

November 25th, 1914.

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# Icones Plantarum Formosanarum

et

Contributiones Botanicarum Formosanas.

Icones of the Plants of Formosa -- Materials for a Flora of the Island, based on a Study of the Collections of the Botanical Survey of the Government of Formosa.

B

B. Hayata, *gakuhakushi*.

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ICONES PLANTARUM FORMOSANARUM  
NEC RON ET  
CONTRIBUTIONES AD FLORAM  
FORMOSANAM.

IV.

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AUCTORE

**B. Hayata**



**TO HIS EXCELLENCY COUNT SAMATA SAKUMA,**

**GOVERNOR GENERAL OF FORMOSA.**

**SIR.**

I have the honour to submit to your Excellency the fourth volume of the *Icones Plantarum Formosanarum, nee non et Contributiones ad Floram Formosanam* by B. HAYATA, D. SC.

**KAKICHI UCHIDA,**

**CIVIL GOVERNOR OF FORMOSA.**

September 1, 1914, Taihoku..

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## INTRODUCTION.

As was stated in the third volume of this work, several more volumes were to be devoted to the results of studies of new materials which were then on my hands. The first part of these studies was published in Vol. HI. under the heading, "Contributions to the Flora of Formosa, Part I." The present volume is principally devoted to the second part of the same studies. It also contains some plants collected during my last excursion to Formosa, in the spring of this year.

The volume contains 285 species and several varieties, of which 167 are proposed as new species, and 9 as new varieties of known species, while 118 are identified with species which were known from the island or from other countries. Of genera contained in this volume, one genus, *ArisanorcJds*, is proposed as new, and thirteen genera are mentioned as new to the flora of the island. The genera new to our knowledge of the flora are shown in the following list.

<i>Aconitum</i>	<i>Jbfmeses</i>	<i>Gryptostylis</i>
<i>AilarUkits</i>	<i>Boschnialda</i>	<i>Cystopteris</i>
<i>Corylqpsis</i>	<i>Betlschmiedia</i>	<i>Leucostegia</i>
<i>Modecca</i>	<i>IlydrocJiaris</i>	
<i>Gornvs</i>	<i>Arisanorchis</i>	

Genera,\* species\* and varieties\* now to be added to the flora of Formosa number as many as 13 genera, 194 species and 9 varieties. Thus, up to the present date, the total number of species of the flora, so far as is known, is 3112, belonging to 891 genera and 158 families.

In the present volume, floral sketches of some of my species already described are given, and the original descriptions are repeated, as I desire to give a clear conception of my species to any one who examines them to see whether they are to be recognized as genuine new species or to be reduced to known species.

Of the species mentioned in this work, I have proposed more than

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\* It should be understood that plants outside of the island are not counted in this number, although they are mentioned in this volume.

lialf as new. In so doiug, I shall be accused of having described too many new species, and shall be censured for having paid but little attention to known species. But such is not at all the case. I have, as far as necessary, consulted all accessible literature bearing on my work, and liave made exliaustive comparisons with all the herbarium specimens preserved in our institutes at Taihoku and Tōkyō. It should be understood, as I stated in my former paper,\* that our herbaria are as yet very inadequate for the working up of my materials which pre really extensive. It frequently occurs with us that foreign herbarium specimens for comparison being very scanty, we are compelled to consult original or reproduced descriptions, instead of herbarium specimens themselves.

In this way have my own investigations been made. I lmve commenced my work with the utmost care, examining all descriptions of the species with which my plants might be identified. In those cases in which the descriptions of plants under examination were exliaustive or at least available for identification, the work could be carried on with some measure of satisfaction. Much more satisfactory has it been when they were accompanied with figures. When, however, the descriptions were very short and imperfect and not accompanied with any figures, the work of identification was utterly disappointing if not impossible. In cases where I could not satisfactorily identify my plants with any known species in consequence of the imperfection of the given descriptions or the want of herbarium specimens, the only work that was possible for me was to describe my plants fully and accurately as new species, giving their affinities. This has been most frequently the case with ferns. As stated by Sir WIULIAAT HOOKER,\*\* the identification of ferns with given descriptions is a very difficult task, and in some cases utterly impossible, if the descriptions are not accompanied with figures.

For us to whom comparison with herbarium specimens can be but imperfectly earned out, the most important work to be undertaken is not so much the identification of plants with known species, as the study of their

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\* HAYATA, B.—Materials for a Flora of Formosa, in Joura. Coll. Sci. Imp. Univ. Tōkyō, XXX-1, p. 2.

\*\* HOOKER, Sir WILLIAM JACKSON. - A second Century of Ferns (18C1), p. VII.

characters and affinities. Works which contain full descriptions and illustrations of plants of the regions in question, should present important materials for students of phytogeography and of systematic botany. Works which deal only with the names of plants, perhaps erroneously classified, as would probably be the case in circumstances like ours, would be likely to lead students of phytogeography to erroneous results, and would puzzle students of systematic botany with an endless confusion of nomenclature of plants.

In this work, plants, the identification of which has been satisfactorily made, are referred to known species. In this case, I usually have made it clear how I have identified them with the species to which they have been referred,—by means of a comparison of herbarium specimens, of figures or of descriptions found in literature. But in cases in which identification has not been satisfactorily made, plants have been described as new with affinities. In some cases, my species may be the same as those which I have given as their allies under descriptions of plants in question. Therefore, though many of my new species should be reduced to synonyms, still I have little doubt that my work will present important material to students of the flora of Eastern countries. No one is more conscious than I that errors may have crept into my work; but the errors in most cases are of a nature inevitable in work of this kind done in the East, far from Western herbaria, and will doubtless easily be detected by those who are familiar with the species, when they see merely my descriptions and figures without troubling themselves to look at my original types.

As stated above, nothing is more difficult than to identify plants by short descriptions unaccompanied with figures. Original descriptions ought, therefore, to be very clear, accurate and exhaustive, and if possible, ought to be supplemented with figures, so that one can identify one's plants easily and satisfactorily. For one to whom original types are easily accessible, it is not difficult to work with short descriptions, as one may go to see the types themselves, if one finds original descriptions unavailable for identification. But, for one to whom original types are not accessible, when descriptions are too short for use, the work cannot but be very difficult and



sometimes impossible. Exhaustive descriptions are, therefore, indispensable for us to whom herbarium specimens for comparison are not sufficient and types are practically inaccessible.

Descriptions of new species ought to be accessible to all botanists and are necessary, except in the case of those of certain circulation of which types are at hand. Moreover, type-specimens are not things which can be widely distributed; they may be rare, or even extinct. Descriptions, however, when published, can be easily obtained, and the excuse of inaccessibility is not admissible. Accordingly, original descriptions should be so exhaustive that they may be substitutes for type-specimens and that one can work with descriptions in cases where the types are not available. In this sense, Eastern botanists are in no more urgent need of exhaustive descriptions of plants of which types are preserved in Western herbaria, than Western botanists are of those of which types are preserved in Eastern herbaria. The same can be said of all botanists either with reference to different countries or to different herbaria. It is also much to be desired that the multiplication of type-specimens proposed by SWINGEL\* should be carried out by all botanists who have to describe new species. Though the distribution of merotypes is most important for taxonomic botany, yet it is far too difficult, and in some cases impracticable, to make it obligatory on all authors of new species.

Descriptions might be very short so long as the species belonging to the same genus were few in number. As the species increase year after year through the exploration of new territories or other causes, descriptions will tend to become fuller and more exhaustive. In such cases, original descriptions of two or three lines only for the sake of priority should be absolutely avoided.

It is much to be desired that the following resolutions should be considered at the next meeting of the International Botanical Congress to be held in London next year, if the present overwhelming war is then over, viz: (1), that in the case of new species, descriptions of two or three lines only for the sake of priority should be as far as possible avoided; (2), that authors who are compelled to describe new species from imperfect

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\* SWINGLE, W. T.—Merotypes as means of multiplying botanical types.

specimens should supplement their original descriptions with perfect materials as soon as possible.

As this volume is principally devoted to studies of the Orchidese and Pteridophyta, a few remarks on the classification upon which the two families is based will not be out of place. In working up my collections of orchids, I have principally followed BENTHAM and HOOKER, sometimes LINDLEY, KING and PANTUNG, and PFETZER. AS to the classification of Monandrw-Acrotonse, many authorities do not agree. \*PETTZER'S system which, taking into account whether the inflorescence is terminal or lateral, distinguishes Acranthse and Pleuranthse, or, on the basis of the veneration of the leaves being either convolutive or duplicative, makes many divisions in the above named tribes, proved to be impracticable in working up my materials. Moreover, I have found many doubtful cases, so far as inflorescence being terminal or lateral is concerned, and there are even more cases in which it is impossible to determine whether the veneration of the leaves is duplicative or convolutive. KING and PANTLING'S Orchids of the Sikkim Himalayas in Ann. Bot. Gard. Calc. Vol. VHI. and several other illustrations given in the same Annals have been very useful to me in identifying and comparing my collections of orchids.

As to ferns and especially to the genus, *Dryopteris*, I have followed C. CHRISTENSEN'S system in his Index Filicum. His classification of the subgenera of the genus\*\* is based principally on the presence or absence of hairs and on their structures. This newly founded system is certainly one of the most natural arrangements and has proved to be easily applicable to Formosan ferns. But, as far as Japanese and Formosan species are concerned, there are a few cases in which I can scarcely agree with the author. Some species which are taken by him as types of a subgenus do not show the characters of the same subgenus, after the delimitation of the latter as stated by him. For example, *Dryopteris Miqvdiana* (Max.) C. CH. which is taken as one of types of the subgenus, *Eudrycpteris*, which after CHRISTEN-

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\* PFITZEB, E.—*Orchilaceai* in ENGLEB U. PBANTIL, nat Pfl.—fam. II-6, p. 76.

\*\* CHMSTENSEN, C—On a natural classification of the species of *Ih-yopteris*, pp. 74-76, and a monograph of the genus *Dryoptwis* part-1, pp. 61-63.

SEN'S delimitation should have no true hair, has true unicellular hair; while *D. Siebdtii* (van HOUTTE) O. KTZE, which is taken as another type of the same subgenus, has true multi-cellular hair. I have no doubt, however, that the two just referred to could be quite naturally assigned to the subgenus named, as might be seen from their general characters. With a very few exceptions, his delimitation of subgenera and classification of the genus are very natural, and I have, therefore, followed his system solely.

As to my new species mentioned in this volume, I have described them as accurately and fully as possible and in almost all cases, save where the number of pages or the want of materials forbade, I have supplemented them with figures, in plates or in the text. Accordingly, I believe that any one who is familiar with the plants in question can at once decide whether my species should be recognized, or should be reduced, without taking the trouble to look at my types. As to ferns, I have added to full descriptions photographs of whole forms and magnified sketches of pinnae or pinnules, scales and sori. As a type for description, I have taken the largest form possible; for describing pinnae or pinnules, I have taken basal ones; and for angles of pinnae, I have taken the middle ones. Great attention has been paid to venation and the structure of hairs.

All the species of phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER, while those of vascular cryptogamia are arranged after the system of ENGLER and PRANTL. The scope of the present volume is the same as that of the preceding volume.

In conclusion, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa to whom I am much indebted for help in the collection of materials and in the publication of this work.

B. HAYATA.

August 31, 1914, Taihoku and Tōkyō.



RANUNCULACEAE.

## Contributions to the Flora of Formosa.

### II.

#### Ranunculaceae.

*Aconitum* LINK.

*Aconitum Fukutomei* HAYATA sp. nov. Catilis non visas. Ramuli flexuosi subcomplanati laves tenuiter Uirsuti (pilis patentibus). Foliis radicalibus ignota. Folia in ramulo tripartita breve petiolata vel 3-foliolata, foliolis subaequalibus, terminali in eireimscriptiue **obovato-lanceolato** 3-5 em. longis 1-1.5 cm, lato apice acuminate basi connato ad petiolulum 2-3 mm. longum; lobes unguibus laciniatis, (laciniis linearibus 1-1.5 cm. longis 2-2.5 mm. latis), foliolis basilibus laciniatis, utraque pagina hirsuta, nervis venisque supra impressis subtus elevatis, petiolis communibus 8 mm. longis. Flos versus apicem ramulorum racemosim dispositi vel ad axillas foliorum **saparioram soli** tarsi sibi utriusque, diametri 1-1.5 cm. longis 1-1.5 cm. longis sursum bracteatis alternis instructis, bracteis linearibus 5 mm. longis; floras violaceae, basi stipitibus antice usque ad apicem galero 3 cm. longis. Sepalum posticum galatiforme 22 mm. longum 1 cm. latum et profundum dorso convexum hiudito-conveniens intus hirsutum apice breve conspicitum, (**obtusum** tritum **obtusum reflexum**, basi subconnato-connatis; sepalis lateralibus **obtusum** rotundum, (filiis) 14 mm. longa totiusque lata apice late rotundata basi arcuato-convexa latere superiore interiore arcuata, interiore inferiore excavato-arcuata ad basium 2 mm. hirsuta truncata, nunc pagina hirsuta eiecta prope apicem margine exteriori curva ciliata plana; sepalis ovato-oblongis, (filiis) obovato-oblongis, 5-6 mm. longa 5-6 mm. lata apice obtusa vel conspicitata-acuta ad apicem semper obtusa basi subconnato **obtusum** cuneato-convexa utraque luxuriosa ad basin 1 mm. lata margine intus recurva. Petala superiora 2, inferiora longe mucronata apice cuneata sub galea recondita, linguibus mucronatis 9 mm. longis 1 mm. latis intus profunde sulcatis kirsutis vel subbarbatis (pilis patentibus) basi —formis **obtusum** subcomplanatis, cucullis ?-formibus 9 mm. longis 1-2 mm. latis apice recurvis deorsum longe

linearibus basi dilatatis ad extremitatem brevissime 2-lobis vel retusis tenuiter barbatis; petala 3 inferiora minima angustissime linearia 3 mm. longa 5 mm. lata apice obtusa basi laud contracta subglabra vel tenuiter barbata nervia. Stamina oo glabra, filamentis exteriore recurvis 5-6 mm. longis a medio usque ad basin alatis, partibus alatis 3 mm. longis cum alis 1 mm. latis apice sagittatis vel gradatim ad partem exaltam abeuntibus, antheris reniformibus 1 mm. latis minus 1 mm. longis utrinque emarginatis. Carpella distincta pauca circ. 3 fusiforme linearia ± obliqua cum stylo 4 Jmm. longa glabra.

HAB. Mt. Kirai-shuzan, leg. K. FUKUTOME, Oct. 1913.

As the specimen is rather imperfect, exact determination is not possible. It should be comparable to some extent to *A. sacJialincense* F. SCHMIDT in the linearly parted or lacinate leaves and in the size and hairy form of the flowers; but the new species is widely different from the congener in having glabrous filaments and more opened dorsal sepals.

## Ternstroemiaceae.

### *Actinidia* LINDL.

*Actinidia callosa* LINDL. var. *fonnosana* FINET et GAGN. PL. As. Or. II. (1907) p. 20.

*Actinidia Cliampioni* HAYATA in Herb. Bot. Gard. Tōkyō (non BENTH).

HAB. Mt. Taiton, leg. G. NAKAHARA, Aug. 1905, (No. 262-A).

Determined by Mr. W. K. PRICE at Kew.

## Malvaceae.

### *Gossypium* LINN.

*Gossypium hirsutum* var. *religiosum* WATT.

HAB. Shizangan, leg. T. MAKINO, NOV. 1896.

Determined by Mr. SPRAGUE at Kew, through Mr. W. R. PRICE.

## Simarubaceae.

### *Ailanthus* DESF.

*Ailanthus glandulosa* DESF. var. *Tanakai* HAYATA n. v. Arbor? Folia (in specimine nostro singulo) 55 cm. longa 26 cm. lata in circumscrip-

tionem oblonga 27-foliolata, foliolis suboppositis, jngis 3J-4 cm. remotis, inferioribus majoribus obliquis ovato-oblongis 13 cm. longis 5\*cin. latis apice subito acuminatis, (acuminibus linearibus) basi obUquis latere interioribus 3 cm. latis latere exterioribus 2 cm. latis, basi in latere interiore truncatis, ad angulum partis truncate glandulis 1-2 instructis, bad in latere exterioribus acutis vel cuneato-acutis ad angulum partis acute glandulis 1 instructis, chartaceis, utraque pagina glaberrimis supra ad costas impresso-sulcatis, costis versus sulcos distinct© graciliter elevatis, venis lateralibus utroque latere costs© 10-11, mediis a costa angulo 50° egressis supra tenuiter impressis vel planis, costis venisque subtus distincte sed graciliter elevatis, venulis minute reticulatis, subtns subglaucis vel pallidis, margine integris; glandulis utroque latere margine 1-2 complanato-globosis 1 mm. in diametro supra planis subtus prominente elevatis ad centrum depressis, petiolulis 2-2J cm. longis subteretibus basi subito dilatatis, petiolis 12 cm. longis subteretibus basi ± dilatatis. Mores ignoti. Panicute fructiferte cymosse 25 cm. longae 30 cm. latae, pedicellis ultimis gracibus 2-1 cm. longis. Samera generaliter una in receptaculo singulo sed interdum 2 lineari-oblonga ± obliqua apice obtusissima sursum ± tortuosa basi oblique obtusa latere raph» acuta, latere opposite obtusissima vel rotundata, venoso-reticulata 1-sperma, semine ad centrum sito.

HAB. TGyencho: Shibutsuke, in montibus 3000 ped. alt., leg. I. TANAKA, Nov. 1913.

Very near the type; but differs from it in the quite glabrous leaves and in the samarse which in this new variety are broader and usually convexed at the margin on both sides at the base, while in the type they are convex on one side, but concave on the other.

## Rhamneae.

### *Ilhaniius* LINN.

**Rhamnus acuminatifolia** HAYATA IC. PI. Formos. m. p. 62. Descriptio auctata: Flores subumbellati 9-10-florati, pedunculis semper solitariis axillaribus 1-J cm. longis hirsutis apice cicatricibus pedicellorum 5-6 notatis, cicatricibus rotundatis cupulseformibus ad centrum depressis, pedicellis cum pedunculo articulatis ad apicem pedunculi radiatim dispositis 4 mm. longis

hirsutis apice ad connatas calycium expansis. Cupula calycis late campanulata 1 mm. longa 2 mm. lata extus hirsuta intus glabra discis flavis obtecta. Lobi calycis valvati triangulares 2 mm. longi 1½ mm. lati apice triangulari-obtusi extus subglabri plani intus glabri sursum prominente deorsum tenuiter costati post anthesin a cupula decidui. Petala late obovata cum sepalis alterna valde concava minus 1 mm. longa ½ mm. lata apice 2-lobata basi unguiculata 1 mm. longa glabra. Stamina 5, cum petalis opposita minuta cum filamentis 1 mm. longa, filamentis 1¼ mm. longis, antheris ovatis ½ mm. longis apice connectivis mucroniforme productis. Ovarium late ovato-rotundatum 1 mm. longum, stylo validiusculo columniformi ½ mm. longo apice brevissime 3-lobato.

HAB. Kitōzan, ad 6500 ped. alt., leg. T. KAWAKAMI, Juli. 1913, (No. 9).

## Leguminosae.

### *Acacia* WILLD.

***Acacia confusa*** MERRILL var. ***Inamurai*** HAYATA n. v. Arbor circ. 10 m. alta, circ. 2 ped. in circumscriptione. Phyllodia latere compressa falcato-lineariter lanceolata 10-8 cm. longa 7-4 mm. lata apice acuminata prope apicem subito angulo recto falcata basi attenuata in stipitem latere compressum 1½ mm. longum abeuntia, membranaceo-coriacea utraque pagine manifesto 3-nervia, nervis parallelis, inter nervos 1-vena, venis parallelis, inter venas et nervos venulis longitudinaliter reticulatis, nervis venis venisque utroque latere elevatis, margine integerrima sub lente nervata. Flores ignoti. Legumina valde complanata ± falcata circ. 10 cm. longa 7-8 mm. lata apice obtusa basi subito attenuata ad stipitem 5 mm. longum abeuntia valde complanata ad suturas utrasque costulata, costulis elevatis, facie ± depressa, inter cava seminum vix vel haud constricta, cavis seminum ± elevatis, valvis 2 chartaceis fusco-cinerascentibus. Semina ellipsoidea vel complanata apice rotundata basi obtusissima ad extremitatem breve obscureque apiculata 6½ mm. longa 3½ mm. lata 1½ mm. crassa, utraque facie annulariforme maculata, annulis singulis 4½ mm. longis 2 mm. latis ellipticis, facie fusco-fulvescentia.

HAB. Kōslmān: Kuraru, leg. T. INAMURA, Oct. 1913, (fr.)

Very near the type, differs only by its much narrower leaves, pods and seeds.

It grows on the very windy side of the shore mountains in the southern part of Formosa. According to Mr. T. INAMUBA, there is no difference between the type and the variety in the saplings. I doubt if this be not a mere form of the type.

## Rosaceae.

*Hubus* LINN.

**Rubus glandulosopunctatus** HAYATA sp. nov. Frutex ramosissima, ramis et ramulis flexuosis subsevis vel tenuissime striatis, cum foliolis calycibus petiolisque tenuiter hirtellis glanduloso-punctatis, punctis flavis minutis, aculeatis, aculeis cuspidato-triangularibus latere complanatis 2 mm. longis 1 i mm. latis acutis leviter desuper recurvis. Folia 7-5-foliolata in circumscriptione lanceolato-ovata circ. 10 cm. longa 4-5 cm. lata, foliolis lateralibus oppositis subsequialibus vel superioribus  $\pm$  minoribus, mediis ovato-oblongis  $\pm$  obliquis 22 mm. longis 1 cm. latis apice acutis basi obtusissimis vel rotundatis chartaceis duplicato-dentatis, (dentibus primariis 4 mm. remotis, denticulis secundariis 1 mm. remotis triangulari-acutis), sessilibus, venis et venulis supra non visis costis venisque subtus prominentibus, venulis subtus minute reticulatis; foliolo terminali ovato-lanceolato 4 J. cm. longo 1 j cm. lato apice acuminatissimo basi obtusissimo margine duplicato-dentato, (dentibus primariis  $\frac{1}{2}$  cm. remotis 4 mm. altis, dentibus secundariis minutis 1 mm. a se remotis triangulari-acutis), venis lateralibus supra tenuiter impressis utraque latere costae circ. 10 rectis ad apicem dentium primariorum attingentibus angulo  $35^\circ$  a costa egressis rectis subtus prominentibus, petiolis communibus 2 j. cm. longis remotissime aculeatis gracilibus, rhachibus cum petiolulo folioli terminalis gracilibus 3 cm. longis, jugis foliolorum a se 1-J-1 cm. remotis, stipulis linearibus 7 mm. longis 1 mm. latis acuminatis. Flores ad axillas foliorum superiorum solitarii vel breve racemosi, racemis 1-2-floratis, pedicellis (vel pedunculis) erectis rectis. Ovipula calycis 7 mm. in diametro obtus ad centrum depressa, lobis ovato-triangularibus cum cuspidibus 7-8 mm. longis apice cuspidatis (cuspidibus 2 mm. longis vel longioribus) basi haud constrictis 4 mm. latis extus dense hirsutis vel glanduloso-punctatis intus velutinis crassiusculis margine tenuioribus. Petala rotundata 8-9 mm. in



diametro apice rotundata obtusa vel leviter emarginata basi brevissime unguiculata, (unguibus 1½ mm. longis ad basin 1 mm. latis), margine integra subrepanda hirsuta facie extus dense villosa intus tenuiter hirsuta basi crassiuscula alba. Stamina oo ad marginem cupulse calycis inserta pluri-seriata, filamentis 3 ½ mm. longis 1 mm. latis sursum constrictis, loculis antherse lineari-oblongis 5-6 mm. longis. Ovarium semi-obovoideum 1 mm. longum ½ mm. latum apice rotundatum basi cuneatum latere valde complanatum apice dorso glanduloso-muricatum facie glabrum, stylo ad latus apicis ovarii sito 1½ mm. longo filiformi apice et dilatato truncato. Receptaculum ellipsoideum cum stipitibus 4 mm. longum hirsutum basi pilosum. Syncarpium elliptico-globosum 7 mm. longum, stylis purpurascens, cupula reflexa.

HAB. Eitozan, ad 6000 ped. alt., leg. T. KAWAKAMI, Aug. 1913.

Near *Rulnis rosaefolius* var. *Maocimowiczii* FOOKE, but differs from it in having minute glandular dots all over the plant.

## Hamamelidese.

*Corylopsis* SDEB. et Zucc.

***Corylopsis stenopetala*** HAYATA sp. nov. Frutex? Kami recti teretes cinereo-rubescens lenticellis minutis elevatis notati deorsum glabri sursum hirsuti, prope summum dense villosi. Folia oblonga ovato-oblonga maxima 11 cm. longa 4½ cm. lata apice acuminatissima vel cuspidata, (cuspidibus triangulari-linearibus 1½ cm. longis 6 mm. latis, ad summum aristatis), deorsum a medio usque ad prope basin subcuneata ad basin truncata et leviter cordata, margine a basi cuspidis usque ad medium distincte et tenuissime aristato-dentata, (dentibus a se 7-8 mm. remotis latere superiore 1½ mm. longis latere inferiore 6-7 mm. longis ascendens brevissimis ad summum aristis 1½ mm. longis instructis), a medio ad basin subintegra sed remotissime aristata, (aristis a se 1-3 cm. remotis), chartacea, (supra costis venisque distincte impressis, subtus distincte prominenteque elevatis, venulis subtus transverse tenuissime reticulatis elevatis supra haud vel vix visis, venis primariis lateralibus utroque latere costis 9 rectis ad apicem dentium attingentibus a costa angulo 35° egressis), basi subtrinaria supra subglabra subtus ad costas et venas tenuiter longeque barbata, barbibus adpressis, petiolis

1Jcm.longis gracilibus subteietibus dense hirsutis. Spicsa subovatse 2Jem. longse 2 em. laise; pedunculis in parte inferiore 5-6 nodosis ad nodos bracteatis et articulatis 1 cm. longis dense villosis bracteis basilaribus sterilibiis imbricatis alabastmm spicse complete involventibus, inferioribus sterilibiis minoribus, mediis sterilibiis majoribus, superioribus (in pedunculo) sterilibiis gradatim minoribus ad bracteam fertilem abeuntibus, bracteis mediis (in pediinculo) ovatis valde conc&vis 1J-2 cm. longis 1} mm. latis apice acuto-obtusis, basi obtusis circ. 5-nerviis basin spic» amplectantibus extus dense villosis intus tenuiter hirsutis. Pars florifera spieffl 2 cm. longa villosa densissime ilorata, bracteis (fertilibus) sub flore uno singulis late ovatis inferioribus 8 mm. longis totiusque latis apice triangularibus obtusis basi obtusis valde concavis florem semi-amplectantibus extus intusque dense villosis margine subintegris, bracteolis sub flore singulo duabus ovato-linearibus ± falcatis concavis 4 mm. longis 2 mm. latis apice basique obtusissimis extus dense intus tenuiter villosis. Calycis tubus late tubuloso-campanulatus 2 mm. longus 2& mm. latus extus tenuiter subpilosus (pilis simplicibus vel fasciculatis) vel subglaber, ore brevissime 5-dentatus, dentibus latissime brevissime triangularibus vel obsoletis vel semirobundatis J mm. longis totiusque latis barbatis. Petala 5 ad orem calycis affixa cum dentibus calycis alterna spathulata 4^ cm. longa 1&mm. lata sursum obovata deorsum linearia, parte obovata 1j-mm. longa minus lata, parte lineari 3 mm. longa §-J mm. lata, basi { mm. lata, utraque glaberrima. Stamina 5 erecta recta exserta cum petalis alterna ad orem calycis inserta, filamentis linearibus valde complanatis 1 mm. latis 7mm. longis sursum gradatim angustioribus, antheris quadrangularibus 1 mm. longis minus latis subrectangularibus cum filamentis toto glabris. Glandules 5 clavatocomplanatae cum staminibus altern® 1 mm. longse g mm. latse apice ±: dilatate ad centrum impressse. Ovarium fere inferius vel semi-inferius 2-loculare, loculis 1-ovulatis, ovulis ad summum placentae pendulis anatropis raphis ventralibus. Styli 2 a basi distincti 6 mm. longi teretes basi dilatati ad ovarium abeuntes, sursum latere prof unde sulcati prope summum muricato-tuberculati, sursum ± tortuosi.

HAB. Shinshikei, ad 3000 ped. alt., leg. TAYEMON ITO, Jan. 1913.

Near *Corylopsis Veitchiana* BEAN (Bot. Mag. t. 8349), but differs from it in

the very much larger bracts, much narrower petals and in many other points; and from all other known species, this differs by the very narrow spatulate petals and ovate spikes and nearly truncate calyx.

## Passifloreee.

### *Modecca* LAM.

**Modecca formosana** HAYATA sp. nov. = *Adenia formosana* HAYATA. Herba volubilis validiuscula. Caulis teres glaber cavus in exsiccato longitudinaliter rugulosus. Folia alterna petiolata palmatim 3-fida in circumscriptione pentagona maxima 11cm. lata totiusque longa profunde 3-fida rarius 5-fida 3-nervia rarius 5-nervia, (nervis subrectis vel arcuato-divaricatis ad apicem segmentorum attingentibus a se angulo 45° divaricatis a basi usque 5 mm. altum se conuatis), basi late truncata, parte truncata 6 cm. lata ad extremitatem subito attenuata, parte attenuata 3 mm. longa totiusque lata basi utroque latera auriculiforme cordata, auriculis supra in exsiccato rugosissimis, subtus ad centrum glandulis rotundatis subplanis 1 mm. in diametro instructis; nervis segmentorum lateralium excentricis, in basi 4 mm. a margine interiore distantibus basi a margine exteriori 12 mm. distantibus; segmentis lateralibus ± interiora falcato-divaricatis linearibus, segmento centrali subrecto lineari vel lanceolato vel lineari-lanceolato chartaceo 10 cm. longo 22 mm. lato apice acuminato basi vix vel haud angustiore in argine integro utraque glabro, costis venis venis utraque pagine elevatis, venis lateralibus primariis manifestos 8 a costa angulo 70° egressis; sinibus inter segmenta obtusissimis, sub sinu subtus glandulis minimis unis sitis; glandulis flavescens punctiformibus, patulis circ. 2 cm. longis vel brevioribus subteretibus vel subtetragonis supra et utroque latere tenuiter sulcatis basi vix vel haud dilatatis glabris, stipulis fere obsoletis vel minutis late cuspidato-triangularibus 1 mm. longis; cirrhis simplicibus axillaribus 10 cm. longis deorsum teretibus supra medium 2-3-bracteatis (bracteis minutis) sursum dorso complanatis. Bacemi axillares 1-2-florati longe pedunculati, pedunculis 3-6 cm. longis glabris teretibus supra medium floras singulos vel geminos lateraliter gerantibus, supra partem floriferam elongatis et cirrhos simplices complanatos abeuntibus, bracteis sub basi pedicellis floris singulis triangulari-acuminatis 2 mm. longis 1 } mm. latis margine remote vel

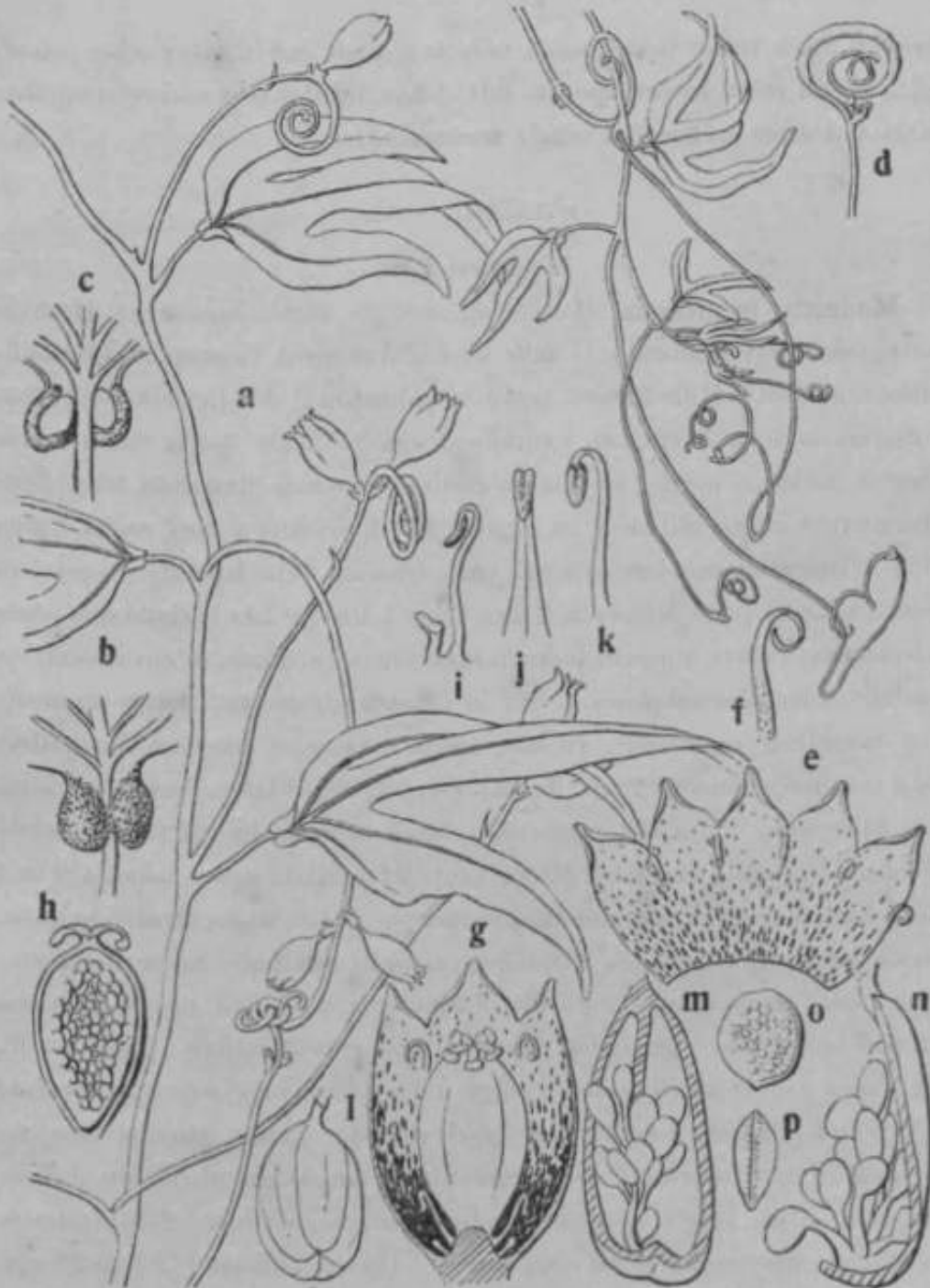


Fig. 1, *Mbdeow fltrm Mana* HAYATA; a, the plant; b, Imsul portion of it lonf. titowii glands, won bom above; a, tlw xiimn, KWH from l>elow; d, u ivudril; e, nily.t of it female flower, px|mnd<l; f, o jMitil; g. (Hi "Miry; li, the snnio, in vitrtifal s<-i<ti<sin; i, A staminolo with a glandule; j, ftitother BtamiroxVt; k, tfi. nme, seen from aide; l, n frnit; nt, a valve of the same; n, Uio wimo, seen from side; o, n soc.l; p, the same, sectt from ride; u, in anl a x }; l, mtu-li rtylik<tl; otlmnj vnrioiudy mngntfiod.

oliolate drnt fciilatis, bracteolis sill) pedicetlo scugno duabus mimitis trinnglari-  
:iciitis £ mm. longis, pedicallis infra medium arteulatis 3-4 mm. longis teretibus  
glabris. Floies iinisexnales. Fl. J: calyx fnsiforme trrbinahis vel tiibiformis  
utriuque contraehis vel apice semk'lausus crassus 10-12 mm. loogus G-7 mm.

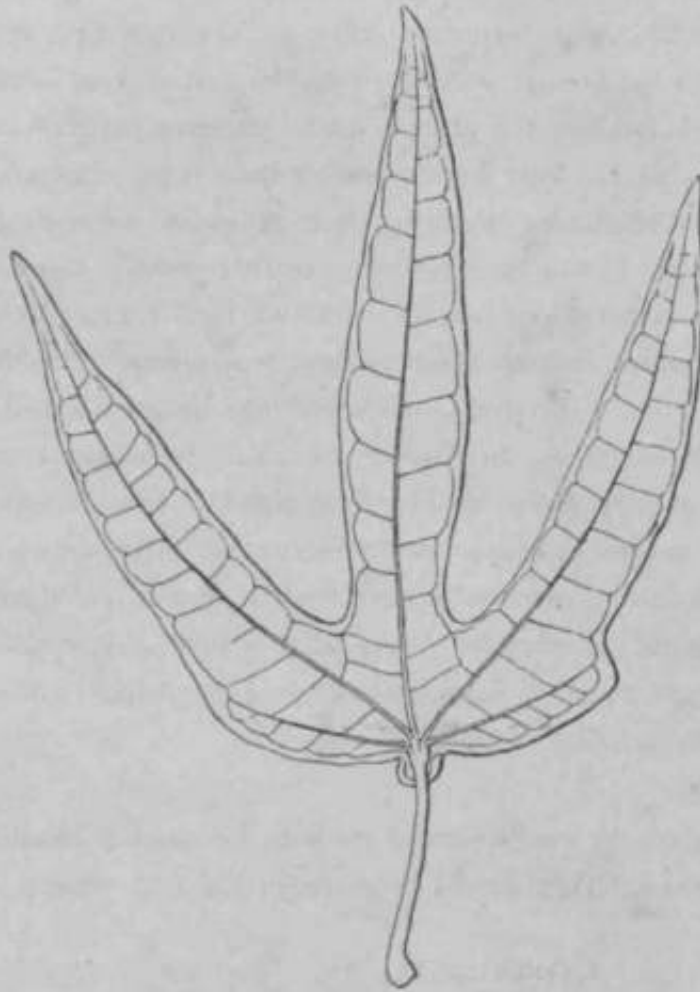


Fig. 2, *Modecca formosana* BAYATA ; A leaf, seen from  
below; natural size.

latiis facie 5-sulcahis  
inter snlcos impressim  
1-sti'tatus apioe 5-  
lobatus (lobia trian-  
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I mlycis iuserta 4 mm. longa, filamontis basi counatis 2} mm. longis doreo  
complaimtis basi ti'iaiigilali'i-dilatfttLs Luist 1 mm, ktis, glabris, antheris basifixis

ovato-lanceolatis 2j mm. longis minus 1mm. latis apice acuminatis apiculatis basi latioribus cordatis. Rudimentum ovarii filamentis firme involucratum cylindricum 2 mm. longum Jmm. latum plurisulcatum infra apicem  $\pm$  contractum. EL ? : calyces petalaeque ut floris masculini; glandulse breviores quam iis floris masculini. Staminodia triangulari-lineararia 2£ mm. longa basi triangulari-dilatata 1 mm. lata apice obscure antlieriformia. Ovarium stipitatum oblongo-ovoideum stylis stipitibusque exceptis 5 mm. longum 3J mm. latum glabrum 4-5-carpellare 1-loculare 4-5-placentiferum, placentis parietalibus, stylo brevissimo £ mm. longo 4-5-lobo, lobis patento-reflexis dorso complanatis £ mm. longis totiusque latis apice stigmatate peltato rotundato ad centrum depresso terminatis, stipite  $V_s$  mm. longo validissimo glabro tereti. Capsula pendula vel cernua stipitata longe pedunculata obovoidea C cm. longa 4£ cm. lata aptee depressa in sectione verticali apice cordata basi obtusa rotundata extus nitida flava usque rubra 4-5-valvata, valvis coriaceis lineari-lanceolatis utrinque obtusis intus albescentibus. Semina oo rotundata valde compressa  $\pm$  angulata exocarpio membranaceo semi-liyalino obtecta, testa tenuiter coriaceo-crustacea extus remote grosseque impresso-punctata intus muricato-elevata, muricibus prominentibus obtusis trabeculiformibus, funiculis elongatis linearibus circ. 1 cm. longis complanatis 1 mm. latis, arillis campanulato-cupuliformibus 2 mm. longis 4 mm. in diametro basin seminum amplexantibus membranaceis margine irregulariter denticulatis.

HAB. Formosa.

I have lost a label given by a collector and my note mentioning affinities and localities of this species. They should be given in the next volume.

## Cornaeae.

*Cornus* LINN.

**Cornus longipetiolata** HAYATA sp. nov. Arbor? Ramuli glabri subsoves lenticellis minutis subalbis notati. Folia alterna approximata sita longissime  $x^{01}$  ovato-oblonga vel rhomboideo-oblonga 5-10 cm. longa 3 J-7 cm. lata apice breve acuminata vel cuspidato-acuta basi rotundata obtusa cuneato-acuta chartacea margine integra sed sub lente minute denticulata supra viridia hand nitida subtus glaucissima subalba, costis venis venulisque

tenuissime impressis subtus prominente distincteque elevatis, venis lateralibus primariis utroque latere costae 5-7 angulo acuto vel obtuso a costa egressis, venulis transverse reticulatis, petiolis longissimis gracilibus 3-9 cm. longis laminam equantibus vel superantibus subtus dorso complanato-semiteretibus supra intus hand sulcatis planis basi vix dilatatis. Cynue 8 cm. longae 10 cm. latffi, floribus ignotis.

HAB. Toyencho: Shibutsuke, in montibus circ. 3000 ped. alt.; leg. I. TANAKA, NOV. 1913.

Near *Comus coniroversa* HEMSL (= *Cornus 7naerqphytta* MATSUM: Ind. \>. 446), but differs from it in having very much longer petioles and leaves with depressed veins and veinlets on the upper surface. I am a little too bold in treating this plant as a new with such an imperfect specimen. Still the very much longer petioles and impressed veins and veinlets on the upper surface of the leaves are so remarkable that it is quite sufficient to recognize the plant as distinct from other species.

## Caprifoliaceae.

### *Viburnum* LINX.

***Viburnum arboricolum*** HAYATA sp. nov. Frntex 5 m. altus vel altior, in trunco arboris crescens vel terrestris. Kami cinerascens vel ± fulvescentes lenticellis minutis notati longitudinaliter rugosi. Folia opposita oblonga lanceolata vel oblongo-lanceolata maxima 17 cm. longa 8 cm. lata apice breve cuspidata, cuspidibus 1 cm. longis Smm. latis ad summum obtusis, vel simpliciter obtusa coriacea glabra supra (in vivo) non nitida opaca viridia subtus X)allidiora l)asi cuneato-acuta margine a msdio sursum dentato-sarrata, (S9rris ;iscendentibus a se 7 mm. remotis apica interiore racurvis latara superiores 2 mm. longis latere inferiore 13 mm. longis), deorsum usque ad basin integrum, costis supm planis vel tenuiter elevatis subtus prominente elevatis, venis lateralibus primariis uti'oque latere costse 7-8, mediis angulo 60° a costa egressis d= ai-cuatis prope marginem evanescentibus, venis secundariis transversis transverse reticulatis, venis latemlibus supra tanuiter sed distincte impressis, subtus distincte elevatis, venulis supra non visis subtus distincte visis, petiolis 2 cm. longis. Cymaa terminates pyramidales in circumscriptione 15 cm. lougro

totiusque latse, (pedunculis 5 cm. longis), verticillatim 2-superpositim ramosse, ramis inferioribus rectangulare patentibus 7 cm. longis, ramis superioribus gradatim brevioribus, ramulis rectangulare patentibus stellato-pilosis, bracteis triangularibus lanceoaktis 1 mm. longis stellato-pilosis apice obtusis. Flores campannlati 7 mm. longi 6 mm. lati. Calycis tubus basi cum pedicellis articlatus 2mm. longus cylindricus 1mm. latus glaber, limbo 1mm. longo campanulato-patenti late 5-dentato, dentibus late triangularibus minus 1 mm. longis 1 Jmm. latis apice acutis vel breve cuspidato-acutis. Corolla cyUndrico-campanulata utraque glabra 5 mm. longa, tubo 3 mm. longo totiusque lato, lobis late cordato-rotundatis 2 mm. longis totiusque latis apice rotundatis basi cordatis, partibus cordatis imbricatis margine integris vel obscure crenulatis. Stamina 5 ad faucem coroUse tubi affixa. Stylus validus basi conicus apice clavatus 3-sulcatus. Drupa ellipsoidea 8 mm. longa 4} mm. lata apice reliquis calycis loborum et styli coronata 1-sperma. Putamen semi-eUipsoideum, in sectione rotundatum 7-8 mm. longum 4 mm. latum, dorso acute 2-costatum latere acute angulatum facie profunde sulcatum vel excavatum.

HAB. Mt. Arisan: Funkiko, ad 6000 ped. alt.; in trancos arborum crescens, leg. B. HAYATA et S. SASAKI, Jan. 1912. fl.; Rinkiho, leg. T. Dor, 1912, fr.

Near *V. odoratintmum* KER., but easily distinguishable by the deeper green lusterless leaves.

**Viburnum melanophyllum** HAYATA, sp. nov. Kami oppositi purpureo-fusco-cinerascentes, cortice longitudinaliter mgoso. Folia ut videntur decidua late ovata 5 cm. longa 3 cm. lata apice breve acuminata basi rotundata in exsiccato nigricantia supra ad costam et venas stellato-tomentosa, subtus ad costas venas venulasque dense stellato-tomentosa membranacea margine seiTulata, serrulis minutis 1 mm. longis totiusque latis apice aristato-acutis a se 1 mm. remotis, venis primariis lateralibus utroque latere costa) 9-10, mediis angulo 40° a costa egressis subrectis sursum ramosis, ramis rectis ad apicem serrularum attingentibus, supra tenuiter impressis, subtus costis venisque prominentibus, venis secundariistransversisminute transverse reticulatis elevatis, petiolis 15cm. longis. Cymro terminales a basi ramosse. vel ciespitosre dense tomentosse, basi cataphyllis 3-4 lanceolatis crassiusculis 2 mm. latis 1 cm. longis



obtusis instructis, 3 cm. longse totiusque late ramo<sup>399</sup>, bracteis lancaolatis censa stellato-tomentosis 5 mm. longis 1<sup>^</sup>mm. latis. Fl. steriles marginales: corolla rotato-patens irregiilaris 5-lobata, lobis in&qualibus majoribiis rotundatis 4 mm. in diametro. Fl. fertiles: calycis tubus suburceolatus vel truncato-obconicus subglaber 1 mm. longus -§ mm. latus, limbo 5-partito, partibus linearibus 1 mm. longis obtusis dense tomentosus. Corolla 5-lobata, lobis rotundato-oblongis. Stamina 5. Stylus ovoideo-coriaceus, stigmatē 3-lobato.

HAB. Mt. Takasan, 6000 ped. alt., leg. N. KONISHI, 1909, mart.

Near *V. furccdum* BLUME.

**Viburnum propinquum** HEMSL. Ind. Fl. Sin I. p. 355. Kami teretes oppositi fusco-rubescens lenticellis rotundatis notati. Folia opposita ovata ovoto-oblonga 9cm.longa 4Jem.lata apice acuta vel triangulari-acuta basi late acuta vel obtuso-acuta coriacea vel coriaceo-chartacea utraque glabra margine remote semdata, serrulis brevissimis ad mucronem reductis £mm. longis a se 9 mm. remotis, prope basin integra trinervia, nervis lateralibus a basi folii 5 mm. remotis arcuatis, nervis supra impressis subtus prorainentibus, venis primariis lateralibus transversis venulis reticulatis supra impressis subtus teuiiiter distinctis, petiolis 1 } cm. longis intus sulcatis glabris. Cymse terminales 6 cm. long© 4 } cm. lataa umbellatim ramose, pedunculis 2 cm. longis, bracteis ovatis minutis caducissimis, pulvinis sub bractea elevatis, ramis primariis (radiis umbellarum) 7, 2 cm. longis, ramis secundariis 5-6, 8 mm. longis, ramis tertianis (pedicellis) 3-4, 2-4 mm. longis breve hirsutis. Flores rotato-patentes 4 mm. in diametro 3 mm. longi. Calycis tubus 1mm. longus, limbo campanulato-patenti circ. 1 mm.longo 5-lobato, lobis triangularibus apice obtusis £ mm. longis 1 mm. latis. Corolla campanulato-rotata, tubo 1mm.longo 5-lobato intus hh'suto et glanduloso-piloso, pilis clavatis glandulosis brevissimis, lobis oblongis 1 } mm. longis apice rotundatis basi haud contractis extus glabris intus prope basin hirsutis margine integris exteriore ±: recurvis. Stamir ad 1<sup>^</sup>in tubi corollfe affixa, filamentis 1j mm. longis linearibus api >centibus, venis s<sup>^</sup>.\*UiDticis dorsifixis. Ov<sup>^</sup>arium inferius, stylo conico c <sup>^</sup>lls sllP<sup>llft</sup> tenuiter sed distincte 1m,

HAB. Mt. Nantan, leg. U. <sup>m u o n v<sup>^</sup>s<sup>^</sup>s</sup> subtus distincte visis, petiolis xmidalas in circumscriptione 15 cm. loiiigoe

## Ericaceae.

*Rhododendron* Lim

**Rhododendron** (*Cfionastrum*) Tanakai HAYATA sp. nov. Fmtex 3m. altus, in sasa ± snbscaixdens, Rarauli graciles teretes, oortice mbvo-cinerascnti longitndinalitor fisso et soluto, cicatrii-ibn\* eataplyllamm transverse lineavilms 3 mm. latis ^ mm. lougia remote not&ti, ad lamificatiouam eieatricibns semirobundatis foliomm verticillatim notatr, usque ad ramificationem recti vel it recurvi siilxlichotome ramosi surstim 3 mm. in diametro. Folia ad summurn <ramnlonuu vertieillatim sita coriacea supra atiu-vinMia improsae reticiilafei subtus pallida ovato-oblouga 10-15 cm. longa 4 £-5 cm. lata apica **aonto-**acumtnata ad summum obtusinscula basi rotuudata ad exti-emitatem snbtit breveqne attenuata ad petiolum aboiuitia IKISI ± obliqiaa vol interduin aruto-acuminata margin(! iuttigm sub]>Iatia ± tenuiter desuper **caeorvft** iiti-aqtiB l>agine liaud nitida, irostis vonis vemilisque supra impressis, eostis subtiiR prominente elcvatis validinsetilis basi 2 mm, latis, venis Litoralibtis uh'nque latere costae 10-12 grouillintis subtus **tesiniSBuaa** olovatis rectis augulo 70<sup>3</sup> a **eosta** egressia pivpe marginem reticulatim ramosis et evauesoentibtis, venulis tsnuis-simis tenuLSSime elovatis distincte visis, utraque jmgine glabiii, pftiolis 2 cm. luugia semi-teretibus Riipra plants madio **tannibor** snlcatis subtus couvexis apica ± suljalatis vel liaud alatis bagi vix dilatatis in exsiecati> fiisco-nigii-cautibus. Gonunsa florum ad apiceni ratnulornm circa gomraam foliornm verticillatim 3-4-5 sitfe, 1-Sorataj clongato-oblongfo vtsl oblongo-fosiformas 1 cm. longs 14 mm. latto utraque extremitate ybtusse, perulis oo seariosis, baaiUribus yxtimis miuutLs ti-inngulitri-uvntts 4mm.longis totiiwquo latis apice obtusLs basi ± contractis ad iusertiouem ^ -formibus, **ia&rioribns** interioribua giadatim loiigioribus, int<jrioribus supartoribus longissimis ob^vato-spathulatis 3 cm. longis 13 mm. latis apica late **fcritttnlaribus** obtusis 1 >:i' lougt) attonuatis margino integris interior.) i-dciuviv sar^am in\*- " plus oxtus minus sericea-pubdsctutibua deorsum glal, mlato-liueiu-ibas longissimis 33 mm. longis s, snpiiii temutti tim augiistioribus ad liasiu 1 m- atibus, venis sGendariistransversisii l >etioLs 15 era, longis. Cymffi tenmnales a post anthesiu caducissimis. tomontosp, IMISI wiraplyllis 3-4 laneolatis

Floras apertientes campanulato-infundibuliformes 5 cm. longi albi vel leviter albo-purpurascens, pedicellis brevioribus glabris 5 mm, longis teretibus, viridibus. Calyx viridis 5-lobatus, lobis patentibus late triangulari-semi-rotundatis, ~-formiter recurvis, i. e. basi deorsum apice sursum recurvis, -J mm. longis 1½ mm. latis apice late rotundatis margine pectinato-ciliolatis, ciliolis glandulosis, utraque facie glabris. Corolla campanulato-infundibuliformis 5 cm. longa 6 cm. lata, tubo 18 mm. longo basi 4 mm. lato apice usque ad 11 mm. latum dilatato, limbo 5-partito-lobato prope basin lobi superi maculato-punctato, maculis flavescens, lobis obovato-oblongis 33 mm. longis 25 mm. latis apice rotundatis vel ad centrum tenuiter retusis vel haud retusis margine crenulatis dz undulatis multinervis longitudinaliter reticulato-venulosis, utraque pngine glabra sed prope basin corolla) tubi interiore tenuissime hirsuta. Stamina 10 in longitudine variabilissima, longfesimum 4 cm. longum brevissimum 28 mm. longum, filamentis filiformibus complanatis usque 1 mm. latis sursum minus latis supra basin usque ad infra medium hirsutis c&terum glabris, antlieris versatiliter dorsifixis obovato-rectangularibus 3 mm. longis 2 mm. latis apice truncatis breve 2-lobatis 2-porosis (poris it: oblique terminalibus circ. 1 mm. in diametro) basi retusis, loculis apice truncatis basi obtusis tenuiter brevissime 2-lobulatis, connectivis apice haud productis basi brevissime productis ad summum extremitatem retusis. Ovarium viride cj-lindricum it declinatum 9 mm. longum basi 3 mm. latum apice 2 mm. latum apice truncatum basi haud contractum 5-lobatum 5-sulcatum, stylo declinato ~-formiter recurvo 3j-4cm. longo glabro circ. 1mm. in diametro sectionis apice vix dilatatis infra stigma 3 mm. in diametro. Stigma viride 5-partitum in partem apicalem styli cupuliformem insitum, partibus cuneiformibus 1}mra. longis upice truncatis. Disci annuliformes sub ovario siti margine remote denticulati, denticulis \$ mm. longis rectangularibus apice truncatis a se £ mm. remotis, sinibus inter denticulos rotundatis. Capsula ignota.

HAB. Mt. Arisan: inter Karapin et Suisharyō, ad 3000 ped. alt., leg. B. HAYATA et I. TANAKA, 1913, Aprili. (fl.).

Near *R. eUipticum* MAXIM, and *R. leiopodum* HAYATA, but separable from them by the larger darker green leaves, nearly white flowers, very much shorter pedicels, and especially by the pectinately ciliate calyx-lobes. The

plant seems to be rather rare- We could find the tree only once in the Arisan ranges, during our journey through the mountains. It is a dwarf shrub nearly 2-3 m. high, sending the branches downwards along the rocks where it stands.

*Moneses* SALISB.

**Moneses rhombifolia** A. AKDBES Piroleen-Studien, in Verb. Bē\*. V «. Prov. Brand. LYL (1914), pp. 23 et 69.

*ChimxpMla rhmtydia* HAYATA IC. PL Formos. H. (1912) p. 119, t. XVI.

## Diapensiaceae.

*Shortia* TOER. et GM.

**Shortia ritoensis** HAYATA Sp. nov. *S/uniiopsis ritoerws* HAYATA in Sched. Herb. Mus. Taihoku. Rhkoma erectum validiusculum. Folia cum in radicalia coriacea longe petiolata, lamina ovato-oblonga vel oblonga ± rectangulariformi 15mm. longa 13 nun. late apice obtusissima ad centrum imicronata basi fere truncata ad basin subito ad petiolum attenuata ntraque glaberxima concolora mai-giue partibus prope apicem basinque exceptis serris utroque latere margine 6-7 a se 2 mm. x^emotis transverse ascendentibus late triangularibus apice ascendentibus 1J-2 mm. latis f-1 mm. longa obtusis ad summum mucronibus brevissimis coronatis, margine crasso-marginata basi apiceque subintegra, costis venisque supra tenuiter elevatis snbtus costis prominente elevatis venis planis, venis lateralibus nboque latere cost\* 4 sitectis apice obscuris ad apicem serrarum obscure attingentibus a costa angulo &P-70<sup>3</sup> egressis, venulis non distinctis sub luce transvex-sa vfcus reticulatis, petiolis gracilibus cum laminis foliomm desuper arcuatis ad terrain attingentibus 23-25 mm. longis subalatis supra profunde sulcatis subtus costatis lasi ± dilatatis. Scapi cum foliis ffiquilongi erecti terminales, basi bracteis basilaribus (vel cataphyuis) 3-4-verticillatis instructi, bracteis basilaribus lanceolatis 8 mm. longis 2 mm. latis concavis margine interiore recurvo-revolutis apice acuminatis multinem, a supra basin usque ad prope apicem midī, prope apicem sub flore 1-2-bracteis superioribus instruct!, bracteis superioribus ovato-lanceolatis acuminatis 5 mm. longis valde concavis margine interiore revolutis. Flores ad apicem scapi solitarii; calycis lobi 5, 3-exterioribus ovati

5-6 mm. longi 3-4 mm. lati apice acuti ad summum submucronati basi liaud vel viz contracti 2-interiores elliptici 5 mm. longi 2-3 mm. lati apice rotundati vel obtusissimi ad summum retusi vel brevissime 2-lobati ad centrum sinus brevissime mucronati basi contracti rotundati 1 mm. lati margine prope apicem minute denticulati ceterum integri intus plani extus medio tenuiter costati (costis basi triangulari-dilatatis), multinervii. Corolla (alba?) campanulata 7 mm. longa 5-lobata extus intusque glabra, tubo 1-2 mm. longo, lobis cuneato obovatis 6 mm. longis 4 mm. latis apice rotundatis basi late cuneatis sed vix angustatis apice 3-5-lobato-dentatis, dentibus triangularibus 1 mm. latis totiusque longis apice obtusis vel acutis interdum obtusissimis latere margine integris basi vix contractis pinnivenis, venis latelaribus utroque latere 2-3, venis ad apicem dentium attingentibus, sinibus inter lobos obtusissimis. Stamina 5 cum lobis corollae alterna, filamentis validiusculis basi ad tubum corollae usque ad sinus inter lobos corollae adnatis, partibus liberis 1-2 mm. longis 1-2 mm. latis valde complanatis ad basin utroque latere appendiculatis, appendiculis mucroniformibus 1-2 mm. longis, antheris cordatis 1-2 mm. longis 1-2 mm. latis apice emarginatis basi cordatis bilobatis intus 2-lobatis extus 2-lobatis dorsifixis, apicibus filamentorum vel connectivis dorso latioribus. Ovarium late globosum 1-2 mm. longum 1-2 mm. latum apice plano-depressum tenuiter 3-lobatum vel obscure vel haud lobatum glabrum, stylo columniformi tereti 2-3 mm. longo apice truncato tenuiter 3-lobato. Capsula ovato-globosa 3 mm. longa loculicide dehiscens, valvis a placenta solutis, stylo non partito. Semina oo rubra scobiformia ellipsoidea angulata 1/2 mm. longa, testa elegante reticulata. Staminodia nulla.

HAB. Mt. Eitōzan, by T. KAWAKAMI, Juli. 1913.

Resembles *Shortiopsis\* empendiculata* HAYATA (= *Stortia empendiculata* HAYATA IC. Pl. Formos. III. p. 147) in having nearly sessile anthers, not divided styles of the capsules and in the absence of the staminodes; but differs from it by the far much smaller leaves with different dentation, by the smaller flowers, very short broader complanate filaments with appendiculas on both sides and by the differently shaped anthers.

## Orobancheeae.

*Boschnia* Ma C. A. MEY.

**Boschniokia Kawakamii** HAYATA sp. nov. Parasitus ad radices *Rhododendronis* sp. Volva ignota. Caulis 13-35 cm. longus teres 1½-2 cm. in diametro glaber basi squamis late triangularibus dense imbricatis obiectus, squamis sursum gradatim longioribus remotioribus in racemo ad bracteas abeuntibus, squamis superioribus infra partem floriferam caulis triangulari-lanceolatis 18 mm. longis 8 mm. latis coriaceis in exsicco valde fragilibus concavis apice obtusis vel obtusissimis basi haud contractis et dilatatis decurrentibus utraque facie glabris a se 1-1 Jem. remotis. Racemi floriferi ignoti. Racemi (partes caulium fructiferorum) 8-16 cm. longi cylindrici cum fructibus 3-3 Jem. lati, bracteis elongato-obovatis oblongo-obovatis 2 cm. longis circ. 1 cm. latis apice triangulari-obtusis basi vix angustioribus ± cuneato-angustatis vel haud angustioribus ad basin 6 mm. latis ± decurrentibus, bracteolis nullis, pedicellis 3-2 mm. longis 2 mm. latis subcomplanatis apice gradatim dilatatis ad calycem abeuntibus glabris. Calyx fructifer: tubi subnulli vel brevissimi, limbo subpatenti cum receptaculo 8 mm. in diametro 4 mm. in radio margine integro vel irregulariter 3-5 lobato, lobo postico longiore late obovato-oblongo 3 mm. longo totiusque lato apice truncato-obtuso basi vix angustiore, lobis lateralibus sub-oblongis cum lobis anterioribus 2 connatis, margine in totum totis minute denticulatis minute remote brevissimeque glanduloso-ciliolatis. Capsula ovoidea ± obliqua anteriore basi plus convexa posteriore minus convexa, inferior major 2 cm. longa 14 mm. lata apice triangulari-pyramidalis acuto-obtusa basi obtuso-rotundata sursum 3-gona 3-valvata, valvis ovato-triangularibus apice triangularibus ab apice usque ad medium solutis apice brevissime 2-fidis glabris. Semina complanata multi-angulariformia 1 mm. in diametro 1 mm. crassa radialiter reticulata, reticulis valde profuidis alvum simulantibus.

HAB. Mt. Morrison, ad 10000 ped. alt., leg. T. KAWAKAMI et S. SASAKI, Oct. 1909.

Very near *Boschniokia*, *Tiimalaica* HK. f. et TH., but differs from it by the very short fruit-bearing pedicels attaining 2 mm. in length, (in Himalayan

species it is 1/2 in. long), and by the irregularly lobate and minutely glandularly ciliolate calyx-limb. Capsule in this species is always regularly 3-valved, while in Himalayan species it is irregularly 2-3 valved.

## Laurineae.

### *Beilschmiedia* NEES.

***Beilschmiedia erithrophloia*** HAYATA sp. nov. Arbor, truncus erectus et rectus, cortice rubescenti variegato. Kami recti subternatim ramosi longitudinaliter rugulosi cicatricibus minutis elevatis notati. Folia tenuiter coriacea, in exsiccato costis et venis subrubescentibus, in vivo viridia supra nitida oblonga ovato-oblonga vel ovato-lanceolata 9 cm. longa 4 } cm. lata apice acuminata sed ad summura obtusissima vel simpliciter obtusa basi cuneato-acuta obtusa ad petiolum attenuata plus minus obliqua, costis rubescentibus supra subplanis vel tenuiter sulcatis subtus tenuiter elevatis, venis et venulisque utraque pagine distincte elevatis eleganter reticulatis, reticulis subtus plus distinctis, utraque pagine glaberrima margine integerrima sed ± repando-undulata, venis primariis utroque latere costae 5-6 arcuatis, petioli 1½-2 cm. longis semiteretibus et complanatis sursum intus planis deorsum sulcatis. Floras ignoti. Bacca obovoidea 2 cm. longa 12 mm. lata apice rotundata basi obtusa nigra nitida uni-sperma, pedicello haud incrassato.

