Dec. 1904.

Yunnan. Mountains in the N.E. of the Yangtze bend. On open pasture. Alt. 11,000 ft. Lat. 27° 45' N. Shrub of 8–10 ft. In fruit. Forrest. No. 10,834. Aug. 1913.

Yunnan. Sungkwei Pass. In and on the margins of pine forests. Alt. 10,000–12,000 ft. Lat. 26° N. Shrub of 6–10 ft. Flowers white with crimson markings flushed rose exterior, fragrant. Forrest. 15th May 1917.

Rhododendron sinolepidotum, Balf. f.

Rh. lepidotum, Hook. f., var. *eleagnoides*, Franch. (non Hook. f.), in Bull. Soc. Bot. France, xxxiii (1886), 234.

Suffrutex aromaticus humilis ad 4.5 dm. altus pulvinatim ramosissimus. Ramuli tenues, hornotini circ. 1 mm. diam. flavido-virides squamis laxis peltatis stipitatis ex umbone lato institaque latiore margine irregulari cincta constructis obtecti, annotini rufi squamarum vestigiis notati, deinde grisei decorticantes. Alabastrorum oblongorum parvorum perulae paucae saepe 2 fuscae lepidotae folia convoluta tegentes. Folia breviter petiolata ad 2.2 cm. longa autumnno promoti laete erubescencia; lamina coriacea ad 2 cm. longa 1 cm. lata oblonga vel elliptico-oblonga apice obtusa vel acutiuscula mucronulata margine leviter revoluta nunc subasperata basi obtusa, supra viridis opaca squamis contiguis peltatis siccis superficialibus sordide albidis (nunc umbone annulatim subnitente) furfuracea, subtus squamis contiguis vel vix contiguis subimpressis partim brunneo-coloratis partim subviridibus nunc punctulatis obtecta, costa media supra sulcata infra elevata venarum reti caeteroquin occulto; petiolus brevis circ. 2 mm. longus lepidotus. Flores 1–3 perspicue pedunculati ad apices ramorum dispositi; bractee crustaceo-coriaceae helvenaceae cucullatae carinatae extus rubiginoso-lepidotae intus puberulae, extimae rotundatae circ. 5 mm.

longae 4 mm. latae mucronatae margine longe ciliatae, intimae oblongo-spathulatae dimidio longiores subfoliaceae intus lepidotae; pedicelli tenues lepidoti circ. 1.5 cm. longi sub fructu paullo aucti. Calyx circ. 3 mm. longus ad medium vel ultra 5-fissus cupula dense lepidota, lobis ovatis vel rotundatis subaequalibus patentibus saepe nudis viridibus vel rubidis. Corollae intense roseae extus albido-lepidotae circ. 1.2 cm. longae tubus ad 6 mm. latus poculiformis circ. 3 mm. longus venulis petalinis 15 percursus, limbus explanatus, lobi 5 inaequales (posticus maximus roseo-maculatus) rotundati vel hemisphaerici basi auriculati et imbricati circ. 6 mm. longi ad 9 mm. lati obscure crenulati uninervi. Stamina 10 alterna paullo longiora exserta, filamentis circ. 8.5 mm. longis a basi ima glabra intra tubum corollinum villosis, antheris stramineis circ. 2 mm. longis. Ovarium sulcatum circ. 2 mm. longum albido-lepidotum; stylus deflexus circ. 2.25 mm. longus clavatus; stigma lobulatum. Capsula oblonga circ. 4 mm. longa 3 mm. diam. rufa squamarum vestigiis notata valvis 5 tandem deciduis ab apice dehiscens.

Species *Rh. lepidoto*, Wall. valde affinis habitu humiliore, foliorum indumento, calyce, loborum corollinarum venarum reticulo distincta.

E.N.W. Yunnan. Likiang. Delavay. No. 18. 10th July 1884.