HAB. Mt. Arisan, (3000 ped. usque ad 7000 ped. alt.), leg. R. KANEHIBA, I. TANAKA et B. HAYATA, Aprili., 1914.

One of the specimens of this species in my previous collections was brought to Kew by Mr. W. It. PRICE for comparison, and it was sent back to me with the following note. "Mr. GAMBLE identifies this as a species of *Beilschmiedia* NEES., but can not match. The venation and shape of buds separate it from *Cinnamomum*.—W. R. P. The tree is very common in the Arisan ranges. I found the tree bearing fruit in January, 1912, and also in April, 1914; but I could never see the flowers.

### *Cinnamomum* BLUME.

***Cinnamomum pseudo-Loureirii*** HAYATA sp. nov. Fructus pisiformis ellipsoideus 1 cm. longus 6 mm. latus, tubo calycis auctato late campanulato 3 mm. longo 4½ mm. lato, pedicellis 6 mm. longis.

HAB. Tōyen: Taiyaka, lej. I. TAMKA et S. NAKAI, Oct. 1912, fr.

Very near *Cinnammum Laureirii* NEES., but differs from it by the quite entire calyx. Full description should be given in the next volume.

## Cupuliferae.

### *Quercus* LINN.

**Quercus kodaihoensis** HAYATA sp. nov. (Tab. IV.) (*Pasania kodailwensis* HAYATA) Arbor. Kami fusco-cinerascentes lenticellis minutis rotundatis parce notati, ramulis et petiolis fusco-pubescentibus sulcato-angulatis. Folia oblonga obovata vel oblongo-ovata in magnitudine variabilissima, minora 8 cm. longa 3 cm. lata, maxima 14 cm. longa 6 cm. lata, apice cuspidato-acuminata basi cuneata vel obtusa margine sursum serrata, (serris ascendentibus a se 1-1 Jem. remotis latere superior 2 mm. longis latere inferiore 1-1J cm. longis), chartacea vel tenuiter coriacea supra (in exsiccato) viridia subtus plus minus pallida, costa supra impressa subtus elevata, venis primariis lateralibus supra impressis subtus elevatis utroque costae latere 8-9 mediis angulo 50 a costa egressis subtus distincte elevatis, petiolis 1-3 cm. longis, intus tenuiter sulcatis basi to valde tumidis. Cupula turbinata 1J cm. longa 3 cm. in diametro basi rotundata ore leviter contracta 17 mm. in diametro, extus lepidibus triangularibus cuspidatis dense imbricatis adnatis obtecta, (lepidibus inferioribus longe triangularibus 1 mm. longis 4 mm. latis apice cuspidatis, superioribus late triangularibus apice cuspidatis multo minoribus), intus cicatricibus glandum perfecte occupata partibus ultra cicatricem 3 mm. altis. Glans semi-globosa 2 cm. longa 28 mm. in diametro basi cupula complete involucrata (cicatrice convexa rotundata), apice subtruncata leviter convexa vel subplana exposita tenuiter sericeo-villosa ad centrum mucronato-apiculata.

HAB. Kagi: Kodaiho, Sankyakunanzan, leg. S. NAKAI, NOV. 1912.

Near *Q. KonisMi*, but differs from it by the much deeper cups, and by the truncated semi-globose glans. Also near *Quercus Gornei* in the shape of the cones, but differs in having far much smaller leaves.

**Quercus stenophylloides** HAYATA sp. nov., Arbor. Kami cinerei longitudinaliter rugulosi, cicatricibus minutis remote notati. Folia coriacea ovato-oblonga vel ovato-lanceolata 9 cm. longa 3 cm. lata apice acuminata



rotundata obtusa vel acuta margine basi apiceque integra osetem aristato dentata, (dentibus 1 cm. a se remotis late brevissime triangularibus latere inferiore 1 cm. longis latere superiore 1 J mm. longis ascendentibus sursum  $\pm$  recurvis aristatis, aristis 1 mm. longis obtusis it superiore recurvis), supra nitida in exsicco subbrabescentia Tel subviridescencia subtus glaucissima, costis venisque supra tenuiter sulcatis vel planis, subtus costis prominente elevatis venis tenuiter sed distincte elevatis graffillimis, venis primariis lateralibus utroque latere cost\* 10-11 subrectis, mediis a costa angulo 45° egressis prope marginem subarcuatis ad apicem dentium attingentibus, venulis supra minute reticulatis subtus hand vel vixvisis, petiolis 1 Jem. longis gracillimis semiteretibus intus subplanis vel late sulcatis. Cupula prsDmatura obconica 8 mm. longa 11 mm. lata ore vix vel liaud contracta sessilis extus villosa, lepidibus (bracteis) connatis spiraliter 5-annulatis, annulis a se 2 mm. remotis margine denticulatis, denticulis truncatis dense villosis. Glans conico-globosa matura non visa.

HAB. Mt. Arisan, leg. K. UYEMATSU, 1912, Sept.

Near *Qiircus stenaphylla* MK.; but differs from it in having thicker leaves with different dentation.

## Coniferae.

### *Cephalotaxis* Zucc.

**Cephalotaxus Wilsoniana** HAYATA sp. nov. Ai-bor, ramulis rectis subglabris. Folia disticha spiraliter disposita linearia 4 cm. longa 3 mm. lata apice gradatim acuta basi obtuso-contracta supra in exsicco costa distincte prominenteque elevata subtus minus distincte elevato-plana, margine tenuissime desuper recurva, subtus inter marginem et costam glaucissima. Drupa ellipsoidea-vel obovato-ellipsoidea 18 mm. longa 10 mm. lata apice ncuta breve apiculata basi obtusa subsessilis.

*CepMotaxus 9p.* HAYATA Fl. Mont. Formos. p. 215.

HAB. Mt. Arisan, leg. K. UYEMATSU, (NO. 18) typus; Ganzan, leg. NAGASAWA, (NO. 568).

Very near *Cq>Motavus dmpacea* S. et Z., differing from it only by leaves with less acute (or nearly obtuse) aj^ex and narrower base.

## Hydrocharidae.

*Hydrocharis* LINN.*Hydrocharis asiatica* MIQ.

HAB. Kiwhim (Herb. Tattiokii).

## Orchideae-

*Oberonia lasni*.

*Oberonia arisanensis* HAYATA sp. nov. (Fig. 3, a-e, aud h.) Epiphyta pendubi. Caulis cum spicis 15 cm. Iougiis esepitosua, partibus foliatis inferioribus (i em. Ioiigis dense apprasimatim foliatis, **partitas** florifaris pendulis filiformilms 7 em. IougLs, imvti-

**bns fhtei** cam

Horifeiam et earn

foliatam 2-3em.

Imigis squainiforis,

Kqiamis Lmceclatis

**aotnninatis** 2 mm.

inngis. Foliaalteria

**distioha** approsi-

mata in exasbctn

**oodaoea** in vivo

crassiuscula im-

**bricata** semi-ob-

longa ecjnitautia

latere compressa

plana 1J-2 cm.

longa 5 mm. lata apico obtusa vel ad summiun apicolata basi ad vaginam

abeiuitia liatid ailiculatn, mai'gine **inferioie** i»cta, margine superioris ---formiter

i-ecurva, vagiuis s« imbricatis. Spicse 7 cm. longro, rhachibus filiformibas,

floiibus verticilLitim ttggi^gatimque ad noclos sitis, nodiia a se 1-2 mm.

l'emotis, bracteis ovato-lancoolatis 1^ mm. Iougis | mm. latis apice acmnut i B

maigie obscutj erosis, podicellis eiim ovarE<sup>1</sup>\* 1 mm. Ioiigis. Sepalum

posticum oblouguru 1 mm. Iongum § mm. lattim snmtim coneavum v(rsus



Fig. 8j n. b, 0, tl, <\*, h. *Oberonia tirvintitxl*\* HAYATA; a, n dorsal sopal; fa, n Intend sepal; .c, u petal; d, it lip; c, n wliunn; h, A pollinium; (, g, *Obmmia fonwsnnn* HAYATA; g, a lip; f, » column, seen from front; i-k, *Gberani/i ktumkumvtis* HAYATA; i, u lip; j, a column, »ccn from front; k, the same, seen from side.

apicem interiore WKHrvnm breve euspitlntmn, **pastbos** conspdafcis **intedore** iucurvis, margine integrum; sepala **lateraEft** ovato-triangularia basi **latiaaima** 1 ram. longa J mm. lata apice acuta basi hand contracta concava. Petala oblonga 1 mm. loiiga 4 mm. lata **npiea** obtusa **bad band** conti-acta marglno eIOSH. Ijal^llum mliesens, Jiucuiwt'urme 1J mm. longiim fajtiusqne latiim alt>> **tribbom**, **bbia** hasikribns (latemlibasi **obloiigia** ^ mm. longis apico obtnsissimis basi vrs conti-actis margiue erasofimlnintis vel erosis, lolx> termijiili rectangiilari 1mm.longo - | m lato **ajaoe** <sup>k2-lolx</sup>), lobis obloiigo-triaiiguliLribus ^ mm. longis totingue latis apico **acatds**, siuibtis **inter** IOIXJS trncatis **taterdnm** lobulo siugulo brevissimo ad ceutnun iustnictis. Lubellmi] bnsi *d*: sacwitiiti impi-essiu.

Columna brevissima

HVB. **Aiaan**: inter Tai-oyen ot Fankiko, circ. 6000 p.:l. all., **ftg.** B. HAYATA et T. ITO, Mart. 1914, (fl.).

Near 0. **hmtoaem** HAYATA, **but difisra** from it by the very- short columns and nmeli large\*<sup>1</sup> lips. **Alao** near **0-formo&sna** HAYATA, bnt easily (listingiisliabla by the lai^er loa<sup>1</sup>\*es.

**Oberonia bilobatolabella** ILVYATA sp. nor. (Fig. 4.) **Epiphyte** oMspitosa peiidnla. Canlis cum mcexnis 15 cm, longus, partibiifi iufeiuribus fliosio 6-7 cm. longis, partibus **flosrifedB** 8 cm. longis iilifonuibns, partibus

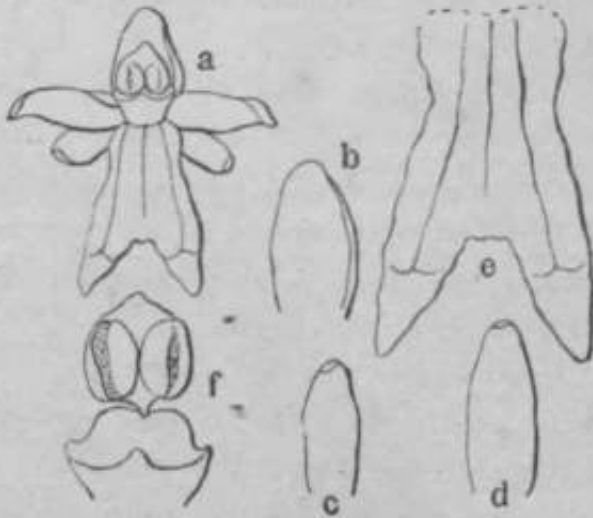


Fig. 4, *Oberonia bilobatolabella* HAYATA; H, n flower; b, n il-iMul Btijiil; c, ii lnlnrl stjui!; d, » (wtnl; C, ft lijj; f, n ix>liiran, nthor lx-iiifi it tittle lift ml.

caulis inter foliatam et flori-feram 2-3 cm. longis **sabnodie** vel paucissime squamatis, squamis 1-2 lauceoktis 1 cm, longis snl>equitautiba8. Folia (iquitautia latere eompresa complaiiata emssiuscnla somi-**oblongo-Imearia** ciiv. 3 cm. **looga** 3 mm. Lita apice **obtaao**-acuta l«isi uon **ootraeta** cum vagiis artictilrta margine siqwriore nwta margiue in-<sup>TMriore</sup> ^ -tormiter **raorva** in **EOKScto** COriacea, **vaginiis**

tenuibus rhomboideis alternis imbricatis circ. 1 cm. longis. Racemi 5-8 cm. longi 8 mm. lati penduli, rhachibus pentagonis  $\sphericalangle$ -formibus filiformibus tenuibus, floribus ad nodos subverticillatim aggregatim sitis, uodis a se circ. 5 mm. remotis, bracteis singulis sub flore uno sitis ovato-triangularibus 1 | mm. longis circ. 1 mm. latis apice obtusis basi liaud vel vix contractis margine irregulariter eroso-denticulatis, pedicellis cum ovariiis 2 mm. longis. Flores circ. 3 mm. longi, sepalis petalisque retrorsum reflexis, labello antice patenti. Sepalum posticum rotundato-ovatum minus 1 mm. longum § mm. latum, apice obtusum basi contractum, lateralia ovato-triangularia valde concava 1 mm. longa 1 mm. lata apice obtusa basi haud contracta. Fetala lineari-oblonga plus 1 mm. longa minus J mm. plus § mm. lata apice obtusissima basi vix contracta. Labellum in circumscriptione rectangulare plus 2 mm. longum plus 1 mm. latum planum basi \ mm. latum 2-nervium basi utroque latere auriculis minutis £ mm. latis semi-rotundatis instructum, supra medium 2-lobatum, lobis oblongo-triangularibus circ. 1 mm. longis plus J mm. latis apice acutis basi liaud contractis, sinibus inter lobos truncatis £ mm. latis. Columna brevissima 1 mm. longa 1 mm. lata.

HAB. Arisan, leg B. HAYATA et S. SASAKI, Jan. 1912.

Near *Oberonia arisanensis* HAYATA, but differs from it by the much larger flowers with nearly obsolete or, if at all, very much smaller lateral lobes of the lips and by the distinctly articulated leaves.

**Oberonia formosana** HAYATA (Fig. 3, f, g), Mater. Fl. Formos. p. 309. Epiphyta cespitosa, caulibus simplicibus vel rarius pauciramosis 3-5 cm. longis toto longitudine foliatis. Folia distichia sessilia alterna approximate equitanta verticaliter compressa lineari-lanceolata 22 mm. longa 2 J mm. lata apice aristato-acuta margine integra basi latere inferiore recta superiore ^-formiter curva vaginosa caulem amplectantia crassiuscula. Spicsa terminales cum pedunculis 8 cm. longse cernuae, floribus minutis 1 mm. in diametro, secus rachin interrupte fasciculatim dense sitis, bracteis ovato-acuminatis 1 mm. longis reflexo-patentibus. Sepala lateralia late ovata basi conata 1 mm. longa totiusque lata obtuso-acuta patentissima, [X]sticum minus. Petala sepalo angustiora oblonga § mm. longa J mm. lata obtusa. Labellum sessile concavum rotundatum in circumscriptione -| mm. longum totiusque

latum 3-lobatum, lobo medio majore. apice tenuiter 3-lobulato obtuso, lobis lateralibus acutis brevioribus, basi minute callosum, callis rubris. Columna brevissima | mm. longa.

HAB. Nantō: Kandaizan. leg. T. KAWAKAMI et U. MOMI; Juni. 1907, (No. 3474).

Somewhat near *O. japonica* MAXD., but differs from it in having long lanceolate leaves which are as three times long as those of the Japanese plant; still nearer *O. Clarkei* in its habit and leaves, but differs from it by the lips with acute entire side-lobes which in *O. Clarkei* are fimbriate.

**Oberonia kusukusensis** HAYATA sp. nov. (Fig. 3, i-k.) Epiphyta, caespitosa scandula. Caulis cum spicis 10-15 cm. longus, partibus inferioribus foliatis 3 cm. longis, partibus floriferis circ. 10 cm. longis pendulis filiformibus, partibus caulium inter floriferam et foliatam minute squamiferis circ. 2 cm. longis, toto glaber. Folia non articulata approximata distichia alterna basi se imbricata lineari-semilanceolata media 2-3 cm. longa 5 cm. lata apice acuta vel subobtusata breve apiculata basi caulem amplectantia in exsiccato membranacea in vivo crassiuscula equitantia a latere compressa complanata a caule angulo 30°-50° egressa margine inferiore recta margine superiore rursus recurva, vaginis cum lamina continuis. Spicae 10 cm. longae filiformes, floribus ad nodos subverticillatim aggregatimque sitis, bracteis singulis sub flore uno sitis, nodis a se 2 mm. remotis bracteis triangulari-lanceolatis 1.5 mm. longis 1 mm. latis apice acuminatis, pedicellis 1 mm. longis, ovariiis 1 mm. longis. Flores apertientes 1.5 mm. in diametro; sepalum posticum obovato-oblongum | mm. longum circ. 1 mm. latum apice obtusissimum basi ± contractione margine obscure denticulatum vel integrum; sepala lateralia valde concava triangulari-oblonga 1.5 mm. longa basi latissima non contracta 1.5 mm. lata apice obtusa ad summum breve apiculata. Petala ovato-oblonga 1.5 mm. longa 1 mm. lata apice obtusissime vel truncate obtusa basi ± cuneato-contracta margine obscure eroso-denticulata. Labellum 3-lobum, circ. 1 mm. longum | mm. latum basi contractum, lobis basilaribus (lateralibus) oblique oblongis a lobo centrali angulo 45° divaricatis semiovatis apice cuspidato-acuminatis 1.5 mm. longis margine interiore rectis subintegris margine exteriori inferiore obscure eroso-denticulatis basi rotundatis ^>-foi\*miter i\*ecuiTis, lobo centrali (terminali)

oblongo-rectanglari -J-J mm. longo -J-J mm. lato sursum latiore basi ± contracto apice truncato-2-lobo, lobis triangularibus } mm. longis acutis, sinibus inter lobos lobulo singulo rotundato minuto instructis. Labellum basi obscure disciferum basi medio subsaccato-impressum. Columna brevissima £ mm. longa basi vaide constricta.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, Juni. 1912.

Near *O. arisanensis* HAYATA ; but differs from it by the very much smaller flowers with linear bracts -which nearly surpass the flowers in length.

### *Idparis* RICH.

***Liparis dolichopoda*** HAYATA sp. nov. (Tab. V.) = *Cestticlis didcluyphot.* HAYATA. Rhizoma in arborem repens teres 2 } mm. in diametro vaginis obtectum vel subnudum. Caulis cum racemis 23 cm. longus teres basi bulboso-dilatatus basi 13 mm. in diametro basi vaginis obtectus vel subnudus, vaginis 5 cm. longis apice acutis partem bulbosam caulis amplexantibus. Folia basi racemi vel apice caulis 2-3-4 alternatim congesta, basi a caule articulatim soluta lanceolata 14 cm. longa 2 cm. lata apice obtusa basi plus minus angustata basi ad articulationem 7 mm. lata in exsicco membranacea, venis parallelis utraque pagine elevatis. Racemi circ. 10 cm. longi cylindracei 2 cm. lati, pedicellis (cum ovariis) 5 mm. longis horizontaliter patentibus, bracteis lanceolatis acuminatis erectis 3 mm. longis, floribus a se 3-4 mm. remotis. Flores albescentes vel albo-virides. Sepala subroqualia oblonga 1.5 mm. longa 1 mm. lata apice obtusa basi non contracta sequilata. Petala linearia 3 mm. longa £ mm. lata apice obtusa basi sequilata £ mm. lata. Labellum plus minus crassum obovatum 3 mm. longum 2 mm. latum valde recurvum medio subito angustatum apice bilobum, sursum prope apicem minute hirtellatum. Disci basi labelli breves 4- lamellati. Columna 2 mm. longa. *Liparis longipes* SCHLECHT. (non LINDL.) MATSUM. et HAYATA Enum. Pl. Formos. p. 404.

HAB. Formosa: loco non indicato, cult, in seminario Taihoku, leg. B. HAYATA, Jan. 1912.

Near *L. longipes* LINDL. (Orchids of the Sikkim Himalayas, in Ann. Roy. Bot. Gard. Calc. Vol. VHI. t. 37), but separable from it by the lips which are in this new species two-lobed at the apex. This species is that

orchid which was sent to H. SCHLECHTER some years before and was sent back here by him with the name of *Liparis longipes* LINDL.

**Liparis Kawakamii** HAYATA sp. nov. (Fig. 5.) **Oculia** (cum racemis) 23 cm. longus basi squamatus, squamia raginiformibus 3-5 em. longis 15 mm. Litis apice acutis Telae acuminatis, basi supra partem squamata 2-foliata. Folia oblanceolata sessilia 13 mm. longa 2 cm. lata apice acuto-obtusum. basi attenuata, nervis manifestis, in vivo acasshiscula, in exsiccato submembranacea. Racemi tenninales 15 cm. longi, rhabdus complauatis alatis, alis 1 mm. latis, pedicellis 10 mm. longis squamifera, squamis cum bractea



Fig. B, *Liparis Kawakamii* HAYATA; a. a whole plant, showing the raceme of flowers; b. a leaf; c. detail of the base of the flower; d. a detail of the lip; e. a detail of the petal; f. a detail of the column and ovary, in longitudinal section.

informibus laevibus 5 mm. longis 1-2 mm. latis acuminatis a se 1 era. remotis, partibus inferioribus 5-6 cm. longis laxiusculis, pedicellis 7 mm. longis gracilibus, ovariis 2 mm. longis 1/2 mm. latis, bracteis lanceolatis 8 mm. longis acuminatis. Siliqua posticum locum occupans 5 cm. longi 1 1/2 mm. latum apice obtusum basi non contractum appropinquatum 3-aeurium, latecolia ± obliqua positum vis breviora. Petala anastomosis lineata 6 mm. longi 1/2 mm. latii apice obtusa 1-nervi basi non contracta. Labellum connatis 5 mm.

longum apice 5 mm. latum apice latissimum

in medio ± contractum 2 1/2 mm. latum basi contractum 1 1/2 mm, latum apice contractum dimidiatum inters margine subintegro latero infra medium sub 11 htm, basi medio discis collosa insensibilis. Columna recurva 4 mm. longa dimidiata, foveolata, nectare leviter alata, alis 1/2 mm. apicem columnae ± dilatatis.

Hol. Formosa: Loco non indicato; leg. T. KAWAKAMI.

Near *Z. Udenyan* Kuhn & Schum., but differs from it by the broader leaves and less prominent auricles at the apex of the column.

*Liparis macrantha* Ito (Fig. 6) in Ann. Bot. IX. p. 150; MATSUM. et HAYATA Emim. PI. Formosa. p. 40C.

HAH. Kelung, Hei'liuslio, Mt. Arisan.

The orchid is rather\* widely distributed in the Island. The type I have never seen. As far as the original description is concerned, our specimens may be referred to ROLFE'S species.

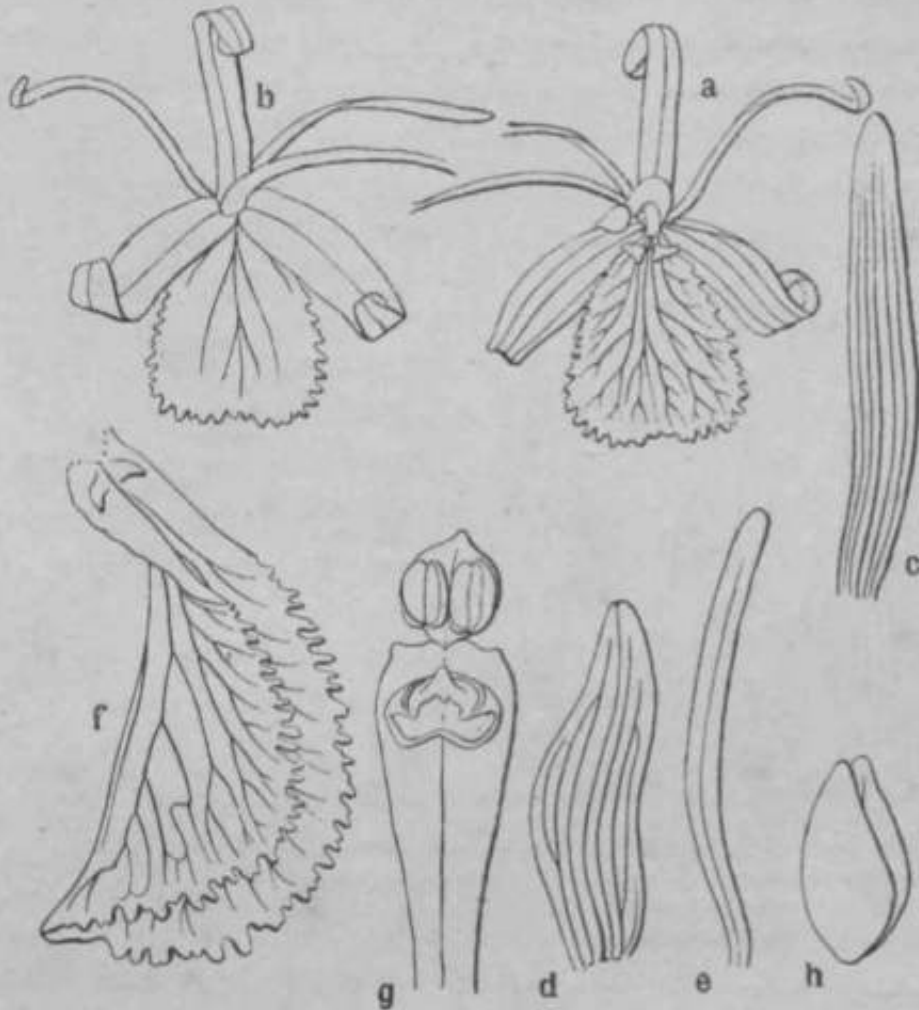


Fig. 7. *Liparis nakaharai* Koi.FK; a, flower; b, the stem, seen from the side; c, dorsal sepal; d, lip; e, column, (in the drawing lifted); f, pollinia; g, ventral sepal; h, lateral sepal.

*Liparis Nakaharai* HAYATA (Fig. 7) *Mater.* Fl. Formos. p. 130. *Goalie S-lodiatos* infenio *bxeviBSixne* vaginahis, vaginLs ovatis brovioribns snperne *gxadatam* «longatis. Folia 2 ad *basin cantEl* sita oblanceolata cum petiolis 35 cm. longa 2 cm. Inta mcemum in longitulum *Eqqaatia* apico



acuminata basi gradatim acuminata in petiolum 10 cm. longum alieuntia **ima** basi articulate multineque glabra. Flores medioeres 2 cm. in diametro, in racemum laxiflorum 15 cm. longum **terminalem pedunculatum** dispositi, pedunculis 18 cm. longis gracibus erectis, bracteis **lanceolatis** 1 cm. longis, Sepala libera jacentia **linearia** 9 mm. longa 1 mm. lata apice **obtusata**, jacentia **obtusata** recurvata, Lateralij antio paralleliter patentia inferue **recurvata**. **Petala linearia** 9 mm. longa 1 mm. lata postico et in femore reflexa. **Labellum** **erectiforme** in circumscriptione 8 mm. longum, 5 mm. latum a medio iatico cavitatem **aploa** itissimam irregulariter **dentatam** basi eolimitaj **hixmu**, a medio basi erectim **ima** columnam

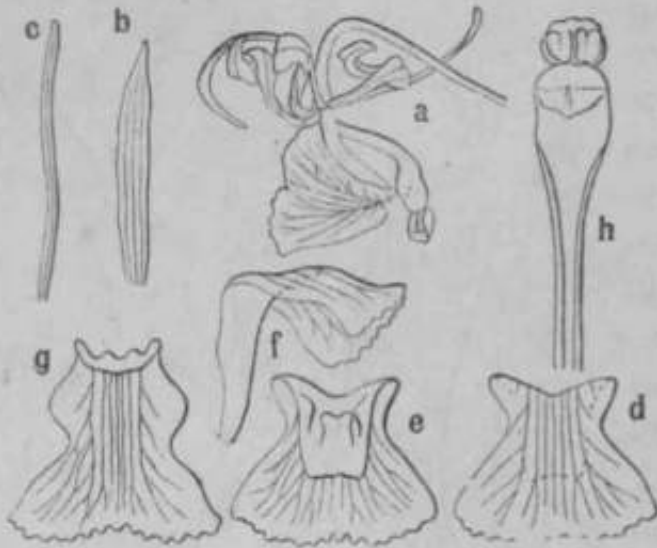


Fig. 7, *Liparis xtkahanu* HAYATA; A. A flower; b, a sepal; c, a petal; d, a lip; e, the **«U»** «amo **noeu** from buck; f, the **«ume, sm»** from **avUs**; g, the **\*ini-»** seen from back; h, a column, anther lifted.

pedicels and in many other\* points.

*Liparis platybolba* HAYATA (Fig. 8) sp. *nov.* Epiphyta. **Rhizoma** in arbores repens complicitum t. r. s -2 mm. latum, **lwliss** a basi pseudobulbigerentes. Pseudobulbi valde complanati oblongi vel ovato-oblongi vel elliptici! 2 cm. longi 2 cm. lati 7 mm. crassi **gabri** **bi**ai **roliquis** squiimanim obtusati apice 2-foliati, foliis **cam petkdia** articulatis, petiolis subnullis in **ufa-ono** latem pseudobulbi valde (Iwaizutibus, **i>ai-tibiis** decunwntibus 25 mm. longis **tenfbds** sm'Siim 4 mm. latis **depmn** angustissimis **ad** millum rednetia. Folia ob-

amplectans a medio sperne patens elobatiu basi 2-tuberculatum. (oluma elongata 5 mm. longa semiteitjs.

HAH, Taitu, Manabosba, leg. T. TAWAKAMI et G. NAKAHARA, *Jim.* 1906, (No. 7(JC).

This is very distinct species; it is somewhat near *L. flucclda* in its habit, but very much different from it in having much larger lips, longer

lanceolata 14 cm. longa 28 mm. lata apice triangulari-acuta lvisi gradatim angustata 8 mm. lata, ad petiolum sribmulani abentia secus medium tenuiter plicata exsiccato mombraiaaea vivo crassiuscula supra viridia ad costas tenuiter silcata utroquo latero costto 3-4 jervata, uarvis et veis supra uon visis, snbtus pallidiora, costis etavatis, um-vis tenuiter visis, margino hitagna circ. plana tenuissima, Scapi (lacemi) ad apicem pseudobulbi torminales,

20-25 cm. longi complauati deorsum **diatincte** alati cum alis 4 mm. lati a basi siirsum usque ad 3| cm. longum uucli, plus sur-sium usque ad partem floriferam squamati, squamis inferioribus longioribus lasiusculis lancoolatis 2> cm. longia4mm. latis aciniuiatis remotiusculis, **Superioriboa minoribus** (lensiusculis ad braetteam alxjiintibus. **Para** fl'iiferara<!omi 10-15 cm. louga tereto-angulata, bracteLs laucaolatis acumiuiatis (> mm. longL? erectis, floribua densiiwfuilis a se 3-7 ram. lBtnotts, pedicallis 2 mm. lougis, ovariis 3-4 mm. longis clavato-terotil HIS apice truncatis liasi attenuate, floribiis snljclausis 4 mm. lougis. Sepalum **poBticnm erectom** lin-

eari-oblonguni 5 mm. longtuu 2 mm. latum apice obtusum basi luuul contractmu 2 mm. latum 1-nerviium dorso cai'inato-costatum secus costtis **nibpll**-cato-concavum, Litoivdia cum **poetico oontormia**. Fetaln nugustissiiiau liiietui;i 5 nun. longa £nim. lata erecta 1-noiTia. 1-coatata basi non **contacta** vix **vel** liaud dilatata apice obtusa baud reflexa. Labellum subpatons in explicato siuVrotundatunt 4}mm. lougum 3|mm. Litum apice cuspidatuni, **partibus** ciispidatisolongato-Uiaugularibiis  $\wedge$  mm. lungia l>asi 1-1  $\frac{1}{5}$ mm.latis apice obtu^is

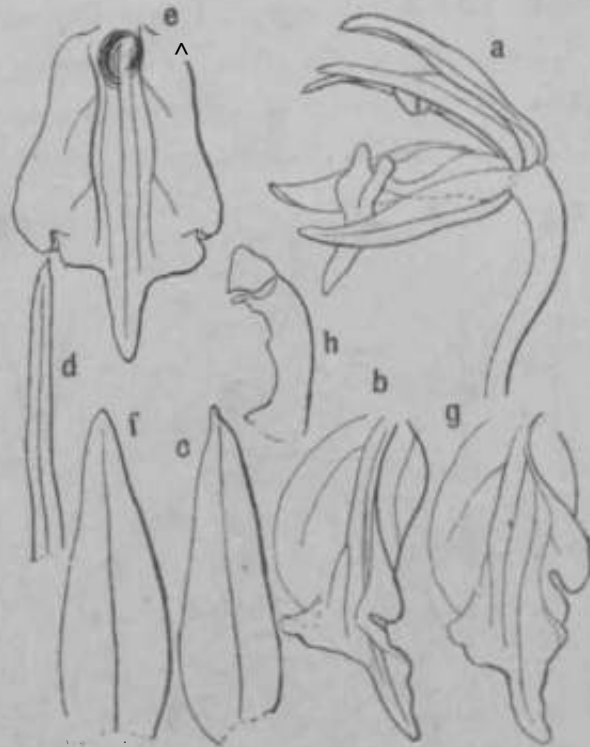


Fig. 8, *Lipnrlf platyfolia* BAVAT.V : a, it llowfir; f, A ilorsfl sfjiiil; o, a lateral sepal; .1. A [jetal; e, a lip seen from front; b, IUMI g, the Hiiinc, wen from tu<to; h, II column. seen from nule.

**desupr** leviter retrivis, **a** infra partem enspiditum deorsum rotundatum, partibus rotundatis (i.e. hypochilidis) \*i mm. lobis toti usque **latis** vel **latioribus** distincte 5-nerviis subrectis basi **HWKIC** **valde** concavis utroque latere **sabered** is, gibbium inter partem cuspidatam (apicillum) et partem rotundatam (hypochilum) valde ad marginem nudilutoplicatum, margine deorsum (pit)pe *Imsin* integerrimum sursum sub **eroso-denticulatis** vel **siibintogiinu**. Columna 2mm. **kmga fere aamitesres** apice <la^atn nsqtie ad supra basin angustata, Ivisin leviter 11 ibitata- Clinaiidriun **valde**

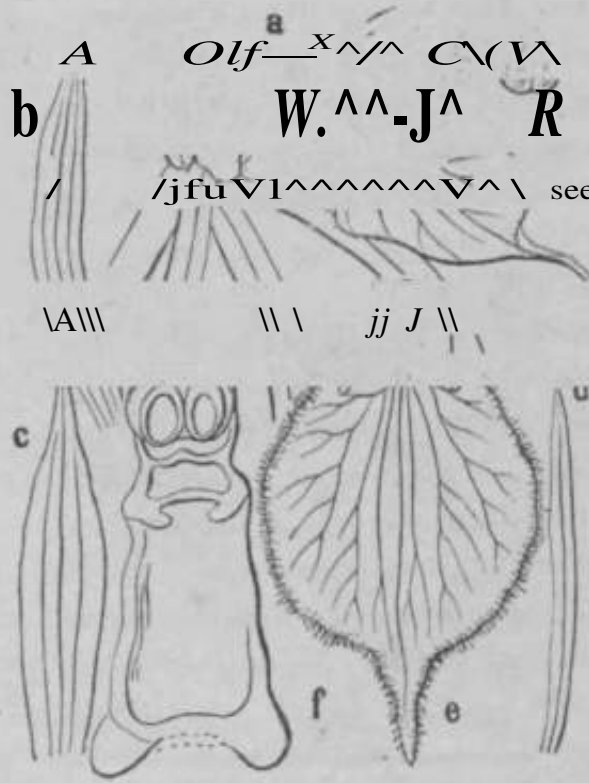


Fig. 9, *Liparis Sasakii* HAYATA; a., central portion of A flower; o, a dorsal sepal; b, n kleml wjiil; .1, a petal; o, A lip; f, a .column; K. pollioin.

<X>^M^TM> rullinia 4, per  
 loculis segregata  
 sub-  
 seeundo obovoideo - f usi-  
 formes apice **olarato-**  
 attenuate S-coosfatee, inter  
 ectione  
 subcirculares, pedicellis  
 3 mm.longis. **GesUcJdsptaiy-**  
**bcUba HXYXTX in** scied.  
 Herb. Taiholai.

HAB. Arisiin, **inter**  
 Fimkiko et Taroytn, leg. B.  
 ITAYATV et T. ITO **Marl. 1914**

K'<nmrkabl> for the  
 very **much laterally** com-  
 pressed psendolnill-s.

**Liparis Sasakii**

HAYATA sp. nov. (Fig. 9.)

Epiphyta in htuico *Chammcyiwris altvsg*. Caulia 8 cm. longis Imsi squamis linltis obtictiis, sqianus ovato-n)timdatis cfuilem finiplectnti1)jLS 2cm. longis totinsfue latis vagiuifonnibHS. Folia 2 fe-ro sessiUa **obovata** 5 cm. longa 2^ cm. lata apice **obtaa** vel rotundata deo'siun angflstata t-ompleto latcque caulem amplectantiit. Sfapi inter folia siti 7 cm. loDgi **angulati**,

partibus floriferis 2 cm. longis, bracteis cordato-cuspidiformibus 3 mm. longis  
 bftsi latissimis 2mm. latis apice subito angustatis cuspidatis ad sumnum obtiisis,  
 pedicellis 6 mm. longis, ovariis 2 mm. longis. Hores atro-purpnei. Sepalum  
 posticum lineari-lanceolatum 13 mm. longum 3 mm. latum apice acuminatum  
 basi cordatim auriculatum 3-nemum maigine exteriori valde recurvum,  
 lateralia postico sequiformia sed  $\pm$  obliqua. Petala linearia 12mm. longa  
 1mm. lata apice obtuso-acuta basi non contracta margine exteriori vald  
 recurva. Labellum rotundato-obovatum 1cm. longum 6 mm. latum apice  
 rotundatum ad centrum breve cuspidatum, (cuspidibus 1½ mm. longis basi  
 ½ mm. latis elongato-triangularibus), margine ciliolatnm versus longitudinem  
 subplicatum infra medium abrupte desuper reflexum basi contraction breve  
 minuteque auriculatum ad basin appendicula una elevata instructum. Columna  
 3 mm. longa utroque latere alata, alis J mm. latis.

HAB. Mt. Arisan, leg. S. SASAKI, 1913, Mai.

Near *Liparis Henryi* Kourc, but differs from it by the much smaller form,  
 shortly caudate and ciliate lips and appendicules at the base of the lip.

**Liparis Somai** HAYATA sp. nov. (Tab. YL.) = *CesticMs Somai* HAYATA.  
 Rhizoma . . . . Pseudobulbi ovoidei 4 cm. longi 2 cm. lati apice 2-foliati  
 basi vaginis scariosis involucrati. Folia 2 oblanceolata vel spathulata 13 cm.  
 longa 2 cm. lata apice obtusa basi attenuate plicata racemum amplectantia  
 in exsiccato chartacea, venis parallelis utraque pagine elevatis. Racemi  
 15 cm. longi, pedunculis (partibus racemi non-floriferis) 5-6 cm. longis latere  
 complanatis alatis cum alis 2 mm. latis, partibus floriferis dense floratis  
 10 cm. longis, pedicellis (exceptis ovariis) ascendentibus 3 mm. longis, bracteis  
 lanceolatis 5 mm. longis 1mm. latis apice acuminatis. Sepalum posticum  
 lanceolatum 3 mm. longum 1 mm. latum apice obtusum basi haud contractum,  
 lateralia valde obliqua oblique ovata 3 mm. longa 1½ mm. lata apice obtusa  
 basi vix contracta. Petala linearia 2½ mm. longa } mm. lata apice acuminata  
 basi non contracta. Labellum ovatum 3 mm. longum 2 mm. latum apice  
 triangulari-acutum ad snmmum obtusum basi cordatim contractum ad medium  
 plicato-recuivum. Columna tenuis 1½ mm. longa apice alata vel apice antice  
 dentibus 2 instructa, dentibus obtusis minutis.

HAB. Kusukusu, leg. T. SŌMA, Jan. 1912.

Near *Liparis comjesta*, but differs from it in having larger leaves and flowers.

***Liparis taiwaniana*** HAYATA (Fig. 10, et Tab. YIL) Caulis brevissimus in pseudobulbum inerassatus 2-foliatus, vaginis brevioribus 5-6 instructus. Folla oblanceolata 18 cm. longa 17 mm. lata apice acuminata. basi attenuata ima basi articulata 3-costata. Racemi ad apicem caulium laterales cum pedunculis 20 cm. longi folio tequilongi, partibus floriferis 8 cm. longis laxi-

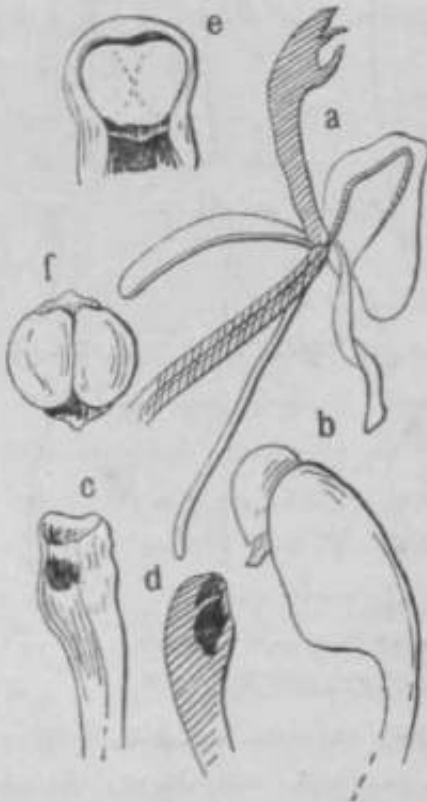


Fig. 10, *Liparis taiwaniana* HAYATA ; a, a flower in vertical section; b, a column, seen from side; c, the same, seen from front, anther shown; d, the same, in vertical section; e, apical portion of the column; f, an anther.

floratis, bracteis lanceolatis 7 mm. longis, floribus **medusribna** 1 cm. in diametro. Sepala **«3qna.lia iMitentisshna**, exterioro valde reflexa recurva oblongo-lineariter 1 cm. longa 1 mm. lata apice **obtusa**, Petala angustolinearia 1 cm. longa 1 mm. lata sinus margine convoluta tortiva apice obtusa postice reflexa. Labellum **ad** laciniam eorum, basi erectam a **medio** sursum patens, ima basi articulatam, obrotam in circumscriptione 8 mm. hinc apice dilatatum 7 mm. latum **vetasa** basin angustatum lacinia 2 mm. latum margine latero integrum apice inequaliter denticulatum lobis lateralibus obscuris, sinu laciniae 2-tuberculatum. Columna 3 mm. longa semitoras 2-alata. apice **curvata**.

HAD. Nantō : Randilizan, leg. T. — — — — — T n a n d r \* x a o n n

This is near *L. jifitata* and *L.*

*Uddyama*, but distinguishable from them

by the longer and more slender column of the flowers. The columns of the other species are very much shorter. Also very near *tipurw viridiflora* Tj. but differs from it in having larger flowers and in the lips with obscure lobes.

**liparis Uchiyamae** SCHLEGKT. (Fig. 11) in lit. MATSUM. Ind. PL Jap.

H-1, p. 235.

Cornered *vnth*  
3L co-type of this  
species.

HAB. Rin-  
kiho, ad 4000  
]xil. nit., leg. H.  
IXABA, Juli. 1911.

This is per-  
haps the sanu  
species as *L.*  
*plicata* FR. et SAV.

**Oreorchis** LINDL.

**Oreorchis**  
**Fargesii** ESQB  
w\*. subcapi-

LULUITAIAJA

(Fig. 12) Ic. Pl.

Formos. H. p.

142. TeiTustris,  
psolidob uIbis

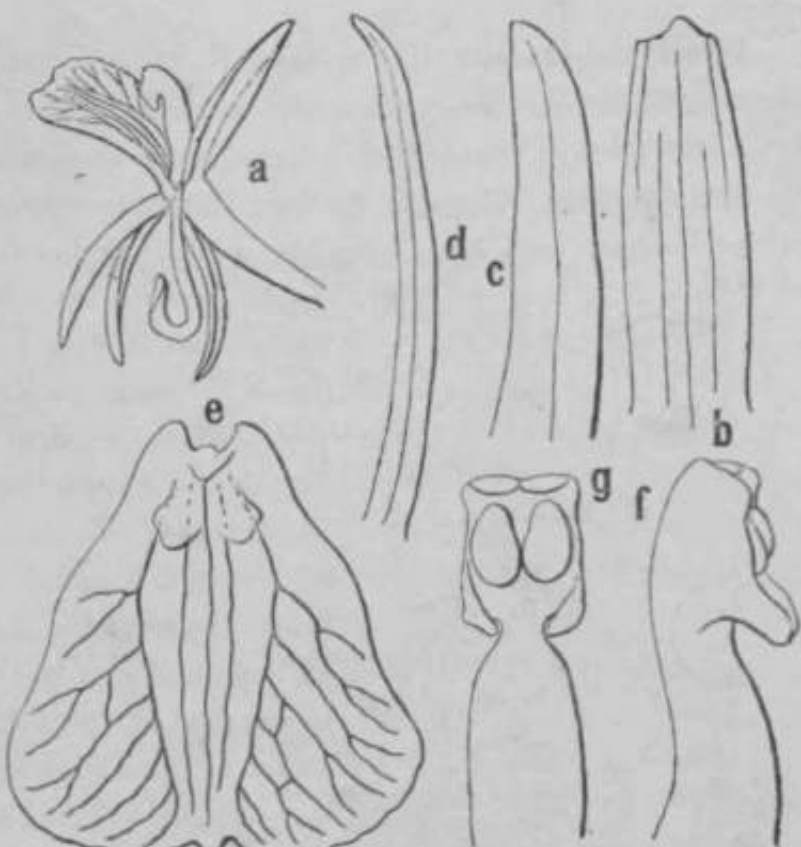


Fig. 11. *Li-parut Uchiyamae* Schlegk. Sonuicnr.; a, a flower; dorsal eop\*1; «, a lutaml sepal; d, a petal; e, a Bp; f. columnft, aeon from Rule; & Hie some, seen from front.

3-4 nodosis ovoitlis 1J cm. lougis 1 cm. lafcia **apoe** l-ostratis bosi rotundatis nd  
nodos squamia obtoctis. Folia duo terminului l>asi Taginis involucrata linoari-  
Inuceolata, (escepte petiolum) 30 cm. longa 12 mm. lata **ap&pe** itcuminata bosi  
attennata ad petiolum 5 cm. lougum nbeiintia membranacea nervoso-plicata,  
cum xwtiolis axticuLita. Seapi e nodis jvrsta terminalem oriimdi quam folils  
breviores 20-25 cm. longi 3-4 nodosi ad nodos vaginati vitginis 4 cm. longis,  
laminis acutia, partibus floriferis Iffevibus 2 cm. longis floribiis dense sub-  
etipitatim dispoaitis, podicellis gitvcUibiis (cum ovariis) 8mra.-10 mm. lougis,  
braeteis lanceolate 4 mm. longis. Sopala sub-patontia subtoqualia, posticuin  
laucuolatuin 11 mm. lougum 2| mm. litum npice obtumuu bosi plus minus  
angiistmu obsciro 5-nervimri, LvtenUin quam postioo latiora oblique ovato-

laneeolata 9 ram. longa 3£ mm. lata distincte 5-nervia apica obtusa basi leviter contracta fidcata. Petala oblique oblongo-lancoolata quam sopalis latoi-altbus angustiora 10 mm. longa 30 mm. lata apice obfensa distmefce 5-nervia minuto punctata. Labellum craioato-obovatum basi miguictxlatnm, (enm iinguibiis 1J mm. loigis) 8 mm. longiim 3 mm. latum *ex* apioe raigiüs vi-lobatum, lobis Liteiidibiis lineaiibttis 2 mm. lougis ^ inm. latis 1-nerviis apice obtusis, lobo medio oblongo-obovato 6 mm, lingo 3 mm. lato iuargiiiG denticulato-cristato,

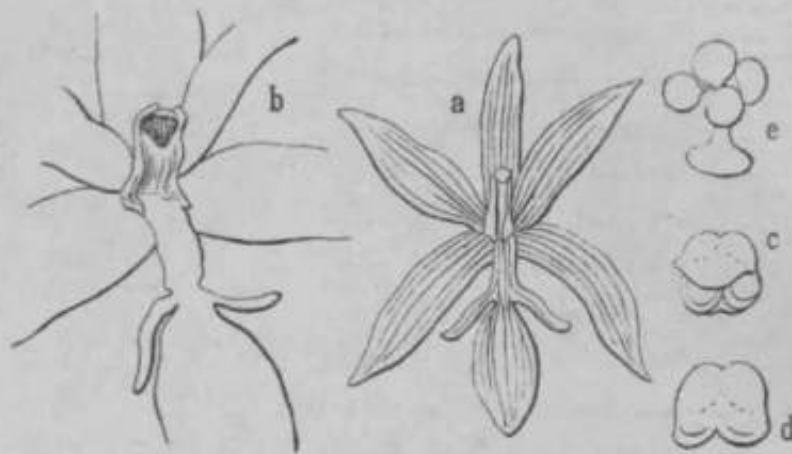


Fig. 12, *Oreorchis Fargesii* FIKKT *vt. submpUtUi* HAYATI; a, a Sower; b, central portion of the stem; c, the pollinarium; d, the same,  $\times 10$ .

't-nevvio facie pBZSe piinctato-cristato Ijasi medio 1-laniellato-appendienlato, appendiculo plicato linear! 1 mm. hmgo, Columna brevis 2 mm. longa levitet alata lxisi aun'colata in pedem breviasiranm producta.

HAB. Mt. Kontabun, leg. U. Mom, April!, 1910.

New *O. Fargesii* Fixer, in Ball. Soc. Bot. Fr. (1896) XLII. p. 697, PI. XTIII.; Int diiftii-s from the typo in having lips with oblong middle lobas, much shorten.' column and purtctat<u i^etals.

#### *Dendrohiwm* Sw.

*Dendrobium erythroglossum* ILVATV sp. nov. (Fig. 13, a) OaiiKs gi-acllis teres 30-40 cm, Lmgas 1mm. in diamefero aectionis ramosissiraus, intenii.)dii3 2-3 cm. longis cylindricisj ad iiodos roliquis vagiuarum fibrosis h—structtis hac atque iliac tuinido-diLitatus, partflnsB dilatata fiwiformibns 2 cm. longis 2J mm. latis, siirsum *vagtoifl* folionim obtecbas, A-aginis cum internodtis

axmilougis cjUndrieia ore fenmuatis liewosis. Folia ad *m*moa eaperkMtes aUeruatim sita linearia 5 cm. lougu 3 mm. lata apiee obtusissima ail cmtrua breve mucronata, In exsiconlo mombrauaooa, basi aubito oontaacta cum vagiuis iwticidata. Racemi Litwulus '2~') em. lougi pauci-flunLti BSBpe J-florati basi 1-2-vagiuaati, vflgtuis cylindz&oeis 5 mm. lougis, bracteis hyaliuis ovatis perlicollnm ampledantdboa, pecliwllis cum ovai-Hs *Jl* cm. Iougis. Flores mbes- eeniea :?l em. in diamgtoo. SujKilum posticum ovato-ljbin'<'(i|,L'timi 83 mm. lougum 8 mm. lfttum apieo siciiminatui u 1 >isi lev itet couti-actum margine clwi-sum ecrfeaciate recur\ma ± convexnm 7-nenium, ktearalia linoari-lautjolata basi obliqua latere in-ferloFe 33 mm. longa latere saporioitj 28 mm. lon^ti iipU'o acumiuata bisi Ititis- sima S mm. lata medio 5 mm. liitji l>asi *mm* pede i-tjluinna) eounati meat m ti G mm. lougum fomoaatia. Titala ovutu- rbomboidea j;> mm. luii^a. cum sepalo ;yquilony;L 15 mm. lata apke irijiugiJari- acnmiiiata basi ctmaata 5-nervia margino iutegm atl Ijasiu it mm. kfca. Labellum com sopalo petiuluqie ftHjiulouguiu 33mm. I«mgum ISnun.Iittum ovato-rhomlwiJeiuun -il'ioe ciwpitlatd-ju'utuju basi cunefann *mm*ttfzoe (esfieptis partibus liaailaribos) seuulato-denticulatun) ;t mwlio tistiuo ml basin •ras siuscuiluni cwternm l\*uiu« facie ubique bneve. hirsutiiui 3-lobuiu, lubis luternlibiis (basOarlbns) scminitimchitls suborefcia bnrribus, lobo terminali majusculo ta-iaigiUiu'i-ovato 17 turn, longo 10 mm. Lito apico breve ooa^dato- iieuto basi vix wi luuul eontracfo. Columiia 2 mm. loaga totiiiape lata basi in pedem G mm. loii^iinin-> nun. l;itii)ii prodncta. Authera ol>loug» 3 mm. luuga lirevo hii-suta, filumentis filiformibas 2 mni. longis.



FIG. 13, n, 0 Hp of MmJitiMmi\* erythrajtos/miii HAYATA ; b, n lip of Detdi-of\*. JimiflriafolaMiuni HAY AT A ; c, a lip of Z>««froM«m JieishwnenM HAYATA ; •1^, ifeniroWum fcwwAofense HAYATA ; il, ii flower, lip tnken down to si. ow a ^land nt tho IMSR of the Ton; e, a lip; f, an operemlnm; R. tbfll mmi'. liftfxl up; a, Oi ti;L'untl abut, ••these more or less magnified.



HAB. Formosa: Loco non indicate; cult, in seminario Taihoku, leg\*  
B. KAXEHIBA, Juni. 1912.

**Dendrobium fimbriatolabellum** HAYATA sp. nov. (Fig. 13, b) =  
*Desmotriclium Jimbriatdabellum* HAYATA in scied. herb. Taihoku. Caulia  
40-60 cm. altus teres ramosissimus, internodiis 1.5-2 cm. longis subclavato-  
cylindricis 7 mm. in diametro, ad nodos subnudus vel subsquamatus nitidus  
in exsiccato flavescens subsulcatus, ramis basi angustatis sursum plus  
minus dilatatis sursum plus ramosis, internodiis terminalibus majoribus circ.  
3 cm. longis clavatis apice dilatatis circ. 9 mm. in diametro sectionis. Gemma\*  
ad apicem rami geminso vel fasciculate divaricate elongato-conics B 1 cm.  
longa?. Folia ad apicem ramulorum sita cum nodis articulata oblonga oblongo-  
elliptica vel ovato-oblonga 10 cm. longa 3.5 cm. lata apice rotundata ad  
centrum obscure leviter emarginata basi rotundato-contracta ad petiolum  
4 mm. longum abeuntia supra nitida in exsiccato subcoriacea vivo coriacea  
crassiuscula, nervis principalibus circ. 11 utraque pagine elevatis, venis inter  
nervos circ. 3, margine desuper ± recurva, petiolis plicatis 4 mm. longis  
3 mm. latis cum nodis articulatis, vaginis nullis. Kacemi breves 1.5 cm. longi  
ad apicem ramulorum siti pauciflorati, bracteis multiseriatis scariosis ovato-lan-  
ceolatis 3-5 mm. longis acuminatis, pedicellis cum ovariis 1.5 cm. longis gracilibus,  
floribus subalbescentibus 1.5 cm. longis. Sepalum posticum lineari-lanceolatum  
1.5 cm. longum 3 mm. latum apice acuminatum G-nervium basi non con-  
tractum plus minus concavum vel subplanum, lateralia lineari-lanceolata  
1.5 cm. longa 3 mm. lata apice acuta plus minus obliqua basi dilatata 5 mm.  
lata cum pede columnse affixa mentum 3 mm. longum formantia 5-nervia.  
Fetala linearia 1.5 cm. longa 1.5 mm. lata apice acuta basi non contracts  
3-nervia. Labelhun lineare (exceptis partibus fimbriatis) 1.5 cm. longum  
21 mm. latum apice acutum basi cuneatum 3-lobum, lobis lateralibus  
(basilaribus) oblongis angulo 45° lobo centrali divaricatis 4 mm. longis 1.5 mm.  
latis margine fimbriatis, fimbriis 1 mm. longis linearibus, lobo centrali lineari  
12 mm. longo 2 mm. Into basi apiceque ± dilatato, parte dilatata superiore  
oblonga 7 mm. longa 3 mm. lata apice apiculato-acuta margine prope apicem  
integra csetenun valdo fimbriata, fimbriis filiformibus 1.5 cm. longis 1 mm.  
Litis 1-nerviis angulo recto a lobo centrali divaricatis, medio subintegro.

vel cnsuato, tisoia nedlo n Pasi usqun ad [Wirteni (Ulat-itam superiorem Q-LniKllatis inalfuofalin, LimelUs eirc. 10 mm. loijriw ] .mm. Intis nuiTgnu luitlnlato-crispatis, 5-neirium basi integnun. Coltimna 3 mm. longa Imsi ad mentum 3 lum. longiun producta.

HAB. Knsuknsn, leg. B. HAYATA ot S. SASAKI, 1912, Juli.

Flowers of this new orchid are somewhat near to those of *Desmofricivum spuvium* J. -T. SMITH, *D. antjnhitum* BLU^CE and *D. crini/erym* KEXSZL, (in rfl.-reiclu IY. 50, H B. 21, p. 347, fig. 35 A-H.); but the branches axe totally different.

*Dendrobium furcatopecticellatum* HATATA ep. nov. (Fig. 14). **Caulis** tores Ivctiia 40-30 cm. K,uigtts 2 mm. **in diiimatro BUWUP** foliatns a medio deosBom non folia-tns Vftginis foliomm obtectvis. **Folia** tinesxia cii^C. 11cm. longn -I mm. latft apioe aonminata laust sequihvfai vtl lciviter contra eta 3-nervia mombran-acea in essiccatu tenuiter coriacea, vaginis tubiformi-bns 3J cm. longifl iuteruodio vix longioribus eaulem firme obtegtmtil »us. **Cynae** laterales 2-flonitue, peduncolis 13 ram.longls, bnsi

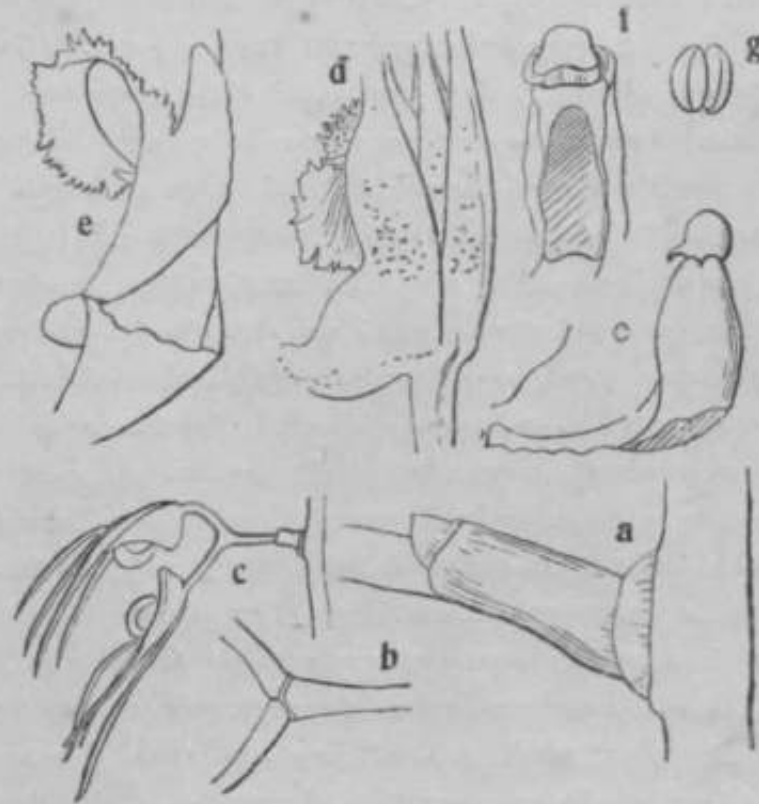


Fig. 14, *Dendrobium furcatopecticellatum* HAYATA; a, basal portion of peduncle; b, basal portion of pedicel; c, column and stigma; d, flower, showing purple dots in the petals and sepals; e, inflorescence; f, column, stigma, ovary and ovule; g, ovary.

bracteis tubiformibus 1-2 instructis, pedicellis 10 mm. longis a se angulo 80° egressis. Flores subclausi non patentis 30 mm. longi. Sepala erecta lanceolato-lineariter flavescentia medio extus pin\*preo-maculato-punctata; posticum 30 mm. longum deorsum lanceolatum sursum lineare revolutum-bliforme, supra basin latissimum 3½ mm. latum, lateralia postico aequalia leviter latiora basi obliqua cum pede columnae connata mentum 5 mm. longum formantia, mento antice recurvo. Petala sepalo aequalia angustiora. Labellum 3-lobum margine fimbriato-denticulatum, disco piloso.

HAB. Maisba, leg. B. HAYATA et S. SASAKI, Aug. 1912.

Near *D. biflorum* SWAETZ (PFTTZER, in Pfl.-reich. IV. 50, II. B. 21. p. 168, fig. 11, A-D.); but differs from it in having lips with pilose discs.

*Dendrobium heishanense* HAYATA sp. nov. (Fig. 13, c). Epiphyta. Kliozoma ramosa tenue in truncos arboris repens, caulibus approximatis. Caulis 30-40 cm. longus teres sursum latissimus deorsum minus latus basi ± dilatatus medio 4-5 mm. latus basi supra partem dilatatam 2 mm. latus, partibus dilatatis conicis 5 mm. longis 6 mm. latis, radicibus sub parte dilatata dense sitis, internodiis mediis 3½ cm. longis, inferioribus clavatis subnudis, superioribus cylindricis vagina obtectis, vaginis cylindricis cum internodiis sequilongis ore truncatis. Folia lanceolata 6 cm. longa 8 mm. lata apice acuminata vel obtuso-attenuata basi contracta basi tortuosa in exsicco tenuiter chartacea cum vaginis articulata. Racemi laterales ad nodos superiores siti brevissimi dense florati, bracteis basi imbricatis ovato-triangularibus valde concavis scariosis 3-5 mm. longis, pedicellis 18 mm. longis gracilibus, ovariis brevissimis 2 mm. longis 1½ mm. latis. Flores albo-rosei 2-2½ cm. in diametro. Sepalum posticum ovato-oblongum 18 mm. longum 6 mm. latum apice obtuso-acutum basi db contractum 5-nerviis, lateralia oblique ovato-triangularia 2 cm. longa basi 1 cm. lata apice obtuso-acuta basi cum >ede columnae connata mentum 8 mm. longum ziz ^^-formiter recurvum formantia 5-nervia. Petala oblonga 18 mm. longa 6 mm. lata apice obtusa basi cuneata manifesto 3-nervia vel obscure 5-nervia. Labellum late rhomboideum 17 mm. longum 13 mm. latum ad basin contractum ad apicem menti affixum 3-lobatum, lobis lateralibus (basalibus) triangularibus 4-3 mm. longis erectis apice obtusis, IOIK) terminali triangulari-oblongo 10 mm. longo 7 mm. lato apice

triangulari-obtuso basi leviter vel vix contracto. Labellum medio infra lobum terminalem callo uno instructum, callo rotundato 2-3 mm. in diametro, lobis lateralibus facie breviter mucosus, caeterum glabrum. Columna brevissima 1 mm. tonga basi ad pedem valde concavum sacciformem latissimum 10 mm. longum (in explicite) 7 mm. latum producta.

HAB. Arisan: inter Heishana et Nimandaira, ad 7000 ped. alt., leg. B. HAYATA, Aprili., 1914.

This is near *Dendrobium cammum* WALL, in Ann. Bot. Gard. Cale. V. t. 19, in the broad concave mentum, in the size of the flowers and discs; but in other respects it is altogether different.

**Dendrobium kwashotense** HAYATA sp. nov. (Kg. 13, d-g, et fig. 15). Caulis secus rhizoma apprimatim situs 40-50 cm. longus basi pseudobulboso-dilatatus, pseudobulbis globoso-conicis 2-3-nodosis 7 mm. latis totisque longis subnudis, parte supra pseudobulbos angustata tereti, partibus angustatis 2-3 cm. longis 5 mm. latis teretibus 1-2-nodosis, parte supra partem angustatam fusiformem dilatate, partibus fusiformibus 5-10 cm. longis 1-1 m. in diametro profunde 8-flulcatis 8-costatis 3-4-nodosis nudis, parte supra partem fusiformem complanate, partibus complanatis 10-25 cm. longis cum vaginis 7-9 mm. latis 6-8-nodosis, internodiis complanatis 2-3 cm. longis a vaginis perfecte obtectis, parte supra partem complanate tereti, partibus teretibus 10-15 cm. longis 3-4 mm. in diametro subnudis, internodiis 2-3 cm. longis. Folia ovato-oblonga 6 cm. longa 23 mm. late valde coriacea apice obtusissima ad summum brevissime inaequaliter 2-loba, lobo longiore 1 mm. longo apice obtuso, lobo breviori subnullo, basi subrotundata cum vaginis articulate, vaginis complanato-cyrtodraceis 2 cm. longis 7 mm. Ms ore truncatis, supra nitida, nervis venis prominente elevatis, subtus venis multis minus prominente tenuissime elevatis, margine desuper recurva. Mores ad nodos superiores lateraliter subsolitarii vel pauciflori, pedicellis (cum ovariis) 2 cm. longis teretibus vix 2 mm. in diametro, basi vagina singula instructis, vaginis cylindricis 6 mm. longis 2 mm. in diametro scariosis nervosis apice 5-4-lobatis, lobis triangularibus 2 mm. longis acutis. Flores apertae 5 cm. in diametro. Sepalum posticum lanceolatum 23 mm. longum 6 mm. latum apice obtusum basi non contractum,

margine sui\*sum interiors raonrvum 5-7-nervnm, latemlia laaceolata triaugu-  
laria latere inferiors 3 cm. louga latere snperiore 2 cm. longa apics obfcusa  
basi 13 mm. lata 7-nervia margine sursum interiors recurva. Fetala lanceo-  
lata 12 mm. longa 6J mm. lata, apice aeuto-obtusa basi contractai obscure  
7-nervia. Lmbollum obovato-oblongiun 28 mm. longum 24 mm. latnm apice  
breve aciitum basi longe cuneatnra miiltinervium tenaiter 3-lobnm, lobia



Fig. TB, *UenhMum fcily\**»Aoterira HAYATA, photogmplicd by Mr.  
T. SOMJL

basinilibua (la-  
tei-alibua) sami-  
oblongis a basi  
labelli ustjue ad  
apicem lobM^um  
lateralinml^cm.  
longis, ex apice  
lobomm iisque ad  
siniLs intra loixis  
ljitemlesetlobum  
terminalem 2  
mm. longis apice  
fcruncatis, lobo  
terminftli ob-  
longo 1^ cm.  
Ion go circ. I  
em. lato apice  
**apieolato** basi  
 $\pm$  coutracto  
**maxghid** cremi-  
lato-denticulato.

Disci medio a  
bust usque ad HUM limn laKHi :-s(n;i,tiiii siti, striis deorsum cmsshiscule  
]iMU!]i.tis sursnm cristiito-tiiljtirculatis. Ctjlunma subiiulki 4 mm. lata l)asi ad  
mentum 14 mm. longum 3 mm. latinn plaimtn orassnm 3-nerwiiin producta,  
mentis siirsum prope apicom disco singulo instractis, disco flialielliformi sub-  
ntipitato 3 mm. lato 1 mm. longo flavo, stipite 3 mm. longototo **connato.**

HAB. KwashOtō, leg. T. SŌMA, Juni. 1913.

**Dendrobium leptocladum** HAYATA n. n. *Dendrobium tenuicaide*  
HAYATA (non HOOK, f.) Mater. Flor. Formos. p. 316.

As *D. tenuicaule* is given to an Indian orchid, another new name *D. leptocladum* should be given to this Formosan species.

**Dendrobium longicalcaratum** HAYATA sp. nov. (Tab. VIII). Epiphyta. in arbores crescens. Caulis foliiferus circ. 15 cm. longus, internodiis 1 cm. longis vaginis obtectis, vaginis quam internodiis longioribus scariosis obconico-cylindratis hyalinis nervosis ore truncatis. Folia lanceolata 35 cm. longa 6-7 mm. lata apice acuminata basi contracta in exsiccato membranacea. Racemi ad apicem internodii laterales circ. 3 cm. longi 1-2-3-floriferi, bracteis triangularibus 6 mm. longis 5 mm. latis apice acutis 3-nerviis, rachibus flexuosis purpureis, pedicellis 1 cm. longis, ovariis 3 mm. longis. Sepala extus leviter prae rubescentia 5-nervia, nervis purpureis, intus albivirescentia. Petala alba. Sepalum posticum triangulari-oblongum 15 mm. longum 7 mm. latum apice acuto-obtusum margine ad apicem incurvum basi leviter contractum; lateralia valde obliqua, partibus supra insertionem ovarii lineari-oblongis vel oblongis 13 mm. longis 6 mm. latis apice acuto-obtusis, partibus infra insertionem ovarii 15 mm. longis quam iis supra insertionem longioribus 4 mm. latis cum pede columnae connatis mentum 15 mm. longum 4 mm. latum cylindricum formantibus, mente apice obtuso. Petala oblique lanceolato-obovata apice obtusa basi angustata 14 mm. longa medio 5 mm. lata ad insertionem 2 mm. lata 5-nervia. Labellum elongato-spathulatum basi cum mentum connatum a basi sursum liberum longe unguiculatum cum unguibus 27 mm. longum 6 mm. latum, ungue 22 mm. longo lineari circ. 3 mm. lato basi cum mentum connato hac atque illic contracto margine ubique interiore plicato apice margine exteriori plicato constricto, parte supra constrictionem (lamina) ovata 9 mm. longa 5 mm. lata apice rotundato-obtusa. Discus apice et medio unguis situs 2-lamellatus. Columna supra insertionem brevissima 2 mm. longa, pede longissimo 18 mm. longo.

HAB. Uiai, Aug. 1912, leg. B. HAYATA et S. SASAKI; fl. Nov. 1912 in horto botanico Tōkyō.

Yen\* near *D&al. Vidorja-retjinte* LOHEK and *D. stbclavsum* ROLEF (KBANZL. in Pfl.-ieich. IV. 50, H. B, p. 11, fig. 6, A-G).

**Dendrobium moniliforme** Bv. Compared with ;i specimen n{ tin\* scies in the Tōkyō horbarium.

HAB. Arisan, inter Taroyfin ot Fnnkiko, leg. B. HAYATA < i T. ITO, Mart. 1914.

The form of the lips is subject to some mutability. It is ovate to rhomboidal, obtuse or acute at the apex, very much hirsute or nearly **glabrous**;

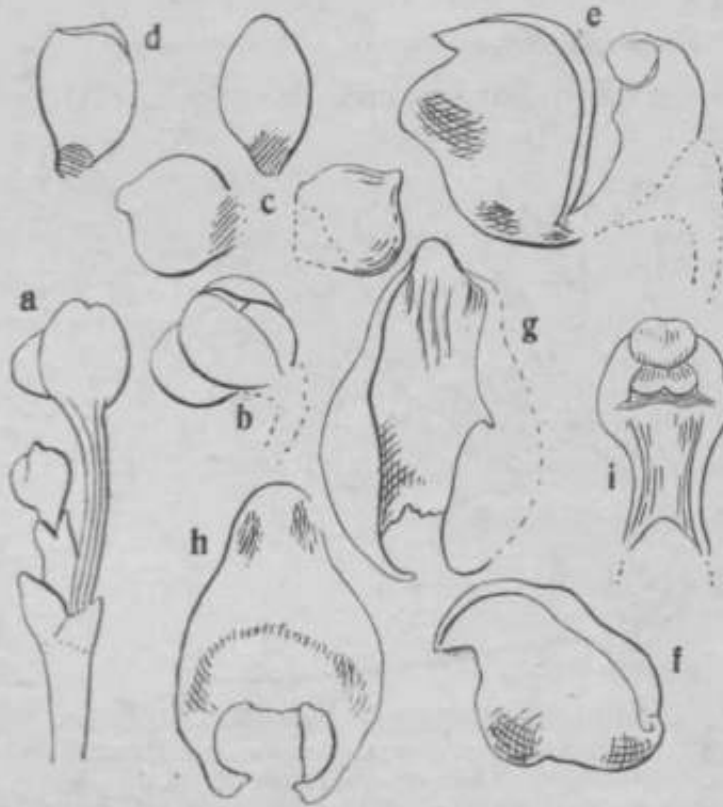


Fig. 18. *Dendrobium pendulicaule* HAYATA; a, inflorescence; b, flower bud; c, sepal; d, petal; e, flower, sepals and petals taken off, to show the lip, cross lines show yellowish tinted portions; f, lip, seen from side; g, the lip, seen from front; h, the lip, seen from below; i, column and foot; J. B. HOTT illustration on the lip and base of lip.

and the callosities at the base of the lip are in one specimen very prominent, but in another very faint.

**Dendrobium pendulicaule** HAYATA sp. nov. (Fig. 10)

— [*Aporosa pendulicaule* HAYATA in Journ. Bot. Soc. Japan, Taihoku (1914), Kryptophyta; caulis caespitosus, a ramorum arboris; similitudo Tertiariter pendulus 30-50 cm, ramis lateraliter valde compressis, omnifolius 7 cm. longis viridissimis toto longitudine fimbrosus glaber. Folia distichae equitantes firmo

plicata (in exaristato multinerviata) plicata somi-oblonga (plicata oblonga) 3 cm. longa plicata 1 cm. lata, explicata 26 mm. lata, explicata 10-nerviata

cum vaginis artieukia, vagbiis imbriuatia 3-4 cm. longis **firma c&atem** obtagontibus. Eawsmi pauciflorati laterales, bmcfois minutis. Floras circ. 4 mm. longi albicnntes. **Bepala** oblonga, ktemlia **qnam pf>stico latiam**. Petab sepalo conformia. LILXIIIUIH ^ubsaocatam vel valde concavnm apioe valde sinuatiim flavo-maculatiuu **bagi** disco 3-stiuato lih"suto instructnra. Cupsnla cylindi-icii, *cii-c.* 10 cm. iffign, 8 mm, lata.

HAB. Kuankusn, leg. B. HAYATA et iS. S-WAKI, Jidi., 1912.

Found **hanging** in;rpndicuWly from a branch of a very tall **tree**, swings ing to and **fro oven** nLth a. very geiitlo breo/ji.

*JlulbophyUum* THOU.

**Bulbophyllum** (*Cirriopetdum*) **flavisepalum** JIAYATA (Fig. 17) Ic. PI. Formos. IT. }>. 131.

Epiphyta, **rhizomati-**  
bus repentibus l-adican-  
tibvis tcrotibua 2 Tim.  
in diametro aectionis,  
pseudobiilbis ovokleia  
2cm.longi3 lcm. latis  
apice obtusis truncatis l-  
foliafcis. Folia eloiigato-  
angnstato-oblonga 7 cm.  
longa 17 mm. lata apice  
xx>tundata ljasl atfcnuata,  
cum psemlobulbis  
ai\*ticalata margins levi-  
ter recurva snpra  
viridiJi subttia pallidiora  
crassiuscula snpra  
I)lana, venis (in  
exsiocito) ufcroquo latsro



**Fig. 17, *Jlulbophytlun flavistpalum* HATATA ; a,** it flower, *naau* from side ; **b,** the some, » sepal, label him. nml rtentun are seen, others **are** taken off; **c,** the **some** Intend sepalti, labellm ami tuoutam taken *oft*, seen from face, clumnA is Been; **d,** ft bibellum soen from **face**, **elevated** dificua lines are soon; **e,** mentum and labeltum, seen from below; **f,** uolumnu, seen from faoo; **g,** the same, seen aido; **h,** tho samo, soeti from back; **i,** an anther; **j,** poDinia, two smaller, the others larger.

S-9, utraque pagine conspicuis. Scapi floriferi e ktere psoudobulborum, aphylli 5^ cm. longt, giMciles vagtnis tonuibas 3-4 instracti, vaginis Inferioribas iinbricatis, aupsiioribas remotis ore obliqais acufcis 6 mtn. longis. Flora3



5-10 flavescentes 1 cm. in longo diametro laxe umbellati rachibus 2 mm. longis, pedicellis gracilibus 9-10 mm. longis basi 1-bracteatis, bracteis fusco-purpurascens 3 mm. longis. Sepala valde inaequalia, posticum hberum minus rubro-purpureo-ascens ovato-quadrangulare 3 mm. longum basi 2 mm. latum 3-nerviis basi latissimum leviter contractum apice obtusum lateralia valde longiora linearia 13 mm. longa 3 mm. lata 3-nervia sed basi 5-nervia flava nervis rubescentibus, apice obtusa basi plus minus obliqua basi columna pede adnata mentum 2 mm. longum formantia supra basin introrse tortuosa latere exteriori a se colicentia facie exteriori basi 3-linearimaculata. Folia breviora quam sepalo postico oblonga 3 mm. longa 1 mm. lata apice rotundata 3-nervia fusco-purpurascens leviter reflexa vel concava. Labellum brevius mentum in longitudine aequans basi erectum a medio sursum valde extrorse recurvum crassiusculum margine erectum apice obtusum acutum vel emarginatum medio discis linearibus 1 vel 2 instructum 2 mm. longum basi purpurascens. Oculina brevissima 1 mm. longa apice (clinandrium) latere bicornuta basi in pedem 2 mm. longum producta, (pede interiore recurvo lineari complanato) apice abrupte incurvis dilatatis. Anthera globosa, 4 mm. in diametro. Pollinia 4; 2 majora, 2 minora. Capsula premaria cylindrico-fusiformis 2 cm. longa 5 mm. lata apice obtusa basi attenuate triquetra facie leviter 1-costata. *Cirriopetrum flavisepalum* HAYATA Herb. Taihoku.

HAE. Mt. Ai-isan, prope Taroyen, leg. B. HAYATA et S. SASAKI, Jan., 1912.

The orchid was found creeping on a large stone at a sunny place on the left side of the Arisan-road near Taroyen.

**Bulbophyllum gracillimum** HAYATA (Fig. 18) Ic. PL Formos. H 132. Epiphyta, caulibus gracillimis prostratis ad nodos radicantibus, teretibus 1 mm. in diametro sectionis, internodiis 1-2 cm. longis, ad nodos vaginatis, vaginis 3 mm. longis ore truncatis. Folia sessilia crassa elliptica vel elongato-elliptica 22 mm. longa 9 mm. lata apice rotundata mucronata vel emarginata basi plus minus contracta ad petiolum 1-2 mm. longum abeuntia multinervia. Racemi axillares 1-2-florati 2 cm. longi graciles basi vaginati vaginis 1-2 mm. longis, basi pedicellorum 1-bracteati, bracteis ovatis acumi-

natis 3 mm. longis l<sup>e</sup> nun. latis, **pediceflia** cum ovario 2-3 mm. longis. Swpal't  
iuaiquifilia, posticnm oblongo-angstatnm 3 mm. lougum l<sup>e</sup> nim. Intum apico  
obtusunibasinoii

ouitxactmn 3-  
nerrimn, latom-  
**lia** l>u'i pede  
columnniO atlnata  
**ban** valde 6b-  
licjiiii 3-nGrviiL  
3 nun. longa.  
**i'. stala** mimitis-  
siniii lmearia  
l| mm. longa 1-  
itervia. Label-

**Inux** l|mm. lon-  
gum •k mm. la-  
tum basi errec-

tin ii interior recuinun medio sin-sum abrnpte esterioit) recnrvm **medio**  
mai^iuis ralde transverse ropando-plicatiim. Dlscns 3-lamellatiis. Colnmiui  
l>!VM'ssima latere antico breve comtita, basi in pecleni l| mm. longnm **producta**,  
ciun sepalis mentimi foimans.

HAU. **Nokomn**, leg. T. KuvvicAiLr et D. Moitr, *San.*, 190S.

**Bulbophyllum Inabai** HAYATA **Sp. aor.** (Tab. IX.) *Gerrhqeicdtm L<sup>rabai</sup>*,  
HAYATA. Ihizoma rapens tores lmm. in diamoh'o. . PstHirtobulbi **ovoidei** *civr.* lcm.  
Unjgi ;")(> mm. lati. Folia oblanceolata vol elongato-oblonga JT cm. long 8mm.  
lati apice obtusa a^l simiinoin mncronata basi ± attenuata in exsiceato ttmui-  
fer cliartacea, snpro v«Qi8 **lateraSboa** pai-allt.lis tenuitor cleTatis, subtus palH-  
clissiitui. Scapi 2^-cm. longi apice floras 5-10 mnbollato-racomosim **gevanter**,  
braeteis basi pedicellorum sitia lanceolatis scariosis 1-J mm. longis, pjdicellis  
4 mm, longis. Sopalum posticum lanceoliitnm 3-J mm. longum l| mm. latum  
**apice** caudato-acnminatnm basi non contractnm, latoralui obliqna triangnLori-  
liineeolata 5 mm. lovigabasi 2 mm. lata Bursnm attenuata margine convoluti,  
clna firme margin« interiors stj attingmtia basi cum pede colnmnffl connata.

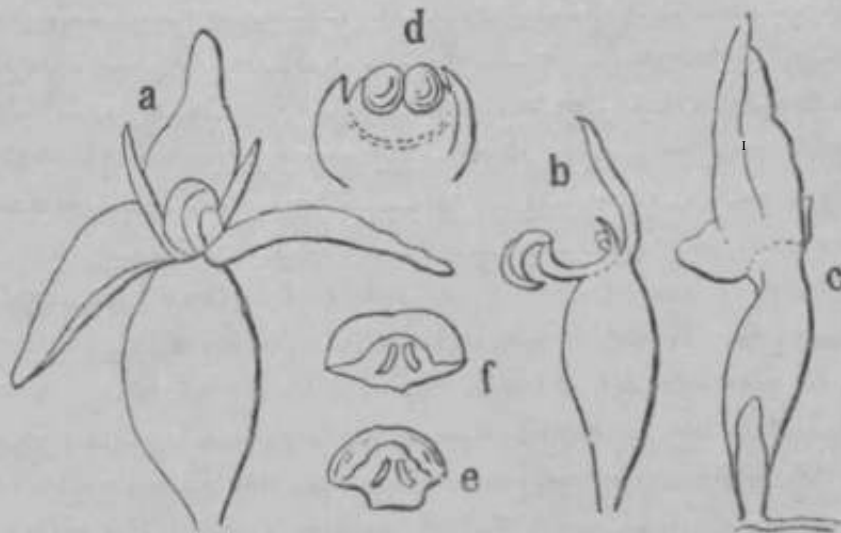


Fig. 18, *Bnll\*pl<jUum, rjracUlhtvm* HAIATA; B, • fiowwr; l>. 3m snrae. soen from side, showing the columnal foot nnd Up; c. tL- same, seen from l>\elt; A, poliniiv era th« clinndrium; e, ami l\ apercula.

Petala obovata 2 mm. longa 1½ mm. iita apico rotuudata vul luviter mtua-i basx levitor cuneata basi 1 mm. lata. Labellran lineaxe 2 mm. longnra } mm. latiim emssran deorsntn utrorjue lafcere auriculiformo siu'sum teretiforme npioe retusum. Columna 1 mm. longa apice antice 2-comibus instructa, eomibiis arisfctO-formibus rectis ; pede 1 mm. longo angulo recto raourvo.

ILu.: JIAISHA, leg. H. IXABA, 1911, Juli.

**Bulbophyllum kusukusense** HAYATA sp. nov (Fig. 19) Epipliya. Khizoma iu arbores repsns teres 2i mm. in dlanietro, r^liquis vagiuarmn



Fig. 19, *Bulbophyllum kusukusense* HAYATA, ft u flower; b, the Hiune of the petals nnd petals t«ken off, showitig the column, oolumn! foot, nnd the lip, c, a lip, sbndea portions tinted Ted; <l. a lip; e, f, And g, seotiaas of the same; h, juicfctho colturtn, sa^ n from front; i, the same sees from side; i, k, an nntlier ween from dillcrent aidtK,

X and b, nntuml size; others varioiwy mngtiifiocl; reel portions on the lip are shaded.

4-5 scarioais vaginatis instracti. Flores subalbi circ. 2 cm. longi, sepalis potalisquepiirpLUdo-striatis. Sapala imaqualia, po3ticum ovato-oblongiim 17 mm.

fjbrosis miilfcis obtactum, iufi-a. partem inseitlonis folii radices **filifoarme** subincrassatas **ftbnn-** ilitnto emittsus. **Paendobolbi cylindrioi** 2-4 cm. longi 5-3 mm. in diamstro (in oicsicfrtto), apiee folium uimm goroiitss. Folia crassa **oblongo-liiieaia** 10-15 em. longa 1J-2J em. **late** apico obtiisa ad summmn **retusa** breve 2-Iobata basi **gradatim** attenuate, ad petiolum care, 1cm. longuiu abeimtia supm **nitida** viridLssima **Babfus** pallidissima supra ad **ooetam** subplicat'i, snbtiis costis actit.) ili^vatis, venia parallelis (m essiocato) sujira elevatis ntao- que latere cosiao 9-10, snbtius non risis margin© integemmn tonuisaiiua. Scapi 1- floniti, basi pseadobulbi oriiimdi 5 <ni. longi gracillimi biusi bracteis

longum 5-6 mm. latum apice acutum basi 5 mm. latum 5-nervium 5-purpureo-striatum, lateralia oblique oblonga postico latiora basi cum pede columnis connata. Petala sepalo minus lata lanceolata 17 mm. longa 4-5 mm. lata apice acuta 5-nervia purpureo-striata. Labellum crassissimum triangulari-lineare 9 mm. longum 1 £ mm. latum subplicatum flavum ad marginem rubro-maculatum, maculis linearibus. Columna 3 mm. longa basi ad pedem 4 mm. longum lineare producta. Operculum cuspidato-cordatum 2 mm. longum dorso facieque toto glanduloso-cristatum.

HAB. Kusukusu, Juni. 1912, leg. B. HAYATA et S. SASAKI. Very near *Bulbophyllum offline* LINDL., but differs from it by the more elongate anthers and in other points.

**Bulbophyllum melanoglossum** HAYATA sp. nov. (Tab. X.)=*Cirrhopetalum melanoglossum* HAYATA. Radices filiformes crispate subincrassate sub pseudobulbo e rhizomate fasciculatim oriundae. Rhizoma in saxa arboresque repens teres 1 £ mm. in diametro. Pseudobulbi ovati 1 cm. longi 6 mm. lati. Folia oblongato-elliptica crassa 3 j cm. longa 7 mm. lata apice rotundata ad centrum retusa basi subito attenuata ad petiolum 2-3 mm. longum abeuntia supra nitida viridia subtus pallidissima, venis parallelis utraque pagine non visis. Scapi a basi pseudobulbi oriundi 9 cm. longi gracillimi basi 1-2 bracteis vaginiformibus instructi, ad apicem flores circ. 10 sub-umbellatim gerentes. Flores circ. 10 ad apicem scapi subumbellatim dispositi, pedicellis 6 mm. longis gracillimis basi bracteis lanceolatis 2 mm. longis instructis. Flores subpurpurei 12 mm. longi. Sepala inaequalia, posticum cum petalis firme imbricatum gleam formans intus valde concavum ovatum 4 £ mm. longum 2 J mm. latum apice acuminatum margine longe ciliatum 5-striatum atro-purpureum, lateralia lanceolato-lineariter 1 £ cm. longa 2 mm. lata purpurea margine integra baud ciliolata ± convoluta dua se firme margine interiore paralleliter attingentia. Petala oblique oblonga purpurea 3 mm. longa 1 J mm. lata apice obtuse acuta basi truncata non contracta 1 j mm. lata margine anteriore subrecta margine posteriore rotundata, margine tota longe ciliata, ciliis % mm. longis. Labellum comiforme 2 £ mm. longum utroque latere basi auriculis instructum crassum medio profunde sulcatum atropurpureum. Columna subrecta vel ± recurva 1 j mm. longa antice leviter et tenuiter 2-alata, alis apice ad cornua

linearia 1 mm. longa productis, pede anguillo recto recurvo circ. 3 mm. longo, parte inferiore cum petalis et sepalis connata, parte superiore libera sursum recurva, apice cum labello articulato.

HAB. Formosa; loco non indicato, cult, in seminario Taihoku.

**Bulbophyllum omerandrum** HAYATA sp. nov. = *Cirr7iqp8talumomeran-*  
*Zram* HAYATA. Rhizoma in arbores repens teres 1½ mm. in diametro vaginis scariosis obtectum. Pseudobulbi elongato-ovati 13 mm. longi 6 mm. lati apice rt attenuati reliquis fibrosis vaginalibus obtscti. Folia lineari-oblonga 6 Jem. longa 12 mm. lata apice obtusissima ad centrum retusa crassa in exsiccato coriacea, venis lateralibus parallelis utraque pagine leviter elevatis, basi subito in petiolum attsnuata, petiolis 8 mm. longis intus prof unde sulcatis. Scapi circ. 10 cm. longi basi vaginis scariosis instructi, vaginis 10-12 mm. longis ore obliquis, apice flores 2-3 racemosim gerentes, bracteis sub pedicello plicato-concavis 1 cm. longis, pedicellis 17 mm longis. Flores subfulvescentes, petalis apice purpurascensibus^ labello flavescenti. Sepalum posticum ovatum 13 mm. longum 6½ mm. latum 5-nerviium apice obtusum ad summum cilio uno 2 mm. longo instructum basi non contractum 6 mm. latum margine sub lente minute crenulatum, lateralia oblique ovato-lanceolato-linearia 2 cm. longa 5 mm. lata apice obtusa basi plus minus contracta 5-nervia. Fetala oblique oblonga 6 mm. longa 3 mm. lata apice obtusissima basi non contracta margine fimbriato-ciliata 3-nervia. Labellum liguliforme 7 mm. longum basi 2 mm. crassum. Columna brevissima 3 mm. longa antice subalata, alis apice ad cornua unguiformia productis, pede column© 5 mm. longo superne recurvo. Anthem apice pectinato-ciliata.

HAB. Mt. Ai-isan: Heishana, 6000 ped. alt., leg. B. HAYATA et TAKEO ITO, 1914, Mai.

Remarkable for the pectinately ciliate anthers.

**Bulbophyllum uraiense** HAYATA sp. nov. (Tab. XL) Rhizoma teres 4 mm. in diametro. Pseudobulbi ampulliformes 2½ cm. longi 8 mm. lati apice- ± attenuati ad summum truncati reliquis squamarum obtecti. Folia crassa oblonga vel oblongo-linearia 10 cm. longa 4 J cm. lata apice rotundata vel obtusa basi subito acuta attenuata ad petiolum 2½ cm. longum abeuntia in exsiccato coriacea, venis lateralibus parallelis utraque pagine

(in exsiccato) tenuiter elevatis, petiolis intus profunde sulcatis. Scapi folio longiores 16 cm. longi basi approximativim imbricativimque squamosi, sursum remotissime squamati vel haud squamati, apice flores 5-10 umbellativim gerentes, pedicellis 1 cm. longis basi bracteis 5 mm. longis lanceolatis scariosis instructis. Sepalum posticum ovato-lanceolatum 2 cm. longum 5 mm. latum valde concavum sursum lineari-acuminatum 5-nerviium basi contractum 2 mm. latum margine integrum; lateralia lineari-lanceolata 5 cm. longa 3 mm. lata basi cum pede columnae connata a medio sursum convoluta lineari-filiformia subteretia. Petala oblique recurvato-oblonga 6 mm. longa 3 mm. lata apice obtusa margine superiore convexa recurva margine inferiore concava recurva integra 3-nervia apice ad centrum mucronata. Labellum lineare valde recurvum 4 mm. longum 2 mm. crassum. Columna brevissima 1 mm. longa antice 2-alata, alis apice ad cornua linearia 2 mm. longa apice obtusa productis, pede apice libero cum labello articulado.

*Girrhopeudum uraiense* HAYATA in sched. herb. Taihoku.

HAB. Urai, leg. B. HAYATA et S. SASAKI, Juni. 1912.

Near *Cirrhopedum honinense* MAKINO in Somokuzusetsu X\TH. t. 20.

**Bulbophyllum viridiflorum** HAYATA (Fig. 20) Ic. Pl. Pormos. n. p. 133. Epiphyta, pseudobulbis ovoideis 2 cm. longis 1 cm. latis 1-foliatis. Folia crassiuscula solitaria elongato-oblonga 3-5 cm. longa 10-12 mm. lata apice obtusa ad centrum acuta basi contracta ad petiolum 5 mm. longum abeuntia supra viridia ad costas impressa, subtus elevata pallidiora. Scapi sub pseudobulbo, aphylli 6 cm. longi descendentivim-recurvi basi 2-3-vaginati (vaginivim imbricatis 7 mm. longis apice plus minus dilatatis ore obliquis) inferiore 1-vaginati, (vaginivim dilatatis 12 mm. longis 8 mm. latis basi contractis apice dorso cuspidato-acutis,) uniflorati apice gradativim ad ovarium abeunt. Flores solitarii apertientes 5 cm. in diametro pallido-viridescentes. Sepala valde inaequalia, posticum oblongo-ovatum 28 mm. longum 14 mm. latum apice obtusum basi leviter contractum 5 mm. latum 7-nerviium, lateralia valde obliqua ovata 23 mm. longa 18 mm. lata apice obtusa basi leviter contracta cum pede columnae connata mentum 1 cm. longum formantia 9-nervia. Petala cum sepalo postico conformia minora 23 mm. longa 11 mm. lata apice subacuta vel obtusa basi leviter contracta 5-nervia. Labellum basi erectum a medio recurvato-patens 15 mm. longum totiusque latum inferiore latere

membranaceum a medio sursiini spugioso-erassu in **ragosmn** medio l-snleattim  
 npice viridescens mimito rubro-punctatum apice snbaentum vcl obtusum marguie

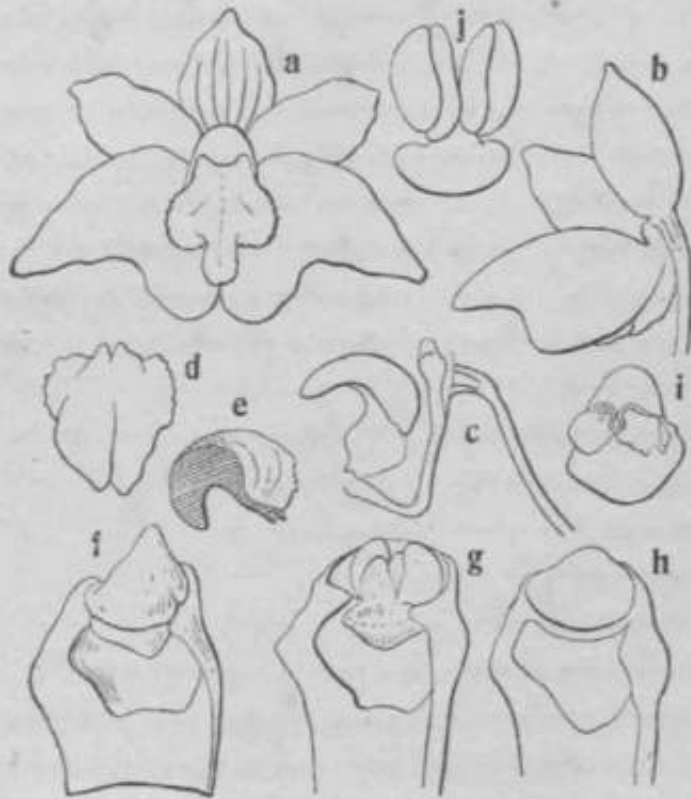


Fig. 20, *Linum pycnostachyum* HAYATA; a, a flower, seen from front; b, the same, seen from side; c, the same, sepals and petals taken off, column, mentum and labellum seen; d, the lip, seen from front; e, the same, seen from side, longitudinally cut, section-facet, minute red dots mentioned for the apex, basal appendages and claw are seen; f, column; g, the column, operculum taken off, 4 pollinia and translucent body seen; h, the same, anther taken off, clinidium and stigma are seen; i, anther, seen from below; j, pollinarium.

Flowered in May in a green house of the Koishikawa Garden, in February, 1912. It was brought back to the Garden by myself from Mt. Ai-isan. It was found on the large trunk of a *Quercus* at Nimandaira. Very distinct for the comparatively large flowers of greenish colour.

*Linum* LINDL.

**Linum Sasakii** HAYATA (Fig. 21) Ic. Pl. Formos. II. p. 139. Epiphyte,

Inferiore eroso-denticulatum sursum integram basi appendiculis, fere pendiculis retrorsis 1 > n. vixissimis 2-lobatis, brevissime iungulatum cum pede columnae articulatum. Columna brevissima vel nulla basi ad pedem producta, pede 2 em. longo 4 mm, lato a basi usque ad medium cum sepalis connato, sed a medio sursum libero angulo 90° inflexo apice leviter cuneato ad summum contracto cum nongiganti labelli reticulato. Pollinia 4 sessilia. Ovary longum.

HAB. Mt. Ai-isan, leg. B. HAYATA & S. SASAKI Jan., 1912.

dlizonate rapcarfci tereti 1½ mm, in diametro sectionis, **pseudobulbifl** remotis elongatoovoideis 1cm. longis 3-4mm. Iatis apice attenuatis **basi** contracts 1-foliatis. Folia solitaria oblongo-linearia 5 cm. longa 7 mm. lata apico rotundata ad centrum emarginata vel breve 2-lobata basi attenuate cum Julbis articnka crassiuscula. Flores racemosi, racemis sub pseudobulbo sitis pantiaoratis 3 cm. longis nodosis, iutordodiia 5 mm. longis ad nodes 1-vagi-uatis, vaginis inferioribus 1 cm. longis tubuliformibus, superioribus laminatis, laminis apice acuminatis, sub **flora** singidis 1-bracteatis, bincteis ovatis 1 cm. iougis Cmm. ktis apice acuminatis vel acutis basi leviter contraotis, **pedioeHia** (cum ovariaisl 1 cm. longis. Flores patentos. Sepala **snbflqaKa** elongato-

**triangularia**; i vel elongato-ovata, posticum 10 mm. longiun 4J mm. latiuun apice acutrnn vel acuminatum **baai** cunfaactnm 5-nervium, Literalia **an-** gustiora et longzora quam iis posticis 11 mm. longa 4mm. latu apice acu-

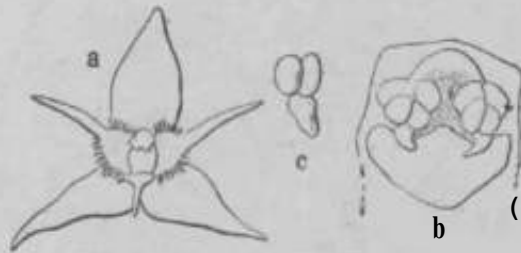


Fig. 21. *Isotria medeoloides* (L.) Hayata; n. a. flower; b, a column; c, n. pollinarium.

mmatabasicmnpadecohimnjGcoimatji flower; b, a column; c, n. pollinarium. atei-e sui^riom basi nngulai'ia (angulis acntis), latera infe'ioiti basi rotundata. l'etala elongato-ciispidato-tL-iangularia 7-8 mm. longa basi latissima 3 mm. la ta uon conti-acta apice h'neari-euspidata, (cnspidibus linearibus cnssiiscidis) nmi-gine inferiore denticlato-ciliata. Tiabellmn cuspidato-wtiindatnm 5 mm. ongunm 3mm.ktuni apice longe **cnspidatnm**, (cuspidibus linearibus 4 ram. ongis), basi abrapte conti'actnm cum pede cohimnas arfciculatiim 3-nen-imn valde concavum basi ad medium 2-lamelkle-appendiculatum. Oolumna fere nulla, basi in pedem 2|-3 mm. longnm pi-oduebv, podo cum sopalis later- iHbus mentum formanti.

HAB\* MI Arisau, leg. B. ILYATA et S. SASAKI, Jan., 1912.

Near *I. intermedia* KINO et PANTLINO, in Ann. Hoy. Bot. Gard. Cale. V. t, 210; but differs by much acuminate or oven caudate segments of the perianth. It was collected and sent to me by Mr iSAEI with flowers preserved in alcohol, upon which the above description is based. It was also collected by myself, in January, this year, in the woods *n<sub>mr</sub>* Nimaudaira in Mt. Arisan and was brought



back to the Koishikawa Garden where it flowered, in August, 1912, in open air. Sketches are drawn from living specimens.

*JEria* LINDL.

**Eria arisanensis** HAYATA sp. nov. (Tab. XII.) B Hizoma in arbores repens. Pseudobulbi secus rhizoma approximativ siti elongato-ovati plus minus recurvi 1½-2 cm. longi 5-7 mm. in diametro apice 2-foliati. Folia 2 ad apicem pseudobulbi sita oblongo-linearia 5 cm. longa 1 cm. lata apice obtusa basi angustata ad insertionem 4 mm. lata in exsiccato chartacea. Eacemi ad apicem pseudobulbi siti 5 cm. longi 4-5-florati fusco-tomentosi, bracteis lanceolato-ovatis 8 mm. longis 3-jmm. latis apice acuminatis, pedicellis cum ovariis 8 mm. longis brevis hirsutis. Sepalum posticum lanceolatum 10 mm. longum 3 mm. latum apice acuminatum basi plus minus contractum margine interiore recurvum 5-nerviis, lateralia obliqua falcato-oblongo-triangularia 10 cm. longa basi latissima 5 mm. lata cum pede columnæ mentum 5 mm. longum formantia falcato-recurva 5-nervia. Petala lanceolata 3-nervia 10 mm. longa 2 mm. lata apice acuta basi non contracta. Labellum obovato spatulatum. 11 mm. longum 6 mm. latum apice rotundatum vel leviter emarginatum basi attenuato-cuneatum apice 3-lobatum, lobis lateralibus oblongo-triangularibus 2 mm. longis 1½ mm. latis apice obtusis, versus centrum falcatis, lobo centrali rotundato 3 mm. longo totiusque lato crassiusculo botryoideo-tuberculato. Discus a medio usque ad basin labelli situs 2-3-lamellatus. Columna 3 mm. longa basi ad pedem 5 mm. longum producta.

HAB. in monte Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912. EL in horto botanico Tôkyô.

Veiy near *Eria reptans* MK. (*Eria japonica* MAX.); but distinguishable from it in many points.

**Eria hypomelana** HAYATA sp. nov. (Fig. 22). Epiphyta. Pseudobulbi ovato-cylindrico-fusiformes 3 cm. longi 7 mm. lati squamis scariosis ovatis obiecti sursum approximativ 3-4-foliati. Folia oblanceolata vel lanceolata 8½ cm. longa 1 cm. lata coriacea viridia nitida apice acuminata basi longe attenuata ad extremitatem dilatata 5 mm. lata. Eacemi ad axillas foliorum superiorum 6 cm. longi, pedunculis 2 cm. longis, floribus laxiuscule dispositis a se 1 cm. remotis, rhachibus tomentosis, bracteis tomentosis ovatis 1

cm. longis 5 mm, latis apice acutis margino minute denticulatis, pedicellis 8 mm. longis, ovariis 6 mm. longis tomentosus. Flores cinereo-viridi-flavi, purpureo-striati semiclausi non patentes. Sepalum posticum oblongum 11 mm. longum 4 mm. latum basi leviter contractum apice obtusissimum 5-nervium 5-purpureo-striatum; lateralia oblique oblongo-triangularia 11 mm. longa basi latissima 6 mm. lata apice obtusissima basi latissima basi pedicolum connata 5-nervia purpureo-striata. Petala oblongo-lanceolata 9 mm. longa 3 mm. lata apice obtusa basi contracta 3-nervia purpureo-striata.

Ijabitillimi in cir-  
cumscriptio

obovatum 9 mm.

longum in ex-  
plicatio 6 mm.

latum apice trun-  
cato-emaigint-

tum basi cune-  
ato - contractum

3-lobatum, lobis

lateralibus semi-

oblongis 5 mm. longis 2 mm. Uterque rectis columnam subamplectantibus,

lobis terminalibus late subreniformibus 3 mm. longo 4 mm. lato apice emarginati  
basi contract\*) ad **bas** 2 mm. lato crassiusculo bobyideo-tuberculato,

sinibus inter lobum terminalem et lobos laterales obtusis axe labelli trans-  
verse sitis. Discus ad medium labelli 2-lamellatus, lamellis 4-5 mm, longis,

labellium subtus **nigro-atro-purpureo** maculis flavum, supra medium  
transversum, lamellis discorum plurimis. Columna recta erecta 6 mm, **longa**

2 mm. lata subalata, pede 4 mm. longo 2 mm. lato.

H, VE. Mt. Arisan, inter Fnnkilio et Taroyen, ad 5000 ped. alt., in  
arborescens, leg. B. HAYATA et T. ITO, Mart., 1914.

Near *E. arisanensis* HAYATA, but differs from it in having much larger  
leaves, pseudobulbs and flowers.

**Eria plicatilabella** HAYATA sp. nov. (Fig. 23). Caulis pauciramosus  
vaginatns, vaginis late cylindricis 1.5 em. longis 8 mm, latis apice obtusis vel

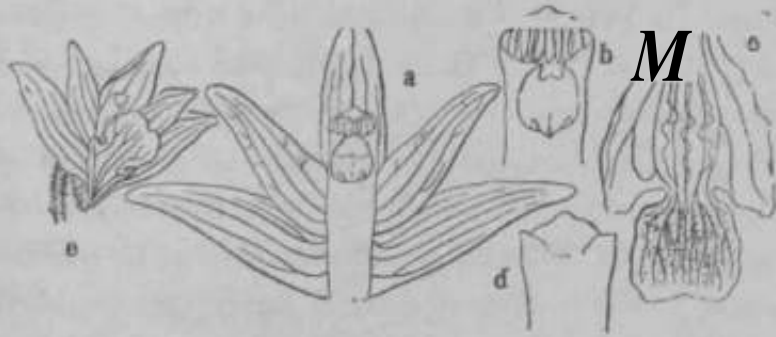


Fig. 22, *Eria hypamelana* HAYATA; e n, flower; a, & flower,  
explicito d, lip taken off; c, it lip; b, upper portion of column; .1,  
the same, seen from above.

obtusissimis nervosis scariosis ore oblique truncatis imbricatis. Folia versus apicem caulis conferta lineari-lanceolata 18 cm. longa 18 mm. lata apice acuminifito-attemiata ad simimn obtuso-mueronata basi gradatim augustata supra basin leviter contracta ad basin  $\pm$  dilatata 9-nervi, nervis utraque pagiuu elevatis, basi cum petiolis articulata, petiolis brevissimis 3 mm. longis latis-simis caulem semi-aniplectantibus. Eacemi axillares 10 cm. longi femigineo-tomentosi iota longitudine bracteoati, partibus floriferis 8 cm. longis, rlmchibus



Fig. 23, *Eria plicatilabellus* HAYATA; a, a flower; h, a lip; c, a column; d, an anther; o, the same seen from *baufk*.

vix contracta. Labellum oblongum 3.5 mm. longum 1 mm. latum apice cuspidatum gibberum margine minute ciliatum dimidium inferius re ereotoplicatum dimidium superius descendente-plicatum apice cuspidatum basi auriculato-rotundatum ad extremitatem valde contractum ad contractionem 1 mm. Mum. Columna 2 mm. longa  $\pm$  recurva basi ad pedem anteriora rotunda 2 mm. longum producta.

HAB. Foimona: loco m<sup>n</sup> mdieuto, cult, in **Xafioka** sominario, leg. B. HAYATA, Mart., 1914, (fl).

**Near** *E. tomtjlora* HAYATA, but differs from it by the longer and thinner leaves, and by the much larger flowers.

**Eria septemlamella** HAYATA sp. nov. (Fig. 24). Eadices o basi pseudobulbi oriundaj incrassatfo. Pseudobulbi ellipsoidei 3-4 cm. longi 18 mm. lati sqtiamis lanceolatis 2-5, 2-10 cm. longis obterti. Folia 2 ad apicem

tomentosis, bracteis ovatis apice acutis 6 mm. longis 2.5 mm. longis rostris subglabris, pedicellis brevissimis 2 mm. longis tomentosis, ovarii 3-4 mm. longis sin-sum latioribus tomentosis. Sepalum posticum oblongo-lanceolatum 7 mm. longum 2 mm. Litum apice obtusum basi nov vel vix contractum 3-nervi extus tomentosis intus glabrura, laceralia oblique oblonga 7 mm. longa 2.5 vel 3 mm. lata apice obtusa basi pado columna adnata muntum 2 mm. longum formatia extus tomentosa intus glabra 3-nervi. Petala oblique lineari-lanceolata 6.5 mm. longa 2 mm. lata 3-nervia glabra apice obtusa basi

pseudobulbi sita oblaneeolata circ. 30 era. longa 5 cm. lata plus minus **obliqua**  
 Hpice actmiin:ita basi longe attenuata plicata basin scapi amploctantia in  
 exsiccato membranacea, nervis et venis  $x^{18\wedge\wedge6\wedge\wedge3}$  utraque pagine elevatis.  
 Seapi 20 cm. longi, pedunculis 6 cm. longis, parfcibus floriferis 14 cm. longis  
 racemosis densiuscule floriferis, floribns subdescendentibus, pedicellis (ciun  
 ovariis) 1 cm. longis, braeteis niimitis. Sepalum posticum liueari-angustatum  
 12 mm. longum basi

latissimum 3 mm. **latum**  
 apice obtusum 8-5-  
 iierviun, lateralia **valde**  
 obliqua triangular!

i)1 **donga** desuper recurvn,  
 1 em. longa basi latis-  
 sima C mm. lata, apice  
 obtusa 5-nervia. Petala  
 b'neai'ia  $\pm$  recnrva 11  
 mm. longa 2 mm. lata  
 5-nervia apim obtusa.  
 X<abellum ad a p i c e m  
 pedis oolmnsQ artion-  
 latum ovato-rliomboi-  
 deum 9 mm. longiim 6  
 mm. latum subpn'catiun  
 columnam semi-am **plee-**

ktns medio desuper re-  
 cm-vum basi cuneatum  
 sursum 3-lobiun, **lobo**

terminali oblougo-triangnlari 31 mm. longo 3 mm. lato apieo obtnso facie  
 lamellis 7 iusfructo, lameUis nndulato-crispatis, meckis 3 mm. longis circ. 1  
 mm. latis, lobis lateralibus semi-oblongis erectds columnam **asmi-aiapleo-**  
 feuitibus 2J mm. longia vol latis. Disci 7-lamellati, lamellis a basi labelli  
 usque ad basiu lobi terminalis sitis 3 non crispatis. Colunina 3 mm. longa,  
 pede C mm. lougo. Pollinia S.

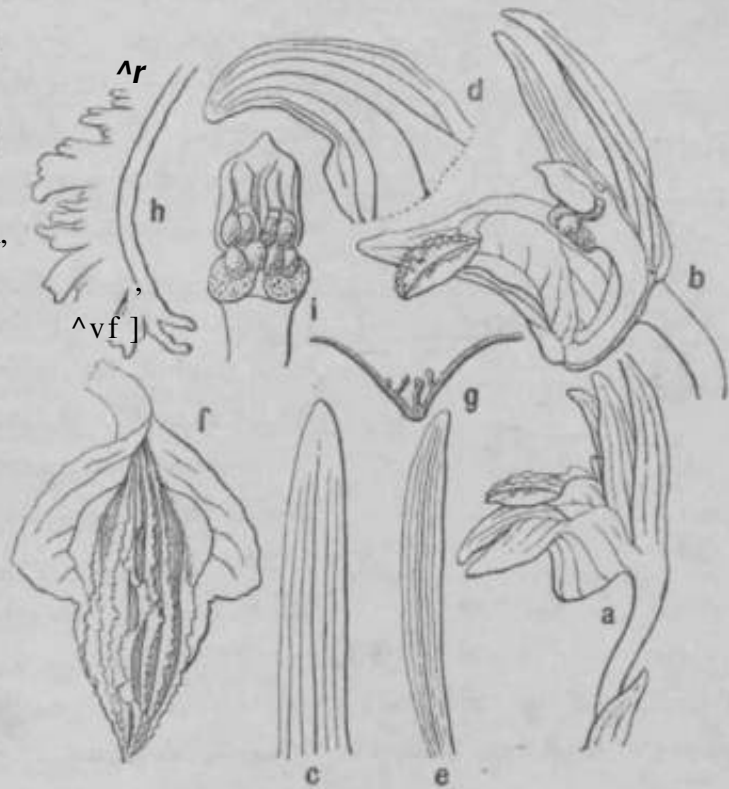


Fig. 24, *Kria Septentlam\* Ua* HAYATA; a, a flower; b, lateral view of the flower, to show the lip, mentum and column; c, dorsal nopal; d, internal view of the lip; e, cross section of the anther, to show the lamellate discs; f, the lip; g, cross section of the anther, to show the lamellate discs; h, apical portion of the column; i, apical portion of the anther.

HAE. Rinkiho, 1911, Aug., leg. H. INABA.

Near *E. Corneri* EICHB. *t*, but differs from it by 7 lamellate discs on the terminal lobe of the lips; also near *JE. fragrans* HEICHB. f. (Ann. Roy. Bot. Gard. Cale. VHI. t. 1G8), but, distinguishablQ from it in having smaller flowers -with lips with 7 lamellate discs.

***Tlireatla* LINDE.**

**Phxeatia Morii** HAYATA sp. nor. (Fig. 25). Epiphyta. Caulis foliates basi psoudobulbosus 2-3 cm. longns basi 1 cm. latus basi sqiiamis 1-2 involncratus. Folia ad apioem pseudobulbi gemina lanceolata 10 cm. longa 17 mm. lata apice obtnsa basi plieatim attenuata ciun vaginis arfciculata erasaiuscna. Scapi a basi pstmdobulbi oriurtdi 30 cm. longi gmcilos deoi-sum Miginati, p<sup>ar\*1i^3</sup> vaginatis 20 cm. longis, vaginis 13 mm. longis 3 mm. latis apice obliquis & se 4-5 cm. remotis seariosis, partibns flariferis 10 cm. longis spieiformibus densiusaile flomtis, braeteis ovatis 5 mm. longis 2 mm. latis **apioe** acnitis, podiceUis snbnnlh's, ovariis 2^ cm. longis obovoideis apice feraneatis liasi attennatis. Sopalum posticum tiiangnlari-oblongum 2^mm. longtun

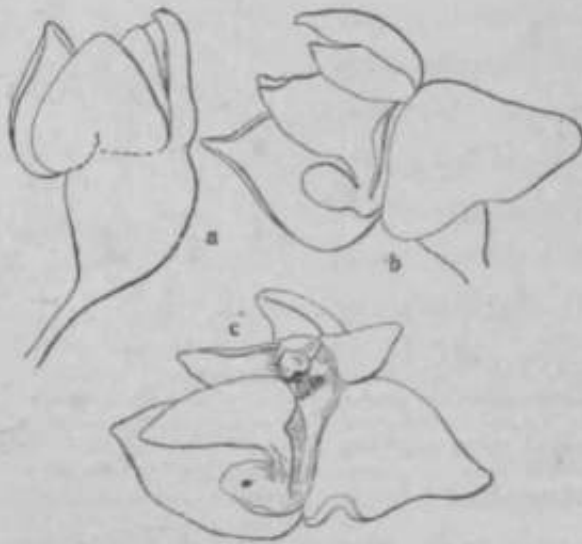


Fig. 26, *Phreatia Morii* HAYATA; n. a flower; b, the calyx, expanded; c, the BMDC, potato expanded, showing the column, operculum, oral foot and lip.

2 mm. latnm apice obtusum basi latissimum valde concavum glabrum 1-nerviun, lateralia oblique triangulari-oblongi concava 3 mm. longa basi Utissime 2£ mm. lata *apioa* obtusa 1-nen-ia giabra. **Petals** ovatooblonga 2^ mm. longa 1J mm. lata apice obtusa 1-noxTia glalira. Labelum orectum oblongo-ti-iangulare 2 mm. longum 1j mm. latnm ;iljice acutinn basi abmpto tnu-

cato-OOnfauetum ad UUgUam \ mm, loDgnm totiusque latum  
abeims, iingtto basL pede oolnm-  
nse connate calcax breve sacciforme J mm. loiiymn formanti. Coliunna sul->  
nulla Jmm. longa basi in podem circ. 2 mm. longnm pixjducta; dimidium

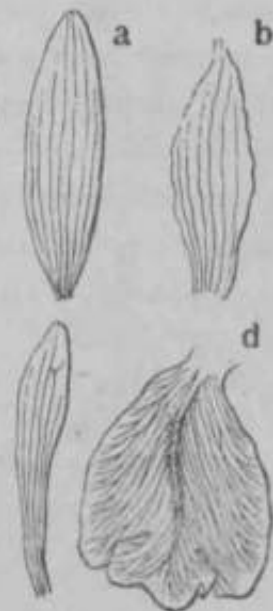
pedis cum sepalis lateralibus connatum, dimidiom liberum apice cum basi unguis labelli connatum sacculum formans; rostellum 2-lobum, lobis acuminatis; ~~anthera~~ late triangulari-obtusata 5 mm. longa; pollinia 8.

**HAB.** Loco non indicato, leg. U. Mom, 1910.

Near *Phreatia nelindaris*, *P. sacdfera* find *P. chgans*; but it does not accord with neither in the shape of the leaves, pseudobulbs and flowers.

***I\*hajus* Loun.**

***Phajus gracilis* HAYATA** (Fig. 26) Mater. Fl. Formos., p. 322. Caules 40-50 cm. longi, racemis a basi caulium emergentibus. Folia elongata plicata in petiolum longum contracta, laminis obovato-oblongis 20 cm. longis 6 cm. Intis apice obtuse acuminatis basi distincte contractis, petiolis 2-3 cm. longis basi **vaginalis**, vaginis 8 cm. longis striatis. Racemi cum pedunculis 30 cm. longi erecti graciles, partibus floriferis 8 cm. longis laxifloratis, bracteis oblongo-linearibus 1 cm. longis, floribus majusculis 3 cm. longis (quater ovarium). Wopala lijom patentia, posticum angustatum 3 cm. longum 1 cm. latum utrinque obtusum, laterali postico breviora oblonga 3 cm. longa 1 cm. Loba apice plicato-aeufca basi obliqua latere inferiore **obsoleta** auicnLiti. Folia sopal opfistico angustiora spatulata 3 cm. longa 6 mm. Loba apice obtusa basi attenuata. Labellum erectum cucullatum 28 mm. longum 25 mm. Latum (expanso) basi in calcar rectum 1 cm. longum productum 3-lobatum, lobis lateralibus amplius erectis columnam involventibus apice undulatis, lobis medio expanso latiore 1 cm. lato 8 mm. longo patent! margine undulato apice emarginato-2-lobato prope basin lamulbito-taberculato, lamellis medio iucrasatis hirsutis csetentibus glabris. Columna longiuscula 2 cm. longa 2-alata apice bivata, alis latioribus.



**Fig. 26, *Phajus gracilis* HAYATA; n, dorsal sepal; h, lateral sepal; c, petal; d, lip.**

**HAB.** Ivoshim: Botansha, leg. G. NAKAHARA, Dec. 1906, (No. 788).

***Phajus undulatomarginata* HAYATA** sp. nov. (Fig. 27.) Terrestre. Pseudobulbi ovato-fusiformes 2-3 cm. longi 8 mm. lati apice attenuati basi obtusati apice 2-3-foliati. Folia lanceolata 20 cm. longa 3 cm. lata apice

acuminata basi attenuata ad petiolum vaginiformem abeuiitia, nervia immifestis 3, essiccato membranacen- intligo-ooloitita, **YSgXOB** 10 cm. longis. Srcipi

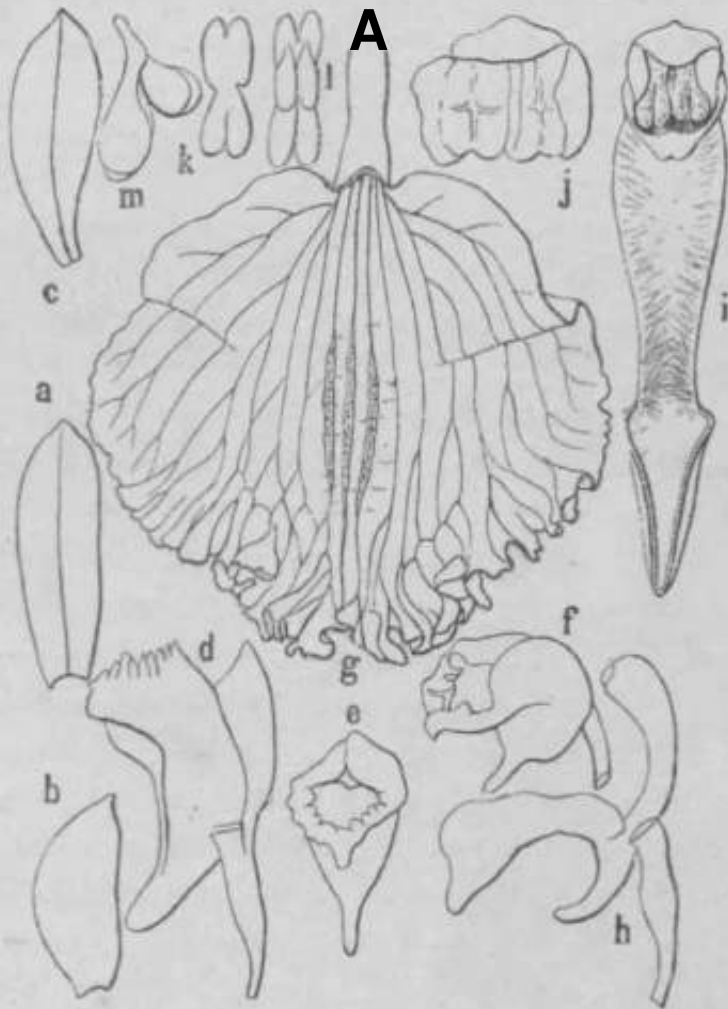


Fig 27, *Liparis undulatomargmda* HAYATA; a, a ilvrenl sepl; b, (i lteral eepal; c, ft petal; A, e, f, a lip, seen from differnt sidas; g, a lip, tmfolded; "h, n oolmnn with a spar; i, ft column with a bnsnl portion of a Bpur; j, an opercalum lifted, »«u from front; k, pollioin, seen from front; l, the same, seen from fan k j m, the same, seen from aide; a—f, and h, nearly n/itoral size; others variously magnified.

aphylli 25cm.longi vaginati, vaginis 3 cm. longis 6-7 mm. lafcis apiee aeutis, partibns floriferis 8 tin. longis, braetels i 'I K tvatis 1J cm. longis 1 cm. latfa apica acamiiiata basi **anrplexicaiili-** bns. **Sepftmn** ]x3- ticiin augnstato-oblongmn 3 cm. longiun lc'ju.liitmii upice obtiism bast leritar contractnm 4 mm. latum, later- **alia** postico latioi-a **obiiqoa 12 mm.** Lit,i **breviora 2J cm.** longa 7 - newia. Petala oblanceolata vel obovato-spat3i- nlata 3 cm. long)! 1 em. lata cleorsum ctmeato - attemiata ad ljasiu 2 mm.lata 7-nervia. Lal^el-

**lmm** esplicato late rotimdatiun 2J cm.litnm totiusque loDgnm apice sul>- emargiatmn busi conti-actiim, ad orom calcaria 3 mm. lattim, lobis lateralibua aniplis orectis somioblongia 2 cm. *lougis* 8 mm. latis margins latara intsgri;?

non plicatis, margine anteriore valde plicato-undiilatis ad lobum centram gradatim abeuntibus lobo centrali brevissimo obscuro apice emarginato margine valde undulato-plicato, facie medio discis 3-5-striatis hirsutis instructum basi medio hirsutum calcaratum, calcari circ 8 mm. longo 2 mm. lato vel latiore intus liirsuto. Columna 1jcm. longa 2 mm. lata 2-alata intus dense hirsuta. Bostellum validiusculum semirotondatum antice productum apice rotundatum.

HAB. Shintengai, leg. K. KANEHIRA, Mai., 1912.

Somewhat near *Pfajus maculata* LINDL. (Ann. Koy. Bot. Gard. Calc. VIII. t. 149) in the shape of the lips which are undulately plicate at the margin, but greatly different from it in having much smaller form, lanceolate leaves with long petioles.

### ***Tainia* BLUME.**

***Tainia cordifolia*** HOOK. f. in HOOK. IC. PI. XIX. t. 1861; HAYATA et MATSUM. Enum. PI. Formos. p. 410.

*Tainia Faurid* SCHLECHT. FEDD. Kep. IX. 1911, p. 282.

HAB. in montibus Kusshaku, leg. U. FAURIE, 1903 (No. 539).

SOHLECHTER'S *Tainia Faurid* is the same species as a plant mentioned in our work as *Tainia cordifolia* HOOK, f., as it was collected by the same collector at the same place and distributed with the same number. At Kew, I compared my plant with the type of this species, and found it to be identical with the same.

***Tainia unguiculata*** HAYATA sp. nov. (Fig. 28)=*Tainiopsis unguicidata* HAYATA in sched. Herb. Tōkyō. Kadices incrassatse; rhizoma subrepens ascendens ramosum teres in exsiccatō 4 mm. in diametro, internodiis 7-10 mm. longis, ad nodos squamis 4inis instructis, squamis ovatis scariosis 3-4 cm. longis 2 cm. latis apice acuminatis basi rhizoma amplectantibus. Folia ad apicem rhizomatis rami solitaria longe petiolata lanceolata (duplicato-plicata) 25 cm. longa 6-7 cm. lata apice acuta vel acuminata basi longe attenuata 5-nervia, nervis parallelis, intra nervos 6-vena, venis parallelis, in exsiccatō membranacea, petiolis 5 cm. longis apice cum laminis folii articulatis teretibus multisulcatis basi cum rhizomate articulatis. Scapi ad apicem rami rhizomatis solitarii vel gemini circ. 10 cm. longi vaginis scariosis ovatis obtekti, vaginis apice acuminatis 2-3 cm. longis quam internodio longioribus. Flores solitarii vel pauci-racemosi, bracteis ovatis



acuminatis 2½ cm.  
 longis alabastrini  
 flaris amplexanti-  
 bus, pedicellis 5  
 mm. longis, ovariis  
 1 cm. longis lineari-  
 bus gradlibns ½  
 mm. in diametro  
 eulcatis. 3?lores  
 patentee 4 cm,  
 longi totiusque  
 lati. Sepalum pos-  
 ticum obloug-  
 obovatam 23 mm.  
 longura 10 mm.  
 latum basi fere  
 hand contractum,  
 sepal a lateralibus  
 magna oblique tri-  
 angulata latere  
 superiore 2 cm.  
 longa latere in-  
 feriore 3-4 cm.