E.N.W. Yunnan. Eastern flank of the Likiang Range. Crevices of conglomerate cliffs in pine forest. Alt. 11,000 ft. Lat. 27° 25' N. Dwarf shrub of 6-10 inches. Flowers rich crimson, rose markings a shade darker. G. Forrest. No. 2505. June 1906.

E.N.W. Yunnan. Eastern flank of the Likiang Range. Dry gravelly banks in pine forests. Alt. 9000-10,000 ft. Lat. 27° 12' N. Dwarf shrub of 6-12 inches. Flowers bright rose. G. Forrest. No. 2770. July 1906.

E.N.W. Yunnan. Ascent of the Sung Kwei Pass from the Lang Kong Valley. In dry pine forests. Alt. 8000-9000 ft. Lat. 26° 12' N. Shrub of 6-18 inches. Flowers rose with crimson markings. G. Forrest. No. 5839. May 1910.

E.N.W. Yunnan. Eastern flank of the Likiang Range. Dry open situations amongst scrub. Alt. 9000-10,000 ft. Lat. 27° 25' N. Dwarf shrub of 6-18 inches. Flowers bright rose-crimson. G. Forrest. No. 5864. June 1910.

E.N.W. Yunnan. Likiang Range. Alt. 10,000-12,000 ft. Lat. 27° 40' N. G. Forrest. No. 10,238. June 1913.

This plant has been confused with *Rh. lepidotum*, Wall. but it is not that species.* *Rh. sinolepidotum* is a smaller plant

* The plants under Nos. 2550 and 2770 of Plantae Forrestianae (Notes R.B.G. Edin. vii. (1912)) named *Rh. lepidotum*, Wall. are this *Rh. sinolepidotum*, Balf. f.

with thinner twigs and leaves which colour beautifully red in autumn. The scales on the leaf upper surface are contiguous and soon dry up, appearing as a dirty white or grey scurf on the older leaves. Occasionally the umbo of the scale has a resinous content, but the scales never stand apart as glistening spots on a shining green surface as they do in *Rh. lepidotum*. The scales on the under-leaf surface, too, are closer set and usually more or less punctulate. The leaf-shape is always on the side of elliptic, whilst in *Rh. lepidotum* it is on that of lanceolate. The pedicels are shorter, the calyx is smaller and its lobes not so separate as they are in *Rh. lepidotum*. The broad rounded corolla lobes have one mid-vein, whilst in *Rh. lepidotum* the mid vein is accompanied by two lateral ones running up nearly to the top. The fruit is smaller.

The species was introduced by Mr. Bulley by seeds collected by Forrest in 1906. From seeds presented to the Royal Botanic Garden, Edinburgh, by Mr. Bulley, plants have been raised which first flowered in 1910.

Kingdon Ward collected in July 1912, under No. 905, on the cliffs and rocks of Ka-gwr-pw, at an altitude of 13,000–14,000 ft., a crimson-flowered dwarf rhododendron which resembles closely *Rh. sinolepidotum*, but the petaline lobes are hardly in character for they are elongated ovate. There are other minor differences, possibly local divergences, from the specific type and giving no sufficient characters for separation. I mention the variation in view of a complete analysis of the *Lepidotum* series at some future time.

Rhododendron stenaulum, Balf. f. et W. W. Sm.

Frutex glaber ad 9 m. altus ramis virgatis folia quasi verticillata gerentibus verticillis fictis inter se distantibus incrementorum annuorum apicem notantibus. Ramuli annotini circ. 2 mm. diam. pallide grisei glaberrimi. Alabastra foliorum ignota. Folia petiolata ad 17.5 cm. longa; lamina chartacea oblonga vel oblongo-lanceolata nunc lanceolata vel subobovalis ad 16 cm. longa 5 cm. lata apice recte vel oblique acuminata margine plana tenuiter cartilaginea pilorum detersilium pedibus nigricantibus obscure scabriuscula nunc ad basim praecipue pilis paucis subsetulosis praedita basi longe cuneato-attenuata, utrinque glaberrima nitens laevis, supra laete viridis costa media venisque primariis subpatulis intra marginem curvatis utrinsecus circ. 12 sulcatis, subtus pallidior costa media elevata viridi vel suberubescente pedibus pilorum juvenilium obscure et conspersim notata venis primariis subimmersis venularum reticulo ultimo occulto; petiolus ad 1.5 cm. longus saepe erubescens supra anguste sulcatus lateraliter subscabriusculus vel setulis

paucis conspersus. Flores fragrantés in racemo-umbellas axillares 3-5 ad apicem ramulorum fasciculatim dispositi; umbellae 3-5-florae rhachi brevi circ. 7 mm. longa glabra; bracteae internae circ. 2.5 cm. longae 5 mm. latae anguste spathulatae vel claviformes membranaceae brunneae obtusae mucronulatae extus puberulae; bracteolae filiformes membranaceae circ. 1.7 cm. longae puberulae ad apicem leviter cristatae; pedicelli graciles stricti divaricati ad 3.5 cm. longi glabri. Calyx minutus glaber profunde 5-lobatus, lobis circ. 1 mm. longis deltoideis sub-erosis eciliatis paullo erubescens nunc lobo singulo (vel 2) lineari-ligulato membranaceo ad 1.7 cm. elongato 0.5 mm. lato breviter albido-ciliato truncato vel longe acuminato vel aristato. Corolla extus roseo-alba vel alba intus varo luteo basali postice notata ad 6.7 cm. longa infundibularis tubo angusto circ. 1.7 cm. longo limbi ampliati disco circ. 1 cm. longo extus glabra intus minutissime puberula haud gibbosa, lobis elliptico-oblongis vel ovalibus obtusis circ. 4 cm. longis 2.5 cm. latis tubo multo longioribus basi angustatis vix auriculatis anterolateralibus paullo minoribus. Stamina 10 subaequalia corolla styloque breviora, longiora circ. 5 cm. longa breviora circ. 4.5 cm., antheris circ. 2.5 mm. longis lacteo-albis, filamentis tenuibus paullo complanatis deorsum vix expansis albis a ima basi ad apicem ovarii glabris supra ovarium fere ad medium puberulis. Discus viridis glaber. Gynaeceum circ. 5.7 cm. longum corolla brevius; ovarium cylindricum in stylum attenuatum angustum circ. 7 mm. longum paullo sulcatum laete viride pilis brevissimis albidis conspersum; stylus glaber basi flavido-viridis sursum albidus sub stigmatē flavido-viridi subdiscoideo lobato leviter expansus et labium circulare formans.

Species *Rh. stamineo*, Franch. affinis staminibus inclusis recognoscenda; a *Rh. oxyphylo*, Franch. foliis chartaceis margine scabridis venis subpatulis notatis, floribus majoribus, filamentis styloque eglandulosis recedit.

W. Yunnan. Divide between the Pú-piao and Yung Chang Valleys. Open situations amongst scrub. Alt. 7000-8000 ft. Lat. 25° 6' N. Shrub of 6-30 ft. Flowers interior white with a blotch of yellow at base, exterior rosy white, fragrant. G. Forrest. No. 5530. April 1910.

This is a distinct species of the *Stamineum* series, easily recognised from *Rh. stamineum*, Franch. by its very much larger flowers and included stamens and style. It exhibits more strikingly than most species of rhododendron the juvenile phase of its life-history. The young plantlets are deep claret red all over and have stems, petioles, midrib, and margin of the leaves densely covered with white bristles, some of which end in capitate glands. So unlike is the plant in this state to the

adult that an observer might well question at first their being the same plant. None of Forrest's specimens provide foliage-leaf buds, and I am unable to say what the features of the evolution of the leaves in the adult are, but the traces of juvenile hairs on the several parts of the adult leaf and the occasional presence of setulae indicate that the leaf in its younger stages is setulose. Although the leaves of the adult are green, there is often a tinge of reddening in the petiole and midrib, and at times the lamina may show a sort of metallic purpling reminiscent of the juvenile phase. All the leaves, even the most green, yield on boiling a dark purple red almost black solution.