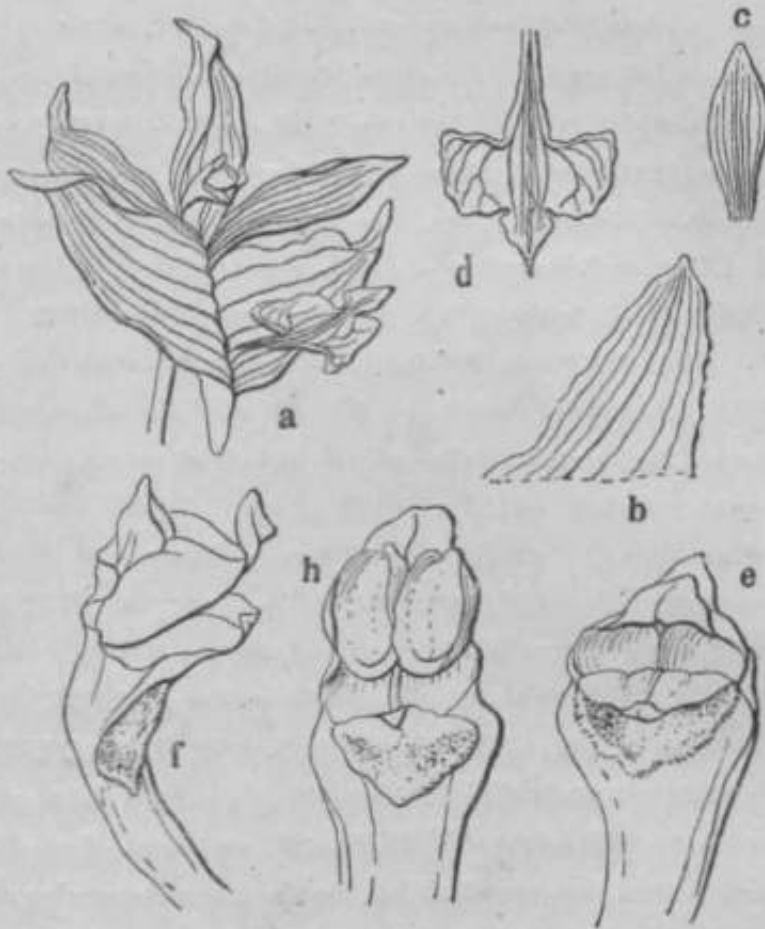


Fig. 28, *Tainia wyjuicvdxta* HAYATA; a, fl. flower, expanded; b, a detail of dorsal sepal; c, a petal; d, a lip; e, apical portion of its column; f, the same, sepal from sulcus; U, the same, seen from front, anther lifted;

longa basi 2½ era. lata apice acuta basi cum pede columnae ciliolata mentem  
 2 cm. longam formantia, latere superiore hinc, latere inferioro basi se con-  
 nata calcar 7 mm. longum 4 mm. latum formantia. Labellum ad orem  
 calcaris situm liberum longe unguiculatum, unguibus linearibus 9 mm. longia  
 4 mm. laevis sursum ad laminam expansum, lamina cruciformi 3-lobata 2 cm.  
 lata 1½ cm. longa, lobo terminali triangulari-ovato 6 mm. krago 5 mm. lato  
 apice triangulari-acuto ad summum cuspidato-acuto basi leviter contracto ad  
 basin 3 mm. lato, lobis lateralibus divaricatis rectangulari-auriculiformibus  
 8 mm. latis totiusque longis. Discus medio labelli 1-lamellatus, lamella circ.  
 2 cm. longa eraasuscula. Columna ciliata. 10 mm. longa 2 mm. lata subalata

apice dilatata circ. 3½ mm. lata nuda, basi in mentum 2} cm. longum producta, stigmati triangulari. Rostellum triangulare, latere clinandrii ultra insertionem antherarum producto. Anthera ovata 2-ocularis cum appendice 4 mm. longa, appendice connectivi antice producto, sessilis dorso 2-cucullata.

HAB. Formosa: loco non indicator cult, in seminario, Taihoku.

Near *Tainia cordifolia* HOOK, f.; but differs by the much broader sepals, unguiculate lips, and much narrower lanceolate leaves.

It is with some hesitation that I have referred this plant to *Tainia*. It bears some resemblance to *Tainia* and *Acantliephippium* in its terrestrial habit, large membranous plicate petiolate leaves, few-large-flowered short lateral racemes, and in having Lateral sepals adnating to the foot of the column, erect petals, footed column and 8 pollinia. Besides, it resembles the former more affirmatively by the long slender column with wings towards the apex and solitary leaves; while its affinity with the latter is more emphasized by the short lateral sheathed raceme, lateral sepals adnating to the long foot of the column to form a large pouch-like spurred mentum, mobile small stipitate lips with broad incurved lateral lobes and a small triangular terminal lobe, and long footed column. But it differs from *Tainia* on one hand by the short few flowered sheathed raceme, lateral sepals adnating to the long foot of the column to form a large pouch-like spurred mentum, mobile small stalked lip with broad incurved lateral lobes and a small triangular terminal lobe, and by long footed column; while on the other it is distinguishable from *Acantliephippium* by the long slender column winged towards the apex, solitary leaves, not fleshy flowers, and free sepals. Upon considering all the characters above mentioned, I am very-much inclined to regard the plant as representing a new genus, *Tainiopsis*, just intermediate between the two named genera. What is rejected from one genus is accepted by the other, and *vice versa*. The two (*Tainia* and *Acantliephippium*) may be united to one and the same genus, when the characters which separate each other are connected by the one represented by this new orchid; or the three may be regarded as distinct. In my opinion, however, the new genus *Tainiopsis* should be regarded as a valid one, so long as the two (*Tainia* and *Acantliephippium*) should stand as distinct ones.

*JPleione* Dos.

**Pleione formosana** HAYATA Mater. Fl. Formos. p. 326. *Cadogyne formosana* HAYATA in sched. herb. Taihotti. Descriptio nuctata. Pseudobulbi ampulliformes apice rostrati emn rostris 3 em. loigi 17 mm. lati basi globost, parfcibus globosis 17 mm, in ditimetro, partibiis rostratis 1cm. longis }em, latis apioe truncatis. Sepala petalaquo purpureo-rosea. Labelliun album ~~VBBa~~ discos maculatiim. Peduneidi 20 cm. loigi, fraefcus aiugtilos gerentes. CapsiiLi elavato-cylindiica ± 3cm.longa 8 mm. lata apice abrupte hnmcata basi cuneato-attenuatA 6-costafai inter costas lavfande siilcata, petlicellis 1 cm. longis.

ILVB. Semnroi-a, in Mt. Arisan, ad 6000 peel, alt., leg. B. HAYATA. et T. ITO, ^rart., 1914,

*Pholidota* LINDL.

**Pholidota iraiensis** HVYATA sp. nov. (Fig. 29) Kliizoma repens sub-  
tems 2 mm, in diametro, squamis  
scariosis dense obtectum, sqimms  
8-10 mm. longis deoisnm vagini-  
foranbiis rliizoma complete am-  
plcictantibus apice acutās venoais  
se imbricatis, Psoudobnlbi ascen-  
dentes 1-nodosi ovoidei apice  
truncato-obtusi basi rotandati ±  
leviter teniissime complaBati  
2 cm. long! 1 cm. lati l>asi sqiamis  
imbricatis in magnitudine vari-  
abilibus demum defectis dense  
obtecti vel basi reliqui's sqim-  
mai-um instrneti. Folia gemina  
tenuinalia ad apicem pseudobtill 'i  
sita Hneari-oblanceolata 9 cm.  
lougā 7 mm. lata deorsum gra-  
datim attenuata ad petiohmi 1£ mm. longum abeuntia ad apioem fcriangulari-  
~~obtusa~~ Tel obtuse nmawnata, lamina sabcoriacea snpm plana margiio desupor



Fig. 29, *Pholidota traknsui* HAYATA; a, a flower; b, a dorsal sepal; c, an internal sepal; d, a petal; e, a lip; f, the same in vertical section; g, a stamen column; h, the anther, in section; i, an operculum, lifted up; j, a pollinium.

recurva ad costas subsulcata, nem's venisque utraque paginenondisfcinctis, petiolis haud distinctis cum pseudobulbo articulatis. Scapi vel racemi e basi pseudobulbi oriundi basi sqamiferi 8 cm. longi sursum filiformes, parte florifera 2£-3 cm. longa, biacteis ovatis 4.J mm. longis 4 mm. latis valde concavis subplicatis valde acutis 5-nerviis alabastrum floris amplectantibus caducissimis post anthesin deciduis, floribus subclausis vel subpatentibus 4 mm. longis densiusculis a se 2 mm. remotis, pedicellis ascendentibiis 2 mm. longis, ovariis 1 mm. longis. Sepalum posticum ovatum 4£ mm. longum 2| mm. latum apice angukto-obtusissimum basi vix contractum 2 mm. latum planum vel leviter concavum 3-nervium, nervis parallelis, margine integrum, lateralia obliqua ovata plicato-concava saquilonga cum postico, apice obtnsa basi ± contracta 3-nervia dorso manifeste ad costam carinata, carinis infra apicem acute productis. Petala late oblonga vel kte obovata 4 mm. longa 3 mm. lata apice triangulari-obtusa basi cuneato-obtusa ad basin 1 mm. lata subplana 3-nervia, nervis parallelis. Labellum valde concavum in explicata late rotundatum 3 mm. longum 4£ mm. latum apice late rotundatum ad centrum breve obtuse cuspidatum, (cuspidibus triangularibus *i* mm. longis totiusque latis ad apicem obtusis), basi contractum prope basin disco transverso versus marginem valido, ad centrum tenui uno instructum basi ad pedem column© affixum. Columna 2 mm. longa subteres basi in pedem circ 1 mm. longum tumidum producta. Pollinia 4.

HAB. Uraislia, leg. S. SASAKI, Jan., 1913. Kemarkable for its having scapes arising from the very base of the 1-noded pseudobulbs.

***Calanthe* K. 'Bit.**

***Calanthe axisanensis*** HAYATA Mater. Fl. Formos. p. 327.

HAB. Inter Funkiko-Taroyen, leg. B. HAYATA et T. ITŌ, Mart., 1914.

Note: Flowers nearly white, ovary slightly purple. Capsules elongate-obovoid 3£ cm. long 1J cm. broad attenuate at the base, pedicels 1cm. long.

***Calanthe brevicolumna*** HAYATA (Fig. 30) Mater. Fl. Formos.p. 328. Caulis brevis incrassatus 1-2-foliatus. Folia sessilia oblanceolata 35 cm. longa 8 cm. lata apice acuta basi attenuata. Scapi aphylli vel 1-foliati vel vaginati 70 cm. longi validiusculi, racemis densifloratis 10 cm. longis, bracteis ovatis



Fig. 30, *Calanthe breviatunna* HAYATA : a, fl. flower; b, a uppermost sepal; c, a lateral sepal; d, lip.

2 cm. longis 6 mm. latis. Flores mediocri 2 cm. in diametro, pedicellis 5 mm. longis. Sepala sequalia erecto-patentia ovata 9 mm. longa 6 mm. Uta apice obfusa basi contracta. Petala sepalis angustiora oblongo-angustata 1 cm. longa 3 mm. lata apice truncata basi angustata. Labellum sepalis longius, (unguis cum alis columnae in tibiam connatis, tubo late campanulato 3 mm. in diametro), ima basi in calcar 6 mm. longum 1 mm. latum productum, calcar subrecto; lamina patens obovata in circumscriptione 8 mm. longa 5 mm. lata 3-lobata, lobo medio longiore 6 mm. longo apice divaricato-2-lobulato, (lobulis oblongo-truncatis), basi cuneato, lobis lateralibus minoribus oblique oblongis anticis falcatis apice obtusis 3 mm. longis 1 mm. latis; discus calloso-cristatus basi labelli 3-soriatum. Columna brevis 3 mm. longum. Clinidium excavatum; rostellum 2-lobatum, lobis oblongis obtusis; anthera rotundata antico brevis acuta. Pollinia 8 elongato-ovata apice acuminata, caudiculis brevissimis.

Il us. Taito : **Bataian**, leg. T. KAWAKAGE, **Apxili** 1907.

Near *C. Jierhacea* LINDL., but differs from it in having much shorter spines, and in the lips, sepals, and in many other points,

***Calanthe caudatilabella* HAYATA sp. nov. (Tab. Xin.) *Pseudobulbi*.**  
 . . . . Folia 5-6 ex apice pseudobulbi orinnda unari-lanceolata 20-30 cm. longa 1-1.5 cm. lata, apice acuminata basi gradatim attenuata basi plioata in exsiccato membranacea, venis lateralibus multis, venis transversis tessellatis. Scapi 35 cm. longi simpliciter, partibus floriferis 15 cm. longis, bracteis ovato-lanceolata apice acuminata, foliis a se 1 cm. remotis. Sepala lanceolata 2 cm. longum 5 mm. latum apice acuminatum basi leviter contractum, latera oblique lanceolata 23 mm. longa 5 mm. lata apice acuminata basi leviter contracta. Petala parviora 12 mm. longa 2 mm. lata apice

acuminata. Labelli lamina ovata 16 mm. longa 12 mm. lata apice breve caudata basi contracta a medio sursum 3-lobata, lobo terminali ovato circ. 1 cm. longo 6 mm. lato apice cuspidato-caudato basi contracto 4 mm. lato, lobis lateralibus late oblongis apice truncatis 4 mm. latis 3 mm. longis, margine irregulariter crenulato-denticulatum basi cum columna connatum, partibus connatis 5 mm. longis intus villosopilosis, pilis rectis, calcaribus linearibus 5 mm. longis 1 mm. in diametro desuper recurvatis. Discus basi laminae labelli situs 2-lamellatus. G)lumna brevis 4 mm. longa. Rostellum acutum apice 2-lobum, lobis acutis. Ovarium hirsutum 4 mm. longum, pedicello brevi.

HAB. Kinkiho: Gosarin, ad 7000 ped. alt., leg. H. INABA, Aug., 1912.

**Calanthe forsythiiflora** HAYATA sp. nov. (Tab. XIV.) Rhizoma erectum, mdicibus incrassatis. Folia 4-3 fasciculata basi se involventia ob-lanceolata membranacea 40 cm. longa 6 cm. lata apice acuminata ad summum acuta basi gradatim attenuata, partibus attenuatis 13 cm. longis, nervis principalibus 5, inter nervos venis 12, venulis transversis tessellatis. Scapi e basi fasciculi foliorum oriundi 30-40 cm. longi aphylli vaginati, vaginis scariosis 3£ cm. longis 6 mm. in diametro apice acutis ore obliquissimis a se 8cm. remotis, partibus floriferis 8 cm. longis flores flavos racemosim gerentibus, floribus a se 1 cm. remotis korizontaliter patentibus vel sub nutantibus subsecundum dispositis, bracteis valde caducis non visis, pedicellis (cum ovario 7 mm. longis) 4 mm. longis. Sepalum posticum obovatum 8 mm. longum 4 mm. latum apice acutum vel aristato-acutum basiJformiter insertum 3 mm. latum 3-5-nervium, lateralia oblique ovata vel obovata postico conformia. Petala tenuissima late ovata ± obliqua 7 mm. longa 4-5 mm. lata apice subito acuta vel mucronato-acuta basi contracta 1J mm. lata 3-nervia, nervis parallelis, valde concava. Labellum basi cum columna connatum, lamina lato rotundato-reniformi 3£ mm. longa 5£ mm. lata apice late rotundata ad centrum emarginata ad medium partis emarginato breve mucronata basi contracta 2 mm. lata basi utraque latere auriculis instructa, auriculis semirobundatis £ mm. longis totiusque latis, multinervium basi medio discis 2 instructum, discis auriculiformibus J mm. longis *i* mm. latis lamelliformibus, calcaribus it recurvis 3£ mm. longis apice zh dilatatis *li* mm. in diametro. Columna 2 mm. longa; clinandrium concavum. Pollinia 8.

IIAB. Kuslmn, leg. T. KAWAKASU et T. ITŌ, 1909, Jimi.

*Yety* near *C. Mannii* HOOK. fil. in Grch. Sikk. Himal. in Ami. Roy. Bot. Gaicl. Cale. YHI, t. 225, in its external appeamnee, but differs by the quite yellow flowers with qnite diilerent lips.

*Calanthe graciliflora* HAYATA (Fig. 31) Mater. EL Fonnos. p. 329. FoUa 2-3 oblongo-si>athulatfi cum vaguiis 30 cm. longa (3Jem.lata apioe

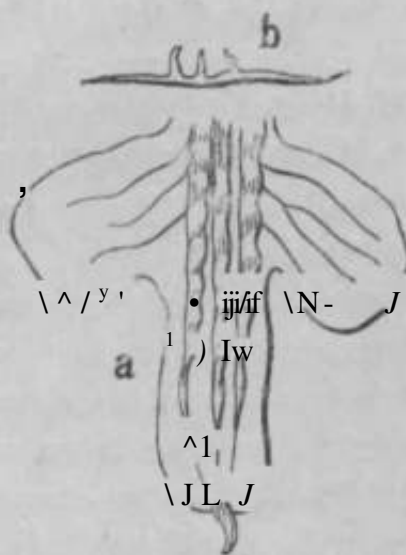


Fig. 31, *Qabmfhegrtuyiffra* HAYATA; a, < lip; b, section of it basal portion of the same.

acuminata basi gradatim attenuata at vaginam aijeuntitt. titrinque glabra plieato-plana. Scapi graciles GO cm. longi, racemis laxifloratis, floribus mediocribus 3£ cm. in diametro, bracteis lanceolatis scariosis 1 cm. longis tenuibusj pedicellis gmcilibus 1 cm. longis, petalis et sopalia valde postict; reflexis, labollo antice horizoufculiter patonti. Sepala snbrequalia oblongo-lanceolata 2 cm. Iouga 6 mm. lata apiee aristato-acmtnatji bagi leviter contractn, 5-nerria estiis bnivn Lii'tellata. Fetala sapalis angnstiom ob-lanceokita apiee acnta busi attonnata 18 mm. longa 4 mm. lata 3-nurvia. Labellum antice patens; uugnis cum alis columnxe in tubum

connatiia, tubo augiisto (om 2 mm. in diametro iutus lni-tellato) ima basi attenuato in calcar 12 mm. longtmi 1 mm. latran producto, calcai'i extns et iatxm lnrntellato; ljimiim liilxjlli l-ottmdata in ainbitu 1 cm. longa totitisque Lita 3-lobibi, lobo medio angusto 5 mm. Iongo 2 mm. Iato apiee emai'giniito-ai'istato, aiistis 1 mm. longis desnper itiflexw, lobis kteralibas quadri'angulari-it)tundatis 4 mm, longis totiusque latia oblique diTOIM>tiB; discus calloso-laniellatns, Iiunellis 3. Oolumna brevis 5 mm. longa clavatft. Ginandrium oscavatum, lobo posterior tnmcato, anteriore (rostallo) 2-lobato, lf^bis dentiformibus. Anthera operenlaius incuiubens, postieo coKlata antice acuminata 3 ram. longa (Ustincte 2-locularis, loculis distincte 2-Ioeellatis. Pollinia 8 subcomplanata oblongato-ovata apiee attenuata 1^ mm. longji cancluculis counata, candiculis 1 nun. Iougis.

HAD. Nau6, Kiiumonsha, ad 3200 ped. alt., Aprili. 1909, (No. 15), leg. U. Hour.

Near *G. Henryi* ROUE., but differs from it by the much narrower leaves and by the lips with very much divaricate side-lobes which are inserted at nearly 90°. In the other respects they are inserted at an acute angle and nearly as long as the middle lobe. Sepals and petals greenish red, rosaceous on the outer side, but greenish yellow on the inner; lips whitish; column light rose.

*Calanthe Kawakamii* HAYATA (Fig. 32) Mater. EL Forinos. p. 330. Caulis brevis in pseudobulbuni Lite globosius 1 cm. longum in crassatua basi vaginatus *sajmi* baain foliatus. Folia oblonga 20 cm. longa 0.5 cm. lata apice brevis acuta basi abnupte ad **vaginam** contm-ta plicatoplena. Scapi 40-50 cm. longi gi-aciles lasifnli-iK vel aphylli vaginati, racemis luxu floratis, floribus brevis pedicel latis, bracteis lanceolatis 1 cm. longis. Flores niajnsculi 3 j- cm. longi, pedicellis 5 mm. longis. Sepala in & qualia estns brevissime liliellata, **posticain** majus ovato-oblongum 33 mm. longius 15 mm. latum apice brevis cuspidatoocnttn basi contractnm, hiteralia angustiori ublongo-lanceolata 3 cm. longia 1 cm. lata apice obtuse acimiuut;t; basi angustata. Ijabelli imgius **alls** columnje in tubm canipanuLitum (ore 5 mm. in diametro) connatus, inia basi in calcar 7 mm. longum rectum productus, lamina patens 2 cm. longum, totmsque lata proinde 3-lobata., lobo medio obovatooblongo 13 mm. longo 9 mm. lato apice omarginato ad stuns brevis aristato basi angustato, lobis **biexallbtffi** divaricatis culti-iformibus 1.5 cm. longis 8 mm. latis **apdoe** rotundatis; discus 4-laniellatus, Umellis snpiw medium laminarum sitis, 2-hiteralibus a medio deorsum intis dense pilosis. Columna, lata brevis 8 mm. longum\* alis cum unguo hibeUi connatis. Clinandrium profunde excavatum oblique truncatum, lobo anteriori\* e (lwtollo) oblique erecto 2-lobato, lobis deutiformibus; anthera ad apicem membranarum posterioram clinandrii affixa **tnaombeoa** cordatoovata apice obtuse



Fig. 32, *Calanthe Kawakamii* HAYATA; a, n. o. sepel; b, a. M. sepel; c, n. petal; d, a lip.



acuminata 7 mm. longa 4 mm. lata 2-locularia. Pollinia 8, in singulo loculo 4, cerea oblonga plus minus complauata apica attenuata basi rotundata circ. 2j nun. longa apice eaduculis connata, eaduculis filiformibus 21 mm. longis.

HAB. Shintiku: Gakokdzan, leg. T. KAWAKAMI et K. WATANABE, Apvili. 1907.

**Calanthe lamellata** HAYATA sp. nov. (Fig. 33.) Caulis 20-30 cm. longus gracilis infra medium 2-3-foliatus sursum racemosus, racemis circ. 10 cm. longis. Folia 3-4 ovato-oblonga 15 cm. longa 6-7 cm. laeta apice subito; nitida basi fittentata sessilia caulem amplectantia margine integra vel leviter crispata, venis nervisque vix marginali connectis, bracteis ovato-lanceolatis 7 mm. longis. Sepala subaequalia; existunt ovato-oblongum 23 mm. longum 10 mm. laetum apice acutum basi plus minus contractum margine non recurvum 5-nerviis, lateiis ostio conformia. Petala ovato-

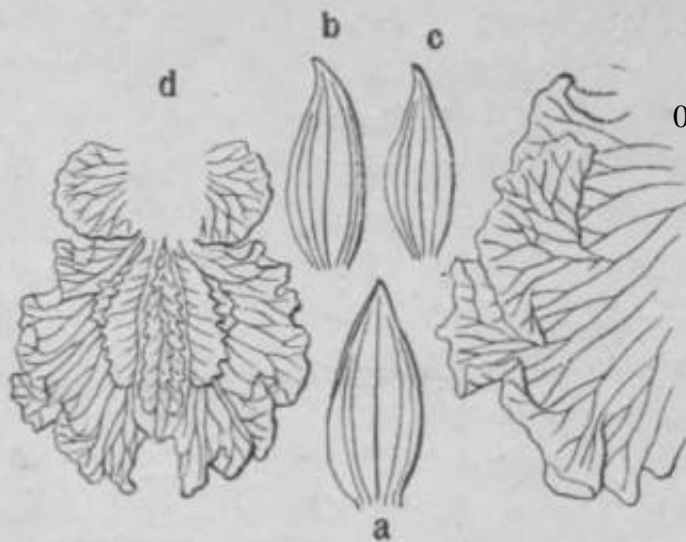


Fig. 33, *Calanthe lamellata* HAYATA; b, uppermost sepal; c, lower sepal; d, lip of the same.

oblonga 11 cm. longis 5 mm. lata apice acuta basi plus minus contracta 3-nerviis vel obsessis 5-nerviis. Labellum callosum ovatum 2 cm. longiusque latius apice profunde emarginatum vel leviter 2-lobum ad ciliatum apicis brevissime truncatum acutum vel mucronato-acutum contractum pins

minus eordatum **S-lobum**, **lobis** **baa** **Uarabns** (latertilibos) antrifoliosum 4 mm. longia totiusque latis vix quadrangularibus margine crenulatis, lobis terminalibus rufiformi-rotundatis 1 cm. longo 2 cm. lato basi contracto 2 mm. lato apice leviter bilobato ad centrum apicis brevissime acuto margine valde undulato-plicato-erectato. Discus ad medium lobi terminalis situ longitudinaliter 3-5 kuneis, lamellis circ. 1 cm. longis 2 mm. latis, margine ciliatis. Columna bracte-



apice usque ad laminam laevill 2 cm. longo apico subrecto acuto. Discus basi laminic 3-striatim dispositus obsennts. Columna 5 mm. longn ± dorso necurva.

HAB. Ato, Mt. **Bopeean, kg.** EL SASAKI, Mart., 1910.

*FAtlophia* E. BR.

*Eulophia bracliycentra* HAYATA sp. HOT. (Fig. 36, a) Fasciculi foilo- mm basi vaginati, vaginis 3-4, 10-20 ran. longia inferioro cyliiidmceis superlore laneeolatis. Folia 3-4-fascieilata lmeori-lanceolata cire. 50cm. longa 12 nun. Iata apiee acuminata basi gradatira attenuate inferiors propt> basin vaginatt se amplectantia supra minute elevato-renulosii subtus pruminente 3-nervin, **nerns** elovatis, minute Tenulosn. Scapx (raccmi) 73 cm. longi folia multo



Fig. 36, a, *Kidojihin*

*brach* I'-mtm IUVAI A ;  
*Kiiiophia Minnxa* HAYATA ; 1 >  
 n flow»-r: f, u donml sepal;  
 il, ft lalernl rs<D>fil; e. a i\*tnl;  
 f. n lip; g. ij column, 9(\*11  
 from front; h, *Di* sniae, awn  
 from sidn; b. imtural size,  
 others more or less magnified.  
 Fig. 36, a, HAYATA;  
 •-a EUYATA; • !L  
 " " " • \*\*\*\*\* " •  
 ft flower: c, it dorsal sepal;  
 d. ft kitmi *nopal*; e, a petal;

superontes, parte non florifei7i G2 cm. longa IUI  
 inxlos vaginata, vaginis cylindi-aceis 10 cm. longis  
 sursum lauceolatis aeiuninatis, parte florifora 10-  
 13 cni, longa densiuscne florata, floiibtis a so  
 1 cm. remotis, bractois glabris lanceolatis 1cm.  
 longis apiee ncumtnatis, pedioellis cmn ovarii  
 15-20 mm. longis, floribua apertientibns 25 mm.  
 in diametro, sepnlis petalisque patentiasimis.  
 Sepalnm jx>sficm olwvnto-olJong^im 13 mm.  
 longnm G mm. Lit nm **apice** obtusum ad summmn  
 npieiliitniii, (apiculo desui>er recurro), basi ± con-  
 tractiim2mm. latum 7-fl-nenium margiueplamim  
 piw[]eapict:mint+aiurc nciuTumgIabnim,lateraliii

<nmpostieoconformia ± obliqna. Petala oblongft  
 sepalo postieo latiora 1'S mm. longa 7-8 mm. **tata**

apk'o ubtiisissima basi couti-acta obtusissimii  
 2 nun. lata 7-nenia. Labellum erecto-patens Life

obovatnm 1} cm. longum 14 mm. latnm glabnim  
 l>asi sul>calojiratuui vel monti-forme (mento 4 mm.

longo) 3-lobatum, lobis LitemlHnis (basiLuibas)  
 semi-oblongis apiee rotumlntis 3-4 mm. latis

!i-lvctis iinir^inciit<\*gns, lolx)torminalioblango 7-8 mm. lingo7 mm. latoapiee  
 i-fecte rotundato basi non contra\*-to nmrgino **stasmO** nmlnl.it.) plirnto. Biseus

a prope apicem ad supra basin situs 5-striato-lamellatus, lamellis sursnm <?onvergentibus crassiusculis crispatis medio tenuissimis vel ad nullum rediictis evanescentibus deorsum prominentibus latioribus, |xirtibus latioribus circ. 1 mm. latis. Columna 8 mm. longa semiteres ^-formis in sectione subapoda ? Follinia 2 globosa, stipite lineari 1 } mm. longo £mm. lato.

HAB. Taitō: Shinkōgai, leg. Z. KOBAYASHI, Juni., 190C, fl.

Near *Eulqphia lierbacea* LINDL. (Ann. Roy. Bot. Gard. Calc. XI. part-2, t. 106.), but differs from it by the narrower leaves, lamellate discs, undulate margins of the lips and by many other points.

**Eulophia ramosa** HAYATA (Fig. 35, b-h), Mater. Fl. Formos. p. 332. Giulis circ. 50 cm. longus glaber angulatus striatus basi squamatus, (squamis amplexicaulibus ovatis acutis 15 mm. longis), superiore racemosus. Folia (KAWAKAMI, NO. 6281) inferiora lanceolato-lineararia 20 cm. longa 6 mm. lata basi amplexicaulia ad vaginam attenuata, superiora minora lineararia 3-6 cm. longa amplexicaulia plicata. Kacomi 20-25 cm. longi pauci-ramosi, ramis gracilibus erectis. Flores erecto-ascendentes 15 mm. longi, pedicellis cum ovario 15 mm. longis, bracteis ovatis acuminatis pedicellum amplectantibus 7 mm. longis. Sepala sequiformia lanceolato-angustata 12 mm. longa 2% mm. lata apice acuta basi leviter angustata erecta. Petala sepalis latiora plus minus breviora 11 mm. longa 3} mm. lata lanceolato-obovata apico acuta erecta. Labelliim a basi columns erectum obovatiim sepalum in longitudine soquans 11 mm. longum 8 mm. latum, inter sepala lateralia in calcar gibbosum 2 mm. longum ad apicem leviter contractum productum, supra basin contractnm 3-lobatum, lobis lateralibus erectis columnam amplectantibus latissimis margine latere integris antice eroso-denticulatis apice obtusis, lobo centrali patenti globoso-obovato 4 mm. longo 5 mm. lato apice rotundato-truncato basi leviter contracto ad basin 3 mm. lato. Discus medio a basi labellorum usque ad medium 3-lamellatus, (lamellis utrinquo ramosis), etiamque ad paginam lobi oentralis a medio usque ad prope apicem fimbriato-cristatus. Columna brevis crassa aj)oda sropius 2-alata. Ovarium cylindricum sulcatum 6 mm. longum.

HAB. Nōkōzan, leg. T. KAWAKAMI et U. MORI, 1908, Jan. (No. 6281).

The present species is near *E. taiwancn&is* HAYATA, from which it differs in having branched inflorescence and smaller flowers with slightly denticulate lips.

*Cymbidium Sw.*

**Cymbidium albo-jUCUndissimumHAYATA** sp. nov. Pseudobulbi annotini conico-ovati 6cm.longi 2Jem.lati infra medium latissimi subcomplauati circ. 4-nodosi, internodiis longioribus 1jcm. longis, brevioribus 8 mm. longis. Folia lanceolata 30 cm. longa 22 mm. lata apice acuminata basi cum petiolis articulata supra nitida viridia subtus opaca margine sub lente suberosa, costis subtus acuto-elevatis, nervis lateralibus principalibus utroque latere costsB 2, crasso-coriacea, petiolis 2 cm. longis subplicatis in explicato 12 mm. latis. Scapi vel racemi 30 cm. longi. Flores apertientes 4 cm. in diametro, pedicellis cum ovariis 12 mm. longis, albescentes. Sepalum posticum obovato-lineari-lanceolatum 23 mm. longum 4 mm. latum apice acuminatum basi vix contractum 2 mm. latum 5-nervium planum margine integrum planum, lateralia cum postico conformia. Petala ovato-lanceolata 2 cm. longa 5 mm. lata apice acuta basi obtusa 5-nervia margine interiore recurva .basi 1 mm. lata. Labellum ovatum 1} cm. longum 11 mm. latum, hypochilo 8 mm. longo 11 mm. lato rotundato erecto basi rotundato-contracto 2\ mm. lato facie glabro medio disco 2-lamellato instructo, lamellis subadnatis ( )-formiter dispositis, latere erecto, epichilo desuper recurvo oblongo facie dense brevissime muricato-liirtello 8 mm. longo 7 mm. lato apice obtusissimo ad summum brevissims triangulare apiculato vel non apiculato sursum prope apicem margine interiore sub-recurvo. Columna 12 mm. longa 3-3|mm. lata complanato-semiteres subalata.

HAB. Formosa: loco non indicator cult, in seminario Taihoku, leg. B. HAYATA, 1914, Mart.

Near (*C. sinense* WILLD., but differs from it by the smaller nearly white flowers, in the maculation of the lips and in more hirsute tarminal lobe of the latter.

**Cymbidium aloifolium** SWARTZ (Fig. 37, et 38-a); Orch. Sikkim Himal. in Ann. Roy. Bot. Gard. Calc. VIII. t. 252.

HAB. Form&sa: loco non indicato, cult, in sominario Taihoku, ld^ . T. SŌMA, Aug. 1913, (fl.).

Columnal foot is more conspicuous in our plant than in the figure in the above mentioned work. The following description is drawn from our specimens.

OBSERV. Folia crassa linearia 30-60 cm. longa 1} cm. lata in vivo supra

intida vuitUsaimft, vems 11011 visis, ad eostam teuniter sulcata subtns pallidiora, eostis eiovatis, margino desupor recurva apice ins&qualiter emarginata vel infiequaliter 2-Ioba, (lobo longiore 2 mm. Iongo 7 mm. lato apioe rofcuudato, lobo brevior sub-nullo), basi lion angustatti plicata cum vaginis articlata. Scapi vol raceini IH-IIIlni 32 em. longi, partibus basilaribus nou florifen's 8 cm. longis, partibus flori-foris 24 cm. longis, floribus A se 4 cm. remotis, bracteis lauceolatis 2 em. lougis pedicellum TIS siiperantibns, pedicellis cum ovariiis 2 cm. longis pafcenfcibus gracllibtis glabria. Mores3-4cm.in diametro, sepalis valde l-efkja)-retrorais, **labello** suljeyrecto. Sepalum -posticu in lineari-lanoeolatum 2 cm. longnm apico acukun basi vix vel hand angustius 2J mm. latum supra medium latis-simnm 4^ mm. latum 5-liervlum margine valde reflexum convesum, lateiali.i **omn** postico jcquilonga vis latiora 5 mm. loDga ± ob-



Fig. 37, (*tyinbidkun*. aJoi/Wium SWABTZ. xj; photograph by Mr. T. SOMA.

reflexa. Petala oblauceolata

2 cm. longa 6 ram. lata apice acuta basi gi^adatim augustata basi 2 mm. lnta niargiue valde extoriore reciirvft erecta 6-nervia ± obliqua. **Labellum**



apice acuto-obtusa basi cuneato-contracta 5-nervia. Labellum ovato-oblongum 18 mm. longum 1 cm. latum facie brevissime hirsutum inter hypochilum et epichilum constrictum ad constrictionem 7 mm. latum, hypochilo subrotundato 1 cm. in diametro basi cuneato-contracto 9-nervio erecto medio discis 2-lamellatis instructis lamellis ( )-formiter dispositis apice acutis, epichilo late ovato-rotundato 8-9 mm. lato 8 mm. longo apice rotundato-obtuso ad summum breve apiculato facie brevissime hirtellato 5-nervio patenti desuper recurvo. Columna complanata semi-teres 12 mm. longa.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, Juni. 1912.

Near *O. cn&jfolium* Sw. (Bot. Mag. t. 1751; Sōmokudusetsu, Vol. VIII. tt. 1 et 2); but differs by the falcate semi-oblong lateral sepals.

**Cymbidium formosanum** HAYATA Mater. Fl. Formos. p. 335. Folia ad apicem pseudobulbi 4-5 fasciculata, fasciculo singulo basi vaginis 4 apice ovato-lanceolatis acuminatis subplicatis nervosis 6-14 cm. longis involucreto, lamina linearis lanceolata 40 cm. longa 6-7 mm. lata apice acuminata basi gradatim attenuata in exsicco coriacea-membranacea, uervis principalibus 3 supra prominente elevatis, inter nervos multivenata. Scapi 1-florati 6-10 cm. longi basi multi-vaginati, vaginis prope medium scapi 7 cm. longis a basi usque ad medium cylindratis a medio usque ad apicem lanceolatis apice acuminatis scapem basi complete sursum fere amplectantibus glabris, vaginis superimis cum flore subaequilongis. Flores solitarii apertientes 6 cm. in diametro, petalis sepalisque patentissimis, suberectis vel subnutantibus, pedicellis cum ovaris 2-3 cm. longis gracilibus. Flores ut videntur in exsicco fusco-atropurpureascentes. Sepalum posticum oblanceolatum 38 mm. longum 9 mm. latum apice acuto-acuminatum basi angustato-cuneatum basi 3 mm. latum 5-nerviis planum, lateralia cum postico sequiformia ± longiora 4 cm. longa 1 cm. lata apice acuminata basi angustata basi 5 mm. lata margine leviter exteriori recurva 7-nervia. Petala oblonga oblongo-elliptica 2½ cm. longa circ. 1 cm. lata apice obtusissima vel obtusa basi 5 mm. lata 5-nervia plana. Labellum ampulliforme inferiore late rotundatum superiore oblongum, partibus late rotundatis (hypochilicis) crassiusculis 12 mm. latis 9 mm. longis V-formiter versus longitudinem subplicatis medio discis 2-lamellatis instructis, Liniolis ( )-formiter dispositis recurvis crassiusculis 1 mm. latis, partibus



superioribus (epichilis) oblongis 9 mm. longis apice rotundatis desuper reflexis liguliformibus margine subintegris. Columna elongata 1½ cm. longa 4 mm. lata antice subalata, alis ½ mm. latis. Capsula clavato-cylindrica 6-7 cm. longa 22 mm. lata 6-costata, costis 3 mm. latis, partibus inter costas 7 mm. latis, apice obtusissima basi attenuata rostrata ad stipitem gradatim abeiens, pedunculis 22 cm. longis.

HAB. Montibus centralibus, leg. U. MORI, NOV. 1906, (fl. et fr).

Near *C. virens* LINDL., but differs from it by the much longer and acuter sepals. Also near *Cymbidium MacJdnnoni* DUTHDE, Ann. Roy. Bot. Gard. CaJc. IX. t. 115, but quite distinguishable from it by the obovoid cylindrical and nearly clavate capsules, and by the much narrower sepals.

**Cymbidium illiberale** HAYATA sp. nov. Folia lineari-lanceolata 40 cm. longa 1 cm. lafa apice acuminata basi attenuata utraque minute venulosa subtus distincte supra haud nervaei valde coriacea. Scapi vel racemi 20 cm. longi erecti basi vaginato-squamati, parte non florifera 10 cm. longa, parte florifera 10 cm. longa, bracteis lanceolatis minutis 5 mm. longis acutis, pedicellis cum ovariiis 18 mm. longis, floribus a se 1-3 cm. remotis. Sepalum posticum lineari-lanceolatum 18 mm. longum 3½ mm. latum apice triangulari-obtusum basi haud contractum 2 mm. latum planum manifesto 3-nerviū vel obscure 5-nerviura, lateralia quam postico breviora et latiora 1½ cm. longa 4½ mm. lata apice obtusa basi haud contracta 3 mm. lata lineari-oblonga plana distincte 7-nervia haud obliqua. Petala oblique lineari-oblonga 1½ cm. longa 4½ mm. lata apice obtusa basi angustiora 1½ mm. lata plana 7-nervia leviter ^-formiter recurva. Labellum late obovatum facie brevissime liirsutum 13 mm. longum 11 mm. latum apice rotundatum vel ad summum breve triangulari-cuneatum, hypochilo erecto medio disca 2-costatis instructo, costis 8 mm. longis paralleliter dispositis, lobis lateralibus (hypochili) semi-oblongis apice rotundatis basi labelli usque ad apicem 1 cm. longis 5 mm. latis erectis, lobo terminali (epichilo) desuper recurvo rotundato 6 mm. in diametro. Columna 13 mm. longa complanato-semiteres recurva intus brevissime liirsuta sursum alata, alis 1 mm. latis. Pefila sepalaque viridescencia ± rubescencia. Labelli disci flavoscenti; labelli lobi laterales rubro-punctati, lobo terminali

rubro-maculato. Labellum subtus leviter rabescens basi atro-rubrum. Columna basi atro-sanguinea.

HAB. Formosa: loco noii indicato: cult, in Taihoku seminario, Mart., 1914, leg. B. HAYATA, (fl.).

Near *Gymhidium pumilum* ROLFE (in Kew Bullet. 1907, p. 130; *Kinryō-tcn%* Somokuzusetsu, XVIII t. 13.); but differs from it by the light reddish green petals and sepals and by the lips which are light red with a red maculation on the front lobe, and numerous minute red spots on the side lobes.

**Cymbidium lancifolium** HOOK. f.; Orchid. Sikkim Himal. in Ann. Roy. Bot. Gard. Calc. VHL t. 247.

HAB. Formosa: loco non indicato; cult, in bot. horto. Tōkyō, leg. B. HAYATA.

The orchid has been cultivated in our garden since some years, and is believed to have come from Formosa. The flowers are slightly different from the figure given in the above referred work.

**Cymbidium misericors** HAYATA sp. nov. (Fig. 38-b). Pseudobulbi vix prominentes. Fasciculus folii 4-5-foliatus. Folia lanceolata 30-40 cm. longa 11 mm. lata apice acuta vel obtusa basi attenuata basi in parte angustissima 5 mm. lata infra basin dilatata 1½ cm. lata pseudobulbos semi-amplectantia margine Integra prope apicem sub lente denticulata in vivo tenuiter coriacea, nervis principalibus 3, inter nervos multivenulata, nervis venisque supra minus subtus plus prominentibus. Racemi (scapi) 15-20 cm. longi laxe florati, floribus a se 3-4 cm. remotis, bracteis lanceolatis circ. 1 cm. longis acuminatis, pedicellis cum ovariis 2 J-3 cm. longis. Flores apertientes 4 cm. in diametro viridi-albescentes haud maculati fragrantis, inter menses Septembris et Octobris apertientes. Sepalum posticum oblongo-oblancoelatum 27 mm. longum 9 mm. latum supra medium latissimum apice acutum vel obtusum ad summum apiculatum basi 2b angustius ad insertionem haud contractum 3 mm. longum subplanum vel margine tenuissime exteriori recurvum distincte 5-nerviū crassiusculum margine integrum, lateralibus cum postico sequilongis sed angustioribus oblancoelatis 6 mm. lata apice obtusa ad summum apiculata basi cuneato-angustata ad basin 3 mm. lata 5-nervia. PetaJa oblonga 24 mm. longa 1 cm. lata vel obovato-oblonga apice obtusa sed ad summum acuta basi obtusa-

contracta 2 mm. lata plana distincte 7-nervia. Labellum obovato-oblongum 21 mm. longum 12 mm. latum apice late obtusum basi rotundato-contractum, liyochilo 8 mm. longo 9 mm. lato valde concavo medio discis 2-lamellatis crassis instructo, epichilo rotundato 12 mm. longo desuper reflexo convexo 7-nervio, crassiusculum facie minute sub lente tuberculatum margine sub lente minute denticulatum. Columna 12 mm. longa leviter recurva semiteres ^-formis in sectione apoda.

HAB. Mt. Kwannonzan, prope Tamsui; cult, in seminario Taihokn, leg. B. HAYATA et T. SOMA, Mart. 1914.

Near *C. banran* MK. (in Somokudsusetsu XVIII. t. G), but differs from it by the greenish flowers with non-dotted lips.

**Cymbidium oreophilum** HAYATA n. sp. (Fig. 38-c). Folia et habitus ut speciei praececedentis (*Cymbidii misericordis*). Kacemi (scapi) circ. 50cm. longi, partibus non floriferis 30 cm. longis basi squamatis, squamis subvaginiformibus 4-5 cm. longis inferiore cylindratis superiore lanceolatis apice acuminatis nervosis, floribus a se 5 cm. remotis, bracteis lanceolatis 2 cm. longis acuminatis, pedicellis cum ovariis 3½ cm. longis. Flores apertientes fragrantis 7 cm. in diametro viridescens, sepalis petalisque retrorse reflexis; labellum flavescens rubro-maculatum. Sépalum posticum lineari-lanceolatum 4Jcm. longum 4 mm. latum apice acuminatissimum basi haud contractum sed leviter angustius 5-nervium margine exteriori recurvum valde retrorse reflexum, lateralia cum postico conformia sed ± obliqua. Fetala ovato-lanceolata 3 cm. longa 7-8 mm. lata apice acuminata basi contracta ad insertionem 2 mm. lata 5-nervia margine Integra subplana. Labellum oblongo-ovatuin 25 mm. longum 15 mm. latum apice obtusum apice triangulari-acutum tenuiter interiore recurvum basi rotundatum contractum ad insertionem 3 mm. latum, hypochilo late rotundato 14 mm. lato 12 mm. longo medio discis 2-lamellatis instructo, (lamellis ( )-formiter dispositis crassis 1 mm. latis recurvis subsevis), concavo crassiusculo margine tenuissimo erecto, epichilo elongato-triangulari ovato 1J cm. longo 1 cm. lato crassiusculo margine tenuissimo undulato-integro valde desuper recurvo. Labellum subtus lllve supra toto minute tuberculatum margine sub lente minute denticulatum. Columna semiteres 13 mm. longa ^Vformis in sectione subalata.

*Gymbidium miseriors* HAYATA var. *oreophilum* HAYATA in sched. herb. Taihoku.

HAB. Formosa: loco non indicato; cult, in seminario Taihoku, leg. B. HAYATA, Mart. 1914.

The present orchid was regarded as a variety of the preceding species. After careful examination, I have found that the sepals and petals of this new plant are considerably larger than those of the preceding species, and the lips of the former are minutely botryoideo-tuberculate all over the upper surface, while those of the latter are hirsute. All these collectively make it sufficient to regard this new plant as specifically different from the preceding species.

**Cymbidium purpureo-hiemale** HAYATA sp. nov. Folia angustissime linearia 40cm. longa 5-6 mm. lata apice acuminata basi angustissime attenuato-plicata supra minute venulosa subtus 3-nervia, nervis prominentibus, inter nervos minute venulosa tenuiter coriacea. Scapi vel racemi 25-30 cm. longi, parte florifera 15 cm. longa laxe florata, floribus 3-4 cm. a se remotis, bracteis subnullis (vel caducissimis?) 1 mm. latis annuliformibus -fa mm. longis, pedicellis cum ovariis 1J cm. longis. Flores apertientes C J cm. in diametro. Sex>alum posticum lineari-lanceolatum 4 cm. longum 4 mm. latum apice acuminatum basi haud contractum 5-nervium margine interiore recurvum, lateralia quam postico vix breviora vix latiora 3 J cm. longa 4 mm. lata sursum margine interiore recurva. Fetala ovato-lanceolata 2J cm. longa 6 mm. lata apice acuta basi contracta 1J mm. lata ± concava margine plana 7-nervia. Labellum brevissime hirtellum in circumscriptione ovatum 22 mm. longum 12 mm. latum, hypochilo erecto late rotundato 12 mm. lato 9 mm. longo margine integro (lobis lateralibus erectis) medio discis 2-lamellatis instructo, lamellis circ. J-1mm. latis ( )-formiter dispositis, epichilo desuper recurvo oblongo 12-13 mm. longo 7 mm. lato apice triangulari-obtusissimo ad apicem vel prope apicem margine interiore recurvo margine subintegro basi non contracto basi secus nervos manifesto hirtello, inter hypochilium et epichilum constrictum 6 mm. latum. Columna 12 mm. longa tenuiter recurva complanato-semi-teres sursum subalata.

HAB. Formosa: loco non indicato: cult, in seminario Taihoku, leg. B. HAYATA, 1914, Mart.

Ni M *Cymbidium Jcmran* !MAK. in Sumokuzusetsu Vol. XVIII. tt. 4, 5

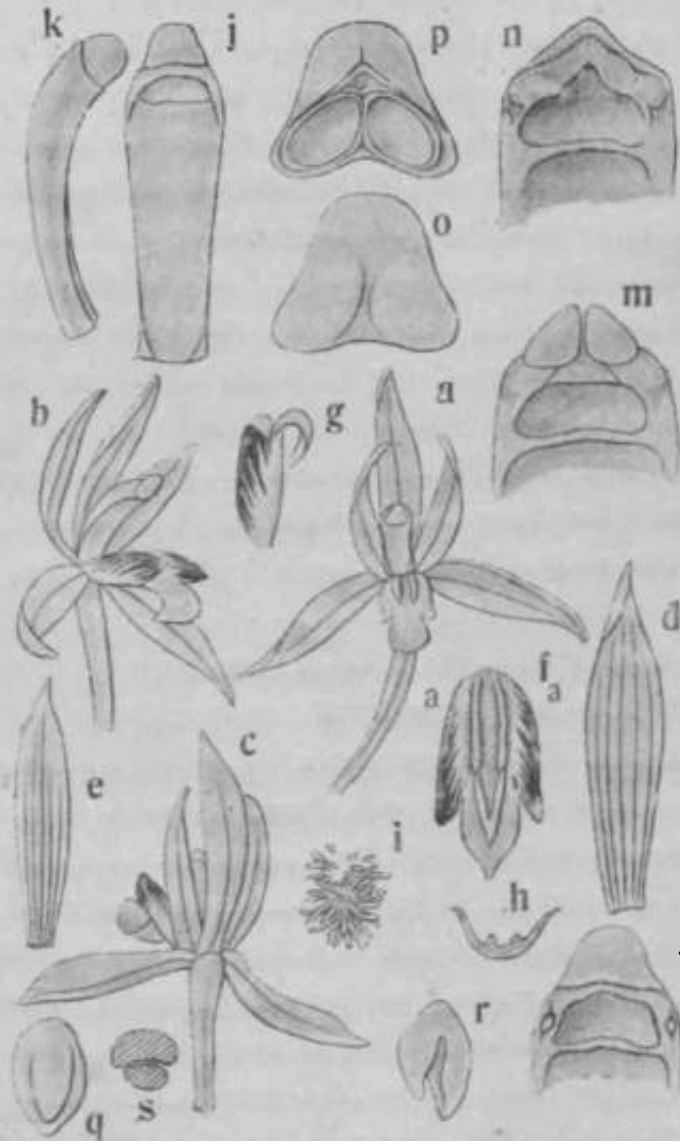


Fig. 89, *Gymbidivni Simowiamm* K. et P.; a, b, c, D flower, seen from different sides; ci, n sepal; e, a petal; f, a lip; g, the anther, seen from above; h, the same, in section of a portion shown by IHI in fig. 4; i, the ovary; j, the column; k, the anther, seen from side; l, the ovary of the same; m, the same, operculum bilobed; n, the same, operculum bilobed; o, the same, operculum bilobed, seen from front; p, the same, operculum bilobed, seen from side; q, a detail of the ovary; r, the ovary, seen from side; s, the ovary in section; fig. a-c, natural size; others more or less magnified.

et 6, but (lifters from it by the lips with hirsute lines on the terminal lobe).

*Cymbidium simonianum* KINO et PAN (Fig. 39). Oich. Sikk. Hiiuil. in Ann. Hoy. Bot. Gaid. Yin. t. 250. HAB. Mt. Arisan. Observ. Folia 40-50 cm. longa linearia 10 mm. lata, apice acuminata; in sicco valde contracta utraque pagina distincte nervata sed minute elevato-venata basi cum setolis articulata, petiolis 6 cm. longis late sulcatis somicibus in sectione explanatis 1 mm. longis basi dilatatis 1 em. longis totifloris semialexandrinis. Sepala

45 cm. longi basi vtriginate-squamati, squamis 7-8 cm. longis acuminatis lanceolatis 5 mm. longis apertibus

lum posticum oblanceolatum 2Jem.longum 6<sup>^</sup>mm.Litum apice acuminatum basi non contractum 4 mm. latum prope apicem margine interiore recurvum 7-nervium, lateralia cum postico conformia plus minus obliqua. Petala oblongo-lanceolata 2 cm. longa 5<sup>^</sup> mm. lata apice acuto-acuminata basi vix contract\* 1J mm. lata 7-nervia margine integra plana. Labellum in circumscriptione ovatum 16 mm. longum 11 mm. latum apice cuspidato-acuminatum basi cuneato-rotundatum ad basin contractum 1 \ mm. latum facie glabrum basi in hypochilo erecto medio discis 2-carinatis instructum, carinis 6 mm. longis \ mm. latis elevatis hirtellis paralleliter | | -formiter dispositis, 3-lobum, lobis laterali-bus (hypochili) oblongis 2J mm. latis a basi lobi terminalis ad apicem lobi Literalis 3j mm. longis apice obtusis, sinibus inter lobos laterales et lobum terminalem obtusis, lobo terminali (epichilo) desuper recurvo ovato 9 mm. longo 6 mm. lato apice cuspidato-acuminato basi rotundato-contracto ad basin 5 mm. lato. Columna 1cm. longa complanato-semiteres 4 mm. lata glaberrima suba-lata, alis sursum \ mm. latis.

**Cymbidium sineuse** WUXD.; Sōmokudsusetsu XVHI. t. 11.

HAB. Heichōshō, leg. S. NAGASAWA, fl. 1904, (No. 340).

OBSEIW. Folia lanceolata 50 cm. longa 2 } cm. lata apice acuminata basi attenuata supra utroque latere costse prominente 2-nervata inter nervos minute venulosa, costa supra non distincta non elevata, subtus cum costa prominente 3-nervata, inter nervos minute venulosa. Scapi vel racemi 60-70 cm. longi, parte non florifera 40 cm. longa vaginato-squamata, squamis cylindrico-lanceo-latis acuminatis 7-8 cm. longis, parte florifera 20 cm. longa laxe florata, flori-bus a se 3-4 cm. remotis, bracteis lanceolatis acuminatis 12 mm. longis glabris, pedicellis cum ovariis 2 cm. longis. Flores apertientas 5-6 cm. in diametro. Sepalum posticum lineari-lanceolatum 3Jcm.longum Jem.latum, apice acuminatum basi vix contractum 2 mm. latum margine *dt* exteriori recurvum 7-nervium, lateralia cum postico conformia. Petala ovato-lanceolata 26 mm. longa 8 mm. lata apice obtusa ad summum acuta basi obtuso-contracta 2 mm. lata 7-nervia plana. Itfibollum tenuissime hirtellum in circumscriptione ovatum 17 mm. longum 10 mm. latum obtusissimum basi rotundato-cuneato-contractum 1Jmm.latum, hypochilo late rotundato 9mm.longo 1cm.lato medio discis 2-lamellatis instructo, (lamellis siu-sum latiusculis versus apicem se convergentibus

( )-fomniter dispositis), orecto nmrgine latere ereeto, epichilo oblongo 11 mm. loDgo 7 mm, lato apice obtuso basi vix vel Jiand contnicto seciis nervos snb-tnerculnto transverse maculnto. Colmuuiii 13 mm. longn ± wciUTa complmiafco-semiteres aJata.

*Cremastra* LDTOL.

*Cremastra triloba* HAYATA (Fig. 40) Ic. Pl. **Forme\***, H p. 135. Herlw, terrestris, rhizomate erefco tneroso ovoideo-globoso l£ cm. longo basi tothisque

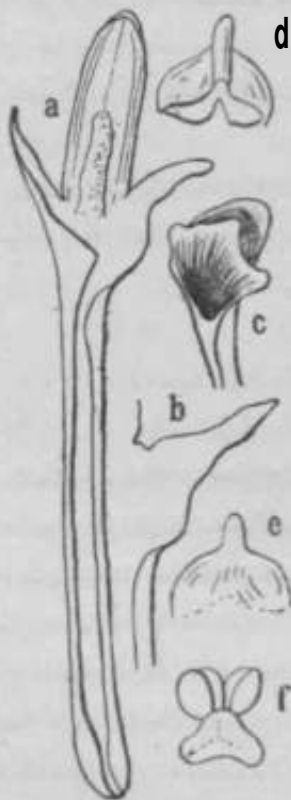


Fig. 40, *Cremastra triloba* HAYATA; a, a lip; b, lnt<inl lobe of the same; c, apicnl portioa of the colonma; d, tm. anther, seen from back; e, the BfUte, Boon froitf front; f, paUin&rinm.

lato apice acuto hnsi latissimo 2-3 nodoso ad nodos vagiuato, (vagiuis defoctis), ad apicein folium nnum gerenti, ad ut>dos jiixta apicem seapum immu gerenti. Folia solitfirin. longe petioluta *hasi* potioli 1 (vel 2 ?) vagois inahiiicta, (vaginis potiohim in longitudine siipevantibus apice phis miuiis dilututLs obhisis), potiolis 10-12 cm. longLs dimidiim laminae in Longitudiue tequantibus subfajretilnis tubulosis, laminis eiim petioliim articnlatis ellipticoljinceoljiti< 30 cm. locgis. 5 cm. Intis apice acutis **baaJ** ivttemiatis lineari-^•yB, (partibus linearibns 6-7 cm. longis 3 mm. latis pliciitis, petiolis arfcieidato-contimiiis) membiunaceis, venis elevatis subplicitis. Seapi solitiu-ii 30-40 cm. alta teretes 5 mm. in sectionis diametro basi 2-mxlosi, interuodiis ittferioribns 4 cm. longis, superiori-**baB** 10 cm. longis ad nodos A-aginatia, (vaginis **taba**-losis 5-6 cm. lougis api<e acntis vel obtnsis,) partiba? florigeris 10-15 cm. longis racemosis. Floras asceud-ento-i^atentes vel enecto-patentes pins minus acundi 3 cm, loughi, segmentis coiiniventibiis apico vis patentiibiis, **pedioells** (emu oviuiis) 13 mm. longLs, bracteis lanceolatis 8 mm. longis. Sepala subseqiialta conni-TGntia lineari-oblanceolata apice acitta Iwisi attenuate,

l>osticum 33 mm. lougtim 4 mm. latran basi mm **ocntmotmn**, latemlia plus minns obliqia. Petnla angiiistiom lineari-oblanceoliita bi\*eviora qiam aepalis fJOMm. longa 3 mm. lata apice acnta basi attemmtn. I^iUllum lineai-o

sepalum posticum in longitudine sequans 33 mm. longum versus apicem 3-lobatum, (lobo medio oblougo 8 mm. longo 3<sup>^</sup> mm. lato apice obtiiso vel rotundato basi non contracto, lobis lateralibus angulo 45° divaricatis lanceolato-triangularibus basi latere inferiore auriculatis plicatis 4 mm. longis apice obtusis vel acutis), basi lobi medii 1-appendiculatiim, appendiciilis liguliformibus liberis crassinscnlis minute tuberculatis, margine a lobis lateralibus usque ad basin labelli plicato-inflexum basi leviter ventricosnm. Columna linearis 23 mm. longa labello brevior exalata apice dilatata, partibus dilatatis obtriangularibus 3-4 mm. latis; rostellum latissimum. Pollinia 4.

HAB. Mt. Nashitanzan, Mt. Rontabunzan, Jiōgesha, leg. U. MORI, Aprili., 1910.

Near a small form of *C. WallicUi* but differs distinctly by the labellum, the lobes of which are much more divaricate. In the Indian species, the side lobes of the lips are nearly parallel to the middle lobe.

***Lnisia* GAUD.**

***Luisia megasepala* HAYATA** sp. nov. (Fig. 41). Epiphyta. Caulis teres viridis 20-30 cm. longus ramosus cum vaginis foliorum 4 mm. in diametro tota longitudine foliosus vaginis foliorum toto obtectus. Folia alterna a se 2 cm. remota; vagina foliorum cylindrica 2 cm. longa 4 mm. in diametro ore subtiuncata vel leviter obliqua, lamina folioram db lateraliter compressa tereto-lineari circ. 10 cm. longa 2 mm. in diametro apice obtusa basi oblique cum vaginis articulata. Eacemi 2-3-florati latere caulis per vaginam oriundi brevissimi, rhachibus 1 cm. longis bracteis pluri-seriatis perfecte obtectis, bracteis distiche imbricateque dispositis latissime triangularibus, superioribus-majoribus 3 mm. longis 6 mm. latis, pedicellis 1cm. longis, floribus subcernuis. Sepala leviter viridia dorso purpureo-punctata, petalis flavo-viridibus, labello supra atro-purpureo subtus medio viridi, partibus lateralibus labelli purpureis. Sepalum posticum oblongum 13 mm. longum 7-8mm. latum 6-nervium apice rotimdatv.m basi 6mm.latv,m; sepalalateralialia oblonga 13mm.longa 7-8mm. lata apice dorso carinata leviter cornuata 5-nervia. Petala obovato-oblonga sepalo loDgiora 16 mm. loDga 7 mm. lata apice obtuso-rotundata deorsum ± angustiora basi 3 mm. lata. Labellnm obovato-cuneiforme 16 mm. longum 9 mm. latum ~~eceseile~~ lasi latere lobis bcsilaribus instructum, lobis basilaribus triangulari-



bus 3 mm. longis 2 mm. latis erectis apice sub-acutis, basi medio supra sacaitim

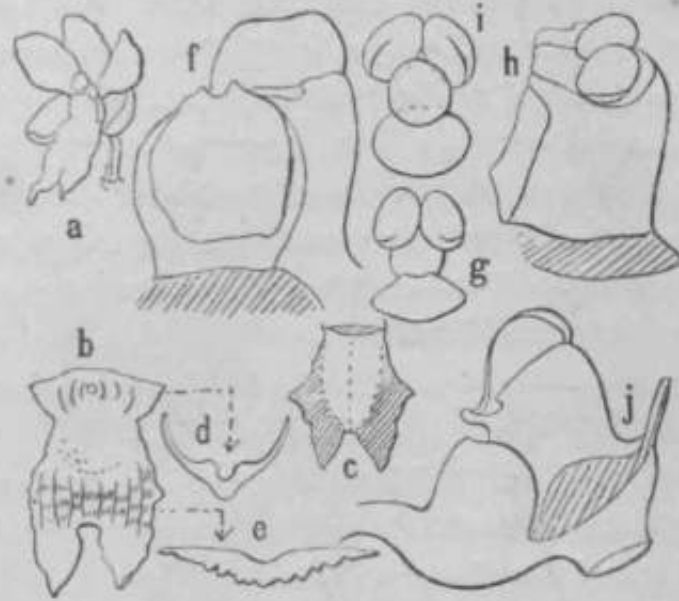


Fig. 41, *Luisia megaarpala* HAYATA; a, *ftfiowei*; b, a Hp, seen from above; c, the *Btaae*, seen from below, shading shows pttplo coloied parts; d, *sec&m.* of the part shown by ft chftinJine; e, section of (mother ports shown by another ehnl-line; f, a column; g, the same, seen from side; h, the same, anther taken off; i and j, pollinaritua, seen from different sides; a, natural size, others more or less magnified.

impressum supra partem basilarom constrictum 4j mm. Lttnm snrsum tiliitaiim supra medium 9 mm. latum apice 2-lobatum, (lobis triangulari-oblongis 3 mm. longis totiusque latis apice obtusis), margine raedio lobulatnm snrsmu et deorsam integmm crassiusculum, supra reticolato-sulcato impressum snbtus Iseve, ufcraque pagine sab nilcroseopio minute mmicato - punctatum. Colurana brevissima 4 mm. longa.

HAE. Formosa: cult, in **aamlmuoo** Tnihoka, leg, B. HAYATA, Aprlli., 1914.

Near *L. feres* BL. and *L. UvJdwmsht* SCHLECHT.; but differs **bon** thorn by the broader petals and sepals, and triangular basal bbss of tlin lip.