The calyx is noteworthy. As a rule it is minute with 5 deltoid lobes hardly one millimeter long, but occasionally one of them grows out into a long narrow membranaceous riband over one centimeter in length and sometimes a second one may also do so. Occasional intermediate stages may be seen. A calyx with all five calyx lobes having this riband or thread form is characteristic of *Rh. nematocalyx*, Balf. f. et W. W. Sm. (hence its name), which belongs to the Stamineum series also and is not far removed from *Rh. oxyphyllum*, Franch.

The species is in cultivation and flowered in 1917 with Mr. Magor in Cornwall, who kindly sent to me the flower. Mr. J. C. Williams of Caerhays Castle also sent to me living specimens of the plant.

Rhododendron stereophyllum, Balf. f. et W. W. Sm.

Frutex ad 2 m. altus ramis rigidis strictis subdivaricatis internodiis elongatis. Ramuli annotini circ. 2 mm. diam. purpurei laxe lepidoti et breviter puberuli seniores erubescens squamarum pilorumque vestigiis notati tandem grisei decorticantes. Folia petiolata ad 6.8 cm. longa ad apicem ramulorum haud aggregata; lamina crasse coriacea elliptica vel oblongo-elliptica vel subovata ad 6 cm. longa 2.8 cm. lata saepe multo minor apice late obtusa mucrone brevi margine plana cartilaginea eciliata basi obtusa vel cuneata, supra viridis subnitida squamis superficialibus discontinuis brunneo-lepidota vel earum vestigiis notata costa media paullo sulcata sulco (sursum inconspicuo erubescens) pilis plurimis brevibus impleto venis primariis utrinsecus circ. 8 vix conspicuis, subtus pallide olivacea squamis aurantiacis vel rubris nitentibus persistentibus discontinuis numerosissimis in foveolas immersis dense obiecta squamarum umbone convexo resinoso-colorato institaque angusta, costa media elevata erubescens laxe rubro-lepidota et pilis brevissimis erectis vestita; petiolus circ. 8 mm. longus ruber plus minusve rubro-lepidotus et puberulus sulcatus sulco pilis albis brevissimis impleto. Umbellae 3-4-florae 3-4 ad

apicem ramulorum fasciculatim dispositae, una terminalis, 2-3 axillares; alabastra floralia ovoidea circ. 8 mm. longa 5 mm. lata atro-brunnea; bracteae sub anthesi persistentes exteriores rotundatae circ. 4 mm. longae et latae cucullatae dorso dense lepidotae subcarinatae mucronulatae intus sericeae margine albo-ciliatae interiores membranaceae spadiceo-brunneae oblongae vel obovatae subspathulatae truncatae circ. 1.2 cm. longae extus basi velutino-puberulae supra aurantiaco-lepidotae intus glabrae margine verticeque albo-ciliatae; bracteolae longae pedicellis longiores a basi ad apicem acutam attenuatae ramentaceae pilosae; pedicelli circ. 8 mm. longi lepidoti et brevissime puberuli apice obliqui bracteis fertilibus breviores. Calyx minutus vix 1 mm. longus extus lepidotus cupularis in lobos 5 inaequales undulatos divisus. Corolla rosea postice rubro-maculata infundibuliformis circ. 2.3 cm. longa extus sparsim lepidota intus puberula, lobis circ. 1.25 cm. longis 9 mm. latis integris. Stamina 10 inaequalia longiora circ. 2.5 cm. longa breviora 1.3 cm., filamentis infra planis ima basi nuda sursum ad trientem puberulis, antheris violaceis 1.5 mm. longis. Gynaeceum circ. 2.8 cm. longum corollam et stamina superans; ovarium parvum vix 2 mm. longum apicem versus paullo attenuatum dense lepidotum; stylus tenuis sub stigmatate aequilato haud ampliatus. Capsula cinereo-brunnea oblonga sursum paullo attenuata recta circ. 1.2 cm. longa 4 mm. diam. ab apice valvis 5 dehiscens. Semina rubra vel spadiceo-brunnea circ. 1.5 mm. longa 0.75 mm. lata oblonga subcomplanata exalata vix carunculata.

Species *Rh. siderophyllo*, Franch. affinis sed ramulis petiolisque puberulis, corolla intus perspicue puberula, stigmatate parvulo diversa.

Yunnan. Mountains in the N.E. of the Yangtze bend. Alt. 10,000 ft. Lat. 27° 45' N. Open situations amongst scrub. Shrub of 6-7 ft. Flowers rose. G. Forrest. No. 11,299. Sept. 1913.

This hard-leaved species does not appear to have many features to commend it as a garden plant. The rose-coloured flowers are small and few in a truss, and the base of the trusses is enveloped in the bracts. The red colour of the twigs may be perhaps its most effective character.

Rhododendron Surasianum, Balf. f. et Craib.

Frutex patens circ. 4 m. altus ramis virgatis. Rami annotini circ. 2.5 mm. diam. imbricatim furfuracei squamis peltatis pallide brunneis deinde griseis induti. Alabastra foliorum ignota. Folia petiolata ad 10.5 cm. longa; lamina coriacea oblonga vel oblongo-elliptica vel oblongo-lanceolata nunc

lanceolata ad 9.5 cm. longa 4 cm. lata apice subacuminata mucrone tuberculato terminata margine cartilaginea paullo recurva obscure undulata basi obtusa saepe inaequalitalis, supra olivacea opaca laevis costa media sulcata squamis marcidis lepidota venis primariis utrinsecus circ. 7 paullo conspicuis glabra sed squamarum juvenilium peltatarum vestigiis notata, subtus fulvida costa media venisque primariis prominulis ubique dense (costa media leviter) lepidota, squamis biformibus, paucis majoribus ad 0.5 mm. diam. conspersis caeteris minoribus fere contiguis (areis inter squamas angustis pallide viridibus) secretionem rubra vel aurantiaca impletis instita lata integra (in squamis majoribus saepe lobata) cum umbone aequilata; petiolus circ. 1 cm. longus imbricatim furfuraceo-lepidotus supra sulcatus. Flores in umbellas terminales 2-3-floras dispositi; bracteae exteriores crustaceae rotundatae vel ovatae flabelliveniae obtusae vel acutae ad 2.5 cm. longae dorso puberulae et lepidotae pilis brevibus albis ciliatae intus centro sericeae, interiores spathulatae ad 3.5 cm. longae carinatae mucronatae similiter ac exteriores vestitae; bracteolae rubrae lineares longissimae circ. 3.5 cm. longae ex toto pilosae lepidotae; pedicelli crassi circ. 1.2 cm. longi imbricatim furfuraceo-lepidoti. Calyx patelliformis brevis circ. 1 mm. longus margine undulata lobos 5 semi-lunatos vix formante extus dense lepidotus setis albidis ciliatus. Corolla pallide rosea infundibuliformis circ. 7.5 cm. longa, tubo extus puberulo et ubique lepidoto intus puberulo sursum in lobos 5 expanso, lobis latis obovatis circ. 3.8 cm. longis 3.3 cm. latis crenulatis apice rotundatis vel subobtusis vena media conspicua. Stamina 10 inaequalia longiora circ. 5.7 cm. longa antheris oblongis 7 mm. longis, breviora circ. 4 cm. longa antheris circ. 5 mm. longis, filamentis deorsum dilatatis a basi ad trientem puberulis. Discus sub ovario puberulus. Gynaeceum circ. 8 cm. longum corollam paullo superans; ovarium conoideum sulcatum circ. 6 mm. longum a stylo haud constrictum dense imbricatim lepidotum squamis ramentaceis; stylus longus a basi ad medium lepidotus sub stigmate discoideo magno latiore haud expansus.