#### *XHploprara* HOOK. f.

*Diploprora kusukusensis* HAYATA sp. nov. (Fig. 42). Epiphyte. **GaaUs** subterea 5-10 cm. lougiis vixginis foliorum obtectna. Folia alterna 'jblongolanceolftta 8 cm. longa 2 cm. lftti apice acuta ad sum mum brevisaiim 2-loba basi obtusa cum vagina artictibita subdistiehum dlsposita margino Integra w-!onnitor falcata erassiuacuU subaincolora, venis Litai'alibus parallulis in exsiccato alevatia. Kacami 5 cm. longi pauce floriferi, floribus 3-5, podieellis divtwicatis 0 mm. longis, braoteis late triuuguljiribus 3 ram. longis medio pUcatis ihaeluu amploetantibns. ]?lores snbiilbi vel leviter flivesoenti-albi patentes 15 mm. in diametro. Sepalum posticum **obovato-**

»»Uougim 9 mm. **langtun** 4min.latum 7-nervium apice rotundatum basi phis minus angustius 2| mm. lutntii 0101\*80 medio eaiinatum, luteratia posteo subsoquifoxmia. PetalaobUqne oblongo - oblanceolata 8 mm. longa 3 mm.lata npice obtusa 5-nervia. Labellum latissime nnculiforme apice Htiaricaudatimi ad simmiura bictosunx basi **latissimum** 4mm. latimi **Osama** subiki controctum ad caudam linearein 3 mm. longam prodnctiun, (cauda Uneaii deorsnm laterals compressa sursiun doi^o comjjressa ad siunnum setis 2 instructa, setis 2 mm. longis mibcrispis filiformibus), medio iitius rallo maõ instructiun, ca-llo obtriftiigulari 3 mm. lougo apice 2 mm. lato. Columna 2 mm. loun.

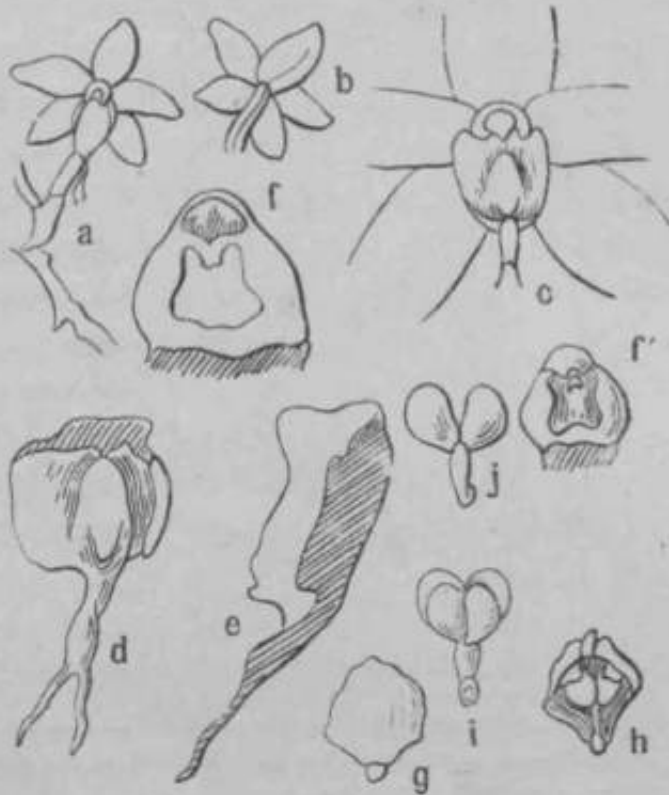


Fig. 42. -Epipfotr&ra kvsukitsensis HAYATA; n, part of inflowflence and a flower; b, tho anme flower, Been from t>fiek; c, centml purt of the sfuno flower; d, n lip, ^iib tmsverse section; e, the Bnme lip vitli v<rti<il medial section; f, stigml. rostellum ad cliuandriuin; g, an nntlier; h, the snmc, seen from brick; i, pollinnriim; J, tho simo seen from bock.

HAB. Kusnkueu, Juiii., 1912, leg. B. HAYATA et 6. SAS.VKI.

Very near *J. Championi*, but diffiera by the longer threads **at tin- apex** of tlio labellwn and by the other jwints.

**Diploprora uraiensis** HAYATA sp. nov. (Fig. 43). Epiphyta subpendidn? CanUs 18 cm. Iouguis toto foliosns vaginis foliom obtectus. Folia crassiusculn oblongolinearia vel lint iiri-lanceolata 11 cm. longa 2 cm. lata v/\_-formiter fulcatn apice insequa-liter breviter bi-loljata, lobis 1mm. longis aentis, basi contract: i turn Taginis articulita in exsiccato venis lateralibiis parallelis eleiatLs, utraqiu\* pagiae sub-concolora subdistichiim **disposita** 1^ em. use remotn, vaginis **rare**

2 cm. longis ore truncatis. Racemi laterales 7 era. Iodgi pauce flornti, floribus 4-5 remote dispositis, pedicellis 5 mm. longis patenfibus, bracteis lancoolatis. Floras patentes 1£ cm. in diainetro. Sepala et petala rLiva; columna alba;

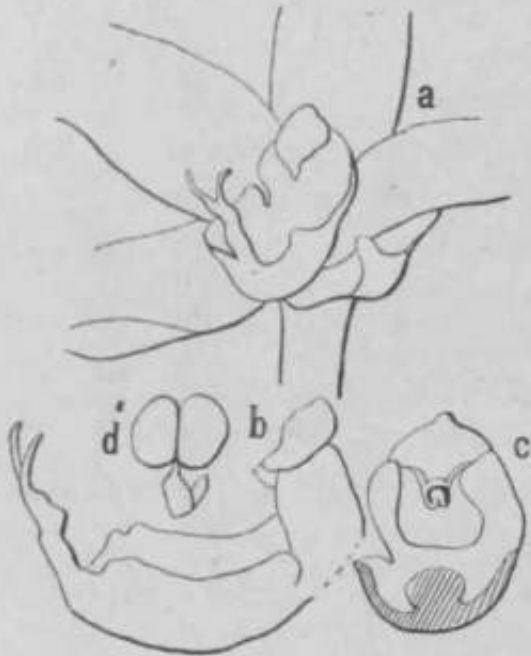


Fig. 43, *Diploprora uraietis* HAYATA; A, ceunt] portion of *a tcnvcr*; b, the same een from aide sepals and jwtiUs taken offE; A, n colnmn with bnsnt portion of A lip, seen from front; tl, a pollinnrium.

I&betium album intus maculatum, maculis flavescentibus. Sepalum posticinn oblongo-oblaiicoolatum 8 mm. longum 3£ mm. latum **apioe** obtuso-rotundatum basi angiiitutnin 1 j mm. latum dorso **medio** «triuatum, lateralia postico latiora. Fetala oblique Uneari-oblonga \$ mm. longa 3 mm. lata apice obtusa 5-!ei\*via. Labelliim latissime miviculi-forme apice lineari-ctiudatum ad summmn setia 2 instructum cum canda, setaqne 8 mm. longum parba basilari latissima, 4 mm. lata 3 mm. longa quadmngulari iutus callosa, (callo obti-iangnlari-oljlongo **bad acuo** 3 mm. longo 1^ mm. Into), apice subito conctincta ad caudain iibeinti, caiula Uneari 2J mm. longa setis filtformibus

subcrispis 1J mm. longis duabns iustruuta. Coluiiua 2^ mm. longa. **Oapsola** cylindrica ntrinquo acnta 4 cm. longa **I cm, lata.**

HAB. Umisha, 1914.

**Near** *D. knaukummls* HAYATA, but **fifieax bom** it by the smaller yellow flowers and larger le.aves.

*SaccolaMuni* BLUME.

Saccol^bium formosanum HAYATA (Fig. 44) Mater. Fl. Funu<js. p. 336. IleiUi epiphytica, caulibns foliatis non psau-do-bulbosis prostaitia vaginis folioitun persistentibiis iustructis ad nodos radican-tibns. Folia disticha carnosu plana oblouga 2 cm. longa 7 linn, ln-ta apice obtusa breve ^piculatn basi in petiolnm 2 mm. longum cum vaginis nrticlatn **deoidnom**



punctati 9 mm. in longo diametro, pedicella 1 cm. longis, **bracteia** oblongo-triangul&ribus obtusis. Sepalft patentia reflexa, posticum ellipticum 4 mm. loughnm 2\$ mm. latmn apice rotndatnm basi truneatmii non contractum, lateralibus cum ptwtico roqualibus. **Petala sepaEfl** subaBqualifi. Labelhim basi ad columnam adnatum plus minus cum alls colnmii fl continiuim sacentum, saceo Gmm. longo pimetato-macnlnto ore contrncto, lamina rotndata 2 mm. in diametro apice brevissime 2-lobata valdo coticavn, disco ad medium lnm in fe sito inei'iissato hirsuto. Columna brevis 1mm. longa 3 mm. laia, rostellran 2-don-tatnm.



Fig. 45, *Saecolium munitum* HAYATA; A, a flower bud, seen from side; b, an open flower, seen from front; c, sepals and petals, in profile; d, lip and column; e, the same, slightly cut; f, apical portion of a column, rostellum and anthers are seen; g, the same, number taken off, to show attachment; h, operculum, seen from back.

HAB. AriSiin, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Hear *S. foimoscum*, but differs by the smaller leaves and the much smaller rounded lobes of the labellium. Also near *S. Malsuran* MAE. from which it differs by the much larger flowers. It was first brought back by myself from Aisan liore to the Koislikaivji

Garden, where it flowered in May, 1912, in a green house.

*Saccolabium quasipini folium* HAYATA (Fig. 46) Ic. VI Formog. II. p. 144. Epiphyta 4-5 em. alta, involucris teretibus **marginatis** albicantibus 2mm, in sectione 20-30 cm. longis undulato-reflexis. Caules dense foliati 7-8 cm. longi, Taginis foliorum imbricatis. Folia 5-9 disticha alterna acroai, extrorse leviter recurvata subterminalia cum vaginis cuc. 10 cm. longa intus (supra) profunda sinuata costis (subtus) rhombata in sectione apice obtusa **rel acuta** basi cum vaginis articulate extus basi plus minus costata, vaginis dilatatis canalem serai-amplectantibus **bracteis** 7 nun. Intis glabris. Racemi axillares 1-2-3-florati foliis in longitudine **aequantibus** pedunculis 3-6cm. longis art **medium** bracteis unis insh-ucteis, bracteis (non

floriferis) vaginifloris 5-6 mm. longis obtusis. Floras apertientes 2 cm. in longo diametro 1| cm. in brevi diametro alljo-vmdescentes basi bracteis

nnis instruct!,  
bracteis (florife-

ris) circ. 1 cm.  
longis florem

amplectantibus  
(ihtibus, pedicel-

lis (cum ovaris)  
8 mm, longis 5-

(I-silicatis. Se-  
X>alm posticum

oljovatum 9 mm.  
Longum obtusum

basi non cou-  
tractum 3-ner-

viumL dorso cax-  
inato - costatum,

Literalibus valde  
obltqiiisposticni ii

in lougitudine  
ajqtiantibus acu-

to-obtibus lateitj  
inferioi-o latiori-

)>ns dorso 4-  
<-;ninat(>-costatis.

Petala sepalis  
SubtPqn;ili:i sed

]>las minus bre-  
viora 3-neiTia

earlnato - eostata.  
Labellmn hori-

« mtiiit-er patens

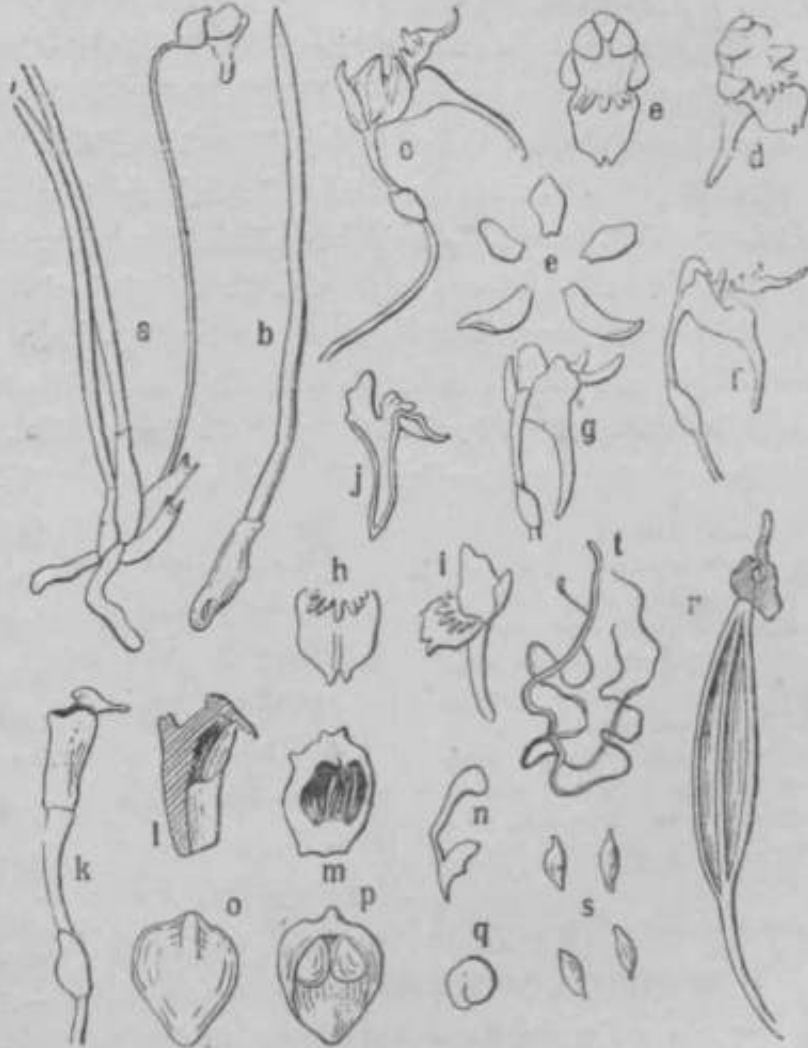


Fig. 46, *Soccolabium qitaspinifolium* HAYATA ; a, the plant; K b. a leaf; c, d, a flower, «»n from side; o, the same, seen from front, •. rotachod sepals and petals; f, a flower, sepals nntl petals talum off, aeon from side; g, the same, seen from back; h, lamina of the lip; i, n defaoljeil lip; j, the same, medially cut; k, a colmna on the peduncle, author taken off; l, the same, medially cut; m, the sama, seen footn front; n, a poUinarium, pollinia, caudicle und gl'incl; o, an authcr, seen from front; p, the same, Been from back ; q, n pollinimii; r, a fruit; B, seeds; t, thrcals in the capsule, n-j. nnd r, natural size; others variously mgnified.

1 cm. longum 3-lobium 1-calcoritum, (calcari 1-1J cm.

\*

longo retrorsum recurvo apice obtuso ore dilatato), lobis lateriilibus at  
 Litus faucis oileans erectis latiscutis oblique triaugularibis 4-5 mm. nltis  
 basi 6 mm. latis apice obtuais, lobo medio valde convexo 8 mm- longo 6 mm.  
 lato apioe obtuso brove 2-npiculato minute denticulnto nmulti-nervio; disco  
 Ijasi lobi centmlis transverse sito plnrilobulato, lobulis calloso-lamelLitis, Limellis  
 1-2 mm. longis obtusis. Colunria 6 mm. longa 3 mm. Inla alatti, rostellum antim  
 atutum 2-lobum. Anthei'a mbt^scons 3 mm. longa 2jmm, liLta antioe aeuta  
 postice medio 1-costatti 1-loculfliis; pollinia 2 subgloboaa sulcata, stipitibiis  
 laticcllatis lineaiibus 3^ mm. longis cii'C. ^ mm. latis basi attenuafcis. Capsuli  
 tyliutlricn apice bravo basi longe attenuata 4cm. longa 8 inm. Lita mulfici-  
 <La Semina minnta fusiformia cum flbris longissimLs multis mixta.

HAD. Mt. Arisan, leg B. HAYATA et S. SASAKI, Jan., 1912.

*Saccolabium retrocallum* HATATA sp. nov. (Fig. 47). *Epiphyta.*

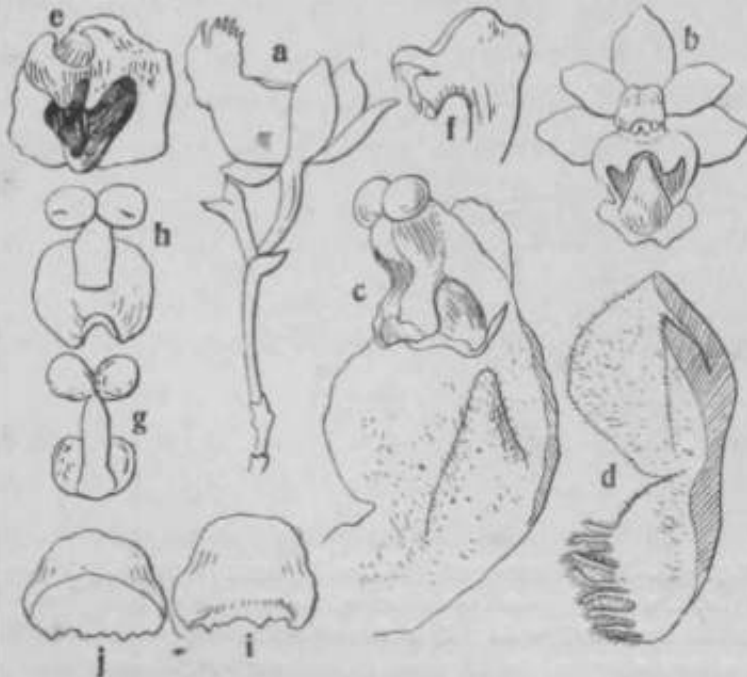


Fig. A7, *Saccolabium retrocallum* HATATA ; a, a flower on the inflorescence, the purple colored portion is shaded; b, a flower, seen from front, purple colored parts are shaded; c, a column and lip, the latter partially cut off; d, a lip, medially cut, showing a lefracted callosity; e, column, anther taken off, stigma and clinandrium are seen; f, the same, seen from side; g, a pollinarium, seen from front; h, the same, seen from back; i, an operculum, seen from front; j, the same, seen from back.

Caulis subteres in uostro specimine bzevis 1j-2 cm. longtis foliatis, internodiisbivibus. Folia disciccha olliptico-oblonga crasso-conacen 2jcm. longa 1cm. Iata apico obtusa Ixisi contracta cum **vagLoia** ftitieulata 9-nervJA margine leviter desn-)n,r recnr'a, **VBfilif** pei'sistentibus 3 mm. **loiiigis imbricatia** caulem obtegentibus. p^luucnli latomles simpb'ces folio **æqui-** lnni 2cm. **longi** basi luodio apicotjUO

bracteis instructi, bracteis infimis tubiformibus 2 mm. longis, eis superioribus late triangularibus 1½ mm. longis. Mores in nostro specimine solitarii apertientes 1½ cm. in diametro. Sepala patentia distincta albo-flavescentia 5-nervia, posticum ovato-oblongum 7 mm. longum 3½ mm. latum apice obtusum basi leviter cuneato-contractum ad basin 1½ mm. latum, lateralia angustiora quam postico ± obliqua 8 mm. longa 3 mm. lata apice acuta basi cuneato-angusta. Petala sepalo breviora angustato-oblonga 7 mm. longa 2½ mm. lata apice obtusa basi angustata. Labellum ad basin columnse sessile patens in circumscriptione oblongum ecalcaratum sepalis longius 14 mm. longum 8 mm. latum concavum sursum medio valde crassum, callo uno triangulari retrorso instructum medio contractum, lobis lateralibus (vel auriculis) 2 mm. longis 5 mm. latis margine minute ciliolatis, lobo terminali rotundato 7 mm. longo 8 mm. lato apice emarginato margine breve fimbriato. Labellum extus glabrum intus breve hirsutum intus prope callum ancori-forme purpureo-coloratum, (callo colorato), ceterum albicans. Columna brevis lata 1 mm. longa apoda exalata, clinandrium dentibus 2 instructum. Anthera terminalis opercularis incumbens, pollinia 2 globosa cerea vix sulcata; caudicula linearis 2½ mm. longa, glandula cordato-rotundata parva. Fructus ignoti.

HAB. Formosa: loco non indicato; cult, in seminario Taihoku, leg. B. HAYATA, Juni., 1912.

Remarkable for the large obtriangular retrorse callosities on the center of the lips.

**Saccolabium Somai** HAYATA sp. nov. Epiphyta; caulis 7-8 cm. longus. Folia altera distiche disposita lineari-oblancoolata 14 cm. longa 17 mm. lata apice mucronato-acuta ad summum obtusa basi attenuata crassiuscula in exsiccato chartaceo-membranacea w-formiter recurva cum vaginis articulata, vaginis 5 mm. longis apice truncatis cum foliis articulatis nervosis. Kacemi laterales 2 cm. longi pauci-florati. Sepalum posticum lineari-obovatum 6 mm. longum 3 mm. latum apice obtusissimum basi angustius 1 mm. latum 3-nervium, lateralia obovata 6 mm. longa 2½ mm. lata 3-nervia apice obtusa basi cuneato-angustata. Petala sepalo subsimilia angustiora. Labellum sacciforme 7 mm. longum 5 mm. latum ore 3 mm. in diametro apice antice lamina late triangulari instructum, lamina transverse /—^ -formi 7 mm. lata 2½ mm. longa medio



rugoso-crassa basi ntnique latere aiiriculis instructn, auriculis rotuudatis 1 }  
mm. in diametro, margine subintegmm. Polliniar 2 ovoidaa 1 mm. longn  
ad centrum minute l-foveolata, stipite lineari ljmio. longo, glandula  
elliptica 1 mm. longa antice 2-  
lobata.

HAB. Pinansha, leg. T.  
SOMA, Mart, 1913.

*Savcanthus* LINDL.

*Sarcanthus fuseomacula-*  
*tus* HAYATA sp. **nov.** (Fig. 48)  
Epiphyta; radices nērise a lattw^  
canlis oritmdso simplices terettis  
albto 5 mm. in diametro **agna** •  
2-3-divisso. Canlis 30cm. longas  
teres 5 min. in diametro vagi-  
nis foliorum obtectns, vaginis 2-3  
cm. longis 1 cm. latis emu foliis  
articulatis. Folia linearia 16 cm.  
longa 17 nun. labi basi apicequo  
aequilata apice bfloba (lobis in-  
aequalibus 5-7 mm. longia 6 mm.  
latis) basi plicata ciun vaginis  
artieulata in exsiccato **Oddao** n.



Fig. 48, *Sarcanthus fuseomaculatus* HAYATA; a, n flmvor; b, another flower, sepals, petals juul terminal lobe of the lip ~~with~~ **i** **f**; e, fl dorsal sepal; **f** **l** lateral ~~with~~ **e**; e, « petal; f, n lip, seen from side; g, the same in vertical *section*, terminal lobe taken off; h, a, lip and colnmn, seen from front; i, the **MHM** in vortical eotion; j, transverse section of a spm; k, an operonlam, seen from front; l, the same, seen from back; m, the same, aeen from side; n, polliniferous **with** **IB** operoulm; o, polliniferous, seen from front; ji, the same, aeen from back; q, the same, seen from side,

Faucciila lateralis 20-25 cm. longa, pedunculis (partibus non floriferis) 10 cm. longis glabris, ramis 4-5 simplicibus 8 cm. longis gracilibus patentibus desuper recurvis, floribus a se 5mm. remotis, bracteis triangularibus 2 mm. longis acutis 1½ mm. latis retrorse reflexis. Sepalum posticum 4½ mm. longum oblongum 2½ mm. latum basi laud contractum obscure 3-nerviū apice obtusum, lateralia oblonga 4½ mm. longa 3 mm. lata apice rotundato-obtusa basi laud contracts. Labellum ad pedem brevem columns affixum 4 mm. longum basi calcaratum, calcar 5 mm. alto 2 mm. lato apice obscure 2-lobo vel emarginato intus lamina una verticali partito 2-loculari intus prope orem hirsuto ore callosis posterioribus lateralibusque semiclauso, lobis lateralibus latissime triangularibus 1 mm. longis 2 mm. latis erectis margine interioris recurvis apice obtusis, lobo terminali s~\*-formi 2 mm. longo basi latissimo 4 mm. lato ad insertionem constricto 1 mm. lato 3-lobulato, lobulis basilaribus (lateralibus) triangulari-linearibus 2 mm. longis ½ mm. latis apice acuminatis, lobulo terminali anguste triangulari 1-½ mm. longo 1½ mm. lato apice interiore incurvo cum facie connato. Columna 2mm. longa 1mm. lata a basi in pedem 1mm. longum alatum producta, antliera globosa 1mm. in diametro 2-locularis. Pollinia 2, singulum 2-lobatum, stipite late lineari 1mm. longo ½ mm. lato. Flores flavi; sepala et petala intus prope marginem fusco-punctato-maculata; columna basi fusco-maculata.

HAB. Formosa: loco non indicato; cult, in seminario Taihoku.

***Cleisostoma* BLUME.**

***Cleisostoma brachybotrya* HAYATA sp. nov.** (Fig. 49). Epiphyta. Caulis 7 cm. longus tota longitudine foliatus. Folia approximata subdistiche disposita linearia 15 cm. longa 3 cm. lata apice subtruncata subbiloba, (lobo altero longiore 6 mm. longo 5 mm. lato apice obtuso, lobo altero subnullo apice truncato) margine integra in exsicco tenuiter coriacea basi sub contracta ad basin plicata cum vaginis articulata, vaginis imbricatis non cylindratis plicatim caulem amplectantibus 2 cm. longis in explicato 2 cm. latis nervosis. Hacemi axillares 3cm. longi vel longiores, pedunculis (partibus non-floriferis) 1½ cm. longis, partibus floriferis cylindrico-globosis 2-3 cm. longis vel longioribus 2 cm. latis, bracteis late triangularibus 2 mm. longis basi totiusque latis pedicellum amplectantibus, pedicellis 2 mm. longis divaricatis glabris,

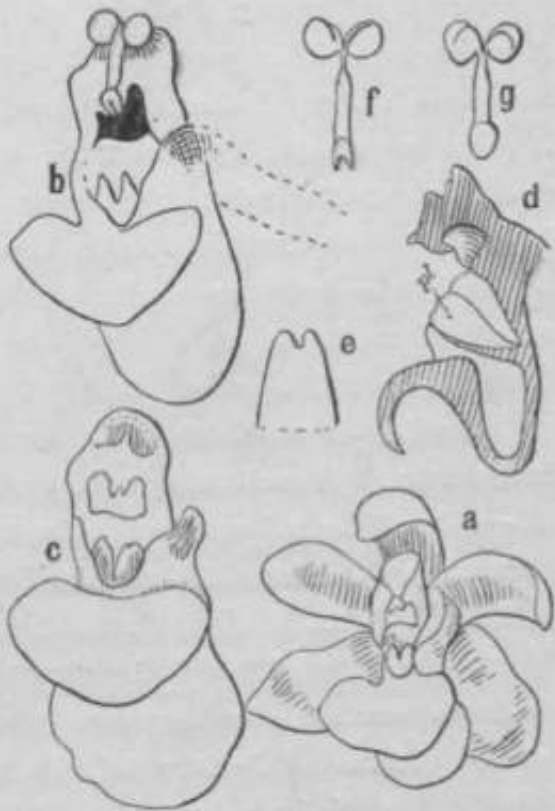


Fig. 49, *Cleitostoma toachijbotrya* HAYATA; a, a flower; b, » lip and column; c, the same, (in the taken view); d, the same, in vertical section; e, transversal plate at the mouth of the column; f, g, pollinarium, seen from different sides, shaded portions fig. in a, b and c, show purple coloration.

lobis lateralibus albis ovatis crectis binerviis, lobo terminali rufice patenti desuper recurvato late 1<sup>o</sup> truncato vel transverse Esemi-rotundo. Labellum **aeato-obtusum** 3 mm. longo 4 mm. lato basi contracto 2 mm. lato. Columna 1<sup>o</sup> mm. longa basi contracta 1 mm. lata apice dilatata 1<sup>o</sup> mm. lata.

HAB. Formosa: loca non **indicata**: cult. in Taihoku semimario, leg. B. HAYATA Mart. 1914.

*Cleitostoma ionosma* LKDL.; HAYATA IC. PL Formos. n. p. 134.

*Stanqaptris Ivcfmms* ROLFE in Kt;w Bull. 1907, p. 131.

HAB. Formosa: Knsukusu, leg. B. HAYATA et S. SASAKI, 1912, Junii.

*Cleitostoma oblongisepala* HAYATA (Fig. 50) IC. PL Formos. n.

ovariis 3 mm. longis 1 mm. **bractea** undraeaeis, Flores apertientes 6 mm. in diametro; sepalum et petalum ciliatis extimis vix flavescentia intus apice basique punctatis; Labellum albescens basi nervis lateribus punctatis. Sepalum parvum obovatum 5 mm. longum 2 mm. latum 3-nerve apice obtusissimum basi 1<sup>o</sup> mm. latum ± eonca<sup>o</sup> im, latens lato obtusissimo 4 mm. longa 3 mm. lata apice obtusissima 1 mm. lobi subplana tri-nerve, nervis vix visis. Petalum lineari-spathulatum 4 mm. longa 1<sup>o</sup> mm. Into, apice obtusum lobis angustis, non visis. Labellum basi commissa affixum basi saccatum, sacco 4 mm. profundo 2 mm. lato ore squamato postiore **Hasan** 2 mm. longa apice 2-lobum subclavatum, 3-lobum,

n. p. 134. Herba **epiphy-**  
tica, mdioibns teretibus 3-4  
mm. in sectionis diametro,  
caulibnB 25 cm. longis a basi  
**usque ad** apieem foliosis  
ffivtibus 4-5 mm. in see-  
tiouia diametro, **ragimis**  
**Foliorum** imbricatis caulem  
jimplectautibns glabiis.  
**Folia erasaa virkja** gkbm  
**distacha** altenui **sngostabi**  
lOem.louga **17mm.Iaia**  
apace miatato-acuta basi  
nbriipte wjutracta ad vagi-  
imin **obenntla** supra ad  
oostas impi-esso, supni pl&ua,  
costis et venis non visis,

**baai** plus ininiis torhiosa cum vaginis aiiietJata, majglno intogiu plus miniiis  
**recunraia**, vaginis oylidraccis tire. 8 mm. longis **atb** truncatoobliqnis. Kaemi  
**axOkree** breves 2 cm. longi paxiciflorati. Flores apertioutes 1 cm. in diametro  
«lbicantes centro nilwscentes, jieclicellis bi-evibiis (ctini ovariiis) 4 mm. longis  
triquetris 3-costatis, bi-aetis brevibus 1-2 mm. longis tiiangiilaiibus basi diluta-  
tis pedioelltuu semi-amplectmttibiis. Sepala: postieuni oblongtun 7 nun. longnin  
4;<sup>1</sup>; nun. latiun apico Fotiuidiitum conciiyum, lateralia plus minus obb'qua breviom  
qiiam ix>stico. petala obovato-oblonga 6J mm. longa 3£ mm. lata. **IabeQam**  
plus minus versus apieem l-uboseens ad columiiam adnatum 4Jmni. longnn,  
**boa** saceatum, (saceo brevi sqiiama postiea clauso, squama lineari minute  
liirtella), 3-Iobatum, lobis lateraUbus minutis ad latus oris sacci adntitis  
obtusis dentiformibus, lobo medio erecto emarginato ctmro mucmnato inhis  
hh-teUato, Anthem 2 mm. longa antieo breve products Pollinia 4, per paiin  
conferta, stipite hjalino; **Ooimna** apico rubescens 3 mm. longa.

HAB. Botansna, leg. C. OWATARI, 1898. The orcliid **was** brought toiek tt)  
the Eufthikawa Garden by *Uv.* C. OWATABI in his first expeditk in to Formosa.

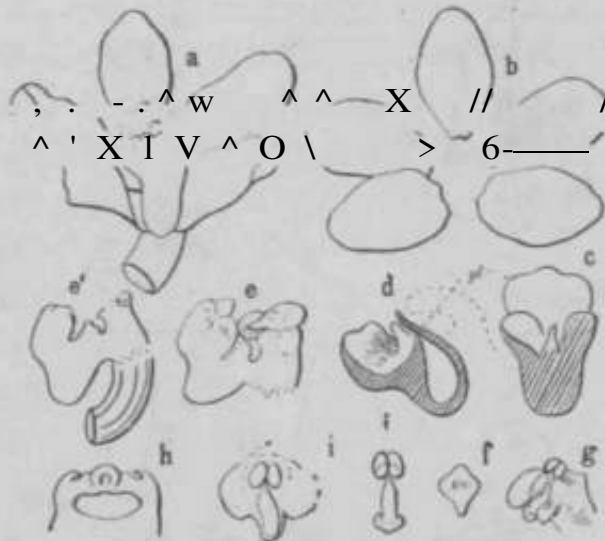


Fig. SO, *Cteisostomtt obtongUtepala* HATATA; a, n  
flower; b, detached **wpata Ht3** jwrtiUs; o, ft lnbclluni,  
seen from front, vertiril pinto is Bepn; <l, the **Mine**,  
seen from stile, mwliiilly c-ut; e, column and labellum;  
f; in anther; g, upkal portion of the colamn, seen from  
side, pollinnriini is seen; h, tie some, seen from front.  
stigma and horseshoe-shaped glnmla too seen; i, n  
pollinarium.

**Cleifiostoma taiwaniana** HAYATA n. n. (Fig. 51). *Sarcanthus tahttamornts* HATATA in Mater. EL Formos. p. 337.

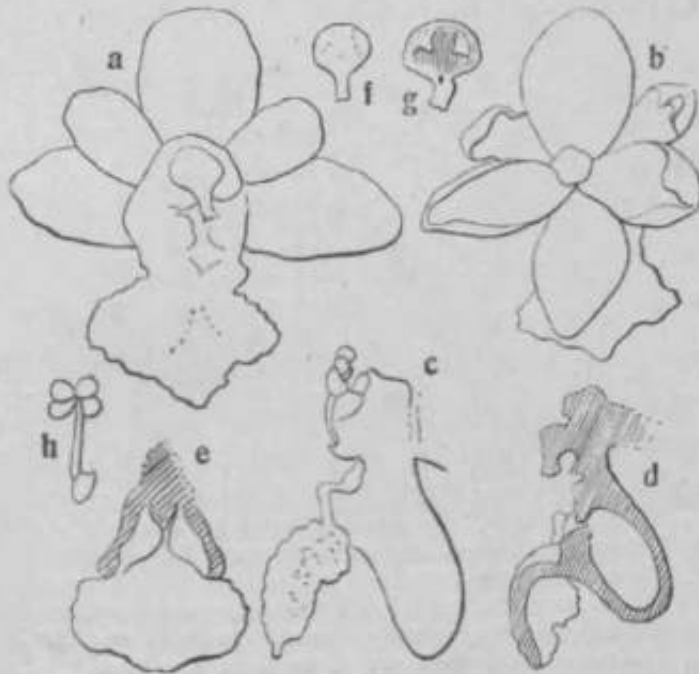


Fig. 51, *Cleifiostoma taiwaniana* HAYATA; a, front view of flower; b, the back, seen from back, ovary taken off; c, a lip and column, seen from side; d, the same, medially cut, anther taken off; e, a lip, detached from column to show lateral appendages and vertical thickening; f, an operculum, seen from front; g, the same, seen from behind; h, pollinarium,

Owing to an erroneous observation, it was first recorded that this orchid has a spur divided by a longitudinal plate and consequently was regarded as a *Sarcanthus*. Afterwards I became aware of that this has no plate but thickening. It should, therefore, be transferred

from *Sarcanthus* to *Saccolabium*.

O B S E K V • Herbarium **epitaphium**, **caulibus**

erectis validis teretibus foliatis non pseudo-bulbosis 25 cm. longis, vaginis persistentibus caulom obtegentibus. Folia disticha carnosae plauae late linearifoliae 30 cm. longa 4 cm. lata apice oblique emarginata sessilia omnivaginata tinctulata, vaginis persistentibus 5 cm. longis. Fasciculi laterales quasi-axillares validiusculi recurvae nimis, ramis 5-6 divaricatis validiusculis 4 cm. longis, imbricatis minutis aequidistantibus triangularibus. Flores parvi 1 cm. in diametro breviter pedunculati flavo-virescentes intus permixti, pedicellis 2-3 ram. longis transverse divaricatis. Sepala libera rostrata carnosae obovato-oblonga 4 mm. longa 3 mm. lata apice obtusa. Petala sepalis angustiora 4 mm. longa 1 mm. lata apice rotundata postice reflexa. Labellum basi columnae affixum contortum patens basi calcaratum, (calcar brevis cylindricum 3 mm. longum 1 mm. lato ore autice lamina longitudinali sensu ulivato, ad 03 postice lateroque callosa-appendiculata), 3-lobata, lobis latioribus ad

latns calcaris sitis brovilms iuirk'uliformibus, **lobo** in dio latinsciuV) 3 mm. longo 5mm. Lifo somiorbiulari apico rutundato marginodonticulato modiolafce callosovnguloso patenti.

Culnma breve oblonga subteres 2 mm. longa.

Clintmdrimn trimcatnm.

HAB, Formosa, leg.: T. UCHIYAMA, 1S99.

*Phymnits* HICH.

*Physurus chinensis* IXOLFE (Fig. 52); MAIBUJL et HAYATA F.UUII]. PL Fnnniis. p. 409.

HAD. Mt. jVi'isun, leg.: B. HAYATA ot T. Ito, Murt, 1914.

Tliis orchid drawn in the accompanying

figures is perhaps identical with ROLFE'S **species**, so far as tli^ original do-  
scription is concerned. The typo I Jiiive never a sen.

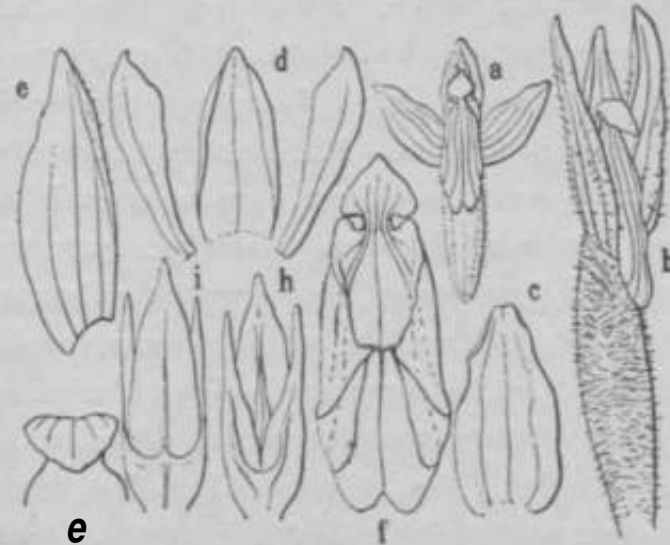


Fig. B2, *Physurus chinensis* ROLFE; a, a flower, slightly exposed; b, the same, a section from the side; c, a hood formed by a dorsal sepal and petals; d, the column, befitting; e, f, the lip, seen from inner and outer side; g, apical portion of the same; h, apical portion of column, seen from front; i, the same, seen from back.

*Anectochilus* BLUME.

*Anectochilus bisaccatus* HAYATA sp. nov. (Tab. XV.) *Odontochilus* Sm  
*bisaccatus* HAYATA in sched. Herb. Taiioku. Tei-i-ostris, radices paucis inci-  
ci-attate. Oculis cum **raemia** 20-25 cm. longus tores subgiber, internodiis  
inferioribus 4 em. longis, superioribus 2 cm. longis inferioro defolius infra  
medium uaque iul basiu ntoemi foliatus sul^ei-ectis vol aseudens. Folia  
alterna a se 2 cm. remota ixitiohita, lamina oblonga 4 cm. longa 2 cm. lata  
**apioa** acuta vel obtuso-acuta ad summum mucronata basi acuta supra atro-  
vuidi ad costas alu>-luieata snbtus sub-pallidii, i^etiolis (vagiis esceptis)  
6 mm. longis gracilibus basi dilihitis IM! viiginas espantibis, vaginis 5-7 mm.  
**bnngis** 4 ram. latis cylindricis hyjdinis ore obhqiis hitiorilms, foliis superiori-  
btis minoribus in racemis ad bracteas recieUs, Raceiai hirsuti 5 cm. longi

basi non floriferi, partibus non floriferis 1½ cm. longis hirsutis, bracteis non floriferis sessilibus lanceolatis basi amplexicanalicibus 14 mm. longis 4 mm. latis: apice acutis 3-nerviis, bracteis floriferis sub floribus lanceolatis pedicellos amplectantibus margine ciliatis vel hirsutis lanceolatis 12 mm. longis 3 mm. latis, pedicellis cum ovario 7 mm. longis bractea brevioribus glabris gracilibus 1 mm. in diametro. Flores cinereo-flavescentes. Sepalum posticum late ovatum 4½ mm. longum 3 mm. latum apice caudato-obtusum ad summum obtusum basi vix contractum 1-nerviium, venis non visis, glabrum; sepala lateralia oblique oblonga 6 mm. longa 3 mm. lata apice obtusa basi contracta latere superiore 1 mm. lata, margine sursum interiore recurva, latere inferiore 2 mm. lata margine deorsum prope basin interiore recurva, duo basi se connata saccum 2-lobatum formantia saccum vel calcar labelli involventia 1-nervia utraque pagine glabra. Petala obliqua late semi-ovata 5 mm. longa 2½ mm. lata apice caudato-obtusa basi breve attenuata basin contracta subfalcato-curva cum sepalo posteriore connata galeam formantia 1-nervia latere exteriori 2 mm. lata latere interiore ½ mm. lata glabra. Labellum Y-forme perfecte liberum ad basin columnae adnatum basi saccatum, sacco globoso 2 mm. late 1½ mm. longo profunde 2-sacculato (sacculis apice 2-lobatis) basi intus medio posteriore callosis duobus instructo (callis cornuformibus 1½ mm. longis ascendente-recurvis), latere oris sacci utroque 1-appendiculatum, appendiculis minutis ½ mm. longis crassis, mesochilo 6 mm. longo lineari margine pectinate, dentibus pectinis utroque latere 3-4-5, superioribus longioribus linearibus 3 mm. longis 1½ mm. latis apice obtusis, medio secus longitudinem 2-lamellato, lamellis linearibus 1½ mm. latis sursum ad lobos laminae abeuntibus, lamina (epichilo) 2-lobata, lobis oblique obovato-rectangularibus 5 mm. longis 3 mm. latis a se angulo 50° divaricatis apice rotundato-obtusis, sinibus inter lobos triangulari-truncatis. Discus medio mesocliili ad medium 1-striatus. Columna brevissima 1 mm. longa antice 2-appendiculata, appendiculis alariformibus, apice cornuformibus suberectis triangularibus apice obtusis crassiusculis ½ mm. latis. Gynandrium dorsale profunde concavum. Anthera dorsalis erecta sessilis ovata 2 mm. longa 1 mm. lata apice longicaudata basi cordata. Pollinia 2, singulum clavato-obovatum apice 2-lobatum basi attenuatum ad pseudocaudiculam unam se connatum. Eostellum 2-partitum, (partibus rostriformibus apice cartila-

*gineo-acuminatis* sulj-torlnosis, InteVe **exterirae** appendienktis). Stigma snl rostello 2-partituni, partibus subrotuntlatis subplanis, vel medio sub-lnbato-plii-atiun. Ovarium cyrindricum torhiosum 9 mm. longiun If mm. in diametrø glabrum sed minute mnrlcatuni.

HAD. Kinkiho, ud 5000 ped. alt., 1911, Ang.

Near *OdwdocMvs ianceokUits* BEXTH. (*Anoectochilus lancecdatus* LDTDL. (Oivhida of the Sikkim Himalayas, in Aim. Boy. Bot. Gard. Calc. THI. t. 392) ; but differs by the shape of tlte lips and their appendages.

*Anoectochilus forme sanue* HAYATA sp. nov. (Fig. 53). Caulis eirc. 20 cm. longus inforiore foliatiis glaber. Folul ovata rel i-otondato-orata 4i cm. loughL 27 mra. lata apice acnta vel acuto-mnoronata luasi rotuidata ad cxb'emitem subito acuta ad petioluni ubeimtia G-nenTa supra velnfcmoso-**nztida** elegante anieo-roticilata subtus (in oxsicwito) mijescentia. Caulis floiitVr 4-5 cm. longus panci-floratus, rliaoliibus lu'rsntis, bincteis ovato-laneeolatis

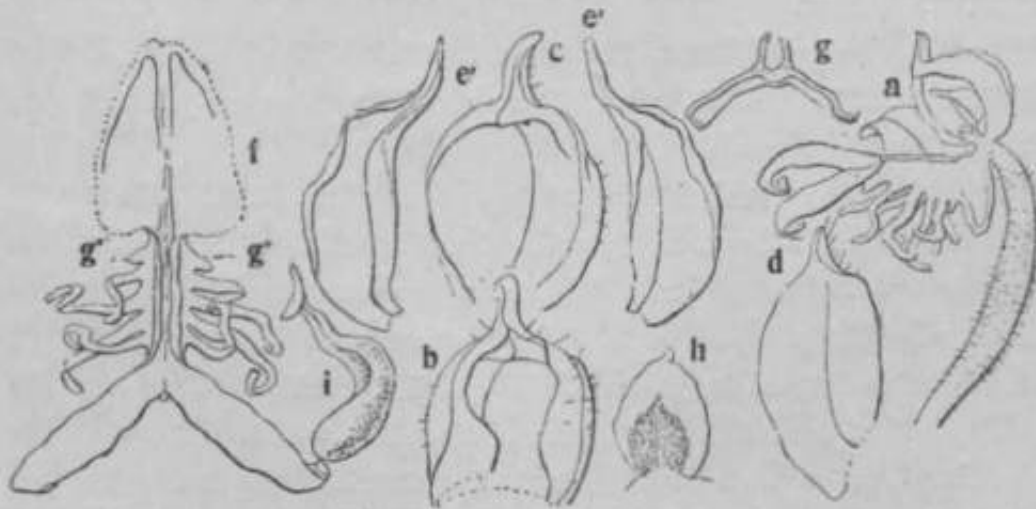


Fig. 53, *Anwochtivis fonnosamut* HAYATA; n, a flower; b, n hood, fonnrf by a dorewl sepal and two petals; o, n donal sepal, e, 6, petals; f, ft lip; g, a section of a portion mentioned by g' g" in fig. f; h, nn Anther, dorsal TOW ; i, n pollinarium.

1 cm. longis coneavis liaui co^ittractia abbashnm floris amplectantlbiis estus liirsntU intus glabris, pedieellis nllis, ovaria eylindrico-ftisifunmbns 1jc m. longis ad utramqne extremitatem angustatis breve lursutis. Sopnlum posticum cuspidato-rotuudatuui G mm. longum 5^ mm, latnm dorso ljiisntiim intus glabram valde concavum cum petalis oonnatum galeam foi-maus apice exterioris



reflexum apice cuspidatum, cuspide 1 mm. longo apice obtuso, margine inferum 1-nerviis, lateralia ovato-oblonga valde obliqua 8 mm. longa 4 mm. lata apice brevis cuspidata ad summum obtusa 1-nervia extus hirsuta intus glabra patentia. Fetala semi-ovata valde obliqua 7 mm. longa 2 mm. lata apice cuspidata, cuspide 2 mm. longo, 1-nervia cum sepalo postico conniventia galeam formantia. Labellum Y-forme, mesochilo 5-6 mm. longo ad longitudinem plicato sub medio 1-costato ad costam fimbriis 2-seriatis instructo, fimbriis lineari-filiformibus 5 mm. longis 1 mm. latis, lamina (epichilj) profunde 2-lobata, lobis lineari-angustatis 7 mm. longis 3 mm. latis apice obtusis divaricatis; calcar sacciforme triangulare 4 mm. longum 3 mm. latum intus prope basin latere anteriore 2-tuberculatum, tuberculis lamelliformibus 1 mm. longis 1 mm. latis obscure denticulatis. Oculum brevis 1 mm. longa, anthera oblonga 4 mm. longa.

HAB. Formosa: loco non indicato cult, in Taihoku seminario, leg. B. HAYATA, 1914, Mart.

Near *A. Boxburgii* LINDL. (Orchids of the Sikkim Himalayas, Ann. Roy. Bot. Gard. Calc. VIII. t. 390); but differs from it by the cream-yellow flowers with more fimbriate mesochils.

**Anoectochilus Inabai** HAYATA sp. nov. (Tab. XVI.) Terrestis; caulis incrassatus 3-4 mm. in diametro teres inferiore glaber, internodiis superioribus 2 cm. longis. Folia 2 cm. a se remota alterna, lamina ovato-oblonga vel oblonga apice acuta vel acuto-acuminata basi rotundata vel rotundato-obtusa 4 cm. longa 2 cm. lata glabra, petiolis (vaginis exceptis) 1 cm. longis basi gradatim ad vaginam dilatatis, vaginis 12 mm. longis 4 mm. in diametro ore obliquissimis basi cylindricis, partibus cylindricis brevissimis semihyalinis. Sacculi cum pedunculis 13 cm. longi hirsuti, partibus floriferis 5-6 cm. longis, partibus non floriferis (pedunculis) 7-8 cm. longis erectis bracteis 2-3 instructis, bracteis non floriferis lanceolatis hirsutis rubescentibus 1 cm. longis semi-amplexicaulibus, bracteis floriferis subflow ovato-lanceolatis 1 cm. longis apice acuminatis hirsutis rubescentibus basi contractis obtusis, pedicellis nullis, ovarii cylindricis vel cylindrico-ovatis 1 cm. longis. Mores rosei. Sepala inaequalia, posticum ovatum vel late ovatum 5 mm. longum 3 mm. latum apice subcaudato-obtusum ad apicem uncinato-

obtusum basi ± contractum 1-nervi, venis utroque latere nervi 1-2 alternis, fusco-viride sed prope marginem et secus nervos et venas laterales album intus glabrum extus glanduloso-barbatum basi cum petalis connatum galeam formans; sepala lateralia falcato-oblonga 11 mm. longa obliqua 4½ mm. lata apice acuto-obtusa basi cum basi labelli et se connata. Petala lunuliformia linearia falcato-curva obliqua 7 mm. longa 1½-1½ mm. lata quam sepalo postico vix longiora vel sequilonga apice acuto-obtusa basi vix contracta utraque glabra basi ad sepalum posticum adnata sursum subconnata galeam formantia, saccum labelli involventia intus glabra extus glanduloso-barbata 1-nervia, (venis lateralibus utroque latere nervi 3 alternis acute ascendentibus), fusco-viridia prope marginem secus nervos venasque albo-reticulata. Labellum Y-forme cum hypochilo mesochilo epichiloque 23 nun. longum basi saccatum cum sepalis lateralibus connatum mentum 1-2 mm. longum formans, sacco globoso 3 mm. longo basi leviter 2-lobo, lobis basi interiore callo uno instructis, callis lamelliformibus rectangularibus 1 mm. longis, lamina (epichilo) longe unguiculata, ungue (mesochilo) in ambitu lanceolato-lineari 9 mm. longo 2-3 mm. lato plus minus crassiusculo longe pectinato (dentibus pectinis inferioribus brevibus, superioribus longioribus 7-8 mm. longis angulo 45° antice divaricatis) medio secus longitudinem 2-lamellato, lamellis sursum ad lobos laminae abeuntibus, lamina (epichilo) alte divaricatim 2-lobata ad sinus inter lobos obtuso-mucronata, lobis divaricatis oblique rectangulari-oblongis 1 cm. longis 5-6 mm. latis apice truncato-obtusis, (sinibus inter lobos rotundato-cuspidatis), margine integra glabra. Columna circ. 1 mm. longa 1 mm. lata dorso complanata; anthera dorsalis verticaliter sita (posterior) cordato-ovata 3 mm. longa 2 mm. lata apice caudato-acuta basi subcordata sessilis 2-ocularis; pollinia 2, bipartita vel apice 2-lobata cum pseudocaudicula 4 mm. longa clavato-obovata, pseudocaudicula 1 tortuosa 1½ mm. longa, glandula oblonga ½ mm. longa. Clinandrium valde concavum latere ad rostellum abeuns; rostellum subcartilagineum rotundatum apice aristato - 2 - lobatum; stigma duo, singulum circ. connatum vel distans infra rostellum situm, appendiculis columnis 2 cornuformibus infra stigma sitis ascendentibus crassis 1 mm. longis obtusis. Ovarium sessile cylindricum 9 mm. longum 2 mm. in diametro hirsutum.

*Odontochilus Inabai* HAYATA (Herb. Taihoku).

HAB. Kinkiho, ad 5000 ped. alt., leg. H. INABA, Aug. 1911, fl. ro33i, (fide INABA).

Near *Odontochilus grandiflorus* BENTH.—*Ancebochilus grandiflorw* LTNDL. (Orchids of the Sikkim Himalayas, in Ann. Roy. Bot. Gard. CaJc. YIH. t. 393), but differs from it by the much longer pectinate claws of the lips and in having hairly sepals.

***Anectochilus koshunensis*** HAYATA sp. nov. (Fig. 54). Eadices incrassatae. Caulis teres solitarius (cum racemis) 16 cm. longus basi 3 mm. crassus a basi usque ad medium foliatus supra medium vaginato-squamatus sursum spicatim florifer simplex incrassatus rubero-purpurascens (in exsiccato) deorsum subglaber sursum pubescens prope basin minus foliatus, prope medium approximativ foliatus, supra medium usque ad apicem aphyllus. Folia alterna ad medium caulis approximativ 3-4 sita petiolata, lamina rotundato-ovata 2 J cm. longa 18 mm. lata apice obtuso-acuta mucronatim acuta basi rotundata ad petiolum acuta margine integra crassiuscula utraque pagine glabra in exsiccato membranacea supra in exsiccato fuscenti subtus rubro-purpurascenti 5-nervia, nervis parallelis lateralibus infra apicem ad nervum centralem attingentibus, venis et venulis reticulatis, supra ad nervos venas venulasque albo-reticulata, petiolis cum vaginis 1 cm. longis linearibus, partibus linearibus 5 mm. longis 1mm. latis plicatis paullo pubascentibus, vaginis 3-5 mm. longis ore oblique truncatis 5 mm. latis circ. 10-nerviis semi-hyalinis rnbescentibus. Spicis simplices 5-6-florat<sup>89</sup> 4J cm. longae, pedunculis (partibus caulis aphyllis) 7 cm. longis 2-3 bracteatis, bracteis sub flore ovatis rubascentibus 7 mm. longis 3-4 mm. latis apice cuspidato-acuminatis 1-nerviis alabastrum floris amplectantibus intus glabris extus pubescentibus. Flores alterni breves pedicellati vel sessiles suberecti. Sepala inaequalia; posticum late rotundato-ovatum 5 mm. latum totiusque longum basi non contractum jipice cuspidatum ad summum obtusum intus glabrum extus pubescens 1-nervium intus valde concavum sursum valde reflexum cum petalis connatum galeam formans dorso ad nervum elevatum; lateralibus oblique oblonga plus minus patentia 8 mm. longa 4 mm. lata valde concava oblique apice obtusa basi non contracta 1-nervia, nervis recurvis, intus glabra extus pubascentia rubescentia, nervis

dmo elevatis ^ndentibus. **Petal\*** temiissima **hjalfoa** valdo obliqna semi-  
 obovataapice cuspi-  
 dato-aonta basi  
 nttenunto-contract\*  
 snrsum reflexa  
 latere superiore  
 -cnm sepalis aduata  
 galeam formaugia  
 valde obliqna  
 Litere inferiors  
 2g nun. lata latere  
 super! ore -[Vram.  
 hitti fc> mill, longa  
 1 -**nervia** utracjue  
 pagie glabra.  
 Lubollnni glabrmn  
**basi** ad basin  
**columnae** adaatnm  
 Longe calcai'itnm  
**(ealosri** ad orera  
 vulde obliquo  
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 5iniu. longo latore  
 anteriori-e 9-10 mm.  
 lun^i) medio 1 mm.  
 lato iitns Liteini  
 posteriors mfta  
 oaktmnam pioboB-  
 cis2 instrct' di at-  
 sm itutiee plus  
 minus recurvo atl  
 apioom 2-]ol>ato,  
**lobis** 2 mm. longis

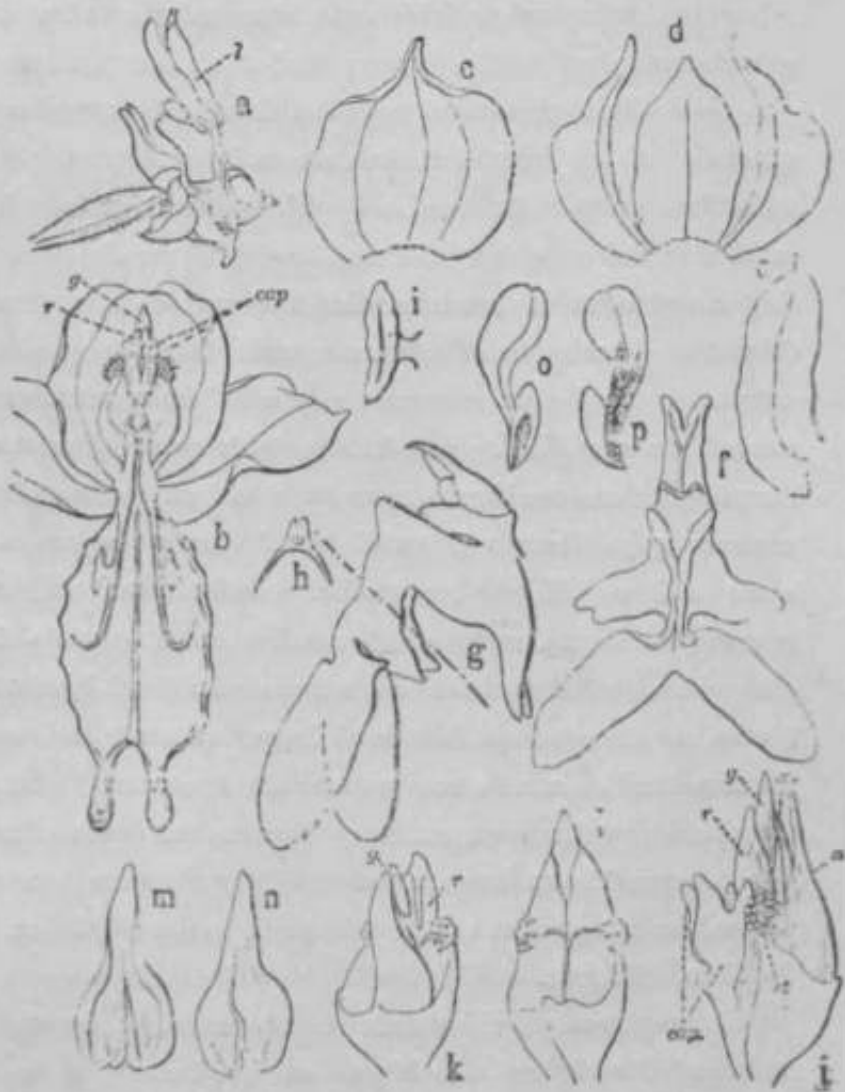


Fig. B4, *Annetool9Ui feestonmrff* HAYATA ; a, a flower; b, another flower, luvinti of the lip taken off, spur explicated, to show column, columnial npj>nrtaga, atdgmntn, rostelJiim, Rfend mul two bnsal appendnges of the spur; a, n dorsnl sejtnl and iictals, connated into A hood; d, H dorsal wpd and jietak, scpiirntod; o, tv Literal aopal; f, n detncliotl lip, slfin from 6we; p, Uio snnn<sup>l</sup> lip, with columns And anther, seen from side; b, Gross wction of the siime at chnin-line; i, a basal nppendnge of the 3]Mir; j, a oolnmiiift, seen Erorn side; k, Uw Biune, seen from back; l, tho uame, unthflr taksn off, showing eliunnclrinm; m, an nntner, seen from front; n, the same, seen from back; O, p jiliuiiriiim, seen from face; p, the same, seeii baa l>icle.

1 — Up ; cap=columnjil rtppentiitges; r = roste] him ; R • gl/in< 1 : of = enucle of pollinia ; (i=anth(!r • at = stigma.

1 mm. latis apice obtusis rectis, versus orem antice utroque latere lobis erectis triangularibus instructum (lobis acutis latere anteriore ad mesochilum abeuntibus), mesochilio a calcaris angulo  $90^\circ$  egresso 3-4 mm. longo secus medium plicato margine conduplicato-plicato subtus secus longitudinem appendiculis 2 instructor appendiculis late pinni-formibus 4 mm. longis 2 mm. latis apice antice obtusis desuper falcatis, lamina (epicliilo) bipartita, partibus verticaliter sitis parallelis oblique oblongis 8 mm. longis 3 mm. latis apice rotundatis vel obtusis, ad sinus inter partes distincte mucronata, mucrone desuper reflexo. Columna a basi usque ad apicem rostellii 3 mm. longa basi constricta latere anteriore appendicibus instructa, appendicibus anterioribus 2 aJseformibus, alis verticalibus parallelis apice 2-lobatis, lobis superioribus magnis triangularibus 1 mm. latis intus sacciforme excavatis, lobis inferioribus minoribus; appendices-columnae apice liberae sub rostellis rostelliformes; stigmata 2 distantia utroque latere basi rostellii sita; rostellum cartilagineum validum 2-fidum 1 mm. longum; anthera dorsalis erecta sessilis lanceolato-ovata 4 mm. longa 1 mm. lata apice rostrato-attenuata basi rotundata leviter 2-lobata 2-ocularis; pollinia 2 sectilia obovato-lanceolata basi longe attenuata ad caudiculas abeuntia; glandula fusiformis, ad utramque extremitatem acuta  $1\frac{1}{2}$  mm. longa  $\frac{1}{2}$  mm. lata; clinandrium profunde excavatum. Ovarium fusiforme a lamina labelli angulo  $90^\circ$  egressum 12 mm. longum 4 mm. latum pubescens utrinque contractum basi plus minus attenuatum sessile vel brevissime pedicellatum.

HAB. Kōshūn.

Differs from all the species of *Anoectochilus* by the mesochil which is not afforded with pectinate lobes, but has broadly entire wingformed lobes, by the columnal appendages which are doubly folded and beak-shaped at the apex, and by the triangular lateral lobes at the mouth of the spurs. It may constitute a new genus (*Aviglossum*, I should propose to call it), when the above mentioned characters are fully ascertained by the study of a living material.

### *Zenxine* LINDL.

***Zeuzine arisanensis*** HAYATA sp. nov. (Fig. 55). Terrestis; radices paucae\* incrassatae. Caulis cum racemo terminali 25 cm. longus supra basium usque ad infra nigrum foliatus. Folia in exsiccato tenuiter membranacea

**ovate** vol ovato-lanceolata apico ocnta Imsi obtuso-rotundata ad petiolum **contracts** 4 cm. longn 11 cm. lilta, petiolis (cum vaginis) lj era. loDgis basi dilnt-itis vnguifovmbibus raulem amplexantibus. Partes florifene 6 cm. longie, partibus iuttsr floriferom et folufemm 11cm. longis hirsntis sqtmmatis, squamis 1^em. longis apiee acuumitis basi vaguiiformibus catilem amplexantibus a ae 3 cm. remotis snbiibris tenuiter scariosis. Floi-es tlensiuscuie dispcti Uneari-ovoid«i S mm, loigi 2£ mm, InL Iirauti, In-actuis lanceolatis. Sepaliuu posticuni valde **eoacaVmn avatens** 5 ram. longiun upice acuto-obtttsim basi levit<r contraetiuu 1-UWTHIIIH vel obscure 3-nerrium exhis **hüsutuiD** intus gla-

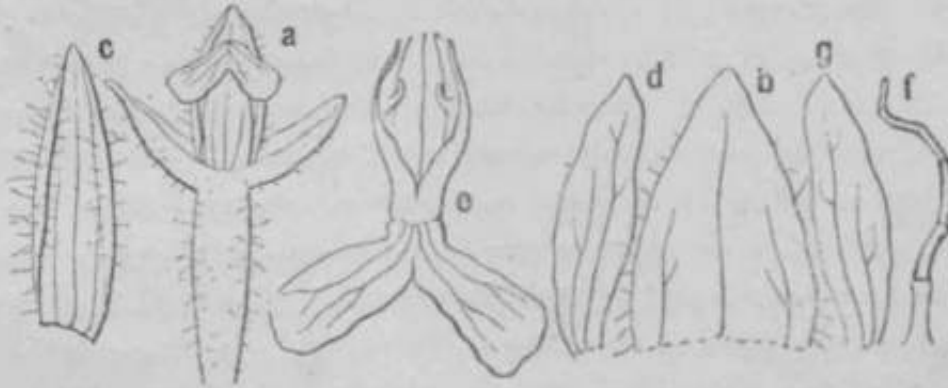


Fig. 55, *Zmtxitw arbawwb* HAYATA; n. a flower; h, n florsfil sepal. expanded; c, a lateral sepal; d. A? petals; e. a, lip; f. a hair on the flower.

luiiut cum petab's coruiatum gllcain **fanaana**, **latenUia** oblique omta 4 mm. **tonga** 2 mm. lata apico acnto-obtiiiaa interior\*\* **tooorva** Iwisi dz conti-acto extiis liirsntu inttis glubra 1-neixia vel ol>acni`e 3-nen-ia, Petabi serai-obloDga 4.} mm. longa 1^ miii. **lata** upicu obttisissinui luisl luvitor contnicUt 1-nervia, uer>> **valde** <\o-n-trico, utraquo pi^iie glabrn. Labellmn Y-^ornie> bimiiia tennis 2-loliabi, **lobfe** augiile\* 70<sup>3</sup> n se divai'icntis qiuuinmgnkribus apico obtusis 21 mm. k>]i« I mm. vol li mm. latis, nngne crasso 1 mm. lato cleoisum latioiB **earn** colimuia conuato hilHun brcvo foimanti margiuo iutns wirinato basi hitus 2-tiil>ei-**ouloto B nun. Jongp. Oohimna** 1-2 mm. longn. Rosk'llni n alto 2-lolwitui 11, **lobia** liiK'niilms 1 mm. lou^i\*-

HAU. *Aximn*, leg- S. BAKAKI, **Uazt**, 1911.

Near *Zeuxvne rejksa* KIXO et PAXTTJNG (Orchids of the Sikkim HJILI-layae in Ami. Roy. Bot. Gard. VIII. t 388), bnt differe from ib ty the shape; of the eohunnal appendage.

*Cheivostylis* BLUME.

**Cheirostylis** Inabai HAYATA sp. nov. (Fig, 5G). Canlis ascndens 10-15 cm. altus tola lougitudiie foliatns, foliis iuferioribus mmoribus its snparioribas majoribus. Folia ovata 2 cm. longa 12 mm. lafca apica nufca vel obscure mii-cronato-acuta basi rotuudnta subito ad petiulum aboutia. a se 2 em. remota in

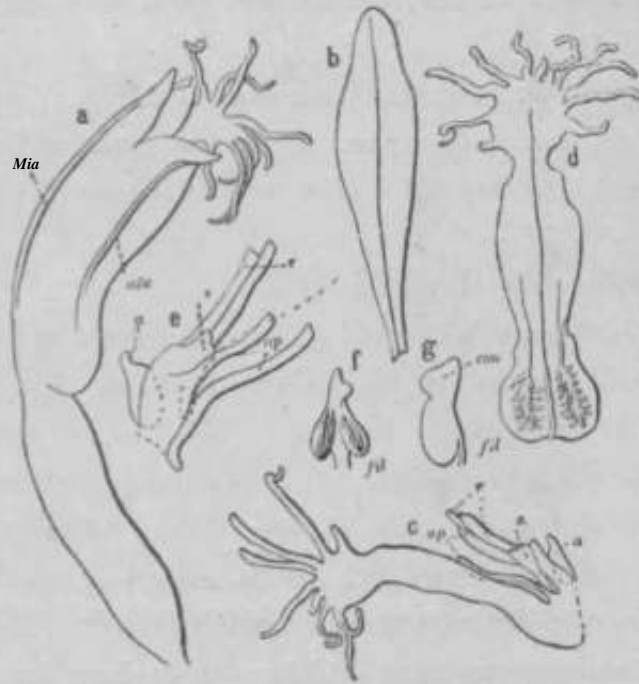


Fig. S6, *CftetrostijlUlnoliai* BAY AT A; a, ft flower; k u **petel**; c, r» flower, sopuJs and jicllala tknen oft; 3, a lip; e, oolumnn; f, iin anther, seen from fiico; g, the same, seen from side; a=anther, r=roatellum, np.= columnal appentlages, s • gtigmn, ala=win^, fil=filament.

exsiccatofcenuiter memlim-nacea, petiolis 1J cm. loughs upice 2 mm. latis cleorsum (lilntitis prope basin vagi-niforinibus, pu-tibus vagini-formibro 5 mm. longis toti-iisque latis. Flores pauci *moe-mosi*, niceinis te'raiiialibiis Kiniplit'ibiis 2-3 cm, longis, pei I mieulis (partibiis nou floriferis) lera. longis breve hirsiiitis, bmcteis orato-lanceolatis 8 mm. longis 2 mm. latis apice aciuniuatis, pedicullis hirsutis 2 mm. longis, ovariis cylindriiois 1 cm. loiigis 2 isiin. l.i.lK ITores albi oblique cylind-racoi subdeclimiti 1 cm. longi (ovariis excoptis) 4 nun. lati apice ± angnstiores l">asi rotiindato-confracti. Sopala liiiioari-lanceolata 1 cm. longa 2£ ma lata medio dorao carin;vto-alata ad imu'ginom a busi usque ad props apicem connata tubnm fornmuti.i, fcabo sabdeoiUnato basi antioe obscure vel vis ventricoso apice 3-lobatf) Lili^ oblongo-triangiuiuibns 3 mm. Ltis apice acutis. Petala lineari-spathnlati 10 mm. longa 2J mm. labi apica obtiisa doorsum att^uata tomiissima Bubhyaliro etecta sublibera sxu^um ± sepalo postico adnata 1-neiTui. Laljellmn enoctum clavato-angustatum circ. 10mm-longam apice a tubo sepalommm exscrbnm Hursuixi snpra medlnm contractuin, parte supra contractionom rotundata 2 mm. hi dia-

metro crassiuscula supra minute villosa margine fimbriata, fimbriis 2½ mm. longis, ad contractionem 1½ mm. latum, parte infra contractionem angustata 8 mm. longa 2 mm. lata lsevi basi subventricosa, ventriculo sub 2-lobato intus 3-nervio ad nervos laterales fimbriis 2-seriatis instructo. Columna circ. 1 mm. longa; appendiculis columnales lineares, partibus liberis 3 mm. longis ½ mm. latis. Kostellum alte 2-partitum, partibus linearibus 3½ mm. longis 1 mm. latis apice truncatis.

HAB. Rinkoho, ad 5000 ped. alt., leg. H. INABA, Aug., 1911.

Near. *Cheirostylis chinensis*, but differs from it by the much larger leaves which are arranged from the base of the stems to the base of the peduncles.

*Ariscmovchis* HAYATA n. g.

Sepala membranacea a basi usque ad prope apicem in tubum coalita subsaequalia ± declinata basi antice in saccum brevissimum producta. Petala sursum sepalo postico adnata deorsum libera. Labellum a basi columnae erectum angustum petalo conforme elongato-oblongum circ. asquilatum apice non dilatatum intus non callosum ecalcaratum apice desuper leviter recurvum. Columna brevis apice brachio uno vel brachiis 2 erectis linearibus rostello recurvum appendiculata. Stigmata distantia utroque latere basis rostellum sita. Rostellum alte 2-partitum, partibus acuminatis erectis. Clinandrium breve profunde excavatum. Anthera erecta acuminata 2-locularis, loculis se separatis. Pollinia sectilia, caudicula oblanceolata glandula lineari peltata inter partes rostellum sita. Herba aphylla terrestris debilis. Rhizoma repens tuberiferum. Scapi aphylli vaginis instructi simplices erecti. Flores parvuli in racemo laxiusculo dispositi breviter pedicellati.

HAB. Formosa. Species unica.

The new genus is more or less related to *Gastrodia*, *Aphyllorchis*, *Epipogon* and *Gakra*, in its leafless habit. It is, however, closely allied to *Cheirostylis* in the gamophyllous perianth, deeply sinuate rostellum, sectile pollinia, one or two armed columnal appendages and stigmatic tissue at the base on each side of the rostellum. But it differs from it by the aphyllous habit, and by the nearly included long entire labellum with no distinction of a blade and claw and with no swelling at the base.



*Arisanorchis Takeoi* HAYATA, n. sp. (Fig. 57). Terrestriis, tuberibus oblongo-ovoides horizontaliter sitis circ. 1mm. longis 5 mm. in diametro **camosis** []; iuscenti-rubrescentibus signis vel moniliforme continuis, apice scapii singulum emittentibus. Scapi erecti recti circ. 15 cm. longi aphylli flavo-albescentes

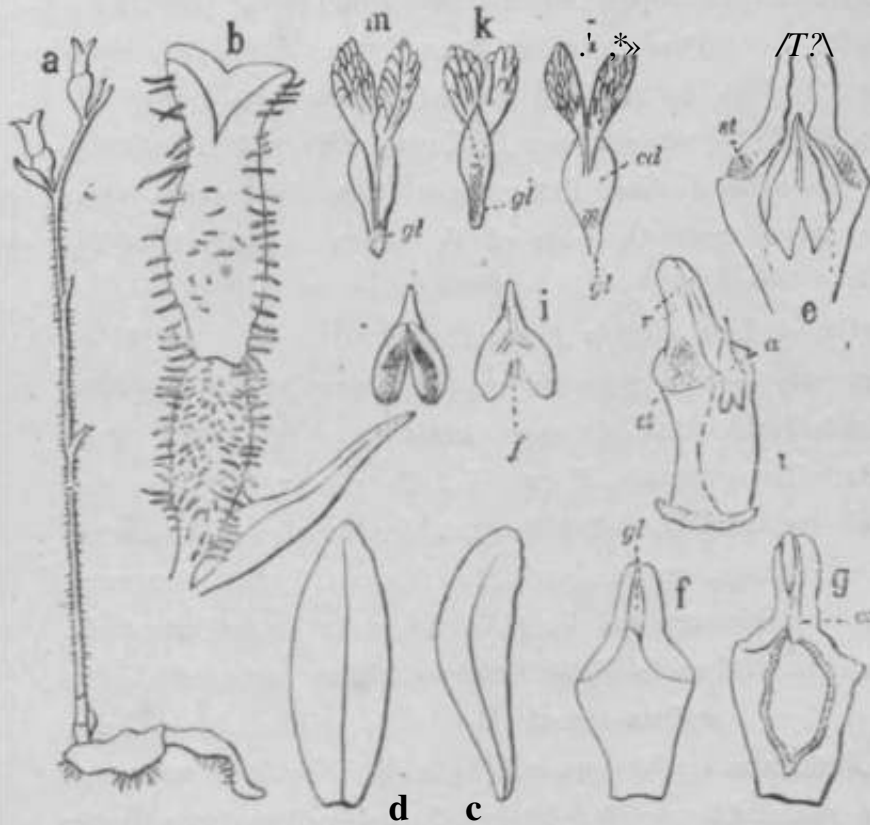


Fig. 57, *Arisanorchis Takeoi* HAYATA; a, the plant; b, a flower; c, the lip; d, the lip, seen from front; e, the column, seen from front; f, the same, seen from side; g, the same, seen from back; h, the anther and dorsal portion of the clinandrium taken off; i, the anther, seen from back; j, the anther, seen from front; k, the pollinia; l, the columnal appendage, seen from one side; m, the same, seen from another side; n, the anther; o, the columnal appendage; p, the columnal appendage with a gland; q, the columnal appendage with a gland; r, the columnal appendage with a gland; s, the columnal appendage with a gland; t, the columnal appendage with a gland; u, the columnal appendage with a gland; v, the columnal appendage with a gland; w, the columnal appendage with a gland; x, the columnal appendage with a gland; y, the columnal appendage with a gland; z, the columnal appendage with a gland.

scapulis 15-7 mm. longis. Flores subditi vti pallidoflavi, ovarii viridibus toto glanduloso-pilosis, pilis reflexis tenuissimis. Sepala toto coarctata tubiui fonnantia\* toti) tenuiter pilosa, tubo 6 mm. longo 2 mm. in diametro ± declinato basi subito constricto ad orei leviter contracto, ore 2 mm. in diametro, basi anteriore lase minus minute saccato, (sacco subsciuo vel i mm. producto), apice **S-bbato**, lobo postico (seimo postico) triangulavi ~1 mm, **bngo**

squamati, (squamis tenuissimis vaginiformibus numero 2-3 em. remotis linearibus eivc. 1 cm. longis cylindricis, ore late obliquis apice truncatis), tenuiter villosi, pilis tenuissimis patentibus crispis, partibus floriferis 2 cm. longis, floribus generaliter 2-3 cm. longis, ovario subsecundis, pedicellis (esoptis ovarii) 3 mm. longis, bracteis sub pedicello [androlatis Bemi-

totiusque lato apice obtuso, lobis lateralibus postico minus latis conformibus. Petala sublibera oblique oblanceolata 6mm. longa 1-1mm. lata apice obtusa basi  $\wedge$  mm. lata ~ formiter falcata basi gradatim angustata. Labellum elongato-oblongum 6 mm. longum 2 mm. latum subinclusa subrecta suberecta sursum prope apicem desuper recurva apice obtusa basi 1 mm. lata. Columna 2 mm. longa. Clinandrium profunde excavatum; anthera bilocularis erecta apice cuspidato-appendiculata, loculis fusiformibus. Rostellum erectum 2-lobatum, lobis linearibus 1½ mm. longis a glandula lanceolata separatis. Pollinia 2 sectilia (granulis cuneiformibus ½ mm. longis) fusiformia, medio caudiculae peltatim affixa, caudicula oblanceolata 2½ mm. longa ½ mm. lata apice obtusa basi attenuata flava hyalina; glandula lactacea linearis 1mm. longa; stigmata lateralia basi utroque latere rostellum sita. Columna antice plana non alata, sed apice antice cum appendiculis simplicibus vel 2-partitis iustructa, partibus linearibus secus rostellum productis 1mm. longis rectis erectis.

HAB. Arisan: inter Karapin et Suisharyō, ad 3300 ped. alt., leg. TAKEO ITO, Mart. 28, 1914.

Found on a sunny place, growing in a clumps of *KcHanchoe spathykda*, apparently with some indirect connections with the latter.

### ***Goodyera* R. Bit.**

***Goodyera bilamellata*** HAYATA sp. nov. (Fig. 58). Caulis 15 cm. longus basi foliatus sursum racemosus. Folia oblongo-lanceolata 5 cm. longa 18 mm. lata apice acuta basi subito acuminata attenuata ad petiolum abeuntia chartaceo-membranacea in exsicco margine subintegra vel minute crispata, petiolis 4 cm. longis basi vaginato-dilatatis caulem complete amplexantibus. Cincinnuli sursum hirsuti, partibus floriferis 5 cm. longis, floribus sessilibus a se 5 mm. remotis, bracteis lanceolato-ovatis 1 cm. longis 4 mm. latis apice acuminatis basi cuneato-angustatis extus hirsutis intus glabris 1-nerviis, ovariis 6 mm. longis tortuosis hirsutis. Sepalum posticum ovato-triangulare 9 mm. longum basi latissimum 4 mm. latum apice triangulari-acutum ad summum obtusum margine prope apicem interiore recurvum 1-nerviium concavum cum petalis galeam formans extus hirsutum, lateralia oblonga obliqua 1 cm. longa 3½ mm. lata 1-nervia sursum convoluta acuminata ad summum obtusa. Petala



Fig. 58, *Goodyera MamJma* HAYATA ; a a flower; b, ft cap composed of & dorsal sep" and petals; o. a dorsal sepal; d, a lateral sepal; e. a petal; f, alip, seen from f<<nt;g^tbfi same, seen fro\_m^e;h, th, same, in vertical section; i, a column; j, the some, seen from side; k, the same, seen from back; l, an anther; m, po nanm. attenuata 4 mm. longa. Ros-

obovato - spathulata 1 cm. longa 3-4 mm. lata apice breve cuspidata obliqta IIOI cuneato-attenuata 1-uervia utraque pagiue glabm. Labellum oblongnm 8-9 mm. longum basi ventriosum, ventriulo extns glabro intiis hirsute, pilis 1 mm. loiigis, 4 mm. longo 3 mm. lato, sursum socus longihiduem plicatum, parte plieata ntraque fjuue glabra 5-newiii esplicato ovata 4 mm. longa 3 mm. lata discis 2-lamellatis **msttnota** flower; ^ ^ ^ ^ Iecurva apice subacuta ad Summwm obtusa. Columna brevis, aiitliera COrdato-OVata apice

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

**Goodyera caudatilabella** HAYATA sp. nov. (Fig. 59). Caulis 40-50cm. longus basi vaginatns medio foliatus suranm mcemosns. Foliu **oblongo-**obovata circ. 20 cm. longii C cm. lata apico acuta basi attennata ad petiolnm 5 cm. lougum abenniia, veimlis transreraiis manifesto reticnlatis, in exsicntn membiflnacea, petiolis 5 cm. loiigis basi dilatatis vaginifonnibus, vaginis 1-2 cm. longis 13 mm. latis. Caulis inter partom racemosam et foliosam sqimatus, partibns scjuamigeris 17 cm. longis hirsutis, squamis truignltu-i-limceolatis Hncaribus 14 mm. longi<j 2 mm. latis, partibus mcemosis 20 cm. lou^is, fluribus inferioribiis remotis a se 1 cm. romotis, superioribus deusiusculis, bracteis lineaii-lnnceolatis lcm.longis 1-2 mm. latis, pedicellis **BobnmlHs,**

ovariis 8mm. Ioiigis d«nse Iweveqwt cnspaio-liirsutis, piHs glandnlosis. Sepalum posticum oblongum 6 mm. longum 3 mm. Iatnm apice **aerfeum** margin-plus minus recxxmxm cixm petalis galeam formaus 3-nervium oxtira gland«los«-hirsutuim intxis glabnxm; sepala lateral\* valde **coneava** (Hm. longa Smm.lata extra hirsxita intxis glabra. Petala, **Bpatmuata** (i mm. longa 2mm.lata ± obliqua apice ttiangulari-obtiiKii, xnedlo deorsum |mm.lata ntfamuata **nfacaque** glabra. Lalx'lluin valde coneimim late **rotanda-tiim** 5 mm. longum **ftpioe** longe caudatum, eaudis linearibus 1J mm. longis ^ mm. latis apice desuper recurvis i- I convolutis, extixs gkbmm intus breve glmluloso-**hirantratu** Coliumui 3 mm. longa apiee 1mm. latsi **baai** unguustior. Eostellum taiangulai-e 1 mm. longxim 1^ nun. latum; antlxera oblnxigo-tx-iangxxlarLs lg-mra. longa 1J mm. lata.

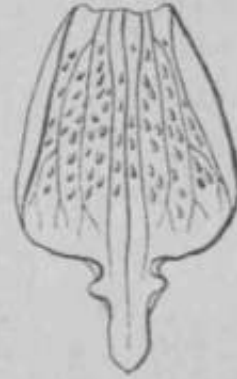


Fig. 59, *Goodyera caudatilabella* HAYATA.

HAD. Ins. Okinawa, leg. T. TASHIEO, 1S87, Mai-t. fl.

Near *G. procera*; but diflto from it by the short rostellum and **bng** caudate lips.

**Goodyera cyrtoglossa** HAYATA Sp. nov. (Fig. 60) Camis 80-100 cm. **longt\*** inferior 7 mm. latxxs deorsum raginatus medio foliatxxs sui^txm racemosus, ^x-tibus foliatis 20cm.longis. Ma oblonga vel oblonga-lanceoL^ 15 cm. longa 5cm.Iatn apice acuminafei basi acuminata ad petiolnxx abeuntu, in exsxecato submembx^iacea, potiolxs 7-8 cm. longis basi dilatatis vag.^t.s, vaginis 1-2 cm. longis 13 mm. latis, partibns into pai-tem florifemm et v mosam aquamiferis, squamis lanoeolatis 3 cm. longis 1 cm. latis caulem am- plectantibus, partibus floriferis 15 cm. longis, rLadiibos dense breveque pilosis, bxm-teia lanceolafe 1cm. longis 2 mm. latis apice Kneari-^cuimimhs, » «ubmxUisj ovariis 1cm.longis dense breveque pilosis, piUs \*\*\*\*\* empat. **Bepatem** posticum ovato-lanmtom 7mm.longxun 2\* mm. latum extus bi-ev **hiisatem** intus glabmm aubtrinervium, nervis **ktetalibaB** tenuous j **sepala** lateiaba qilaiu postic, paullo longkmv et latiora ± obliqua. **Putafc** si>athtlato- **Kneaiia** 9 mm. longa 1mm.lata apice obtusa vel x-otundata medio deorsum attenuata basi 4 mm. kta. LabeUum late mfn«datixm apice caudatum, parte

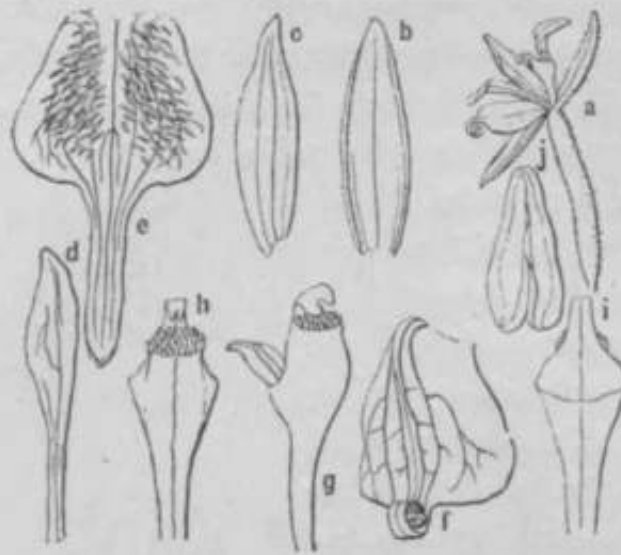


Fig. 60, *Goodifera nfrtogtaasfi* HAVATA; a, n flower; b, an uppermost sepal; c, n lateral sepal; d, the column; e, H *ftp*; f, the column, seen from back; g, A *t>himn*, seen from side; h, the column, seen from front; i, the column, seen from back, anthers taken off, showing the column; j, an anther, seen from front.

ruiudata valde concava  
3 mm. Longa 5 mm. lata,  
parte caudata linearis 2 mm.  
Longa 5 mm. lata apice in-  
teriore desuper convoluta. Colu-  
mna 4 mm. Longa 5 mm. labi  
apice dilatata 1 mm. lata;  
rostellum triangulare 1 mm.  
longum 1 mm. latum apice 2-  
lobatum; anthera  
ovato-oblonga 2 mm. longa 1  
mm. lata.

HAB. Kappanzan, leg.

U. Mora et Y. SIMADA, Mart.  
1910, (fl.).

Near *G. procera*, but  
differs by the long curled tails

at the apex of the lip and by much smaller flowers.

*Goodyera longibracteata* ELVATA sp. nov. (Fig 01, a-h). Caulis 50 cm.  
longus basi vaginatis deorsum infra modum foliatis. Folia oblique ovato-  
oblonga vel obovato-oblonga 12 cm. Longa 5 mm. Lata apice brevis neuromata,  
ad summum breve aristata basi subitae attenuata ad petiolura abeuntia, petiolis  
(cum vaginis) Gem. longis subplicatis basi dilatatis ad vaginam (partem dilatataem)  
aberrantibus, vaginis 3 cm. longis 8 mm. latis nervosis; caulis partem foliosae 10 cm.  
longus; partes floriferae 14 cm. longae; partes inter partem floriferam et foliatam  
18 cm. longae squamatae, squamis 3 cm. longis linearibus-hincolatis caulem amplec-  
tantibus. Racemi laxi vel denseque floriferi, bracteis linearibus-lanceolatis 15 mm.  
longis 3 mm. latis apice acuminatis florem superantibus, rachibus et ovaris  
brevissime puberulis, ovaris (pseudopedicellis) 5 mm. longis linearibus. Sepalum  
oblongum elongato-oblongum 7 mm. Longum 2 mm. latum apice obtusum basi  
leviter contractum 1 mm. latum margine sursum apiceque interiore nervum  
3-nervium dorso breve munitum facie glabrum, latens cum postico fiformi-  
formia sed ± obliqua latiora 3 mm. lata. Petala subulata-linearia 7 mm-

longa 1.5 mm. to apice obtusa medio daoum cuneato-atauat, baai  
 \* mm. fete 1-aervia. Labdlhm cuspidato^tundatum 6 mm. longum explicate

5£ mm. latum apice  
 •eandatum, (cauda  
 linear! - oblonga 2 mm.  
 longa 1-Jinn.lata apico  
 obtnsa basi contracta  
 plana autico recurva),  
 sub can da usque ad  
 basin ventricosum, ven-  
 triculo 4 ram. longo  
 2}mm. la'to extus  
 glabro intns piloso  
 (pilis \$<sup>mm</sup>- longis)  
 orasso ad mnrgi n <• in  
 membranneo, Colum-  
 oa (excoptis antheris et  
 rosteUis) 3 mm. longa ;  
 l'ostellom pitjfunde 2-  
 lobmn, lobis lineari-  
 triangularibus 2 mm.  
 longis 4 mm. latis;  
 nthera trianguliQ-i-lanceolata 3 mm. longa 1£mm.lata apiw

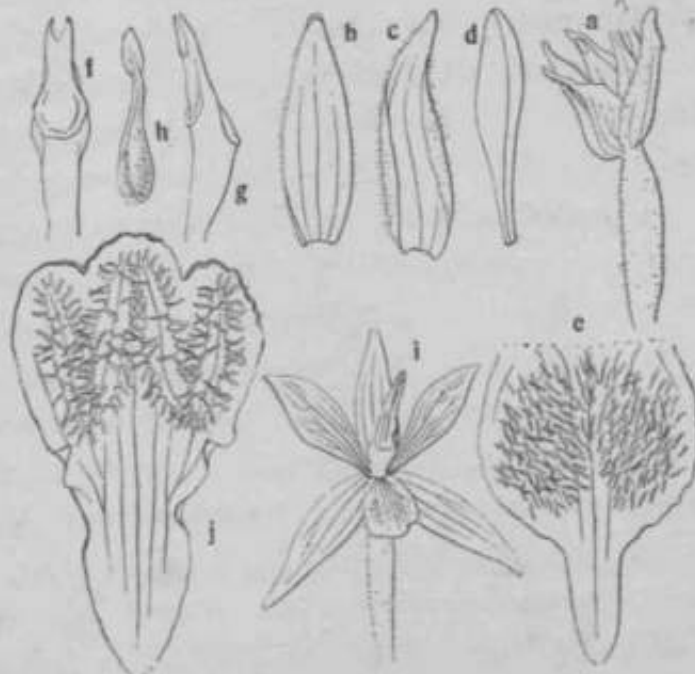


Fig. 61. *Goodyera longibracteata* HAYATA: a, a flower; b, a dorsal expanded; c, a lateral sepal; d, a petal; e, a lip, the same, seen from side; f, a column, seen from front; g, a column, seen from side; h, a detail of the column; i, a flower, with petals expanded; j, a lip, expanded.

HAB. kusukusu, leg. T. TASHIRO, 1913, Jan. fl.

Very near *G. cyriogtem* HAYATA; but differs from it by the shorter tail at the apex of the lips and erect rosteUun, I» ft \*\*\*\*\*>«\* ^ the nsteUmn |k always carved forwards at the apes. Also near *fdima* BENTH. (Orchids of the Sikkim Himalayas in Ann. Eoy- Bot. Calo. m t, 374), but dita torn it by the much narrower 1-

**Goodyera longirostrata** HAYATA ap. nov. (Fig- «• i"J)- shorter  
 »pei» Bd nodoi radkane, n«Ueibus semper soliUms, inkmodns 2-dc m.  
 lougis ad D 0 ^ i»uquis folionim instructis, a btfd Wfflin> creche 20 er n.

altus, basi foliatus siirsum racemosus. Folia ovatooblonga 6J cm. longa 3 cm. lata apice acuta basi rotimdata subito ad petiolum abeuntia margine Integra in exsiccato membranacea, petiolis 4 cm. longis basi dilatatis vaginiformibus caulem complete amplectantibus, partibus dilatatis 2 cm. longis. Racemi pauciflorati, rhachibus dense molleque liirsutis, bracteis angnstato-oblongis 3-nerviis 2 cm. longis 6 mm. latis apice acuminatis margine ciliolatis, floribus sessilibus, ovariis 1J- cm. longis. Sepala subsequalia angiistato-oblonga li cm. longa 6 mm. lata apice acuta 3-nervia utraque facie glabra, posticum cum petalis galeam formans. Petala cuneato-ob lanceolata 1£ cm. longa 6 mm. lata apice triangulari-acuta basi cuneato-attenuata ± obliqua 1-nervia, venis lateralibus obscuris. Labellum basi ± saccatum explicato ovatum 1j cm. longum 8 mm. latum apice late cuspidato-acutum, sacco intus debse piloso, (pilis longiusculis plus 1 mm. longis apice glanduliferis), multinervium. Columna brevis 2 mm. longa. Rostellum lineare 7 mm. longum 2-partitum, partibus linearibus 6 mm. longis 1 mm. latis apice acuminatis. Pollinia cuneato-linearia 9 mm. longa.

HAB. Akōchō: Buisan, ad 7000 ped. alt., leg. S. SASAKI.

**Goodyera morrisonicola** HAYATA (Tab. XVII.) Mater. Fl. Formos. p. 343. Caulis basi inferne radicans superne ascendens 10 cm. longus, tota longitudine foliatus. Folia alterna petiolata ovata vel ovato-oblonga 3 cm. longa 1£ cm. lata apice acuta basi rotundata margine minute crispata 3-5 nervia, petiolis 1j cm. longis a medio deorsum dilatatis caulem amplectantibus. Scapi terminales 4 cm. longi laxe florati pubescentes, bracteis lanceolatis acuminatis 1 cm. longis basi 4 mm. latis florem subamplectantibus. Sepala subsequalia libera, posticum erectum concavum oblongo-angustatum 1 cm. longum 3J mm. latum apice obtusum cum petalis angustis in galeam connivens, lateralia libera erecta. Petala oblonga 11 mm. longa 3 mm. lata apice obtusa basi attenuata. Labellum ad basin columnse sessile plicato-incurvo-ascendens 8 mm. in longitudine basi subsaccatum, (sacco intus villosa apice recurvo-obtusos), margine integrum, apice dentibus lateralibus brevibus. Columna brevis 1 mm. longa apice longe 2-cornuta, cornibus 3j mm. longis. Anthera erecta ovato-lanceolata 3j mm. longa apice attenuata acuminata. Capsula recti oblonga erostrata 1 cm. longa 4 mm. lata.

HAB. In monte Morrison, ad 6500 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct. 1906, (No. 2323).

Near *G. Heiryi* ROLEE., but the leaves of the present plant are narrower, acuter, and the bracts are more acuminate.

**Goodyera pachyglossa** HAYATA sp. nov. Caulis 25cm. longus basi 3-4 cm. in diametro deorsum glaber sursum breve hirsutus tota longitudine foliatus. Folia alterna 3 cm. a se remota oblique ovato-oblonga 5 cm. longa 2cm. lata apice obtusa ad summum minute obscureque mucronata basi rotundata subito ad petiolum abeuntia margine subintegra vel obscure minuteque crispata, petiolis 2 cm. longis basi dilatatis vaginiformibus, partibus vaginiformibus 1cm. longis. Bacemi (vel partes floriferae caulis) 5 cm. longi dense floriferi, rachilibus brevis hirsutis, bracteis lanceolatis 12 mm. longis 3 mm. latis glabris, ovariiis 9-10 mm. longis hirsutis 3-nerviis. Sepalum posticum valde concavum ovato-oblongum 8 mm. longum 3-4 mm. latum apice obtusum basi it contractum 1½ mm. latum 3-nervium extus db hirsutum intus glabrum, lateralia oblique ovata 8 mm. longa 4 mm. lata apice obtusa 3-nervia extus hirsuta intus glabra. Petala rhomboideo-obovato-cuneata 8½ mm. longa 3½ mm. lata apice triangulari-obtusa basi cuneato-attenuata 1-nervia margine sursum subundulato-crispata. Labellum ovatum 7 mm. longum basi ventricosum, ventriculo 3 mm. longo totiusque lato extus glabro intus dense hirsuto, pilis complanatis 1mm. longis, valde crassum ad margine tenuissimum membranaceum. Columna 1 mm. longa. Kostellum 2-partitum, partibus linearibus 3 mm. longis. Anthera elongato-ovata 3 mm. lata.

HAB. Binkihō, 5000 ped. alt., leg. H. INABA, 1911, Aug. (fl. rosacei).

Near *G. morrisanicola* HAY., but differs from it by the much thicker lips, larger leaves, and by the longer stems.

### ***Cryptostylis* R. BR.**

***Cryptostylis erythroglossa*** HAYATA sp. nov. (Tab. XV m.) Radices incrassatae. Folia 2 crassiuscula in exsiccato membranacea elliptico-ovata vel elliptica 10 cm. longa 5 cm. lata apice obtusa basi obtuso-contracta subtus pallidiuscula, petiolis 3 cm. longis subplicatis. Scapi 7 cm. longi, floribus racemosim dispositis, bracteis lanceolatis 7-10 mm. longis acuminatis. Sepala sequalia linearia 13 mm. longa 2 mm. lata margine interiore plicata viridia



apice acumiata. Fetala viridia linearia 9 mm. longa 1 mm. lata margine conduplicatim vel singulariter plicata apice acuminata patentia. Labellum superius oblongo-ovatum vel lanceolato-ovatum 13 mm. longum 5 mm. latum rubrum apice acuminatum basi rotundatum basi breve saccatum, (sacco ore triangulari 2 mm. longo 1 mm. lato) multinervium supra minute denseque puberulum. Columna brevissima 1 mm. longa; appendiculose clinandrii (staminodia) 2 pulviniformes.

HAB. Formosa: loco non indicate, cult, in seminario Taihoku, leg. B. HAYATA, Jan., 1912.

Near *Gryp. JUiformis* (BLUME Fl. Jav. Orchid. Vol. I. t. 45, fig. 3).

***Herviua* GAUD.**

***Nervilia purpurea*** (HAYATA) (Tab. XIX.) Mater. Fl. Formos. p. 345. Herba terrestris; caulis foliatus brevissimus bulbosus, scapis floriferis aphyllis vaginatis. Folia cordata 5 cm. longa 6 cm. lata apice rotundata brevissime apiculata basi cordata ad sinus acuta margine integra supra breve setulosa subtus glabra, petiolis 2 J- cm. longis. Scapi aphylli inferiore vaginati, (vaginis 3 cm. longis apice rotundatis summum brevissime apiculatis), sursum 2-3 florati, bracteis oblanceolatis 1½ cm. longis 2 mm. latis. Sepala sequalia libera erecta spathulata 15 mm. longa 3 mm. lata apice breve acuta basi attenuata. Petala sepalis angustiora lineari-oblanceolata 14 mm. longa 2 Jmm. lata apice breve acuta basi attenuata erecta. Labellum basi columnae situra rectum liberum erectum obovatum obscure 3-lobatum 12 mm. longum 10 mm. latum apice rotundatum. Columna elongata 7 mm. longa apice clavata erecta.

HAB. Kōshūn: leg. T. KAWAKAMI, Juli. 1906, (No. 5150).

Near *Pogonia plicata* LINDL., but differs from it by the broader oblanceolate sepals and much narrower linear bracts.

***Nervilia yaeyamensis*** HAYATA (Fig. 62) Ic. Fl. Formos. II. p. 140. Scapi aphylli 40-50 cm. longi inferiore ad nodos vaginati, internodiis 10 cm. longis, vaginis 3 cm. longis ore obliquis, laminis obtusis, medio squamis singulis instructi, squamis amplexicaulis elongatis 3 cm. longis acutis, partibus floriferis 10-15 cm. longis, bracteis lanceolatis, pedicellis (cum ovariis) 6-7 mm. longis, floribus horizontaliter patentibus val nutantibus. Flores semipatentes, 23 mm. longi. Sepala subequalia linearia, posticum 17 mm. longum 2 mm.

lata apice acntnm basi leviter attenuatom nou coutmcfctun 3-nervmni, lateral ia vix latiom quam iis posticis 17 mm. tonga 3 mm, lata 3-nervia apioe acuta basi uttemuita non eoutracta. Petala linearia 16 mm. longa 2 mm. lata apice ncnta, basi attenuate non

contracta. Laliel-  
him ovatum 17mm.  
longum 10 niin.  
lattmi apice 3-  
lobatum, lobis Lite-  
raUbnsaontiB brevi-  
btis, lobo media  
lutiom ovato ijmm.  
longo 5 mm. lato  
apiee obtiiso basi  
non contracto,  
biisi trinervium,  
reuulis Lite rali bt is  
obliqnis plnrimis,  
supra bavbato-

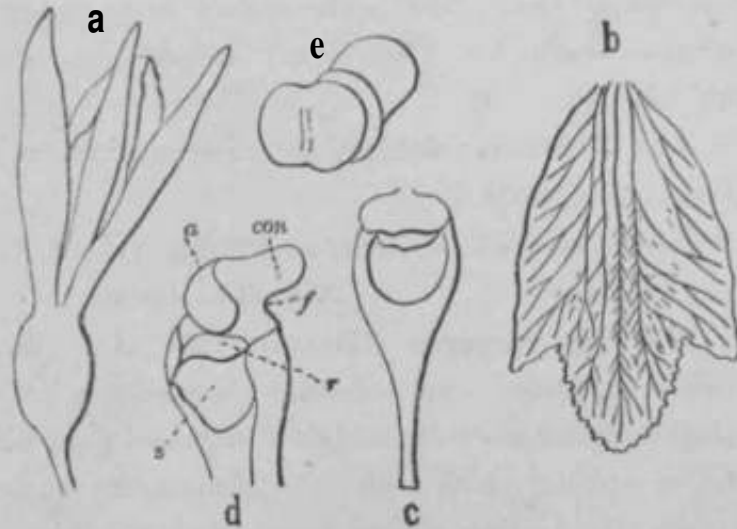


Fig. 62, *NatH&tt yatytmexift* HAVATA ; n, « flower; b, a. lip; c, n column, seen from front; d, the same, seen from aide; e, mi liter; r= rosteltuw, a=stigmft, o=cUnn.miritun, n=nnthei, oot = connective, f=fitam<mt

hix'sntnm. Columna semiteres 6 mm, longn apice plus minus cLivata oxalnta. Pollinii 2 granulosa. Ortu-ium obovoideiun 3l mm. longum apice truncatum Ixasi diatincte constrictiim prominente 2-costatuin inter costas 1-eostulatnm.

HAH. Taoyama; lahigakisliima, Juli., 1910.

Near *Pogonia Scotlii* REICHB. f. in Ann. Roy. Bot. Gnrnd. Calc. YD $\times$  360; but differs by tlie ljarbato lips with obtusely contracted base.

#### *Didynioplexis* GBIEF.

*Didymoplexia subcampanulata* IL^YATA (Fig. 63) If. PL Formos. IL p. 136. Herba tenuis aphyllii, rhizomatibus toberifera, tuboril>us {iislformibus l£em. longis 6-7 mm. latis monilifonne 2-3 contiunis. 8capi orekti 5-6 cm, longi teretes inferiore 1-2-nodosi, ad nodos squiuunis unis instruct!, squamis fissis vel integri's 4 mm. longis triangularibiis, paitibns floriferis 2 J cm. longLs, supei'iore sub floribus singiills 1-bracteatis, bi"acteis Into ttiangularibus apice obtiisis t>asL latissirnis 2i mm. longis 3 mm. Litis. Fbces spicati inferiore

3 mm. a se reinott snperiore plus dense **dispositd** subeampamüitit patented 1 cm. longi 5 mm. hiti, pedicellis cum ovaria 12 mm. longis. **Sepals: poetioam** elongato-oblongtim 1 cm. longam 4 mm. Litnm *npice* rotundatum, inforiore **cam**



petalis connatum, latmidiji portico setmilonga *m\ h&ero* interiors a uosi usque ad medio connata superiore libera apico l'itnndata. Petala cum sepalo **postaco aubannilia sect brevior,** (**jabeHam** late clineatotriangu-  
 mto 5 mm. longam *nd* apit»m ti-titiratuin 6 mm, latnm apice l'pisam lxisi breyo luigniciiltv-film, Tngmbna ^ mm. lougis, apiwi uugniimi l-appendical»-  
 tum, appondiculis lamoll&tis

iT ^\erectis Litissdmis, medio 3-  
 ^ Jj *BeriaUm* cristato-tub^rfuljitem,  
 tiil«;i'ciilis lanwilH - fonnibus.

'I GJumua 5 mm. longa apdoe  
 alata basi cxiJtita. Capsula

a, th^pW; \ Hftuwir.seenfromwlo: a, tbeaimo, oblonga utrinque contract\*  
 b^jifis and petals tiiksa off; d, Inmnn of the Yi/>: \*: \_  
 n. column; f, iwllium, very soft J fig. 17 mm. longa Smill. latu ^  
 b-

uliiiue Qxti-emitatem iinitis 3 latioribns 3 **angustioribus**, extiis pares minute tuberciilata. Semhia mhnitissinia filiformi-liiiearia l|mm. longa.

HAB. Koshiu, leg. T. KAWAKAMI, Mart., 1910, ot B. Jlvvr.v .Viig., 1912.

Ne»a- J). *pollens* Giiui'. but diiTers from it by nearly **oampftnlate** flowers with obh'iangtdiu<sup>1</sup> lips. *D. pollens* GRIFF, figured iu Anu. **Boy. Bot. Qaid.** Calc. V, t. 34G lms rather tabular flowers with **cmajB** oblong lips. Th« description of capsules alxive given is drawn up from another specimen which was doiibtingly referred to 1). *pnllma* by mysslf in my Matorijils for a Blom

of Formosa p. 347. The type specimen, with several duplicates, was first collected by Mr. T. KAWAKAMI at Kōshūn. The plant was also found by myself in my excursion to the island in the beginning of July, 1912, on the sandy ground in a clump of slnibs near the sea-shore on the eastern coast of the south cape.

*Galera* BLTJME.

**Galera kusukusensis** HAYATA sp. nov. (Tab. XX.) Terrestriis aphylla laticolor tuberifera. Tuber oblongo-ovoideum horizontaliter situm vel ascendens 1-2 cm. longum 8 mm. in diametro subnudum apice scapum singulum gerens. Scapi circ. 30 cm. longi basi squamis verticillatis instructi a basi sursum «quamis remotis alternis instructi, squamis ovatis 1 cm. longis basi semi-amplexicaulibus apice acutis, partibus floriferis 10 cm. longis, floribus 1-2 Jem. a se remotis, bracteis linearibus vel lanceolatis circ. 1 cm. longis, pedicellis 5 mm. longis subnutantibus, ovariis globosis 5 mm. in diametro. Sepala et petala semiclausa non patentia. Sepala subaequalia linearia 10 mm. longa 1 mm. lata apice acuminata basi non contracta. Petala lanceolata 10 mm. longa quam sepalis latiora 1 mm. lata apice acuminata basi non contracta. Labellum valde concavum erectum oblongum 10 mm. longum in explicato) 8 mm. latum apice triangulari-obtusum margine undulato-crispatum supra purpureo-maculatum, maculis 4, sursum muricato-tuberculatum basi ad calcar 31 mm. longum productum. Columna brevissima. *Epipogon kusukusense* HAYATA in sched. herb. Taihoku.

HAB. Kusukusu, leg. B. HAYATA et S. SASAKI, 1912, Juli.

Near *Gcdera Roffd* HAYATA (= *Epipogon Rolfei* HAY.); but differs from it by the longer lips which are undulately crispate at the margin, and by the much narrower petals.

**Galera Solfei** HAYATA (Fig. C4) Mater. Fl. Formos. p. 348. Tuber solitarium 3 cm. longum 12 mm. latum elongato-ellipticum apice obtusum carnosum horizontaliter situm. Scapus circ. 35 cm. longus incrassatus erectus rectus basi ascendens teres brunneus inferne squamis distantibus amplexicaulibus obtusis tenuissimis membranaceis instructus, superne florifer, bracteis alternis erecto-patentibus lineari-lanceolatis acuminatis membranaceis circ. 1 cm. longis uni-florem amplexantibus. Flores in pedicellis filiformibus carni aut tandem

peidiili seapo concolores. Sepali asquifornia angosfeata erecta 7 jam. longa 1 mm. Iata obtuso-atmminata hitugi-a parcissime punctata, lateralibus pins naimis obliquis. Petala sepalo latiora 7mm.kmga 2mmulataoamiiuita. Labellum sessile concavum gynostemium amplectans, ima in *calcar* breviter obtusum 3 mm.

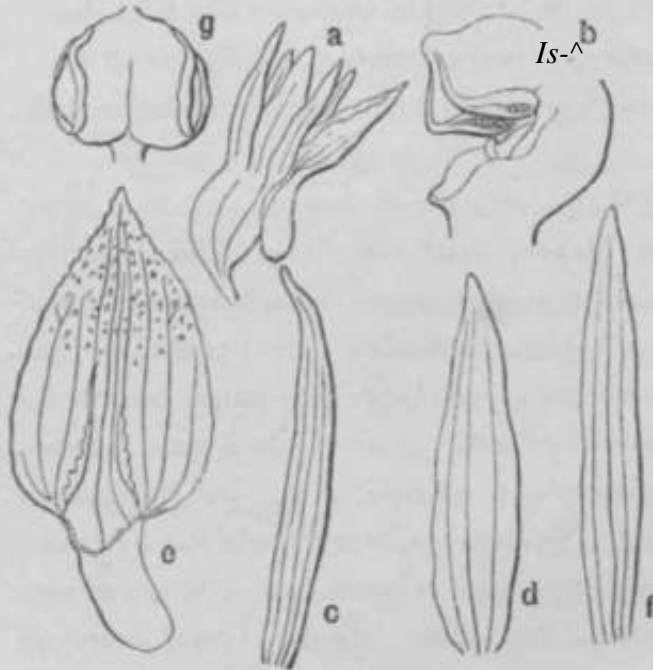


Fig. 64, (*Palera Jitofri* HAYATA ; it, n flower; b, ii (lonsal aepal; f, a lAtentl ac\»i\; d, n («t<]; e, a lji; b. a column; g, nn (Uitht-r,

longum rectum productum, limbo ovato obtuso 9 mm. longo erecto ad marginem subintus vel sub lente minutissimum intus papillosum iuxta apicem parvissime papillosum. Gynostemium breviter binnatum in apice 2 mm. longum dorsum convexum. Charium obovatum sulcatum, pedicello 4 mm. longo.

*Epipoyan Rof/c!* HAYATA in schfid. herb. Tokyo.

HAB. Okina"«"a, leg. S-TANAKA, 191, ^lai. (No. 147).

The present plant is near *G. mckms*, but differs from it in having shorter spines, and in the lips which are nearly obtuse at the apex, nearly entire on the margin, and very much less papillose on the upper surface.

*J?latanthera* RICH.

*Platanthera longibracteata* HAYATA ap, HOT. Gaolus 30-40 cm. longis basi vaginatis, (vaginibus 4 cm. longis apice obtusis), infra medium 1-2-3-foliatus medio squamatis, partibus aequilatis 10 cm. longis, sursum floriferis partibus floriferis 10 cm. longis. Folia spatulata vel ovato-oblongata apice obtusa 1.5 cm. longa 3 cm. lata apice obtusa deorsum glabra; hastata ad vaginam 1 cm. longam abeuntia exsiccato membranaea. Racemi laxi florati glabri, floribus a se 1 cm. remotis, bracteis lanceolatis 1 cm. longis aequilatis, ovaribus vel fructibus G-7 wmylangia ellipticis apice rostratis

3 mm. latis. Sepalum posticum triangulari-oblongum 2½ mm. longum 1½ mm. latum apice obtusum basi dilatatum 3-nerviis, lateralia oblonga v<sup>o</sup>-formiter recurva 4 mm. longa 1½ mm. lata apice obtusa basi angustata 1 mm. lata 3-nervia. Fetala triangulari-oblonga 3 mm. longa 1 mm. lata 1-nervia apice acuta basi haud contracta. Labellum lineare 6 mm. longum ½ mm. latum apice obtusum facie longitudinaliter rugosum basi calcaratum, calcari lineari 1 cm. longo ½ mm. lato utraque extremitate angustato apice obtuso. Columna brevissima.

HAB. Mt. Morrison, ad 8500 ped. alt., leg. S. SASAKI.

**Flatanthera pachyglossa** HAYATA sp. nov. (Tab. XXI.) Caulis 30 cm. longus erectus glaber angulosus basi vaginatus deorsum foliatus sursum racemosus. Folia ovato-oblonga vel oblongo-lanceolata 6 cm. longa 1½ cm. lata apice acuta ad summum obtusa basi obtusa ad basin plus minus decurrentia caulem semi-amplectantia. Sacemi 10 cm. longi, floribus a se 1-2 cm. remotis, bracteis florem vix superantibus lanceolatis, pedicellis circ. 0 vel brevissimis, ovariis circ. 1 cm. longis linearibus. Sepalum posticum rotundatum vel ovato-rotundatum 5 mm. longum 4 J mm. latum apice obtusum basi leviter truncato-cordato-contractum ad insertionem 2 mm. latum, lateralia lineari-lanceolata 7 mm. longa 2-2J mm. lata ~ -formiter recurva margine extime recurva apice acuto-obtusa basi non contracta. Fetala valde oblique late rotundata longe cuspidata cum cuspidibus 5 mm. longa 4 mm. lata, cuspidibus linearibus 3 mm. longis apice obtusis 1 mm. latis. Labellum lineari-lanceolatum crassiusculum rectum 9 mm. longum 2 mm. latum. Columna lata brevis.

HAB. Formosa: loco non indicate

**Flatanthera stenoglossa** HAYATA sp. nov. Caulis 40 cm. longus infra medium 1-foliatus medio sursum squamatus, squamis ovato-lanceolatis lanceolatis vel lineari-lanceolatis 1-3 cm. longis. Pars caulis florifera 10 cm. longa glabra, bracteis acuminato-ovatis vel ovato-lanceolatis 15-13 mm. longis 3½ mm. latis 3-nerviis. Sepalum posticum oblongum 4J mm. longum 2 mm. latum apice obtusum basi contractum 1-nerviis, lateralia linearia postico angustiora 6 mm. longa ~ -formiter recurva ½ mm. lata 1-nervia apice obtusa. Fetala obliqua cuspidato-ovata 4½ mm. longa 2½ mm. lata apice obtusa basi valde oblique rotundata. Labellum lineare angustatum 5 mm. longum ½ mm.

hi inn apico obtusnm cmssiucuhun biisi calcjimtmn, **oacari** lint::iri *G mm.* loigo 1-|ram. Into antice leviter reurvo. Columna (cum anthera) 3 mm. longa totiusque lata.

HALi. Shichiseitonzan, leg. T. KAWAKAMI et Y. SHBIADA Juli, 1910, Remarkable for having narrower lateral sepals than the dorsal one.

*Platanthera truncatolabellata* JAYATA sp. **ner.** (Fig. 65). Caulis **erectus** gwicilis minute **bmviaime** Jiirtellatus :J0cm. longus ad totam



FIG. 63, *J'lalaiU/ijrn tmn-  
entol >!>>Uifa UMWTL\ ; tl, » flow;  
b, A dorsal uopal; c, a. Inteml  
sepal; a, a petal; o, n lip; f.  
colwmtm; ^, A pollinarium.*

loigitudinem foliatus stipemo florifer. Folia alterna sessilia ohlonga 3 cm. longa 12 mm. **fata** apice rohuitlato - acnta basi in vaginam brevem eontracta amplextcaulia, vaginis 3 mm. longis. Flores ad axillas foliorum superioram **sditaiii** vel i'ac«mosi, racemis 10 cm. longis. Flores medioci-es 1J cm. in diametro. tSepala inscqiialia crecto-potentia, posticum oblongo-angnstatum Simni. longum 2| mm. latum apice it^tiindato-acutum, lateralia latioi-a ovata 8 mm. longa 3 mm. latu :ipirti attenuato-obtusa basi totendata valde ol>-liqua latere Inljelli counntii. Petala ovato-olilunga 7mm.louga 2mm.lata basi obliqua ad basin eolumnse eonnata apice atteinuilo-obliqna. **IdibeDnm** 13 mm. lougiim uugiicuhifum, unguis basi columnaj ctiniiiitiis in ciilcar imxliictus, calcftii latinsimo 5 mm. longo, oie 4 mm. in dianietro, lamina obovato-rotnndatn 1 ora. longa 8 mm. Lita apicd emarginata mar-

gine crtepata prope medium **psxoa** :!-ljiniellat\*i, lamollis bntvissiuie **hirtellatis**. <'<>Iuinu; 2 mm. longa.

*PldtcuU/tera olxiordaUt* HAYATA (non LKDL.) iu Material for a **Flora** <f Formosa p. 35L

HAH. Xantt'): Kondaizan, **leg.** T. KAWAKAMI .it U. Monr, Juli. 11): 17, (No. 3482).

Near *JP. obcordata* (Orcli. Western Himalayas in Aim. Roy. But. Gard. (laic IX. p. 144); but differs from it by the quite truncate or omargiuats lips.

*Platanthera* SP- (Fig- 66.) Terrestriis; Tuber snberoctimi cylindricum 1 cm. longum. CanlEs 20cm. longos gracilis orectus deorsmn supra l>asin 2-3-foliatiis snrsom racemosus, partibus iuter florifaras et **foli&tas** 8 cm. longis remote sqnamiitis, aquamia 5 mm. longis lhieuribns.

Folia oblouga vel OTato-oblonga Sj cm. louga 1 em. lata apice obtusa vel amta ad summm breve aristata vel obtusa basi camera umplee- tautia ;ul **vaginam** 5 mm. longam abeniili.-i. llacemi (partes florifersB) 8 cm, longa glabra, Horibas a se 5-10ram. rumotis, bracteis ovatw- lauceolatis 5 mm. longis lj mm. Latis glabris. Sepalnra postk-uni ovato - oblongimi 3 mm. longnm ljm. Intum apico **tranoatcK)btanan** Imsi leviter contractum f mm. Iatnm 1-norvium miu^ine interiore leviter vecnrvxim, ltiteralia **postic**o augustiora 3 mm. loiiga 1 mm. lata ob- lique lineari-oblonga apice obtusa basi obliqua nun coutracta 1-nervia margine interiore re- viirva. Petala sepalo postico conformia swl minora. Tjbellum pmfunde crusifonne 3- lobum, lobis Imsilimbiis lineari-filiformilnis ;i lobo terminali angnlo 90° diraricatis 4 mm. longis ni mm. latis rocanis, lobo **terminal** i liqeari 2mm.longo J—Jmm. lato apice obtoso

**T**Acto, Ijasi calearatum, oalt-ari spathnlito- lineftri 4 mm. lougho sm\*sum dilafaito | mm. lato **apice obtaso** UinT jjiugiistato subrecto. Columna brevissima; anthera fmra. Lxt-i.

**HAB.** ICappazan, leg, W. K. PRICE, -Tuli. 1912.

**I**This interesting tiny orchid was collected by Mr. W. R. PKIOK in July, 1912, in an opeu country among dense *Mhcanthm* in Mt. Kappaumu. It is somewhat near *llahenaria aristata* HOOK. f. (in Orchids of the Siktim Himalayas



Fig. 66, *Flatwiltera tip.*:  
it, ii flower; b, the same, seen  
from back; c, central imrt of the  
same; t), a. ralurcnn, \dth JI  
dorsal aopnl ami petals.



in Ann. Roy. Bot. Gard. VHI. t. 409), but differs from it in having much smaller form and very much more divaricate filiformed basal lobes of the lips. I should propose to call this orchid *Phthantlvera Pricei*, if it proves to be new-species of the named genus, or I should rather entirely leave it to Mr. PRICE to name this orchid, as this is one of Mr. PRICE'S collections. It lacks in the collections of my own.

***Habenaria* WILLD.**

***Habenaria goodyeroides* DON var. *formosana* HAYATA n. v.** (Tab. XXII.) Caulis elongates 60 cm. longus glaber, partibus inferioribus apifollis, intermediis foliis congestis, superioribus aphyllis floriferis, partibus aphyllis infra folia congesta 25 cm. longis vaginatis, vaginis 5 cm. longis remote sitis ore leviter dilatatis apice truncatis, partibus foliatis 7 mm. longis 5-6-foliatis. Folia oblonga 13 cm. longa 5 cm. lata apice obtusa acuta basi contracta in vaginam amplexicaulem attenuata, vaginis 2½ cm. longis, squamis superne minoribus ovato-lanceolatis 2 cm. longis. Spicse elongatse 15 cm. longse dense floratse, bracteis ovato-lanceolatis 13 mm. longis apice aristato-acuminatis, floribus minoribus. Sepala insequalia subpatentia, posticum ovatum 4½- mm. longum 3 mm. latum apice obtusum, lateralia angustiora basi obliqua cum petalis adnata apice dorso breve apiculata. Petala sepalo latiora late oblonga 4½mm. longa 2½ mm. lata apice obtusa basi valde oblique labello connata. Labellum liguliforme 5 mm. longum 4 mm. latum apice dilatatum 3-lobatum, (lobo medio latissimo triangulari 3 mm. longo totiusque lato apice obtuso, lobis lateralibus angustioribus), basi calcaratum, calcari 2 mm. longo ore contracto 1½- mm. lato; discus basi 2-lamellatus, a medio sursum 1-lamellatus; staminodia 2 mm. longa angustata.

*Phthanthera goodyeroides* var. *formosana* HAYATA=*Haheiiari goodyeroides* HAYATA (nqn DON.) Mater. El. Formos. p. 353.

Differs from the type by the narrower leaves and lamellate discs.

***Habenaria lineaxipetala* HAYATA sp. nov.** (Tab. XXm.) Caulis circ. 50 cm. longus deorsum vaginatus, medio approximativ foliatus sursum racemosus. Folia medio caulis approximativ sita obovato-oblancoolata 18 cm. longa 4 cm. lata apice acuminata basi attenuata basi vaginata, vaginis 2 cm. longis caulem amplexantibus, in exsiccato membranacea. Racemi 10 cm. longi

dense floriferi, bracteis lanceolatis 1½ cm. longis apice acuminatis basi attenuatis, pedicellis fere 0, ovariis linearibus vel ovatis circ. 1 cm. longis. Sepalum posticum ovato-lanceolatum circ. 1 cm. longum apice filiforme acuminatum medio 2½ mm. Litum basi leviter contractum concavum 3-nerviū, lateralia postico conformia vix latiora 3 mm. lata plus minus obliqua. Petala linearia 9 mm. longa 1 mm. lata apice acuminata basi dilatata. Labellum 3-partitum, parte centrali lineari longissima circ. 10 mm. longa \ mm. lata, partibus lateralibus linearibus centrali brevioribus 5 mm. longis angustissimis \ mm. latis apice acuminatis, basi calcaratum, calcari 13 mm. longo 1 mm. lato lineari antice leviter recurvo. Anthera \ mm. longa erecta 2-brachiata, brachiis divaricatis, staminodiis claviformibus } mm. longis. Rostellum A-forme 2-brachiatum, brachiis divaricatis 1½ mm. longis apice se approximantes descendentes; stigma 2-partitum, partibus distincte separatis linearibus complanato-teretibus 1½ mm. longis.

HAB. Mt. Morrison, ad 8500 ped. alt. leg. 8. SASAKI, 1909, Oct.

Near *Habenaria astenopetala* LINDL. (Orchids of the Sikkim Himalayas in Ann. Roy. Bot. Gard. Calc. VDDL t. 404), in having linear petals and linear 3-lobed lips; but differs from it by the long tailed sepals and much narrowly based leaves.

**Habenaria longitentaculata** HAYATA sp. nov. (Tab. XXIV.) Caulis erectus 55 cm. longus basi 8 mm. in diametro glaber inferiore vaginatus, vaginis cylindricis 3 cm. longis 8 mm. latis ore obliquis a se 4½ cm. remotis, medio foliatus, foliis approximatis, sursum squamatus, squamis ovatis a se 3 cm. remotis 2 cm. longis caulem amplectantibus, sursum florifer, partibus floriferis 10 cm. longis. Folia ad medium caulis approximata alterna oblongo-obovata vel ovata 12 cm. longa 5 cm. lata apice breve cuspidato-acuta basi cuneato-attenuata ad vaginam abeuntia, venis primariis parallelis, secundariis transversis manifeste reticulatis. Racemi 10 cm. longi remote florati, floribus a se 2-3 cm. remotis, bracteis ovatis acuminatis 18 mm. longis 6-7 mm. latis. Feriantia patentia, sepalum posticum galesiforme valde concavum 1 cm. longum 6 mm. latum apice acutum basi contractum 3-nerviū; sepala lateralia postico conformia sed valde obliqua. Petala profunde 2-loba vel 2-partita, partibus angulo 180° se divaricatis linearibus 1 cm. longis basi



## SELAGINELLACE.

oblique ovata 11 mm. longa 5 J-6 mm. lata apice acuminata ~ -formiter sensua recurva basi valde contracta basi rotundata 7-nervia margine Integra. Petela lanceolate 11mm.longa 2mm.lato apice a^uminata 1-nervia. Irtdhiu A -forme 16 mm. longum totiusque latum basi subito cnmeato-contoactum basi 1\* mm. latum alte 3-lobum, lobis lateralibus (baailaribus) semi-rotundabs unilateralibus 1cm.longis \*cm.latis apice acutis vel \*ruminatis margine interiore rectis margine esteriore ^ -formibus ba^i cuneatis margine extenore suisum irregulariter denticulatis multinerviis, lobo tenninali (centrali) lineari-laneeolato 12mm.longo 2mm.lato apice obtuso basi hand contracto medio congesto-multineiTio, sinibus inter lobos laterales et lobnm terminalem acutis, calcari longissimo 4cm.longo Hmm.lato apice obtuso subrecto. Columna brevissima.

HAB. Tohozan, ad 6500 ped. alt., leg. S. SASAKI, Oct. 1909.

Near *H. Miersiana* CHAMP., but differs from it by the not fimbriate lobes of the lip. Also near *H. genicMa* DON (Orchids of the Sikkim Himalayas, in Ann. Eoy. Bot. Gard. Calc. VIII t. 405), but differs by the much longer central lobes of the lips.

*Hemipilia* LINDL.

*Hemipilia formosana* HATATA (Tab. XXV.) Mater. H. Formos. p. 354.