Species distincta a *Rh. Ludwigiano*, Hoss. specie altera siamensi ejusdem affinitatis longe recedens; illa ramos glabros, folia floresque pedicellosque multo minores possedit; *Rh. ciliicalyci*, Franch. et speciebus aliis sinensibus etiam affinis sed indumento densiore distincta.

Siam. Chiangmai, Doi Sutep. 1500 m. Spreading shrub about 4 m. high; flowers pale pink. On rocky ground in open evergreen jungle. Dr. A. F. G. Kerr. No. 3238. 7th June 1914.

The proper place of *Rh. Surasianum* amongst rhododendrons is beyond question. It is one of the set of species belong-

ing to the series of Maddeni, which have small long-ciliate calyx and ten stamens, by which characters they are separated from the set of *Rh. Maddeni*, Hook. f. itself, in which the calyx is medium or small eciliate and the stamens eighteen to twenty or more, and also from that of *Rh. Dalhousiae*, Hook. f., which possesses a large more or less membranous calyx and ten stamens.

Rhododendron sycnanthum, Balf. f. et W. W. Sm.

Frutex ad 3 m. altus multo breviterque ramosus. Ramuli epilosi tenues, hornotini circ. 1 mm. diam. nigricantes sparsim albido-lepidoti, annotini vix crassiores brunnei nitentes, seniores albido-grisei mox decorticantes. Alabastrorum oblongorum pallide brunneorum acutorum perulae exteriores coriaceae semilunatae circ. 2.5 mm. longae 3.5 mm. latae intus glabrae extus lepidotae margine minutissime ciliatae intimae membranaceae obovato-spathulatae circ. 1 cm. longae apicem versus 3 mm. latae subflavae intus glabrae extus apicem versus lepidotae margine sparsim ciliatae; folia juvenilia convoluta supra glaberrima subtus dense albo-lepidota margine sparsissime ciliata petiolo albo-lepidoto et ciliis paucis praedito. Folia petiolata ad 4.7 cm. longa; lamina coriacea haud rigida oblonga vel oblongo-elliptica ad 4 cm. longa 1.8 cm. lata sursum et deorsum attenuata apice acuta vel obtusa corneo-mucronulata vel corneo-tuberculata margine cartilaginea paullo recurvata basi obtusa vel late cuneata supra luride viridis ex toto glaberrima (epilosa elepidota) superficie reticulata venulosa (in sicco), costa media erubescens paullo sulcata venis primariis utrinsecus ad 8 venularum reti paullo elevato, subtus pallidior glaucoviridis squamis paucis ex umbone lato convexo secretionem rubra impleto institaque angusta brunneo-colorata aedificatis in foveolis haud profundis conspersis, intervallis latis inter squamas venularum reti nunc viridi nunc brunneo-colorato et papillis petasiformibus scintillantibus notatis, costa media carnea elevata squamis sparsissime praedita; petiolus circ. 7 mm. longus erubescens sparsim lepidotus supra sulcatus sulco omnino glabro. Flores 3-4 in umbellas veras terminales solitarias nec fasciculatas dispositi; bracteae deciduae ignotae; bracteolae membranaceae anguste spathulatae circ. 1.2 cm. longae ad apicem 2.5 mm. latae aureo-brunneae intus glabrae extus inferne puberulae superne dense aureo-lepidotae margine longe albido-ciliatae sine crista apicali; pedicelli circ. 1.3 cm. longi purpurei subceraceo-glauci sparsim lepidoti sub flore haud obliqui. Calyx minutus cupularis lepidotus margine in lobos 5 rubros eciliatos circ. 2 mm. latos undulatus. Corollae lavandulaceo-roseae postice varo et maculis rubris notatae tubus infundibuliformis in limbum 5-lobatum obliquum explanatus extus lepidotus intus

postice profuse pubescens, lobis extus lepidotis rotundatis vel oblongo-rotundatis undulatis antero-lateralibus majoribus circ. 1.7 cm. longis 1.3 cm. latis tubo longioribus posterioribus minoribus vix tubum superantibus. Stamina 10 inaequalia longiora circ. 2.7 cm. longa breviora 1.5 cm., filamentis deorsum latioribus a basi ima nuda ad medium puberulis, antheris violaceis circ. 2 mm. longis. Gynaeceum circ. 2.7 cm. longum corollam et stamina subaequans; ovarium circ. 4 mm. longum 2 mm. latum columnare atro-purpureum squamis pallidis dense vestitum; stylus ruber glaber ad apicem vix expansus; stigma discoideum atro-purpureum lobulatum.

Species parvifolia multiflora vero umbellata foliis supra elepidotis epilosis, umbellis haud fasciculatis, floribus plus minusve obliquis, calyce fere obsoleto, corolla extus lepidota intus puberula, ovario lepidoto, stylo glabro notata.

Mid. W. Yunnan. Eastern flank of the Tali Range. Alt. 10,000–11,000 ft. Lat. 25° 40' N. Amongst scrub and on ledges of cliffs. Shrub of 4–9 ft. Flowers lavender-rose. G. Forrest. No. 6771. May 1910.

This is a most distinct species, and if the flower tint is only right the plant should be an acceptable one in gardens. It is most floriferous, and in the dried specimens the flowers retain more colour than is the case in kindred species. In habit it recalls the *Rh. yanthinum* of our gardens, but the thickly-set scales of the under-leaf indumentum in that plant and its allies readily distinguish it and them. The scattered scale-indumentum on the under-leaf surface resembles that of *Rh. rigidum*, Franch., but *Rh. syncanthum* may be recognised by absence of the wax bloom on the leaves, the total absence of hairs from young twigs, petiole, and groove of midrib on upper leaf-surface. This surface from the first is glabrous, not a hair appearing on it even in the groove of the midrib or in the groove of the petiole, nor is there a peltate scale. The few cilia which fringe the leaf-margin in bud fall off with expansion from the bud. Two other characters separate *Rh. syncanthum* from *Rh. rigidum*—the flower-pedicels and calyx are lepidote and the flowers themselves larger.

Rhododendron zaleucum, Balf. f. et W. W. Sm.

Arbor ad 10.5 m. alta tenuiramosa ramulis subvirgatis. Ramuli hornotini circ. 2 mm. lati brunneo-lepidoti, annotini verruculosi, vetustiores grisei decorticantes. Alabastrorum perulae crustaceo-coriaceae exteriores fulvae late ovatae rotundatae carinatae mucronulatae dorso cinereo-puberulae et lepidotae margine ciliatae, interiores ligulatae vel elongato-spathulatae membranaceae indumento simili circ. 3 cm. longae 4 mm. latae tandem