**Selaginellaceae.***Selaginella* SPRING.

*Selaginella stenostachya*. HAVATA Sp. nov. (Fig. 68) CauUs cum spicis 8 cm. longus glaber phui-sulcatus pauce remoteque fohosus. Folia a se l\$mm.remota, dorsaUbits minoribus ovatis 1jmm.longis ^mm.latis apice cuspidato-acutis basi leviter contractis margine minute aristato-verniktis, ventrah-bus majoribus 1jmm.longis fmm.latis oyatis apice obtusissimis basi truncato-rotundatis margine minute aristato^errulatis. Spiexe versus apicem xamorum racemosim disposite simplices erecte rectae tenuiter tetragono-cylindi-acero 7-8mm.long89 cum bracteis 2 mm. late, bracteis radiatis 4-seriatim dispositis imbricatis interdum subpatentibus, dorsalibus venteali aqua-Ubus rotundatoK)vatis 1mm.longis fmm.latis apice cuspidato-acutis basi

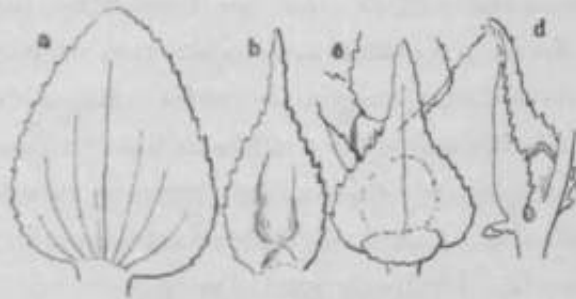


Fig. 68, *Mutaefya* HAYATA;  
a, ventral leaf; b, dorsal leaf; c, portion  
of a spike; d, a hooklet seen from side.

mtimtiitis ad extremitatera iinri-  
l'ilia J mm. longis singulis in-  
sfnciclis, margiue minute fletuloso-  
seiTiilatis tutmibus. *SdagimJUa*  
*leptaphyUa* HAYATA in MATSUM.  
et HAYATA Emun. PL Forraos.  
p. 553 (uou BAKEH).

**HAB.** Slunkocho, leg. T.  
KAWAKASir.

**Vexj afRX** S. *Iqplophyllitt*

**BAKER**, Iml di *fliers hxmi* if by the aaiJi Danwwer spikes.

## Lycopodiaceae-

### *Lycopodium*, IXN,

*Lycopodium (Lapidotis) alpinum* lass, rar. traDsmorrisonenso  
HAYATA n. v. (Fig. 09) Caulis repens terea 1} mm. in di&metro SKctionis  
ramosiasimiiB, mmis ascemlentibiis dense foliosis apice iuterdum ad stipitem  
spfcaram al.«imtibu3. Folia imbricatim spixaliter **dispoeita adpxessa** vel ±  
pateutia ascendenti-recnrva triaQgiilari\*  
latteolata 3 mm. longa apice acuminata  
basi latissima minus 1 mm, Iata crassa  
margine integra 1-nervia ± com-  
planata intus plaua. doi-ao 1-otundata in  
sectione plano-convexa margine obtusa.  
Spicm cylx Bdi-ictD 2| **am. kfligfi** 3-4 mm.  
in diaraofa-o Sfjctionis, bractom m-mo  
imbricatis dHUsiusculB spindibu' sitis  
sub s^xjrangio singtilis tanKLito-ovittis  
apieo caudato-awitis liasi 1-amiculatis  
**emu** auntnlis 4 mm, lougis 2j mm.  
Ijitis margino irregtiLiritor dtntictuatis,  
auricolis oblougo-triangulaiibiis 1 mm. kmgia juimis 1 mm. latis **apioe**  
obtusius, utraqiit; **psgtne** glii.bris 1-uerviis, **BOfil** dorso hand iutus distincte

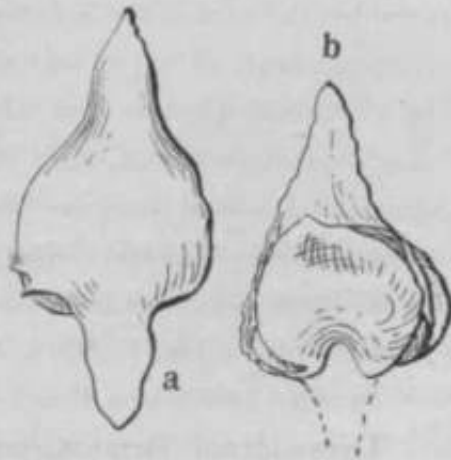


Fig. 69, *Lycopodium Upinutu* var.  
*tfiiixiutrmmrxii* HAYATA, A, A hm>t seen  
from back; b, the tuene uwn from fnw.

visis. Sporangium reniformo latius quam longius apice late rotundatum basi late sinuatum minus 2 mm. latum. Spicse simplices ad apicem ramorum solitaria erectse longe stipitatae, stipitibus 3 cm. longis simplicibus erectis rectis subremote foliosis, foliis spiraliter xiuscule dispositis firme adpressis lineari-lanceolatis 3-4 mm. longis 1} mm. latis intus concavis extus convexis 1-nerviis utraque glabris margine integris vel iiTegulariter obscure denticulatis crassiusculis.

HAB. in montibus centralibus, leg. U. MOM, 1908, Dec.

Differs from the type (HOOK. Brit. Per. t. 53) and its variety *nikocmc* by the long and distinctly peduncled solitary spikes.

**Lycopodium carinatum** DESV. ; MATSUM. et HAYATA Euum PL Pormos. p. 554.

HAB. Kōshūn: Kuraru, leg. S. SASAKI, 1911, Dec.

**Lycopodium cunninghamioides** HAYATA sp. nov. Oaulis pendulus dense spiraliter subdistiche foliosus cum foliis 3 cm. latus cum spicis 50 cra. longus. Polia acuminato-linearum vel acumiato-lanceolata 16 mm. longa apice aceroso-acuminata 2£ mm. Inta basi leviter angustiora ad insertionem 1^ mm. lata margine integerrima leviter carinata 1-nervia, nervis supra planis versus apicem carinato-elevatis subtus plain's, supra viridia subtus pallidiora, foliis dorsalibus basi plus minus tortuosis, ventralibus basi non tortuosis. Oaulis versus apicem gradatim ad spicam abeuntibus, foliis caulinis superioribus gradatim minoribus ad bracteam spicarum abeuntibus. Spicse 7-8 cm. long©17mm.Lita3, bracteis lineari-lanceolatis 11 mm. longis basi latissimis 2 mm. latis apice acuminatis basi rotundatis 1-nerviis margine integris supra basin ad 3 mm. tortuosis, nervis utraque pagine planis non-carinatis. Sporangia cordato-reniformia lj} mm. lata lj-mm. longa apice rotundata basi cordata, sinu cordis acuto.

HAB. Urai, leg. T. SŌMA, Juni. 1910, (No. 1).

Near *L. squarrosum* PORST.

**Lycopodium formosanum** W. HERTEK, HAYATA Mater. PL Pormos. p. 412.

HAB. Taitō: Manchōsliā, leg. G. NAKAHARA, Jan., 1906, (No. C).

I remember that I saw the type of the species at Kew herbarium. From my memory, I think the present plant here enumerated is identical with the type.

**Lycopodium juniperistachyum** HAYATA sp. nov. *Lycopodium pinifolium* HAYATA Mater. Fl. Formos. p. 412 (non BLUME) pro parte. Radices basi caulis ramosae. Caulis pendulus cum spicis 25 cm. longus tota longitudine multisulcatus vel striatus densiuscule foliosus cum foliis 13-15 mm. latus. Folia spiraliter subdistiche subdorsiventraliter disposita lanceolata 11 mm. longa 2 mm. lata apice acuminata basi plus minus augustiora ad basin 1 mm. lata margine integra, (dorsalibus basi tortuosis, ventralibus non tortuosis), utraque glabra crasso-membranacea 1-nervia, nervis supra planis subtus distincte elevatis visis, subtus paginae plus minus pallidiora supra viridia nitida. Spicra 8-13 cm. longae terminatae simplices vel 1-2-plo dichotome ramosae cum bracteis 7-8 mm. late, bracteis spiraliter radialiter densiuscule dispositis cuspidato-lanceolatis 8 mm. longis apice lineari-acuminatis basi latissimis 1.5 mm. latis rotundatis ad insertionem plus minus constrictis 1 mm. latis 1-nerviis, uem's intus planis extus (dorso) carinato-elevatis, margine integris basi non tortuosis. Sporangium ad axillas bractearum solitarium cordato-reniforme 1.5 mm. latum 1 mm. longum latius quam longius apice rotundatum basi profunde cordatum, sinu cordis acuto.

HAB. Taitō: Manclia, leg. G. NAKAHARA, Jan., 1903, (No. 787).

*Lycopodium taxifolium* HAYATA Mater. Fl. Formos. p. 412 pro parte, (non Sw.)

Near *Lycopodium taxifolium* Sw; but differs from it by the linear narrower bracts. This specimen is exactly the same as a specimen from the Philippines which is labelled as *Lycopodium pinifolium* BLUME. Somewhat near *L. niteas* SCH. (KUXZE Farnkräut. I. t. 80), but differs from it by the broader leaves.

**Lycopodium pulcherrimum** WALL. (HOOK, et GIEV. IC. Fil. t. 38).

HAB. monte Morrison, ad 8000 ped. alt., leg. T. KAWAKAMI et U. MORI, Oct., 1907, (No. 1783); Arisau, ad 8000-7000 ped. alt., leg. B. HAYATA ut 8. SASAKI, Jan., 1912.

Near *L. cryptomerinum* MAX., but differs from it by the narrower leaves of much softer texture.

**Lycopodium Selago** LINN.

HAB. in montibus centralibus, ad 11000 ped. alt., leg. U. MOKI, 1908, Dec.

Compared with a Japanese specimen so lalxilled in the herbarium fit Tokyō.

*Lycopodium serratum* TH. var. *myriophyllifolium* HAYATA n. v. Terrestri; caulis suberectus bñsi plus minus ascendens tota longitudine densiuscule foliosus tares 1£ mm. in diametro. Folia lineaxia 12 mm. loupi 1¼ mm. lata apice acuminata ,basi liand angusfciora margine crispata undulata irregulaiiter serrulata, serrulis longioribus 1 mm. longis acutis ascendenfcibus, ntmqiiH pagine glabra 1-nervia, nervis supra (intus) elevatis subtus (eortus) planis non distinctis. Sporangium ad axillas foliorum solitariuin lunulato-ieniforme 1£ mm. longnm 1 mm. latnm 2-valvatum brevissime stipitatum vol sabeeaaile.

HAB. in monte Arisan, leg. U. MORI, 3908, Mart. (No. G208).

Differs from the type by the much narrower linear leaves with sharp toothed and crispate margin.

*Lycopodium squarrosum* POBST in MvrsiM. et HAYATA Enum. Pl. Formos. p. 555.

HAB. Taitō: Botansha, leg. G. NAKUHLV, Jan. 190G, (No. 78)); Biōritsu, leg. S. NASASAWA, Dec., 1906.

*Lycopodium subdistichum* MAKISO; HAYATA Mai ir. Fl. Formos. p. 412.

*Lycopodittm pinifoUvm* HAYATA Mater. Fl. Formoa. p. 412 pro parte, (non BLUME).

*I-./copodium UixifdiuniBJCiATAMater.Fl.Formos. p. L12. ]mi parte, (nonSw).*

HAB. Koshun: Botanrosha, Jan., 190fi (No. 791); Wnnttm, leg. T. KAWAKAMI, 1904; Ai'isan, leg. B. HAYATA, Jan., 1912.

*Lycopodium tereticaule* HAYATA (Fig. 70), Mater. Fl. Formos. p. 411. Doscriptio auctata: Epiphyta densLssimo csaspitosa. Cauls tores filiformis pt^ndulns siu"smn Borifer, partibus soriferis non distinetis filiformibim in lougi- 1 u • 1 i no vai'iabili bos UDB 1 tnetei s | tarn.

in <liametro sectionis, bracteis sph-aliter plus minus imbrioitim sitis late cuspidato-rotundatis \\ mm. longis 1 mm. hitis apioe cuspidafco-acutis basi leviter contractis crassiusculis intus plauis dorso carinatLs, (carinis deorsum derarrentibus), mavgine subbitegris. Sponiugium

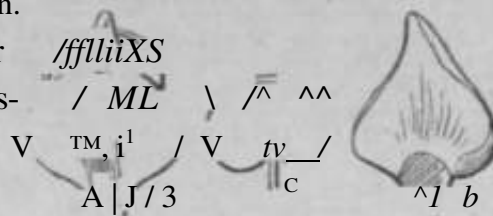


Fig. 70, *Lgmpo&um* (er«(ioayt«<sup>^</sup>YATA; »••»»«\*««' b T ^ \* J l; the same, man from faoe, R{K}rangitim tiikeii o«; c, a sponngium.



ad axillas bmcete solitarium late oordatum reuiforme 1 mm. latiini \bullet mm. longnm apice rottmdutum **baa** oordatam graoillime stipitatnm, stipnte tennis- si mo i nun. vel J mm. longo.

**HAB.** Arisan, ml 8000 **ped.** ult., kg. **B. JIAYAYA** at SASAKI, 1912, **Jan,**

## Ophioglossaceae.

### *liotrychium* Sw.

*Botrychium leptostachyum* JIAYATA sp. UOF. (Fig. 71). **Hhiwnmit** Stipes 14 cm. lougns teros basi dilatats twto glabor. Fions late trianguliiris



**k**

^"53" \ a



Uf^ ) lmtis l)asi in nmbitu cord; it is, \ i y \ yinnis iufimis (latera inferiore)

Fig. 71, *Jiotrychywn tuytostachyum* HAYATA: » the plant; L, a I-TUOB of the spike; u x,"H. b, magnified.

longisaimis u-G cm. longis oblique hmngularibus l)asi 5-C cm. latis, pin mil is in6rms (latere inforioiv.) longissimis 3% cm. longis **oblongia** basi 2 cm. longis pinnatifidis, segmontis ovatis apico in ambitn obtnsis ba« late cunoatis inciaa-lobjitis, lobis acutis. Textnra tenuia^inui biirbaeoa, veuulis terniinalibus stmplicibns **vel** fiiroatis distincte vias tenuissimis, rlinclu'lns fromjjium snbcomplaimtis **roperiore** subalutis, rhachiiuw piuufunm ot piunubinim alafeis cam alis 2 mm. latis. I'III^ **boadis** terminalia Ha luterlibus roquiloii^rt iiotiolata, (petiolo 4Jem. longo mndlo paucii lam sporangiormn ger\*inti), equaliter latissime rbomlxnMt:i cum pt^tiolo 16cm. longn totinaquo la>a bipinnatifida , pinnis iufimis trinugulari-binceolftis apioe acuminatissimis 10 em. longis 4ctn. latis, jiimiulis infimis sesailibus oblongia 3 cm. longis **1&cm.** bitis. > Panicubv sporangiornra tontia^iuiL e mtiio patioli partis terminal is

frondis orinuda cum peduneulo 7 cm. longa 1 } cm. lata, (pedimculis 2^ cm. lougis) recta, ramis pamcularuni 8 mm. longis oppositis augub recto divarioa- tis sporangia spicatum gerentibna. Sporangia seasilia snbglolwsti Imsi latia^ima 2-vaIvata toto glabra.

HAB. Nōkōsan. leg.' U. MORI, Jan., 1903, (No. 0291).

Near *B. virrinum* &\*. (EAT. Fern. North America t. 33), bnt differs from it by the more loosely arranged lobes of the pinnules, lobes of which are much mora larger than those of *B. inrgmianum*, and by the mucli sliorter panicles which uro on tho petiolas of the terminal partitions of the frotuls.

### Osmundaceae-

#### *Osmunda* Lnw.

*Osmunda regalis* HOJN. \BX. ?

HAB. Tonkurankei, leg. U. MORI, 1910, Aprili.

Ko fertile frond. Sterilo one is a little different from tho type. It may be a variety of the same.

### Hymenophyllaeae.

#### *Trichomanes* SK.

*Trichomanes acuto-obtusum* HAYATA sp. nov.

(Fig. 72). IMifzoma repens filiformo. Stipes aubnllus

vel biBvissimus vel usque 5 mm. longus. Fiona

cordato-ovata oblouga, vel lanceolata varuihillimn iwque

2 cm. longa nsqne lj- cm. lata apico rotundata vel

obtusa piuiuitifida vel bipinnatifida, pinuis vel pinnulis

lolwitis, bbig ultimis oblougo-lintiai-ibua 2-3 mm. longis

J \ mm. latis apico obtnso-

iictitis ad suinmum acutis,

rliaciiibusfrondium ljrani,

lutis; frons siuisum sori-

fera; margine plus minus

vel limid undnlata pins

minus desuper l'ccm-va,

COSiS Utraquu pagino

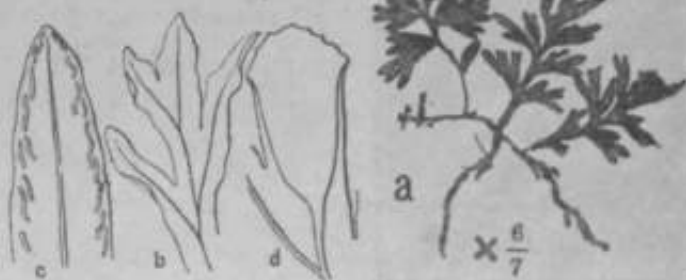


Fig. 72, *Trichomanes acuto-obtusum* HAYATA; n, the plant; l, portion of pinna; u, portion of the underside, showing the venation; d, sorus.

elevatis; pagine supra pilis unicellularibus glandulosis brevissimis pance dispersa subtus subglabrata. Involucrum ad basin pinnarum situm vel ad lobos inferiores pinnarum situm subascendens infundibulo-triangulariter 1-2 mm. longum ad orem plus 1 mm. longum apice late rotundum 2-valvatum, valvis bi-veltris plus 1 nun. latis minus 1-2 mm. longis margine obovato-denticulatis.

HAB. Bonin, log. Soma.

Near *T. nanum*, but differs from it by the longer lobes and obtuse receptacles; from *T. Jucitlwm*, differs by the more acute lobes. Also near *T. KvsraSi* (Bum. Fern. Brit. Ind, t. 28G), but separable from it by the short obtuse valvas of the involucres.

*Trichomanes cupressifolium* HAYATA sp. nov. (Fig. 73). Rhizoma



Fig. 73, *Trichomanes cupressifolium* HAYATA; a, the plant; b, portion of the frond.

repeats filiforme foliis remote foliosis. Stylus cum fronde pendulus. Infundibulum 15-17 mm. longum subglabrum fusco-olivaceum. Frons usque 9 cm. longi usque 3 cm. lata ovato-lanceolata vel lanceolata oblongo-breviter

apice attenuata vel angustata ad summum. Pinnulae basi truncatae acutae. Rachis pinnata. Pinnulae inferioribus longioribus, inferioribus gradatim brevioribus

versus summum ad lobum simpliciter reductis, pinnis inferioribus longissimis 15 mm. longis 6 mm. latis ovato-lanceolatis ad apicem obtusis

*cuneatis* pinuatilobis, lobis utroque latere 4-5 latere superioris phsa aumanxttB latere inferiore minus immerosis ublongo-triangularibHs, tobis mediis longissimis 2 mm. longis I mm. l»tis apieti obttisissimts ilfcemis, piuuis iufimw lwuviuribiis 1cm. longis circ. unilnteralibra vel valde obliquLs, pitmis mediis ft rliachibus fromJinm augulo 45<sup>1</sup> ^reasis. Rliachia fraud ia siiRiim 2 inm. lata ; rliachliis pinuse infortoiiis 2 mm. Liti. Frons SHHHL madinm osqae nd propo aptc«m sori-fera, pinnis singiilis geuemliter latert> sup'iorA sorum stugiihim gerentibiis, vel >> interdiun utexme la&exe Bomm siiigrn'mu vol BOZOS duos gurentibus. Involnorum uilnndtbiUo-^anipaiiitlattim \*2|mra. lutigum ore l£ mm. latum ntroqto lature jila) itin, alia circ. ] mm. longis, ore trmicato-rotimdatu, valvis subiuullLs, iia iuferioribm quam superioribus panllu luugioribun mai'giuu inttjgris. Frona otzaqoe pagiuui glabni margini-: iutcgivi ]<ñit<i ul>scim vel hand *crispato-undulata* T\*U phis mimis desaper ri\*cm"va v<l hand recnrva, (<>stis vmiis vtaiiilia utraquo pagine «lev)itis; collulso *vexuu&mam* deaxint.

HUJ. Arisan, ad 8000-7000 JKXI. t alt., log. B. HATATA et H. SASAKI, Jan., 1912.



Fig. 74, *Trichomanes filiculum* Oakes.

NO a r *Trichomanes kumtze* FORT (HOOK, et GEEV. IC. Fil. t. 85); bat differs from it in liaviug lobes on both sides of the pinnse. Fouud in a *dry* place htrgt} cnig in Mt. Tozau.

**Trichomanes filiculum** UOKY (Fig. 74); **Trichomanes** et HAYATA Enum. PI. Foi-moe.

*Trichomanes apmitinifvm* Pom.; MATSUM. et HAYATA l.c. p. 5G4.

HAB. Koto-sho leg. T. KATVAKAMI et S. SASAKI, Juli., 1912, (Ho. 18).



Fig. 75, *Trichomanes humile* FORT.



Fig. 76, *Trichomanes maximum* BLUME.

**Trichomanes humile** FOUST. (Fig. 75); MATSUIC. et HAYATA Enum. Pl. Formos. p. 565.

HAB. Kotoahō, leg. T. EAWASAH I et S. SASAKI, Jnl., 1912, (No. 21).

**Trichomanes maximum** BLUME (Fig. 76); *Trichomanes fhy&anostomitm* HAYATA in MATSUJ. et HAYATA Khum, Pl. Formos. p. 568 (uou MAKINO).

HAD. Kūtoshō, leg. T. KAWAKAMI et S. SASAKI, Jnl. 1912, (No. 16 et 20).

Compared with a specimen so named from the Philippines,

**Trichomanes orientale** O. C. (Fig. 77). *Trichomanes japonicum* FK. et SAV. Enum. Pl. Jap. II. p. 207.

HAB. Ajrisun, ad 8000 ped. alt, leg. B. HAYATA et S. SASAKI; Rinkiho, leg. J. IKABA, Aug. 1910.

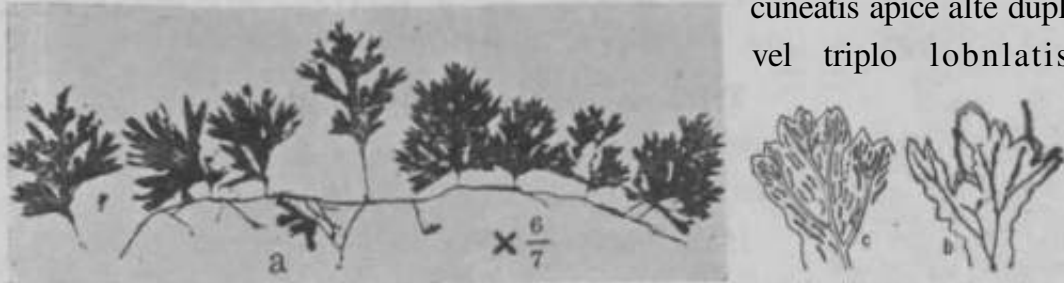
**Trichomanes palmifolium** HAYATA sp. nov. (Fig. 78). Rhizom. it; pens filiforme brevis pilosissima nigricans remote radicalis remote foliosum. Stipes 2-7 mm. longus basi nigricans glaber filiformis. Frons in ambitu coarctato-ovato vel rotundato-ovata 14 mm. longa totiusque



Fig. 77, *Trichomanes orientale* O. C. Cii.; n. (ho plant; b, a portion of the frond).

lata pinnatiloba, lobis utroque latere 2-3, rhaehibus 2 mm. latis, lobis ob-  
 triaugularl-obeunejitis 5 ram. lougis 4 mm. lutis apice in ambita truncates basi

cuneatis apice alte duplo  
 vel triplo lobnlatis,



**Fig. 78, *Trichomanes palnijbtuim* HAYATA;** a, tho pLmt; b, a portion of n fcontl; c, another portion of A frond, showing the vermiform strings on the Intfcr.

lobuHs nltimis 1-2 mm. longis 1-lg- mm. lfi-tis ;JNCK aeutis margine leviter  
 superiore (ansum) l-ecurvis crispato-undulntis; fious levitor recurva vel  
 suberecta, costts frondis loborura vol lybulorum utraque pagine elevatis, utraque  
 paglno piHs brevissimis pauoe (prsesertim ad aistas) dtspersis brovissimis apice  
 clavatis. Iuvolucrim ad lolmlum lateralem terminale apioe valvis 2 sorai-  
 3fotiuidatis 1^ mm. lati^§ mm. longis in-

structum bast complanatum carni>anii-  
 Jtatmu, carapauulis ore lj mm. latis 1  
 mm. altia (profluidia), valvis venteilibus  
 quura iis doraalibua puillo majoribus,

HAB. Arisan, leg. B. HAYATA et  
 S. SASAKI, Jan., 1912.



**Fig. 79, *Trichomanes rigkbtm* Sw.**

Near *T. Mahinoi* C. CH. = *T. acutum* MAKINO (Phanerog. et Pterid. 1.1.  
 16;), but differs from it by the shorter and broader fronds ; from *T. prdtferwn*

(BECH. Fern. South Ind. t. \*22) by the much shorter lobes of the pinnae. Also near *T. lulemargutth* EATON (HK. BK. Syn. Fil. p. 79) in the goniomorph form, but I could not satisfactorily identify our fern with it.

Trichomanes rigidum Bw.; (Fig. 79) KATSUK. et HAYATA Emira. Pl. FosmoB. p. 568.

Trichomanes rigidum Bw.; (Fig. 79) KATSUK. et HAYATA Emira. Pl. FosmoB. p. 568.

Trichomanes rigidum Bw.; (Fig. 79) KATSUK. et HAYATA Emira. Pl. FosmoB. p. 568.

### *Hymenophyllum*

LINN.

### *Hymenophyllum constrictum*

HAYATA sp. nov. (Fig. 80). Rhizome repens teretis 1-2 mm. in diametro sectionis transversae, lenticulis pilis longioribus dense obtectis. Stipes erectus gracilis 8-9 cm. longus teres 1-2 mm. in diametro ad basin vel ad apicem virgulae pilosus, pilis nigro-caesariis subcrispis vel rectis 1-seriatim multice-



Fig. 80, *Hymenophyllum constrictum* HAYATA; a, the plant; b, & hair at the base of the frond; c, a portion of a pinnule.

llularibus 1-3 mm. longis. FOLIA triangulari-ovata 10 cm. longa totiusque late apice acuta basi in ambitu suborbata bipinnata tri-quadrifida, pinnis

latis I. **nttdifil** .vato-triangularibus a «e 1 cm. ramotis a duu.hta from\*  
 on lints I. SOMW egressis 5cm.tongta Scm.latis, pinnis mdmta H. iufimis ab axdla  
**inter** Wlem et pinnam infimam ardinis I. 6mm.dW«itn«» «vat» 2 cm.  
 longis licm.latis **apioe** obtiuis b\*u oblique truncatis pinnate vel **hnt**«  
 fidis, sqgnumtis uliinis lbe^ibns .} mm. latis apice obtodp vel **brevissime**  
 3-lobatis Tel soro tei-minati,, sub **SOW** valde caD<sub>8</sub>teicti«, pwrtlbitt **constrictis**

**I** muulafe \* mm. longis stipitifonnta. Frons p»gii» nteaue # n . **costis**  
 vtms venuliaque ntnupie elevatis, matgine integm; rhaohi **frondis dorsum**  
 btem^te a^tissimn alat. sm-sum rlistincto alate i .l-his pinntom **dis-**  
 tiucte alabi. Iiivolucrm ad basin 2-valvatim **fissum bivalvatum terminale**  
 . rohxnda^m latins qnam longius 1 xnm. longum m « ^ Bubmtegram vel ob\*a»  
 denticuljitum.

**I** Hu). Aisan, log. B. HAYATA et S. SASAKI, Jan., **L91S.**

Ita. **11. Pd^**, tat cliffy Jrom it by U» h...«Uy r»ml » | M i  
 with short stalks.

*Hymenophyllum javaniem* SPIKSG. (F«. 81).

HAS. in moate Arisau, ml 7000-8000 ^ 1 . alt.,  
 leg. B. HAYATA «t S. SASAKI, Jan., 1912.

Comparod with a Japanese specimen so labelled  
 in the TokyO hetbarimn. Our fern looks to be a  
 little **different** from it in liaving mofiii *Tecocoe&z* lobea  
 d the piunje.

**»»** *Hymenophyllum parallelocarpum* HAYATA  
 ep. nov. (Fig- 82). Rhiz/ima repens gracillimum £ mm.  
 in diamotro section is teres rubescens piloso-squanuitmn,  
 pilis nigro-castaneis, remote radicans, radicibus pilosis.  
 Stipes cum fronde perpendiculariter pendnlus 2-2J  
 cm.longns graciUtmus ntro-castaneus glabor basi  
 piloso-squamats, squa-  
 mis pililormibus  
 nigro-eastaneis. l?rons  
 oblongo-lanceolata vel  
 obovato-lanceolata

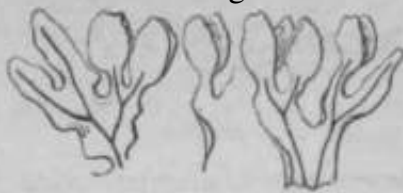


Fig. 81, *Hymenophyllum javanicum* SENSU.



10 cm. longti 4 cin. lata apice obfcuso-aeiita basi in ambifcn cuneato-acutn. bipin  
 natifida, pinnis mediia knigisaimis a ae 8 mm. remotis angulo 45°-50° a rhnchibns  
 egressis lineari-lanceolatis 3 cm. longis 12 mm. latis apice obfcusia obli<ju;  
 cuneatis sossiiibus, pinmilis Tel segmBiitis Unearibus inferioribns a se 3-4 mm.



Fig. 82, *Hymenophyllum parallelum* **earpum** HAYATA; n, the plant; b,  
 fi jwrion y£ a pinna.

rotimdatum vel njtundato-somi-orbicolare basi tnuicatum hand oonstrietiim  
 minus 1 mm. latnm margine intt^emmum apicti j^ierfecte **robmdsfcam** minus  
 1 mm, longum Utius quam lougius glubmm x&que ad basin 2-valvatim fissum.

HAB. Arisan, ad 8000 ped. alt., leg. B. HAYATA et S. SASAKI, 1912, Jan.

Near *E. rarvm* R. BE. (KUKZE Farnkiauter 1.1. 9G), but differs from it by the  
 much mare branched fronds. Also uwir *H. Wriijldii* V. D. Boscr, (MAKINO Pli-  
 nea-og. et Pterid. Vol. 1.1.17.), bnt sei»Lrable from it by the mow\* pinnatifid pinna.

*Hymenophyllum polyanthos* Bw.

HAB. Arisan, ad 7<XX) ptxl. jilt, leg. B. HAYATA et S. HASAKI, Jan., 1912.

l-omob's 6-7 mm. longis 2-Iolmtis  
 vrl simplicibtis, lobis liuearibus  
 2 mm. lougis 1 mm. latis apice  
 tiimoato-iotundatLs vel l e v i t e r  
 etnju^inatis vel apiee SOIXI ter-  
 minatis, segmontis vel lobis sori-  
 feris apice sob soro JJITS minus  
 constrictis fequiltitis **com** iu-  
 volueixi. Frons iitegra pallido-  
 fnasca ntmqne glabiti, costis venis  
 iitiuquepagiuo  
 distincte ele-  
 vatis rubro-  
 castaneis gla-  
 bris; rhachis  
 frondis al>ta  
 modio cnm  
 alis 1 **DDL** bita  
 vel latior. Iu-  
 Tolncrum late

Compared with a specimen so labelled in the Tokyo herbarium. This fern seems to vary a very wide range.

## Polyodiaceae.

*Cystopteris* BEKNHARD.

*Cystopteris formosana* HAYATA sp. nov.  
(Fig. 83). Rhizoma repens  
4 mm. cymisim radices dense  
emittens. Stipes tenuis-  
simus 30 cm, longus inferiore

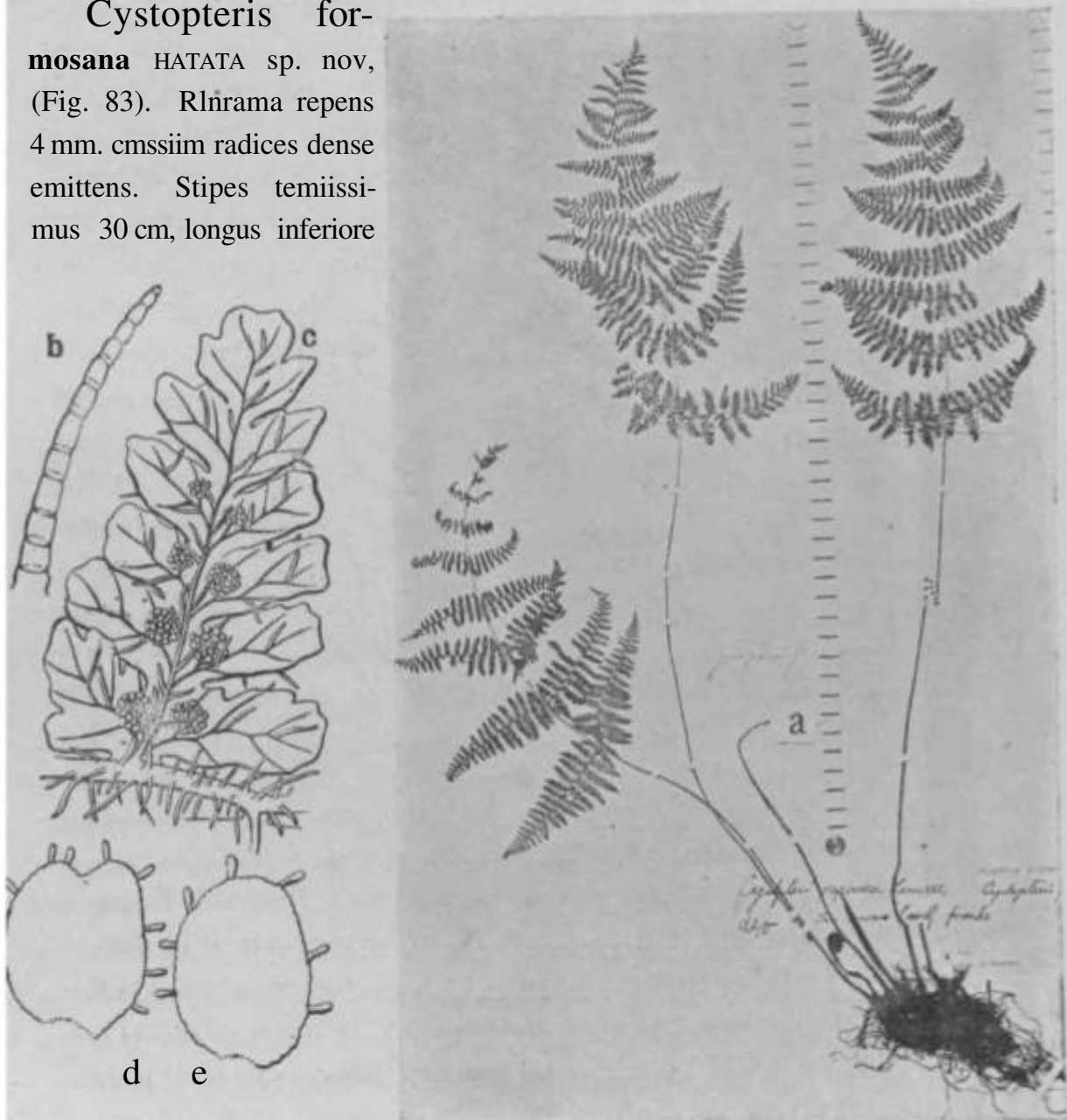


Fig. 83, *Ogdopteris formosanci* HAYATA; n, the plant; b, a hair on the surface of the frond; a, a pinnule; d and e, indusia.

2 mm. in diametro tares basi casfeuius siu'sum fluvo-stramineus piloso-squamatis pauce pilosus basi douse sursum pauce squamatus, squamis mediis triangulari-lanceolatis, inferioribus kiangiilari-cuspidatis 5 mm. longis basi 2 mm. latis basi latissimis, superioribus minoribus tenuissimis margine glanduloso-ciliolatis, pilis tenuissimis multi-cellukribus. Frons ovato-lanceolata vel triangulari-lanceolata 22 cm. longa 10-12 cm. lata a pice ambitu acuminata basi truncata vel rotundata bipinnata, pinnis inferioribus longioribus suboppositis a se 3 cm. remotis a rliachibus angulo  $80^{\circ}$ - $90^{\circ}$  divaricatia rectis vel  $\pm$  recurvis sessilibus lanceolatis 7 cm. longis 3 cm. latis apice acuminatis basi truncatis SBquilateralibus, pinnulis inferioribus a rliachibus angulo recto divaricatis lineari-oblongis 18 mm. longis 7 mm. latis a se 7 mm. remotis apice obtusis basi truncato-acutis sessilibus pinnatifidis inferiore ad costam superiore prope costam fidis, segmentis rectangularibus 4 mm. longis basi circ. 2 mm. latis apice truncatis margine lobulatis, lobulis apice rotundatis J mm. latis, segmentis superioribus brevioribus subintegris. Textura tenuissime herbacea; frons pallido-viridis, rhachibus frondium breve pilosis; costute pinnularum supra leviter canaliculatsB utroque latere canaliculorum densiuscule pilose supra elevatro; pagina frondis densiuscule pilosji, pilis articulatis multicelluLiribus, venis et venulis utraque jMigine jiarce pilosis. Sori utroquo Litoii) costaD pinnuLirum prope costam 1-seriatim dis^siti ^lobosi. Indusium oblou^um m;irgino remote glanduloso-cilioLituni.

HAH. Arisan, ad 7000 yed. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

Near (*G. japonica* LEUBS., but differs from it by the morx5 hairy fronds; still nearer *G. setosa* (BEDD.) (BEDD. Fern. Br. Ind. t. 312 and *Lastrea aetosa* BEDD. Fern. Brit. Ind. t. 262), from which this differs by the oblong nearly orbicular indusium with glanduliferous margin and by the very much smaller fronds. Perhaps a smaller form of *C. seiosa*.

*Cystopteris sphserocarpa* HAYATA sp. nov (Fig. 84). liluVioma. Stipes stramineus flexuosus 18 cm. longus basi parce squamatus nitidus, squamis ovato-oblongis vel ovatis 4 mm. longis 1£-2 mm. Litis apice acuminatis basi rotundatis temiissiniis fusco-pm'purascensibus. Frons trianguliris 12 cm. longa 10 cm. lata basi latissima apice tenuissime lineari-acuminatissima pinnata, pinnis inferioribus longioribus lanceolatis 3} cm. longis a so 1J cm. reniotis

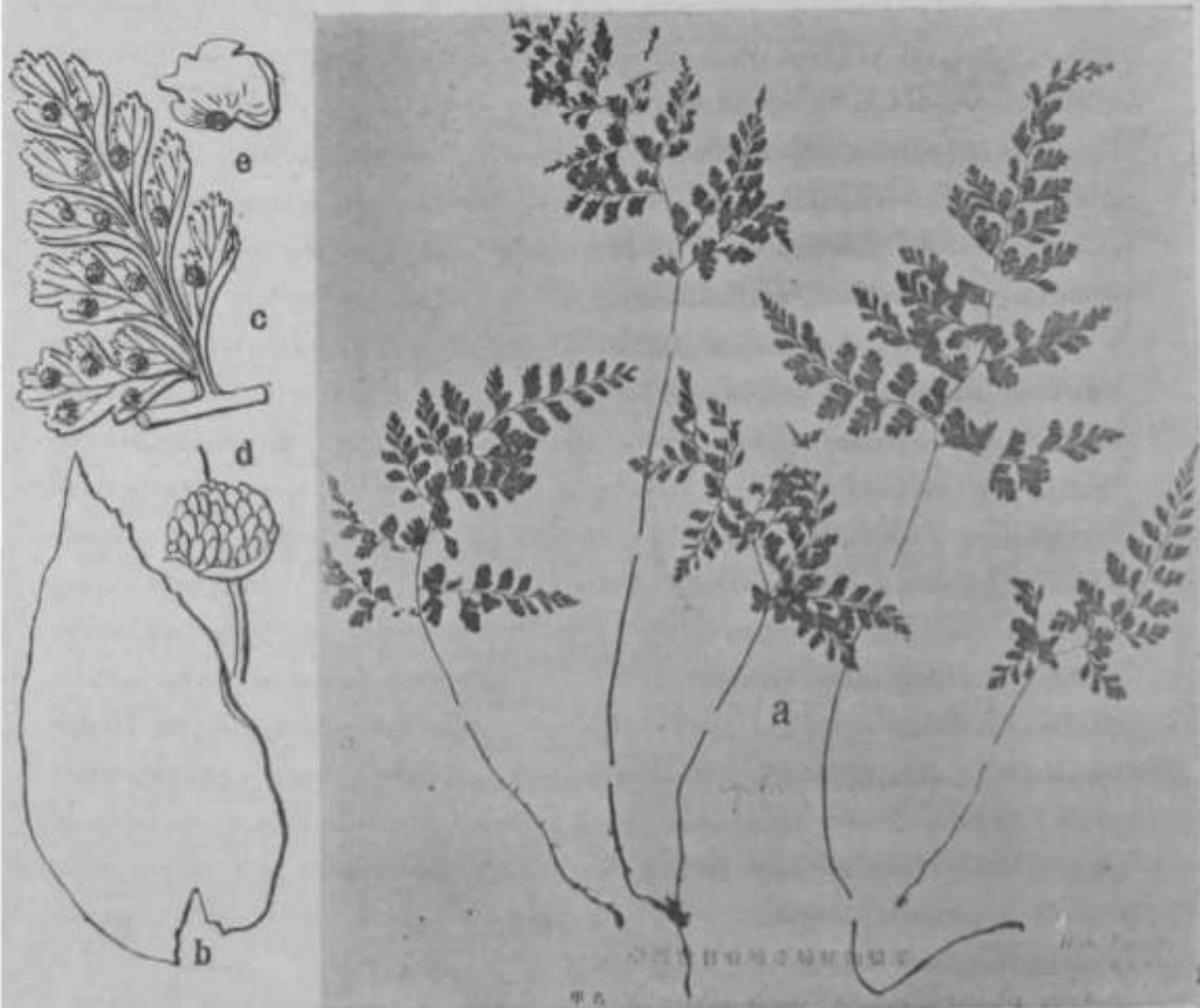


Fig. 84, *Cystopteris nipponensis* HAYATA; fr. the plant; b, n. sori on the leaflet; c, d, e, magnified views of the sori; a, habit of the plant.

rhachilni^ fndium angulo 90° divaricatis, iufimta vilde longissimLs lanceolata 51 cm. longis 23 mm. latis apice acutis ad snmraura obtusis basi tmncatis plra minus jmgustioribus brevissime p«tiolatis, piuulis infurioribwa a se 18 mm. ramotis oblique ovatis 12 mm. longia 7 mm. Litis apice ambitu rotimdatis basi late obliquo cimeatis brevissimn **petiolnlafcis** lobnlatis, lobulis oblongis margine minute denticulate, partibus cimeatis integris. Textura herboceo-membranacea. Son basi lobulonim singtli gloixjsi. Indusium late rotmidatnm margine irregiilariter erosum.

HAB. in mouta Morrisou, ad 11000 pod. lilt., **Lag.** T, KAWAKAMI et S. SASAKI, Oct., 1909.

Kear *Cylopteris /mgilis* BEKSH., bnt diffors from it by the broader, shorter fronds with more obtusely lobed pinnules. Also near *C. tennis* (LOWE Brit. Esot. Fern. Vol. VII. p. 35) from which this differs by the triangular bipinnate fronds ; from *C. mmtplncnm* (FRANCHET H. DAVID. H. p. 149), tins is separable in the bipinnate (but not tripinnate) fronds.

*Dryopteris* ADANSON.

***Dryopteris {Cknititi) angustodissecta***

HAYATA sp. nov. (Fig. 85). Rhizoma ? Stipes 20 cm. longus ferrugineo-iiibro-castaneus pubesoens, pilis pluricellularibus rubescontibus, basi densinscule siirsnm parce sqiiamatiis, squamis inferior ilms ovato-hmceolntisG-Smm.longis 1-2 nun. hXi&. FronseIoiaгато- triajigulftH-ovatji45cni.l()nga basi Litissima 22 cm. lata apice triangulari-acuminata basi acuto-trancjita bipinnata vel tripiunatifida, piniis inferiorilms ( ppositis a se 5-6 cm. remotis angulo 8{F-90° a rliachibns divariciitis,

iufimis lancoo- Iato-triangnlari- bus 13-14 em- **Icngu** brisi 8-9 <iii. lais apice aciuninatis basi hitissimls breve jxliuhitis iptitio- Us 8 mm, longis), pinnnlis innnis latere iuferiom praosertim longissimis Gem. longis 2 cm. lfttis li<sub>1</sub>)ear.i. lanceolft- (is npict; acu-



Fig. 85, *J>nfi,ftti-ibi (dtttSb) angwtattsseda E b u u*; n. tlio plant; b, a hnr on tho rostti of « jiinnule; 0, u portion of i» ]innulo; d, mn incitisiuin.

minatis basi truncatis latissimis sessilibus basi pinnatis sursum pinnatifidis, pinnula ordinis secundarii vel segmentis inferioribus ovato-triangularibus 1 cm. longis 7 mm, latis apice obtusis basi truncatis latissimis sessilibus vel breve petiolatis margine lobatis; frons basi usque ad summum sorifera herbacea supra pubescens subtus ad eam costas venae venulasque tenuiter pubescens, pilis pluribus. *foti* utroque latere costuleo pinnulae vel segmentorum 1-seriatim dispositi. Indusium subreniforme ad centrum pilosum.

**HAB.** KOSUN: Kurayu, leg. B. HAYATA et R. SASAKI, Mai. 1913.

Nei- *D. dissecti* (DESV.); but differs from it by the much narrower pinna) and pinnales with narrower lobes.

- *Dryopteris (Lastrca) apiciflora* (WAIL.) O. KTZE. (Fig. 86); HOOK. Sp. EL VI. t. 248.

*Lastrca apiciflora* (HOOK.) BEDD. Fern, Brit. Ind. t. 40.

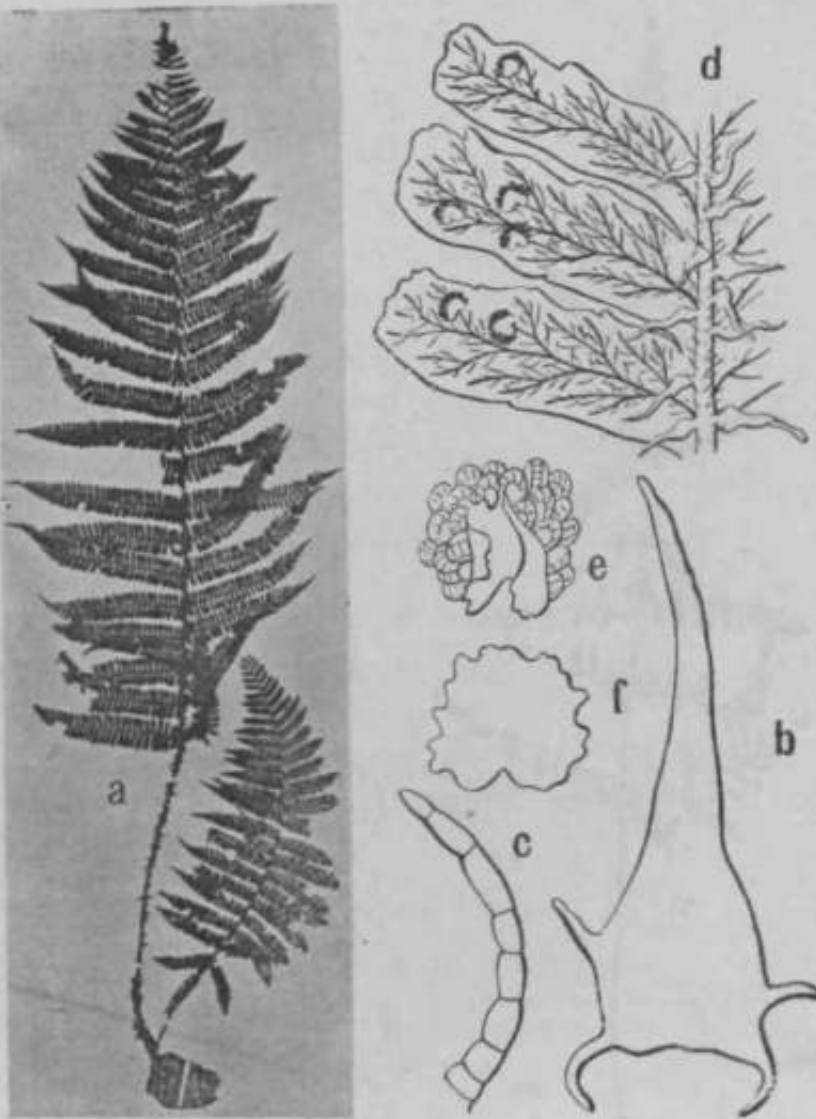


Fig. 86, *Dryopteris (Ctenitis) apiciflora*; a, Oio plant; b, a scale on the under surface of a pinna; c, a sori on the upper surface of a pinna; d, portion of a pinna; e, a sori; f, the indusium.

HAB. Arisan, ad 7000-6000 pod. alt., leg. B. HATATA et S. SASAKI, *Jam* 1912.  
*Epiplatia v\*4 terrestris.*

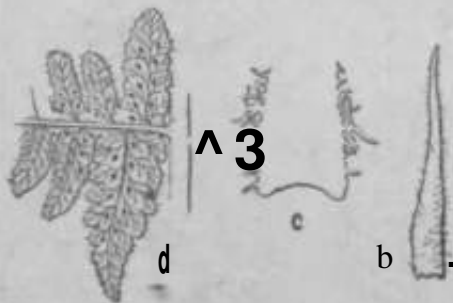


Fig S7, jDri/opferw (*Lastrea aurita* L. CH.; ; n, the plant; b, a, iscale on the rhiwnn; <^ lwisfil j<irt of the wirae; d, bnanl purt of ft pinna.



Fig. S8-A, *Drijoptirbenmtta* C. CH.; «. the pliut.

*Ptyopteria (Lastrea) aurita* C. Cmi. (Fig. 87) Iiid. FiL p. 253 (1905).



*Gymnogramme aurita* HOOK. IC. t. 974. *Aspidium awrila* (HOOK.) ; HATSUH. et HAYATA Enum. PL Formos. p. 579.

riSHHmfik HAI, Raiao, log. T. SOMA, 1910. Dec

Fig. 38-B, *Jhyopteris crenata* O. KTZE.; b. a saile at the base of the stipo; c, piunlo; «l, an iulusiuii.

**Dryopteris** (*Eudryopteris*) **crenata** O. KTZE, (Fig. 88, A-B).

*Hypodematium BuppchHmnm* KUSZE Famk-rauter I. p. 41, t. 21 (1840).

*Nepkrodiwn odoratum* BAKER Syn. p. 280.

HAB. Montibus centralibus, leg. U. Mom et S. KATO, Dec. 1909.

It is rather doubtful that this is identical with *D. crenata*, for there is a little difference regarding the size of the stipes and the hairy state of the fronds. This slightly differs from the Japanese specimen labelled *N. odoratum* BAKER. The sori of our fern are much larger than those of the Japanese.

*Dryopteris* (*Eudryopteris*) *cyrtolepis* HAYATA sp. nov. (Fig. 89). *Ehizora*? Stipes 27 cm. longus basi 1 cm. in diametro cum rhachibus densiuscule squamatis, squamis variabilibus lanceolatis usque filiformibus basi densissimo dispositis usque 2 cm. longis costaneis. Fronds in ambitu lanceolata 100 cm. longa 30 cm. litta apice subito acuminata basi gradatim angusta ad basin 10 cm. lata pinnata, pinnis linearibus mediis longissimis 15 cm. longis 2 cm. latis a se 3 cm. remotis suboppositis apice acuminatis basi latissimis truncatis pinnatifidis basi ad rhachin fissis sursum prope rhachin fissis, segmentis

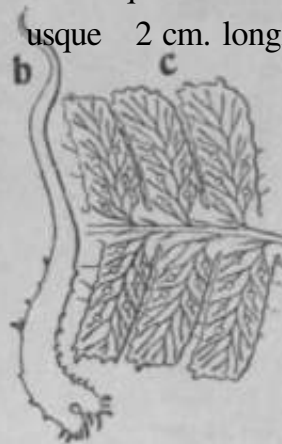


Fig. 89, *Dryopteris cyrtolepis* BATATA- a, the plant, b, a scale on the frond.

IS



inferioribus rectangularibus 1 cm. longis 5 mm. latis apice truncatis margineo obscure et remote serrulatis vel subintegrifolia apice obscure denticulatis. Pinnae medio deorsum a rachibus frondis angulo recto divaricatae apice plus minus falcato-ascendentes, inferioribus a se 3 cm. remotis brevioribus plus minus reflexis, inferioribus 6 cm. longis 1 cm. latis, superioribus ascendentibus a rachibus frondis angulo 50°-60° divaricatis brevioribus a se approximatis, segmentis a costa pinnae angulo 80° angustis. Costae pinnae supra leviter canaliculatae squamis minutis obtectae, subtus elevatae squamis majoribus densiuscule obtectae, costulis segmentorum supra tenuiter impressis subtus tenuiter elevatis, venis venulis supra non visis, subtus distincte visis tenuissimis. Frons herbaceo-coriacea

superius subglabra subtus ad nervos paucis squamata vel subglabra antheris pilis tenuissimis [tenuissimis] paucis instructa. Sordibus utroque latere costae segmentorum 1-seriatim dispositi. Inflorescentia cordato-reniforme.

HAB. Mt Arisan, leg. B. HAYATA et S. SASAKI. Jan., 1912.

*Dryopteris (Ctenitis) Eatoni* (BAK.) O. EARN (Fig. 90).

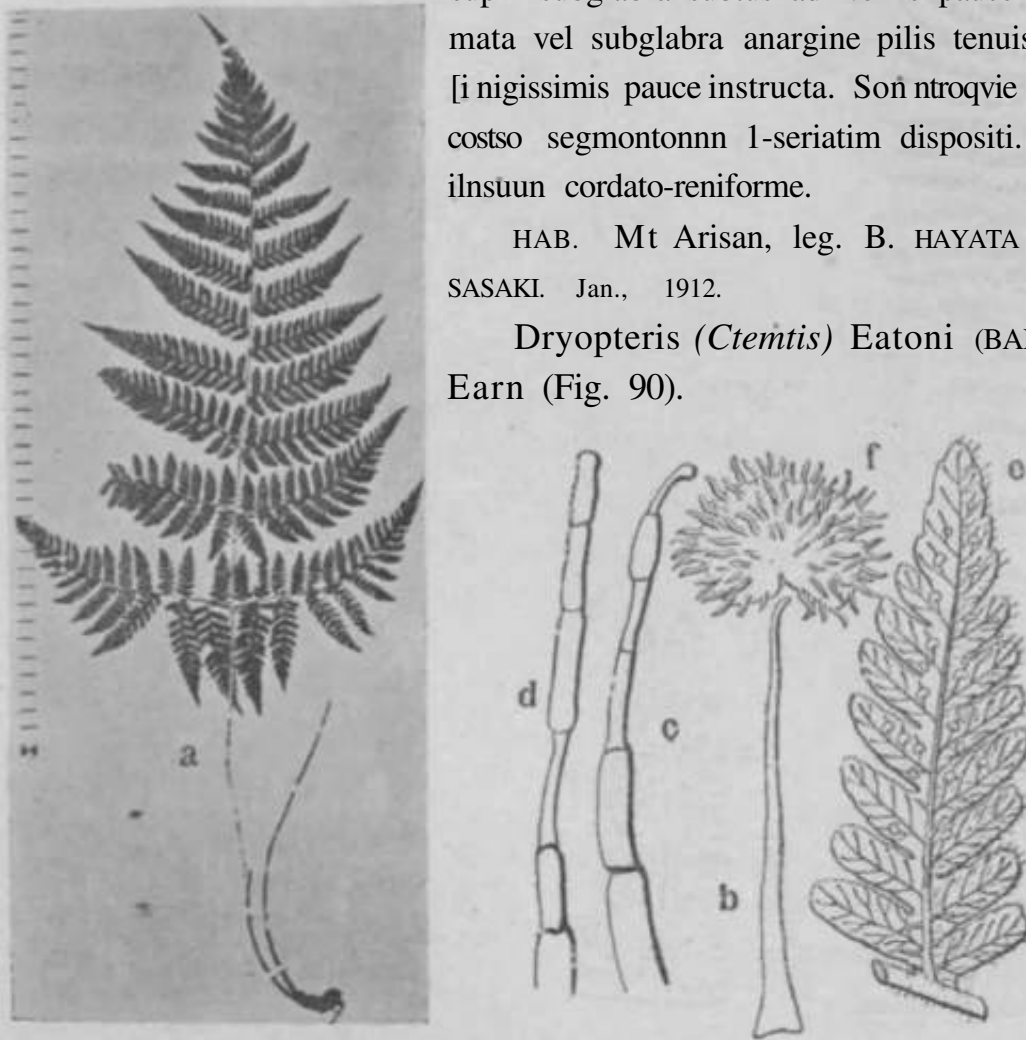


Fig. 90, *Dryopteris Eatoni* O. EARN; a, photograph; b, acule at the base of the stipe; c, pinna; d, pinnule; e, pinnule with acule; f, indusium.

HAB. Kōtushō, leg. K. MIYAKE, NOV., 1899.

Compared with a specimen so labelled from the Philippines.

*Dryopteris (L'Herminier) Beddomei*

(B.V.K.) O. KTZE. (Fig. 91).

HAB. Rinkiho, ad 7000 ped. alt, Aog. 1911, leg. H. ISABA.

*Dryopteris (L'Herminier) gracilescens*

(BL.) O. KTZE. (Fig. 92).

11 vii. Arisan, leg. B. HAYATA et S. SASAKI Jan., 1912.

Compared with a specimen so labelled in the herbarium of Tokyo.

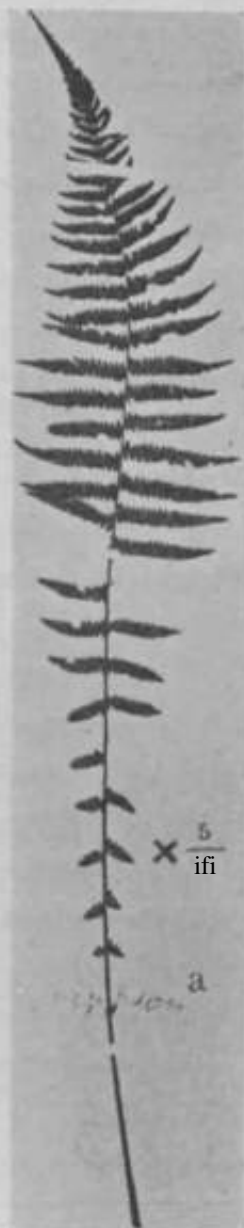


Fig. 91, *Dryopteris (L'Herminier) Beddomei* O. KTZE.; c, the plant; b, a pinnule,



Fig. 92, *Dryopteris (L'Herminier) gracilescens* O. KTZE.; a, the plant; b, a sori; c, portion of a pinna; d, a sori.



*Dryopteris (fivdryopteris) hirtipes* (BL.) O. KTZE. (Fig. 93).

HAB. Aisan, leg. B, ITAYATA et S. SASAKI, JHB. 1912.

Compared with a specimen so labelled in the herbarium of Tokyo.

**Dryopteris (Phcyapteris) fluvialis** ITAYATA sp. **nov.** (Fig. 94). Rhizoma ascendens subereetimi. **Stipea** 5Q-C0cm. loflgus basi pauce squamatus toto glaberrimus, sqtiamis cuspidato-oyatis 3 mm. longis 2 mm. liitis integriis apice acuminato-enspidatis bnsi ± eordatis. Frous 65 mm. louga 50 era. **lata** ovato-triaiigulai'is apieo acuminata infra medium Intissima basi minus lata basi subtrncata bipinnata vcl tfipinnatji, pinnis ijifimis 30 cm. longis 10 cm. latis lineari-laiicolatis **apioe** aciiminatissimis **baaa** truncatis substssilibus vel brevissimo petiolatis, pinnulia ordiuis primaru infhnis lanceolatLs sessilibns 5 em. longis 2| cm. latis apice •K-iuiinatissimis basi tinncatis, pinnulis oi" dinis secundarii infimis oblongo-lanceolatis 18 mm, longis 8 mm. latis apice obtusissimis basi leviter adnatis margine lobulatis, lobiilis quadrangularibus 3 mm. longis 2 mm. latis apiee tiuncatis a rluiclubus 1 mm. distantibns ntroque latere costolarum 1-seriatim soriferis; frons textum tenuiter herlmcea, in exsiccato ftiscens. Finnse inferiores a se,

Fig. 93, *Dryopterta hiriijxs* O. KTZK.; n, the plant; b, n wale on the stipe; c, n scale cm the rimchis, fimiillor one; d, a portion of a pinnule.

10 cm. remotse a rlmchibus frondium angulo *ACP-SGP* divaricatm, ptirnulis ordinis primarii inferiorilus a se 3 cm. remotis a rachibus pinnarum  $TO^{\wedge}SO^0$  divaxi-catis, pinnulis ordinis secundavii inferioribua a se 1 em. remotis a rhachibus



Fig. 94, *Ihyoj/terlifwuli.v* HAVATA; a, a smaller specimen of the plant; b. a. larger one; C, a scale on the rhizome; d, A pinnule; e, portion of H setulose costa (upper surface).

piannlarum angulo recto egressis; costis pinnnlmm supra canaliculatis otroque latere canaliculorura alato-costulatis, costulis remote setuliferis, setulis complanatis £ mm. longis- Sori rotundati lumd involucrati. Indusium millum.



HAB. Arisan, soeus fossas, ad 7-8000 ped. alt., leg. B. HAYATA et S. SASAKI, 1912, Jan.

Near 1). *cremdatoserrulata* C. Cu., but differs from it by thu much fewer scales at the base of the stipes and much larger fronds.

*Dryopteris (Evdrycpteris) hypophlebia* HAYATA sp. uov. (Fig, 95). Rhizoma snberectum apice stipites crosptosos gerens. Stipes 15-20 cm. longus sursum pauce basi densissime squaraatns, S(namis iiferioribuB ovatis lanceolatis

tenuissimis castaneis fuseis usque l£ era.

longis 4mm. latis apico longo cuspidato - acuminatis margins subin tegv i«,

squnmis (ad rliachin) minori-

K bus cnspidato-ova tis 3 mm.

longis 1 mm.

lutis mnrgiim remote setosis

fusco-uigricjinti-

Fig. 95, *Uria btphMbki* HAYATA; a, the plant; b, a actle on rhizome; c, a pinnule.

bus. Frons ovato-lanceolata 30 em. longa 13 cm. lata apice acuminata basi truncata pinnata, pinnis superioribus brevioribus, inferioribus longioribus subasquilonis a se 4 cm. remotis suboppositis a rachibus angulo  $50^{\circ}$ - $80^{\circ}$  divaricatis pyramidalis-lanceolatis 8 cm. longis 2½ cm. latis subsessilibus vel breviter petiolatis (petiolis 3 mm. longis) inaequalibus, latere superioris quam latere inferiore angustioribus, pinnatin vel pinatifidis, segmentis infinis (lateis inferiore) longissimis 1½ cm. longis 8 ram. Litis oblongo-rectangularibus apice rotundatis basi truncato-contractis margine inferiora lobulata superiore duplicato-semilatis; textura coriacea; costae pinnarum basi ± canaliculatis sursum planas distincto coloratis subtis elevatis ± squamatis, costulis vix venulis supra impressis subtus leviter elevatis distincte coloratis distincte visis tenuissimis; pagina supra viridissima subtus pallidior. Sori utroque latere costulorum 1-seriati a basi usque medium frondis dispositi. Indusium cordatum.