internodiis distinctis separatae. Folia circ. 7 cm. longa petiolata ; lamina adulta chartacea lanceolata ad 6 cm. longa 2 cm. lata apice acuminata costa media in tuberculum corneum excurrente margine paullo recurvata cartilaginea pedibus setarum delapsarum punctulata basi obtusa attenuata, supra pallide viridis laevis costa media sulcata puberula caeteroquin glabra venulis primariis utrinsecus circ. 10 vix conspicuis, subtus cinereo-alba strato papillarum epidermicarum ceriferarum induta et squamis peltatis haud immersis rufescenti-resinosis fere sessilibus umbone plano et instita lata aedificatis haud contiguis conspersa, juvenilis tenuiter membranacea purpureo- vel rubro-venulosa supra nigricans glabra subtus pallidior squamulis luteis lepidota margine setulosa ; petiolus circ. 1 cm. longus saepe purpureus lepidotus. Flores in umbellas partiales terminales et axillares 1-5-floras ad extremitates ramorum fasciculati fasciculis inter ramos subflorales praecoces immersis ; bracteae perulas alabastrorum simulantes ; bracteolae lineares subclaviformes circ. 1.3 cm. longae membranaceae brunneae puberulae et lepidotae ; pedicelli ad 1.3 cm. longi (sub fructu ad 2.5 cm.) lepidoti. Calyx parvus crateriformis cupula circ. 1 mm. longa dense lepidota, lobis 5 deltoideis vel rotundatis circ. 1.5 mm. longis saepe purpureis extus dense lepidotis apice setosis. Corolla alba roseotincta a basi infundibuliformis circ. 3.5 cm. longa extus lepidota, tubo intus paullo puberulo sursum in limbum 5-lobatum expanso, lobis ellipticis vel rotundatis emarginatis et crenulatis circ. 1.5 cm. longis 2 cm. latis. Stamina 10 inaequalia longiora ad basim loborum corollinarum attingentia, filamentis deorsum dilatatis basim versus pilosis, antheris circ. 2.5 mm. longis. Ovarium cylindricum circ. 4 mm. longum dense glanduloso-lepidotum ; stylus glaber staminibus longior corollam subaequans ; stigma lobulatum. Capsula cylindrica circ. 1.2 cm. longa 5 mm. lata glauca et rufo-lepidota. Semina oblonga circ. 1.5 mm. longa longitudinaliter striata ad extremitates obscure lobulato-carunculata pallide brunnea.

W. Yunnan. Western flank of the Shweli-Salween divide. Alt. 10,000-11,000 ft. Lat. 25° 25' N. Shrub of 25-35 ft. Flowers rose? In fruit. *Rhododendron* forest. G. Forrest. No. 8923. Aug. 1912.

W. Yunnan. Shweli-Salween divide. Alt. 9000 ft. Lat. 25° 30' N. Shrub of 5 ft. Flowers white flushed rose. Open rocky slopes. G. Forrest. No. 12,065. June 1913.

W. Yunnan. Shweli-Salween divide. Alt. 9000 ft. Lat. 25° 25' N. Shrub 4-5 ft. Flowers rose. Open rocky slopes. G. Forrest. No. 12,064. June 1913.

E. Upper Burma. Hpimaw. Alt. 9000-10,000 ft. Tall thin tree of 25-30 ft. In damp rain forest. Flowers pink and

slightly fragrant. Leaves with white bloom underneath. F. Kingdon Ward. No. 1568. 21st May 1914.

There is no doubt about the identity of Ward's Burmese plant (No. 1568) with Forrest's plant (No. 12,065) of the rhododendron forest of the Shweli-Salween divide. Nor do I think the identification with these of Forrest's fruiting plant (No. 8923) can be questioned. Yet the habitats of the Burmese and Yunnan plants are very different. Its growth as a shrub in Yunnan may be correlated perhaps with its habitat—rocky slopes. The white wax-coated underleaf is certainly more a character of open rocky slopes than of damp rain forest. Forrest's specimen (No. 12,064) must also, I think, be placed here. It has all the technical characters of the species but has smaller leaves.

The very white-grey under-side of the leaf is a striking feature of the species. The grey surface is composed of short cupola-like epidermal papillae coated with wax. The peltate scales have hardly any stalk and do not arise in a real pit of the surface, but only on a slight depression out of which they project and show a large broad central boss with a broad wing.

The whole characters seem to place this species in the series with fasciculate inflorescences to which *Rh. Augustinii*, Hemsl. and such like forms belong. The series is a rare one in West Yunnan, and I do not find any species which I would select as of particularly near affinity to *Rh. zaleucum*. But I have not had as yet material or opportunity to study satisfactorily the members of the series.

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