HAB. Axisan, lag.  
B. HAYATA et S. SASAKI,  
Jan., 1912.

*Dryopteris* (*Oteolites*) *Kawakamii*  
HAYATA (Fig. 96),  
Mater. Fl. Formos. p.  
416. Stipites erecti  
14 cm. longi dorso  
(supra) 3-sulcati  
stamineo-nibescentes  
squamatis, (squamis  
copiosis imbricatis in



Fig. 96, *Dryopteris* (*Oteolites*) *Kawakamii* HAYATA; a, the plant; b, a node on the stem; c, d, sori on the underside of a pinna; e, a hair on the upper surface of the pinna; f, a glandular hair on the underside of the pinna; g, basal portion of an upper pinna; h, an antheridium.

magnitudine variabilibus lineari-cuspidatis acuminatis fusco-stramineis 8-9 nun. longis 1 mm. latis iuterdum basi cordatis), etiamque pilis crispatis dense obtecti. Frondes lanceolate) in ambitu 50 cm. longre 15 cm. latsa apice acuminate basi obtusao bipinnatse, pinnis lateralibus angusto-lanceolatis sessilibus, superioribus a rhachibus angulo 90° patentibus, inferioribus et infimis reflexis, pinnis sub pinna media frondis longissimis 10 cm. longis 2 cm. latis apice acuminato-linearibus a medio usque ad basin sequilatis, pinnis infimis brevissimis reflexis angulo 150° a rhacliibus patentibus 2£ cin. longis 1cm. latis, pinnis utroque latere frondium 30 a se 1-1£ cm. remotis; rhaches supra sulcatse pilosse squamatra, rhachillse supra sulcata<sup>3</sup> dense rubro-hirsutsD subtus paucissime pilosso squamis lanceolatis 1-2 mm. longis basi ventricosis instructa»; pinnulse ad medium pinnarum late lineares 1 cm. longse 3 mm. late sessiles sequilatsa obtuse dentatse, (dentibus utroque latere 3-4-5 plus minus ascendentibus vel transversis obscuris), supra densiuscule subtus parcissime strigoso-pilosse, (pilis rigidis crispatis 1mm. longis), margine plus minus revolute, (venulis liberis), sub quoque dente 1-sorifera), rarius 2-soriferae. Sori depresso-orbiculares 1 mm. in diametro, receptaculis a margine ¼mm. remotis, indusiis generaliter obsoletis rarius late orbicularibus cordatis.

HAB. Randaisan, leg. U. MORI, 1908, Aug. (No. 7134).

**Dryopteris** (*Eudryopteris*) **Eodamai** HAYATA sp. nov. (Fig. 97). Bliizoma? Stipes 14 cm. loagus tereto-complanatus basi dense squamifer, squamis inferioribus maximis 1£ cm. longis 2 mm. latis linearibus acuminatis, siu\*sum glabratus. Frons triangularis vel late pentagons 15 cm. longa totiusquo lata vel latior apice triangiilari-acuta basi latissima bi-tri-pinnata, pinnis suboppositis (pinnis inferioribus bipinnatis, pinnis superioribus pinnatis), pinnis infimis longissimis 10 cm. longis bipinnatis vel bipartitis petiolatis, (petiolis 1 cm. longis), partibus inferioribus (vel pinnulis infimis) cum superioribus SBquiloqgis vel brevioribus 8 cm. longis lanceolatis pinnatis, pinnulis lanceolatis inferioribus 1 } cm. longis 5 mm. latis apice obtusis basi cuneatis basidbadnatis sessilibus margine duplicato-serratis, serris aristatis; frons a medio sursum sorifera; sori utroque latere pinnularum 1-seriatim siti; pinnis inferioribus a se 2-3 cm. remotis angulo 45° a racliibus fiondium divaricatis, pinnulis in-

ferioribus primariis vel secundariis inferioribus a se 5 mm. remotis a rhachibus angulo  $60^\circ$  egressis; textura herbaceo\* coriacea. Costulae pinulamm supra canaliculata utroque latere canaliculorum interrupta costulato. Sori valde elevati globosi. Indusium eordate globosum 1mm. in diametro.

HAD. In monte Taiton, ad 1200 metra alt., leg. IT. FADHEE, 1903, mai. •

Jifjin. irku, l)l« for tins very much elevated sori.

*Dryopteris (Ctenitis) kusukusensis* HAYATA sp. nov. (Fig. 98). Rhizoma? Stipulae rhachibus costis utriusque totis castaneo-hibiscens sub minute pubescens, pilis pluriocellariis, 30 cm. longus basi dense sursum parce squamata,

squamis linearilanceolatis 5-8 mm. longis 1-2 mm. latis. Frondis ovato-lanceolata 45 cm. longa 22 cm. lata apice acuminata basi in umbro cordata innata vel infima bipinnatifida, pinnae inferioribus lanceolatis suboppositis a se 5 cm. remotis a rhachibus frondium angulo  $80^\circ-70^\circ$  divaricatis,



Fig. 97, *Dryopteris Kodamtd* H. «AT».





Fig. 98, *Dryopteris l-m-jciisew'ui* HATATA; n, the plant; b, n scar on the stipe; c, apical portion of a pinna; d, o, sori on the frond.

pinnis infimis obliquis vol semi-triangn-laiibas 11cm.longis basi latissimis 9 cm. latis lateie superiore 1-2 cm. Litis lafcere inferioris 7 em. latis bnsi ad oostam pinuatiBdis, pinnulis vel sdgmentis infimis (latere inferiore) lougissimis lineari-lancwolatis 7|-cm. longis 18 mm.



latis apioe acumi-natis basi ± confcractis a se 1^ cm. remotis a costa angiiilo 50° egres-sis, nmrgine regiilariter ln hulatis, lobulis oblongo-rectaii gulai-ibus apice obtusisaimis basi latissimis 6 mm. lougis 4.mm. latis; textura heibacea. Frous medio sursum sorifera. In-dusium rotunda to-cordatnin.

ILut. Kii3ukuau, Juli., 1912, leg. B. HAYATA et S. SASAKI.

Very near *D. m < m-branoidex* HAYATA, but

differs only by tba thicker herbaceous texture.

*Dryopteris {Oycfoeonu} lsevifrons* HAYATA sp. nov. (Fig. 99). Khi/.nna? Stipes 70 cm. **bn**gaa basi circ. 1 cm. *iu* diametro squamis parcissimr iustmctns lwvis stramineus, (squamis linearibus circ. 1 cm. longis), **naem** iiniis roductis auriculifomiibus 2-4 instructus, aiuricnlis triangnlaribus lobulatis 1 cm. longis 1 cm. latis basi nun aduatis sessilibus apico obtusis vel rotundntis a so 5 cm. remotis. Finns 90 an. looga 25 cm. lata fn ambitu lauceoluUi apk'« Icotge acumiuatissimu VKLS :icuta pinnata, pinnis sul<ilt\*>rnatia limaribus, inferioribus

longissimis infimia paullo brevioribus, superioribus gradatim brevioribus versus apicem gradatim ad lobam pinnæ terminalis abeuntibus; pinna terminali lineari lateralibus conformi pinnis mediis sequilonga, pinnis mediis linearibus 17 cm. longis 12 mm. latis apice acuminatis basi sessilibus vel brevissime petiolatis margine truncato-dentatis vel lobulatis, (dentibus inferioribus quadrangulis truncatis latis 1 mm. longis latere inferiori 2 mm. longis apice truncatis medio centro emarginatis interdum versus latus superius acutis, dentibus superioribus fere acutis (dentibus medio-dentatis), apice ad acumen subintegris. Testura membranacea, pagina glaberrima vel supra ad costam pinnæ paucissime hirsuta, costis supra elevatis tenuiter sulcatis subtus elevatis, costulis venis venulisque utraque jagine tenuiter distinctis elevatis, pinnis a rachibus frondium, et costulis a costis pinnae in angulo 60° egressis, pinnis inferioribus a se 3 em. remotis, pinnis cum rachibus frondium articulis in unum solutis. Sori utroque latere costæ dentium 1-2 vel 1-seriatim dispositi utroque latere costæ pinnae 1-seriatim dispositi. **Eadem** reniforme.

HAB. Kūahūn, Kuraii, leg.

B. HAYATA, Juli., 1912.

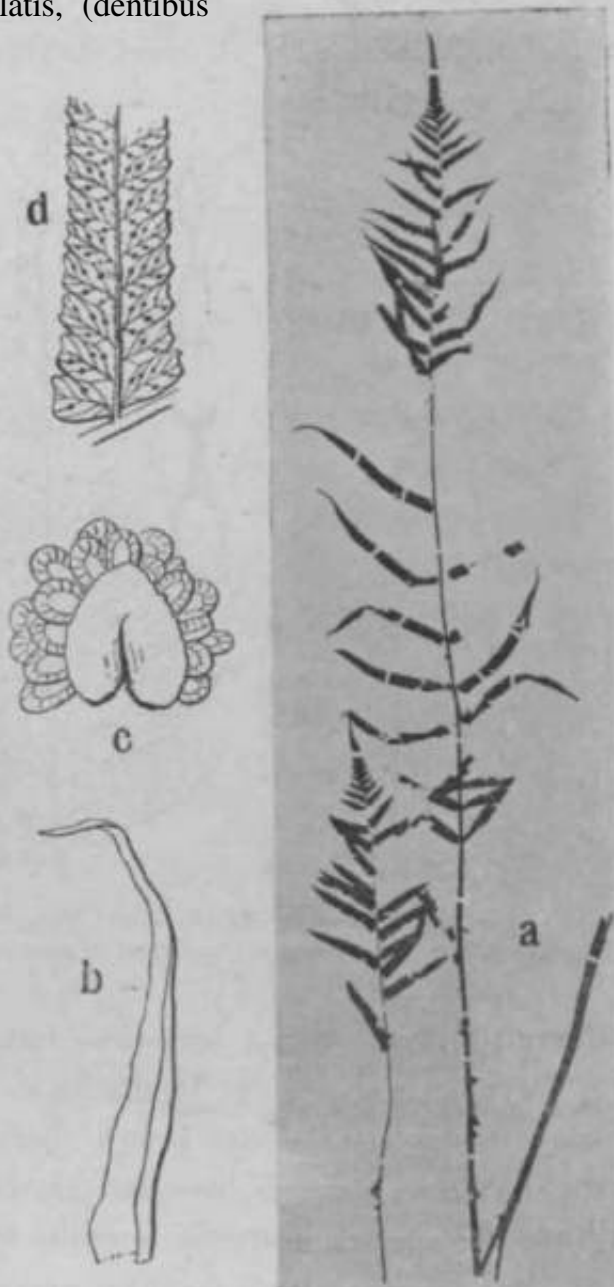


Fig. 99, *Polypodium (Vyclosorus) lanatum* H. Y. U.; a, (Ito plant); b, a scale on the stipe; c, A sori; d, (1, portion of a pinna).

Near *D. truncata* O. KTZE., but differs from it by the much more smooth stipes and much more truncate lobes of the pinnae. Also near *Nephrodium usowianum* (BEDD. Fern. Brit. Ind. t. 130), but differs from it by the less divided or lobed pinnae and far much smaller form of the fronds. It bears some resemblance to *Neph. extensum* BLUME var. *minor* (BEDD. Fern. Brit. Ind. t. 201), but distinguishable from it by the truncately lobed pinnae.

*Dryopteris (Evdryopteria) thysanocarpa* HAYATA (Fig. 100)—*Alky-Hum*

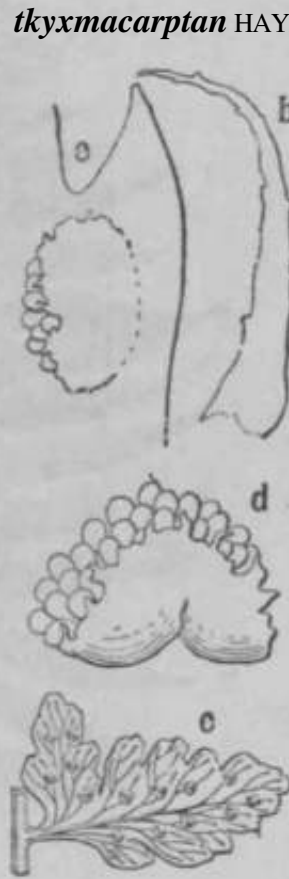


Fig. 100, *Dryopteris thysanocarpa* HAYATA; a, the plant; b, a scale on the stipe; c, a portion of the pinna; d, another sorus to be found at the base of the frond.

Stipes 13 cm. longus tenuissimus basi dense medio parce squamatus sursum glabratus, squamis lanceolatis linearibus 2-3 mm. longis acuminatis margine integra vel  $\pm$  serratis. Frons lanceolata 16 cm. longa 37 mm. lata apice acuminata **euna inferne** soquilata basi truncata pinnata., **pinnae** mediis longissimis 2 cm. longis oblique triangularibus 1 cm. latis latere superiore quam **latee** inferiore latioribus apice obtusissimis basi truncatis petiolatis (petiolis 2 mm. longis) margine interne inciso-lobulatis superne dentato-lobulatis, lobis inferioribus oblongis 7 mm. longis 4 mm. latis apice truncatis margine repandis basi cuneatis; pinnis inferioribus a rachibus frondis in angulo interno, sinu (in sinu angulo 80° divaricatis, **lobis** inferioribus pinnarum mediarum a costa pinnae angulo recto divaricatis, pinnis inferioribus a se 12 mm. remotis, pinnis inferioribus  $\pm$  desuper reflexis. Textura **herbacea**, rachis frondis recta. Sori utroque latere pinnae uniseriatim sicut utroque latere loborum pinnularum uniseriatim siti elevato-globosi in hinc quam 1 mm. in diametro. Indusium laciniforme **tel** rotundatum margine finibrato-denticulatum.

HAB. BiOritsn: Rukujodiisan, leg. U. MOEI, 1908, Oct.

The fronds are exactly like those of *Micrriepia WSfordii* MOOBE or *M. rJtom-boidca* (HOOK. 2nd Cent. Fern. t. 48), but the fructification is undoubtedly that of *Dry&pieris*. IndusUim is generally cordate or sometimes oblong, attaching to the fronds by one side and tends to be like that of *Athyrimm*. It is especially a" towards the apes of the fronds.

Near *Cpztajpleris Drm-gUmi* (HOOK. IC. PL t. 955) and *Oystopteria !•wmcmoa* (HOOK. IC. PL. t. 955), but differs from them by the petiolato mom deeply lobed or pinuatifid pinnsB.

**Dryopteris** (AV *dryopteris lepidopodja* HAYATA Bp. nov. (Fig. 101). Eliizoma? Stipes 23 cm. longus cum rhacliibiis densissime squamatus, sijuaniis lineari-lanceolatis 7 mm. longisl-2mm.liitis jipiee longo acuminatis basi litimidittis liemote ciUulatis vel aubintegria. Fi^ns quum stipit\* nralto longior 50 cm. longfi 23 cm. latii ovato-lunceaolnta pinnato pin-nis mediis lon; simis linear\* - lauceolnfcis 13 cm. longLS D8BI liltas-

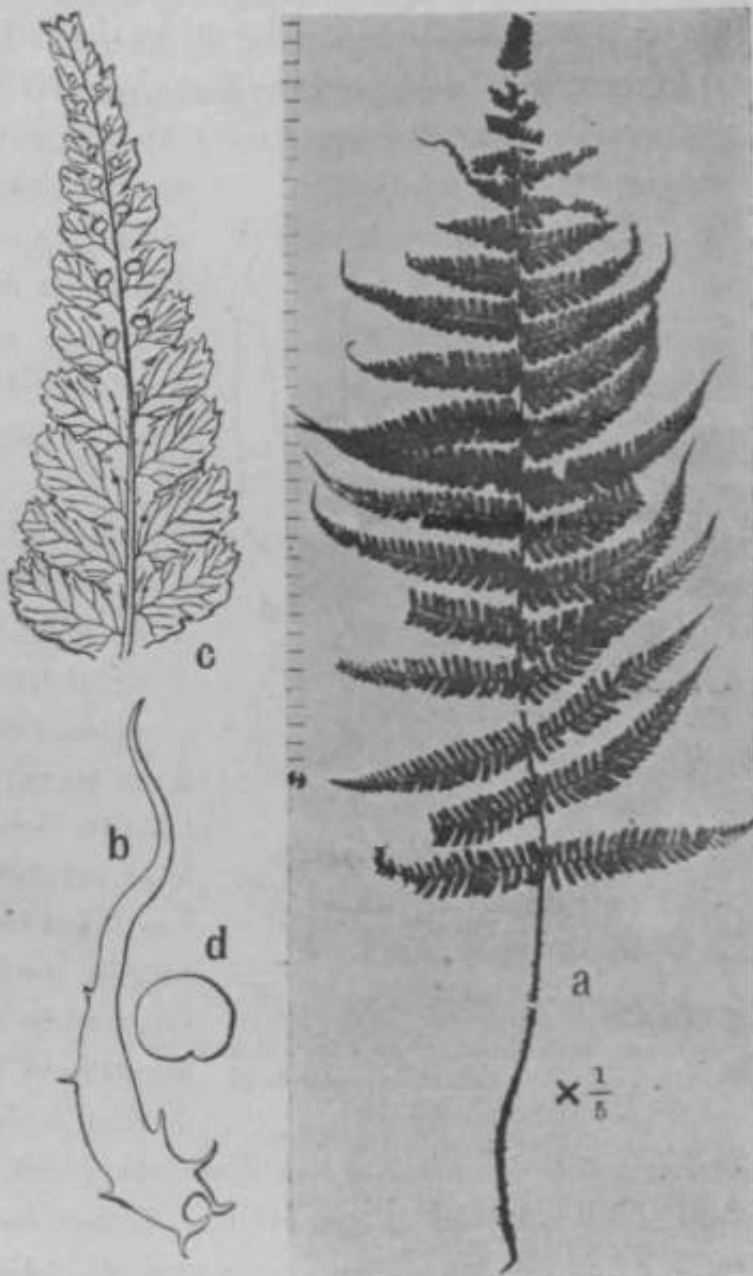


Fig. 101. *DnMphrU lepSdapoda* HAVATA; ii,"the plant; b, a scale on the rachis of the frond; c, a scale on the pinna; d, no indutrium.

si in is -2^ cm. Utis fenmeatis sessilibns a so 2£ cm. reinotis augulo recto divari-  
catis pinnatim fidis inferiore ad rhachiu fidis superiore prope rliacbin fidis-  
segninntis mforiorilms nx'taugularibus 13mm. longis 5 mm. latis apice siibtrun-  
catis vtl nitimilatis **marine** remote obscreque semilatis VHI subintegi'is apieo  
denticulatis ; frons chartaeca, costii pinnaram supra  
subplmia subtus olevata, venis et vemilis supra non  
elevatis vix visis subtus castaneo-coloratis tonuis-  
simis distincte visis. Sori utroque latere costulse  
segmentomni 1-seriatim dispositi.

HAH- Arisan, leg. B. HAYATA et S. SASAKI,  
Jan., 1912.

Near *D. pachyphylla* HAYATA, but differs from it  
by the thinner, less black  
and less ciliated scales on  
the rachis, and by the  
thinner fronds.

*Dryopteris (Eudry-  
opteris) leptorhachia* HAYA-  
TA sp. nov. (Fig. 102).  
Rhizoma erecto-ascendens.  
Stipos cum rhachibus nitidus  
castaneus vel castaneo-rube-  
us 50 cm. longus inferioribus  
dense superioribus parca squa-  
matus, squamis inferioribus  
linearilanceolatis apice acu-  
miuatis 2 era. longis 2 ram.  
latis. Frons ovata 40-50 cm.  
longa 30-40 cm. lata bipin-  
nata, pinnis inferioribus

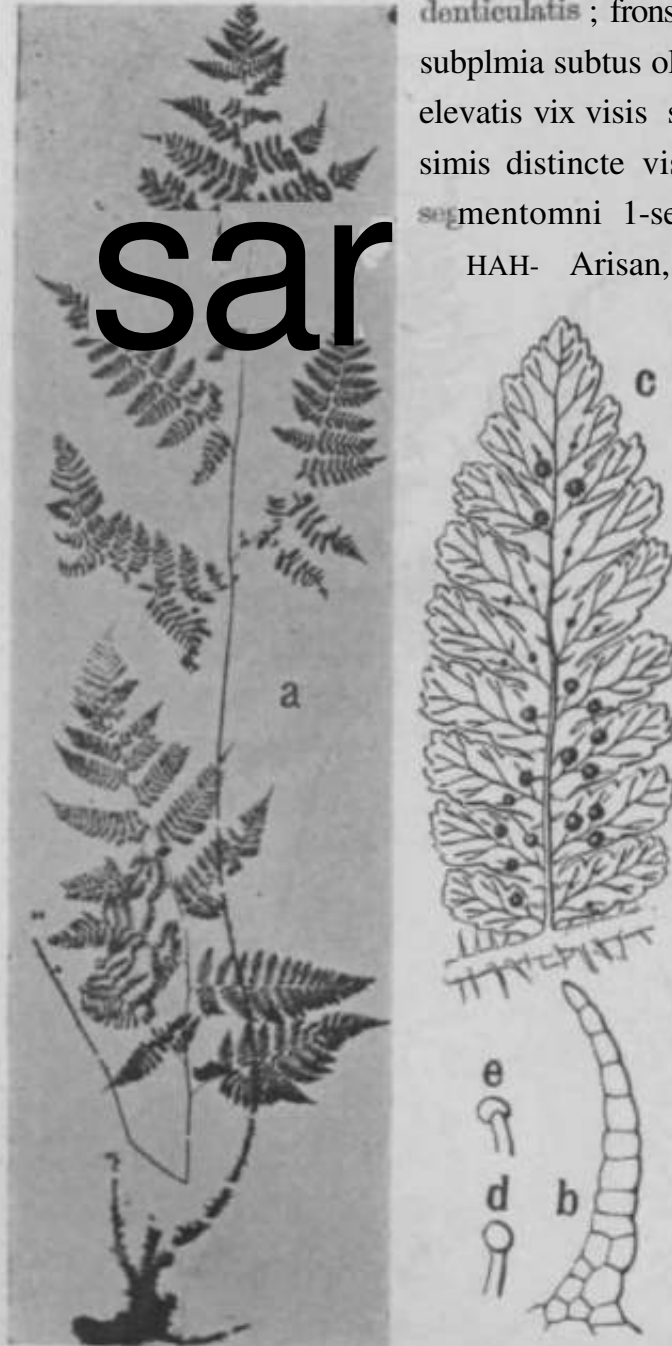


Fig. 102. *Dryopteris leptorhachia* HAYATA; a, the plant; b, magnified view of a pinnule; c, a pinnule or a segment of a pinnule; d, e, magnified views of sori on the pinnule.

egressis, inBmis ovato-oblongis 25 cm. longis 12 em. latis apioe aouminatis l>asi lotundntis petiolntis (potion's 2 era. longis) pinnafe, pinimlts nu\*liis longissirais a so 2 cm. remotis a costa pinnse angulo 50°-80° egressis Imiyiri-oblongis 6} em. longis 2\*2 mm. latis fipie« acumiinto-obtiisis lmsi tmncatis lirevo petfolnlatis ad costas pinnatifidis, segnientis lineari - oblongis 12 mm. longis 5 mm. latis apioe obtuso-iotimdati t^nsi contractis dectirrentibus lobulatis ad summum wsrnilatis, lobolia **1-2 mm. longis apioe ± sexrolatis.**

**Textoraherbaeoa** paginu pflisplmd- Ct'illulaiibus parcw dispevsa; oosbi pinmUarum supra eanaliculata, costulse utroquH latore canaliculoruni costaa sitie lamellatee; Tenis venulisque snbtus diptiucte visis. Son atl Liasin segmentornra Tel lobuloram segmentorum dispositi.

HAE. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Somewhat u(-iu\* *D. Matau-mwroe*, bat diftors from it by tin; seZTtilate IOIXJS of *Hm* pimniL'S.

***Dryopteris* {*Gteidia*} *leucostipes*** (IUKIU:) O. CH. (Fig. 103, A-B), IIAYATA iVInt<r. Fl. Funntis. p. 418.

t ILut. Keehmg.1  
DffIPBIB. liinkiu.

***Dryopteris* {*JSvdrffopteris*} *melanocarpa*** BWATA sp. now

(Fig. 104). Khizoina ereofam aaoadaoa. Stipes 30-40om.1oqgtn rabro-casfcanam lmsi sqnamafia, squjunis **inferkHriboB latiaaimis ampiRdoanlibas ovatifl 7 mm.**



Fig. 103-A//>rt/<>pfem *leucostipes* C. CH.;  
a, the plant



lougis 3-4 mm. latis apice acutis l<sub>1</sub>isi roundatis iu- tegris temiissimis stra- iiriueoeastaneis, sqiia- mis Baperiorl<sub>1</sub>bu<sub>1</sub> gradatim angustioribns. Fronsovata 34 cm. Iougn, 25 cm. lata apice acuminata basi in imibitu cordate bipimiata vel bipiunatiBda, pinnis suboppositis, infiriais longissimis 17 cm. longis versus apicem valde hil<-atia bastato-bipai-t.it<sub>1</sub>B, I.it<sub>1</sub>iis reliqnis triungiilari- laiirrtolatis fJcatia, pinuis iufimis 17 cm. loii<sub>1</sub>gis longissimis breve petio- hlis falcatia liastato-bi- partitiB, paztibna inFerori- bus lanceolatis 9-10 cm. longis 2i cm. latis apice acuminatis biisi tnmcatis snbsessilibne snperiore fnl<ritis pinimtifidis, seg- mentis in6mis ol rtougis

Fig. 103-B, *Dry- opteris leucostipes* O. CH.; b, a scale on the under snrfnee of a pinna; c, n hair on the frond; d, A portion of a pinna; e, a sotos; f, an in- dwi

1^ cm, lougis 6 mm. latis apice obtl<sub>1</sub>SSimts' basi cuneatis latern Infunore ad l'liaclun aecurrentil>us margine dnplicafcoserrulatis ; pinnis inferioribns a se 8cm.remotissuperioribuslan<eolati8acuminati8- sums. (aonminibtis linearibus BBirnlatis i u rhachibus



Fig. 104, *Dryopteris nietanorarpit* HAYATA; a, the plant; b, a nolle on the rhizome; c, o. portion of ft pinnule; d, A ROTUS, seen from nl>To; e, the anno. seen from beknr; f, nn iminium after dis- persion of spores.

condluni augnlo 70° divfU'icatis, piuuulis iuferioribus a se 2 cm, remotis, partabros piinro infiraa? retrorsum reflexis faleatis. Sori valde elevato-globosi; Judnsia reirifomu-cordata 1 mm. lain. TVxtmu herliaceo-mflmbranaoea.

HAB. A'isnn, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Near *D. Salad* in the outline of th« fronds and globose elevate sori; but differs froju it by the much more aceiuninate piuiise. This is still nearer to *D. sparsa* O. KUNTZE (*Neph-odium sparsum* DON), but distinguishable from it by the lowest pinnae with much longer pinnules.

***Dryopteris (Mvdryopterir) membranoides*** HAYATA sp. nov. (Fig. 105). Rluzoma erectiun. Stipos 30 cm. long«3 sqiwmatiis cum rhaehibus et costis pinuarm civstaneo-rubfiscuns breve pubescens, sfjuimis lizioari-buiecolatis 1 cm. longis 1-2 cm. latis atominatis- Froos orato-lancGolata 60 mi. laotga 30 cm. Lita infra medium latissima pinnata vel infima bipinnatifida, pinnis "feiiioilbos Hneiii - lanceolatis sessilibus a se 4 cm. ramotis a l'hacliibns frondium nugulo SO^OO^ egressis, infiinis oblique triangularibns vel SHmi-triatigularibus 14 cm. longis basi 11 cm. latis latere sujjej-oi-e 2 cm. latis latere inferiore 8 cm. latis basi ad cosfcam pinnatifidis, segmetitis infimis (latere



Fig. 105, *Dryopteris membranoides* HAYATA; n, Uiepknt; b, a BOOIO at the apex of tlio rhizomo; o, a hnr on the tmrtar side of the oosta of *n* pinnule; d, a portion of a pinna; a, an indiisitim.



inferiors) longissimis a costa *pinna angulo* 80° r<in:sis Imimdtii is 8 cm. longia medio 2£cm.latis basi dt eontractis **maigise** piiniatiin lobulfttis. lobnlis lineari-oblongis loigissimis l\$cm. longis 6 mm. **latis** tipico obtnsllssimis, shiibus inter lobnlos obfcusis, margine integris. **Texfarra** temiissimt! menibrarmcen, **pareissime** pnlescens, pilis plmit-ellulfrtibiis, venis vemilisque utmqe **pagine**

elei'atis tenuissirais distincte visis **BahfcoB** pilis disiwisis. Iutlnsiium corclatiun tenuissimran.

HAE. Unit: Rahiu), leg. K. MIYAKE, Oct., 1899.

Near *Last re a titelanopUB* (HOOK.) (BEDD. Peiu. Brit. Lul. t. 38), but diffei-sfrora tliat by **Hie** far more larger fmnds with bipin-natifid lowest pinna?; also noar *Dictyqoteri^ P\*nerifron>* (HOOK.) (BEDD. Fern. Iiiit. Ind. t. 4) :tml 7/r •.,•.,-mill mi• inliftutiftJrum l'KEst. t BEDD. Handb. Fern, **Brit.** Ind. p. 227, fig. n. 115), but differs from **the latter** by the **tooger** fronds witli **castaneous soolea**.

**Dryopteris** (*Judryopteris*) **morrisonensis** HWATA Mater. FL l'ormos. p. 4i")<l. *Dryopterit spiuvlosa* O. **KHSEB** vai\*. 7norrimn-easts HAYATA Matur. Fl. Formos. p. 4-22.

11 MI. Mont\*<sup>1</sup> MOITI'WHI, ad 12000 pod. iUt leg. T. **KAWAKAMI**

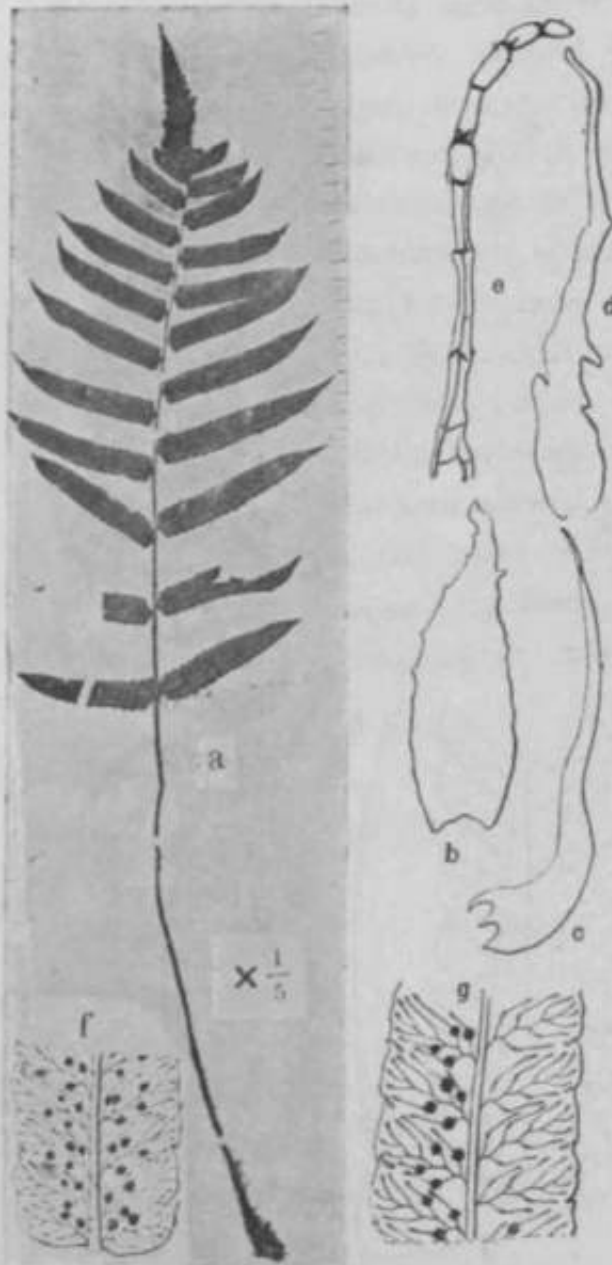


Fig. 106, *Dryopteris nigresquama* HAYATA; a, the

frond rlmli-Lin; i,u **Kale ana** >iium; o, « hair on n junrut; f, luisul ptaticm of ft pfanns; g, iBidSta porti" of Uio JUUHC \* & " ).



HAB. Mt. f Arisun: Fnnkiko, Jan., 1912, leg. B. HAYATA et S. SASAKI

Compared with a Japanese speciineii in the Tukyū herbarium. This f«rn is extremely variable in the size of the fronds,

**Dryopteris** (*Eudryopteris*) **pachyphylla** HAYATA sp. nov. (Fig- 108). Rbi-  
sgoma? Stipes 20cm. lonjjus sqnainatus  
straminetts, s qua mis lineari-lnnceolatis  
usque 7inm. longis usqnu 1 mm. latis longe  
aonmixtaias basi mtmidutis plus minus  
cordatis vel snbjjeltatis margine parce  
braveqie ciliolata. Frons lauctsolata stipite  
malto loiiigior 55 cm. loaga 24 cm. lata ajji  
cuspitlato-acuminata medio deorsmn r pi-  
bta basi phis minus angustior truncata  
pinnata, pinnis mce<sup>1</sup>^ longissimis a se 3  
cm. remotis suboppositia vel alternis augulo  
recto div:n-ifutis lieuri-luuctiohitis 15 cm.  
luu^is "2'i tniiii. luttis aploe acuminatis basi  
truncatis sessilibus latissimis pinnntiiiiiis  
veisus basin circ. ad rhachin fissis, sursuui

prop» rhachin fissis,  
s igmentis inferiori-  
bi is reotaugularibns  
14 mm. longis 5 mm.  
latis iipieo truncatis  
itpprximatis a coata  
pinnariuu angulo 80°  
divaricutis nuu'gino  
remoto miunteque



Fig. 108, *Dryopteris pachyphylla* HAYATA: a, the plant;

b, n seals on the fnuyl-rknchis; A, imHll portico of a pmnn;  
b, n sonw.

semilivtis apieu dentioulatis. Toxtura coriacoa pngina supra glabia nitida  
subtus paQidiox glabra, rhachifcus deushigculo squamiitis, costis primal iis  
supra camdieniata, subtus elevatis s\*nunnis dispoaitis, costulis venisque



lulailis infimis 3 mm. longis 2£mm. latis obliqu« obkmgis apice 2-3 aristato-serris instiuctis. Frons a medio stirsura sorifera; pinnae inferiores a rhaehibus frondium angulo 50? egressis, pinnis a se 7 cm. remotis, piunnlis ordinis primarii inferioribus a se 2£ cm. remotis, pinnulis ordinis secundarii infiii-ioribus a se 8 mm. remotis; testura herbaeo-



oriacea tenuis, costls pinnule supni tomiitor  
ounnliculatis subtus  
olevatis, venis non visis;  
pagine supra glabra sub-  
tus pilis brevissimis  
parcissime obtecta. Sori  
• utroque latente costw pinmi-  
lariun l-seriatimdisjwsiti.

HAB. Mt. Axusan :  
inter Funkiko et Taroytu,  
ad C000 ped. alt., leg. II.  
BATATA et S. SASAKI,  
11H2, Jan.

Somowlmt near *Nep/t.*  
*mxdena* «II»K. Sp. Fil. t.  
365); but differs from it  
Iv tlic scaly but not  
viQose stipus and utuvrly  
g^ftbrotw frouils.

*Dryopteris* (Ifi *nis-*  
*cium*) *prolifera* C. OB.  
(Fig. 110)Ind. p. 286. *Poly-*  
*podium proli/erum* l/t\:\:  
Ex. Ferii. Yui. 11. t. ia

Fig. HO, *Isryopi*, (*Mcniscium*) *prolif.* ••m C. d.; *Mcniscium proli/era* =  
n, the plant; b, a ecale on Uws rhi7tici>; c, a pmni. rt . . .  
*Gontoptcrta prolij\*r<<*  
(PRESL.) BEDP. Fem. **SonthtInd.** t. 17-J i liuidb. **Fern.** Brit. Ind. p. 2%  
fig. 153.

**HAB.** Satō, log. H. ISABA, Jnl., 1911; Holism, leg. T. SoMA, 1911, Juli; Chikutoki, seus fossas crescens, leg. B. HAYATA et TAKEO ITO, Hart., 19H.

**Dryopteris** (*Evdryopteris*) **pseud osielioldii** HAYATA sp. nov. (Fig. 111).  
Rhizoma? Stipes 35 cm. longus validity basi plus minus dilatatis minute muricato-puucbitns basi dense squamatis sursmn glnbratiis, sqnamis teniibus bwicoolatis ovatis usque 2 cm. longis 3-5 mm. Litis apice iiliforme acuminatis tenuissima. Frons 40 cm. longa 30 cm. lata ovata apico in ambitu cuspidata *bnsi* in ambitu obtusji, pinnata, prnnis totis reqiifannibus sequi-longis, pinoa terminali lineari-lanceolata circ. 20 cm. longa 28 imn.lata apice acniui-

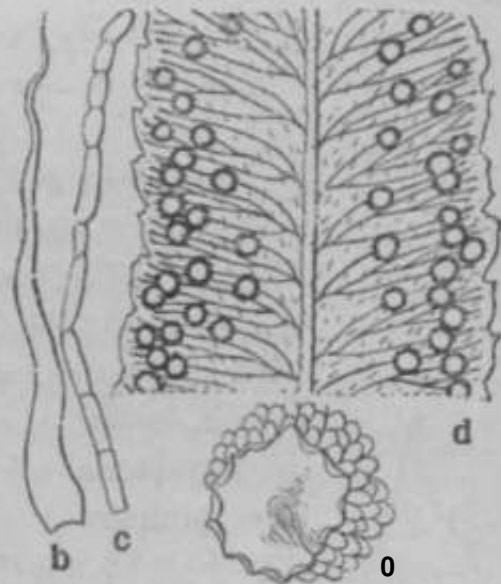


Fig. 111, *Dryopteris pseud osielioldii* HAYATA; a, the **pkst**; b, 4l aciile oo the stipe; c, a Lfiir on the lower surface of A pinnn; d, portion of a pinna; «, a eonis.

**nata** (iiciimiie linenri aerniljito) basi obtnsa margine tenuiter lobulata, lolmlis inferioribus 3 mm. longis 6 mm. latis rotundatis subht)ii7x>ntaliter sitis superioribus ad eronam reductis, sursum mai^gino sen-tdato-denticnlata, pinnis jiiixta tenninalem panllo minoribns, pinnis inferioribiis terminali æquilongis

margine crenulato-lobulatis, lobis minoribus serrulato-denticulatis, denticulis acutis; pinnis inferioribus a se 5 cm. remotis a rhachibus frondium angulo 60° egressis; pinnis lateralibus utroque latere rhachis 6 suboppositis, costis pinnarum supra leviter impressis subtus elevatis, venis lateralibus angulo 80° a costa egressis a basi ramosis a se 5 mm. remotis supra et subtus non elevatis tenuissimis distinctis; pagina coriacea supra glabra subtus plus minus pilis pluricellularibus parce dispersa a margine usque ad medium utriusque lateris costae sorifera supra viridissima subtus pallidior. Sori globosi 1½ mm. in diametro. Indusium cordatum margine undulatum sed integrum.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Very near *D. Sieboldii*, but differs from it by the arrangement of sori which are scattered towards the margin, but not along the costa. It is still nearer to *D. podophylla* (Nat. Pfl.-fam. Pterid. p. 169 fig. 91, C et A), but distinguishable from it by the acutely serrulate margin of the fronds, by the subentire indusium and in the venation.

**Dryopteris** (*Eudryopteris*) **quadripinnata** HAYATA n. n. (Fig. 112). *Micrlepia quadripinnata* HAYATA Mater. EL Formos. p. 434. Stipites 28 cm. longi basi pilosissimi (pilis crispatis depressis densis) etiamque basi squamati, squamis nigricantibus lanceolatis 4 mm. longis 1½ mm. latis apice cuspidatis basi rotundatis extus glabris sub lente intus dense pilosis vel glabris, basi fuscentes a medio sursum stramineo-flavescentes subnitidi supra sulcati subteretes. Frondes late rhomboideo-triangularis 32 cm. longae 40 cm. latae apice acuta vel acuminate basi acuta vel obtuse hirsute herbaceae, partibus infimis quadri-pinnatis, inferioribus tri-pinnatis, superioribus bi-pinnatis, sursum simpliciter pinnatis, pinnis utroque latere rhachis frondis circ. 18 plus minus alternis, inferioribus circ. 6-7 cm. a se remotis subrectis apice ascendente-recurvatis a rhachibus angulo 60° divaricatis, pinnis infimis late triangularibus oppositis 22 cm. longis 20 cm. latis latere inferiore latioribus 12 cm. latis petiolatis (petiolis 2-3 cm. longis), pinnulis I. utroque latere 16 inferioribus 4 cm. a se remotis, infimis elongato-triangularibus 13 cm. longis 6 cm. latis apice acuminatis petiolulatis (petiolulis 1 cm. longis) remote pinnatis; pinnulis II. utroque latere 5, inferioribus a se 1-2 cm. remotis, infimis longissimis triangulari-lanceolatis 4 cm. longis 2 cm. latis remote pinnatis; pinnulis

HI. utroqum latere 6, inferioribus a se 7 ram. remotis, oblique ovatis apice obtusis basi oblique cuneatis subsessilibus 1 cm. longis 8 mm. latis etiamque pumatis vel pinnatifidis, segmentis inferioribus obliquis obovatis apice obtusis basi cuneato-attenuatis 4 mm. longis 2 mm. latis paucidentatis, (dentibus utroque lateie 2-3), segmentis superioribus obovatis obliquis subunilatei-alibus dentatis vel integris; rhachis frondum oomplanate semi-teretes supra salcatfl ad utrimque latus sulcorum dense liirsutso caetemm glabrae subtus oonvexo glabrse stramineso; rbacbes pinnarum supra levitor snlcato vel elevatse snismu sribflatse supra dense liirsutso scbtus glabree; rJiaches pinnularum I. IT-et m. coraplanatso supm densissimo hirtellae Biibtos glabrro, venisetvonulis utrinque hirsutis; pagiuo seais venas et venulas utraque hirautsB, vonulis upico furcata, ramis supei-ioribus brevioribus apice soriferis, ramis inferioribus loDgioribus non soriferis, interdum vemilis ainplicibus soriferis vel sterilibus, ramia prope apicem evaneseentibus. Sori sub quoque dente segmentorum vel vonularuin Ht. singult ab apiee dentum ^-1 mm. remoti ad apicem ramorum venularum terminales. Iudusiun late cordatum i mm. latum margine, ciliatum.



Fig. 112, *JnJopteris quadripirtmht* HAYATA; b, a scale on the rhizome; c, unicellular hair on the upper wits of a costn of n pinnule; d, A pinnule; e, nti indusium.



HAB. Kan to: Mushazan, leg. T. KAWAKAMI et U. MORI, 1906, Ang. (No. 2390); Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Very near *D. (Aspidium) Miqdiama* C. CH., but differs from it by the ciliate indusium.

*Dryopteris (Eudryopteris) reflexipinna* HAYATA sp. nov. (Fig. 113)



Fig. 113, *Dryopteris reflexipinna* HAYATA; a, the plant; b, portion of a pinnule; c, a sorus.

*Miqdiama*? Stipes erectus 40 cm. longus glaber esquamatus stramineus rectus. Fronds erecta triangularis 30 un. longa latior quam longa circ. 40 cm. lata

apice in ambitu abrupte acuminata basi latissima quadripinnata, pinnis utroque latere 8-9, infimis longissimis superioribus gradatim brevioribus ad apicem ad dentem pinnae terminalis reductis, inferioribus a se 5 cm. remotis, infimis 18 cm. longis triangularibus 10 cm. latis basi latere inferiore 7 cm. latis latere superiore 4 cm. latis apice acuminatissimis (acumine lineari) basi petiolatis (petiolis 2-3 cm. longis) pinnulis ordinis primarii infimis (latere inferiore) 8 cm. longis lanceolatis falcato-ascendenti-recurvis basi latissimis 3½ cm. latis apice acuminatissimis sub-eequilateralibus breve petiolulatis, pinnulis ordinis secundarii infimis (latere inferiore) oblique triangularibus 2 cm. longis 1½ cm. latis apice obtusissimis basi subtruncatis breve petiolulatis; pinnulis ordinis tertii infimis (latere inferiore) oblique obovatis 1½ cm. longis 4 mm. latis apice rotundato-obtusis basi cuneatis subsessilibus subunilateralibus 1-2-lobatis, lobis 2 mm. longis totiusque latis obtusissimis; pinnulis ordinis tertii infimis lateris superioris latioribus majoribus quam iis lateris inferioris. Rhachis frondis glaberrima valde flexuosa, rhachis pinnarum minus flexuosa sursum subalata complanata, rliacliis pinnularum subrecta complanata subalata; pinnis inferioribus a se 6 cm. remotis, pinnulis ordinis primarii inferioribus a se 2 cm. remotis, pinnulis ordinis secundarii inferioribus a se 1 cm. remotis, pinnulis ordinis tertii inferioribus a se 5 cm. remotis, pinnis infimis a rliachibus frondium angulo 140°, pinnis superioribus angulo 90° divaricatis, pinnulis a rliachibus pinnarum angulo obtuso vel angulo recto divaricatis, pinnulis ordinis secundarii a rhacliibus pinnularum ordinis primarii angulo 70° vel plus acuto divaricatis; frons textura tenuiter herbacea viridis, costis venis venulis supra obscure subtus distincte visis tenuissimis.

HAB. Rinkiho, leg. H. IN ABA, Oct. 1911; Mt. Arisan; Heisliana, ad 7000 ped. alt., leg. B. HAYATA et TAKEO ITŌ, Mart., 1914.

When I first examined a herbarium specimen of this fern, I thought that it might have been a fern of scandent or pendulous habit, as the pinnae and pinnule are always turning backwards and the rhachis is very flexuose. In my last excursion to the island, I found the fern, quite contrary to my expectation, standing erect or nearly so on the ground. It is very rare; I could find the fern but once in my journey through the mountains. Somewhat allied to *D. Maximowiczii* in its habit, sori and size, but greatly differs

from it by the reflexed pinnae and quite obtuse apex of the lobes. Also resembles *Lash-eci midvlata* (THWAITES) (BEDD. Fern. South Ind. t. 271), but distinguishable from it by the less flexuose quite glabrous rachis and stipes. The ramification of the fern is somewhat similar to that of *Gymnofimm'iic anfractuosa* CHBIST (Farnkmnter der Erde p. 73, fig-187).

**Dryopteris (Eudiyopteris) reflexosquamata** HAYATA sp. DOT. (Kg. 114). Khizoma? Stipes 20-30 cm. longis deuse squamatis, squamis reiiexis lanceolato-ovatis 9 mm- longis 2ℓ nun. latis apice acuminatissimis margins remote brevissimeque aetoso-cih'atis. Frons oblonga vel oblongo-lauceolnt-i



Fig. 114, *Dryopteris reflexosquamata* HAYATA; n, the plant; b, a uctile of the stipe; o, n pinnule.

35-40 cm. longa medio latis-  
sima 20 cm. lata apice  
triangulari-acuta vel breve  
eufpidata basi rotundafci  
bipinnata yel bipiniuitifida,  
pinnis » inferioribns a se  
4 cm. remotis angulo 45° a  
rliachibus clivaicatis, pinnis  
longissimis lanceo-  
latis 12 cm. longia ojcni.  
latis apice euspidato-acumi-  
natLs basi plus minus con-  
tirt is pinnatis, pinnulis  
inferioribns a se 6 mm.  
nemotis a rliaclihns angulo  
8QP-9QP divaricatis lineari-  
lftnceolatis, mmliis longis-  
simis 18 mm. longis basi  
latissimis 5-0 mm. latis apice  
obtusis busi alntipte cunea-  
tis sessilibiis a se 7 mm.  
remotis margine duplicato-  
seTIUntis, semilis obtusis

1½ mm. longis totinsque latis apice et margins serrulis setosis 2-3 instructis. Textura tenuiter coriacea, rhaeliibus frondium rectis dense squamatis; costis pirsto supra profunde sulcatis supra glabris. Bubs parce squamatis, squaroislinearibiisinutis, (xwtulis et venis vennlis supra impressis snbtus ± elevatis; pagina supra glabra subtus minute parce sqnmata. Sori utroqio latere costse 1-seriatiin dispositi.

HAB. Arisan, ad 8000 **pod.**  
»It., leg. B. ILVYATA et S. SASAKI,  
Jan. 1912.

Somewliat rt!Stimbl«s *Nvph.*  
*Falcmeri* HOOK. Sp. Fil. t. 256,  
but difiera from i\* by the far  
less scaly fronds.

*Dryopteris (Pfafopteris) re-*  
*motu* HAYATA (Fig. 115) Mater  
Fl. Formos. p. 421. Stipites  
temies 18 cm. longi 1mm. in dia-  
metro glabri nitentos snbteretes.  
supra profunde sitlcati straminei.  
Fronde stipite bi"evlores ambitu  
triangiilares apice acuminatse basi j  
Latissiniiv 12 cm. longee a I cisf 16  
cm. latso apiee pinnata medio bi-  
pinnatse infime tiipinnabo, piniis ~  
ntimotissime oppositis, a rhacln—  
*Im*s angulo 70° diTaricatis, in-fc\  
ferioribus 3 cm. a ae remotis,  
infimis longisaimis a basi sursum



Fig. 115, *Dryopteris remota* HAYATA; a, the plant; b, a scale on the rhizome; c, a pinnule.

infirmis elongato-triangularibus 8 cm. longis a basi 3 J. cm. latis petiolatis (portion's 13 mm. longis) obliquis latere inferiori quain latere superiore latioribus, pinnulis inferioribus pinnatis a se circ. 1 cm. remotis superioribus pinnatifidis versus summum lobulatis, pinnula inferioribus latere inferiore pinnarum 23 mm.



Fig. 116, *Dryopteris imrayana* (H. B. K.) V. S. P., the plant; b, a scale on the stem; c, a portion of a pinna.

longis 1 cm. latis sessilibus inferioribus pinnatis **media** pinnatifidis sursum lobulatis, (segmentis inferioribus angustato-quadrangularibus 6 mm. longis 1.5 mm. latis a pice obtusis basi pinnatis minus contractis vel ad rachin adnatis divaricatis margine nondum latius integris, undis utroque latere 3-4). Rachis frondium semitarsata glaberrima tenuissimeo supra sulcata subtus convexa; rachis pinnarum supra **§ 8** **^** **^** sulcata glaberrima; venulae centuriatis

segmentorum infimorum et venulis floxiosis, venulis simplicibus ad sinus undarum attingentibus utrumque planis sed distinctis glabris; pagina membranacea utraque glabra. Sori globoi circ. 5 mm. in diametro ad quasque venulas dorsaliter siti utroque latera venarum 1-seriatim 3-4 dispositi; receptaculum prope apicem venarum lineare. Indusium non visum Terisimiliter obaetiim.

HlvB. In monte Morrison, leg. G. NAKAHABA, 1905, Oct.; Arisan, leg. 13. HAYATA et S. SASAKI, Jan. 1912.

Near *Nepkrodium Dryopteris*, but differs from it in the arrangement of the pinna.

*Dryopteris* (*EudryopSerie*) serrato-dentate. (BEDD.) HAYATA n. (Fig. 116), *Dryopteris Filixmas* TOT. serrato-dentata BEDD.; HAYATA Mater. JFl. Fonuts. p. 416. *Lastrea odonidomi* MOORE BEDD. Humlb, Fern. Brit. Ind. flg. 128.

HAB. In monte ST'jmao'J, ad 11000 ped. alt.

This is quite different with the former as *D. Filixmas* var. *serrato-dentata* BEDD. in the herbarium at Kew. This form, however, is widely different from *B. Filixmas* in many points. It should be regarded as a specifically different form.

*Dryopteris* (*Leptogramma*) *squamaeformis* C. CH. (Fig. 117) Ind. p. 294. *Phegopteris auriculoides* BEDD. Hundb. Fer. Brit. Ind. p. 290 t. n. 149. *Pedipodium auriculoides* (WALL.) BEDD. Fer. Brit. Ind. t. 203.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

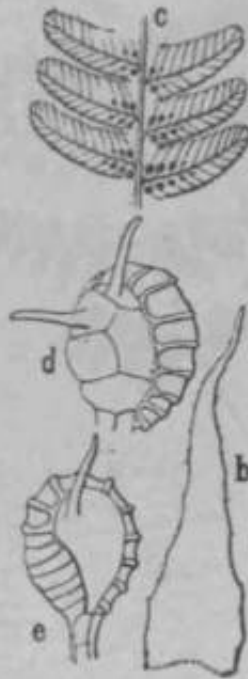


Fig. 117, *Dryopteris* (*Xeptognimifl*) *squamoides* C. Ch.; n, the plant; b, n, scale on the stipe; c, a portion of a pinna; d, e, sporangia.

**Dryopteris (Cydosorm) sophoroides** O. KTZE. form, **ensipinna**, (Fig. 118).

HAB. Botansha, leg. K. MRYAKE, Jan. 1900.

This looks different from *B. sopJioroidcs*, but the venation, sori and

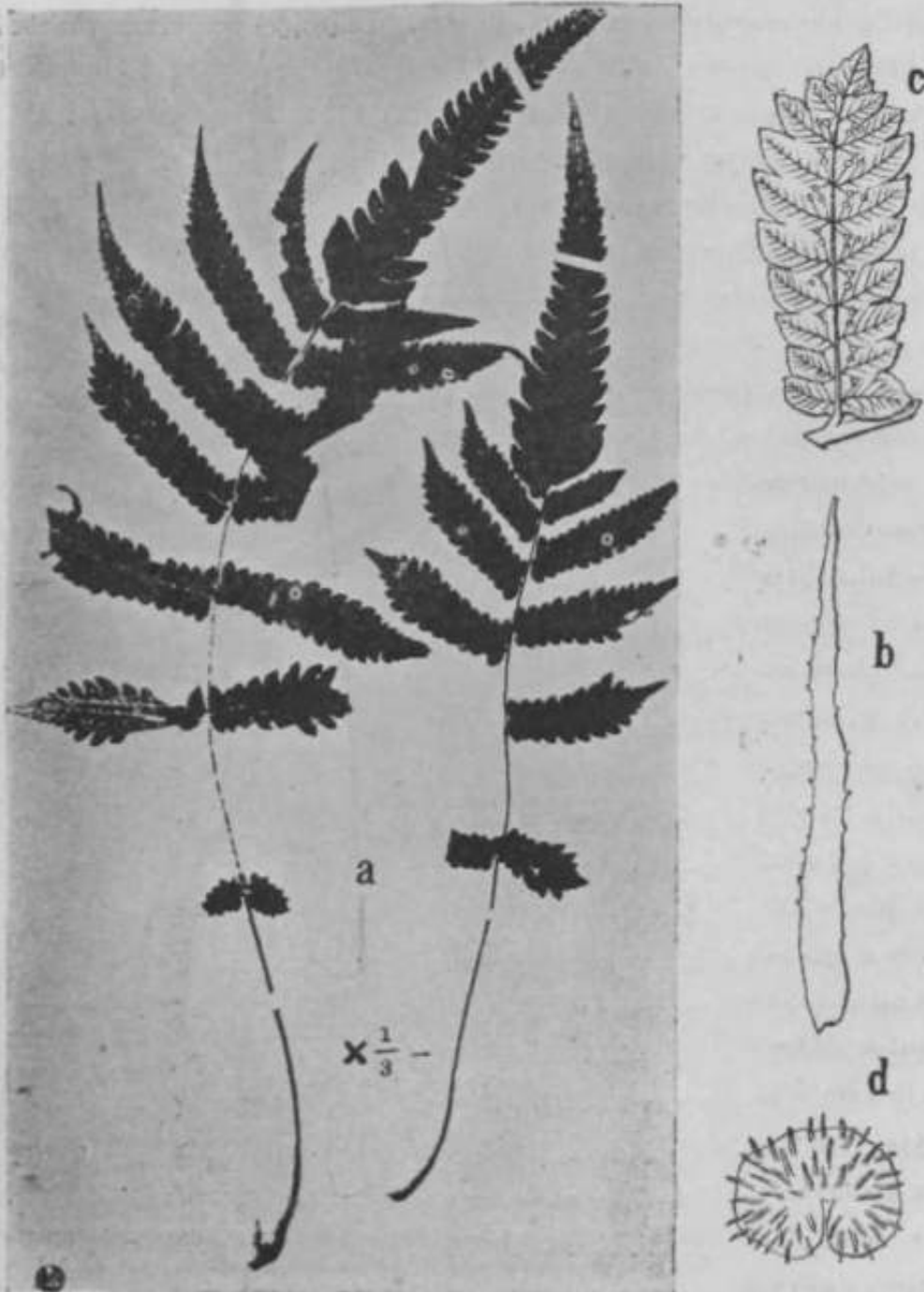


Fig. 118. *Dryopteris* (Cydosorm) *sophoroides* O. KTZE.; a, the plant; b, the base of the stipe; c, the pinna; d, the sori.

scales are all very similar to those of the species, from which this may not be regarded as a distinct species nor even as a variety.

**Dryopteris (Eudnjopteris) subdecipiens** HAYATA sp. nov. (Fig. 119).

Rhizoma subrectum apice dense squamatum, squamis ovato-lanceolatis nigris nitidis apice linear-acuminatis plus 2 cm. longis 5 mm. latis. Stipes 30 cm. longus basi dense sursum parce squamatus, squamis inferioribus vel mediis linearibus 8 mm. longis basi 1 mm. latis subcordatis margine serratis basi parce fimbriatis. Frons ovata 45 cm. longa 10 cm. lata apice cuspidata basi rotundata pinata, pinnae mediis longissimis linearilanceolatis 11 cm. longis 3 cm. latis apice acuminatissimis basi lato mucronatis sessilibus margine

complanatis lobulatis sursum ad apicem serratis, lobulis rotundatis ascendentibus 5 mm. longis 7 mm. latis 1 at ere s 11 ] *teawte* 1-2-mucronatis, pinnae subopposita rachibus angulo 80° (Kvarieatis, inferioribus 3-4 cm. a se remotis versus apicem ± *falpatis*, costis supra impressis subfuscis

elevatis, venis lateralibus a  $S_3$  circ. 6 mm. remotis a costa angulo 50° obliquis



Fig. 119, *Dryopteris subdecipiens* HAYATA; a, the plant; b, a scale on the apical portion of the stipe; c, d, scale on the stipe; e, venation on the rachis of a pinna; f, basal portion of a pinna; g, apical portion of the same.



supra non visis subtis termiter visis distinefcis a basi ramosis, ramis h'beris. Textura herbaceo-membranacea. Sori secus oostas multiseriatim dispositi prope marginem hand dispositi,



HAB. Axistui, leg. B. HATATA fct S. SASAKI, Jan., 1912.

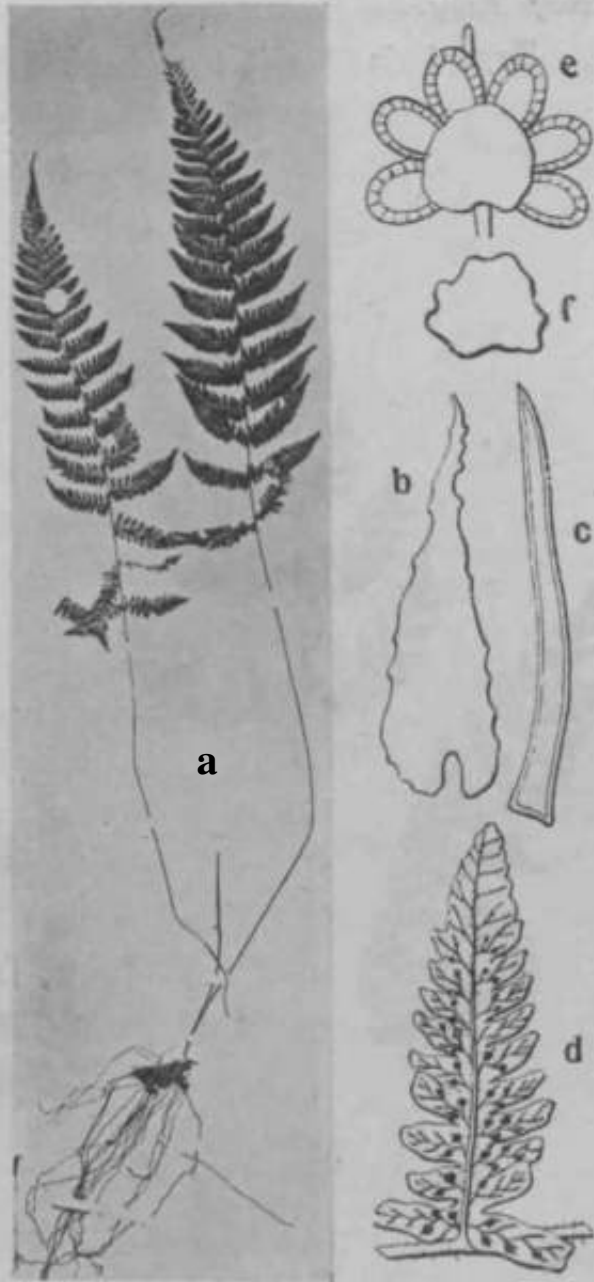
Near *I*), *dedpiena* O. KTZE. and *D. nigrisqv.ama* HAY., butd iffers from them by the much larger fronds, acntely tmccated base of the piumo and by the scales on the rhaehis wiicli are loug fimbriated at the base.

*Dryopteris* (*Eudryop-  
tcris*) *subexaltata* C. CH. [Fig. 120]; HATATA Mater Fl. Fornios. p. 418.

HAH. Ijiukiui: Nago-  
dake, Aprili., 1907, leg. G. NAKAHAIHA.

Fig. 120, *I>r>l<>i4tr\>x* (*Kmhynjjteris*) *sufxmiitta* C. CH. ; a, Uio[pliut; h, n scale on tbo rhizoni; c, a pinna.

***Dryopteris (Lcutorea) sublaxa*** HAYATA sp. nov. (Fig. 121). Rhizoma repens, radicibus filiformibus. Stipulae parvissime squamatae 2.3 cm. longae stramineae glabrae laevia, squamis lanceolatis 1-2 mm. longis. Frons Kueari-lanceolata apice acuminata. Petiole truncata 25 cm. longa 7 cm. lata pinnata, pinnis a rhachibus angulo 70°-90° divaricatis, inferioribus a seorsum 1 cm. remotis altioribus, superioribus gradatim brevioribus, inferioribus lineari-lanceolatis 3 cm. longis 1 cm. latis apice acuminatis ad summum obtusis basi intimis truncatis sessilibus latioribus in superiore latioribus quam latere inferioribus, inferioribus vel pinnatilibus, lobis latero superiore inferioribus 6 mm. longis 2 mm. latis intimis truncatis apice obtusissimis, lobis superioribus gradatim minoribus ± acutis integris. Textura tenuior membranacea, costa et vena pinnarum supra elevata densissime pilosa, pilis unicellularibus, subtus elevata subglobulosis glandularibus pluricellularibus brevissimis parvis instructis; rachibus brevissimis villosis tenuissimis; pagina margine impresso ciliata. Sorus utroque latere lobulatus vel utroque latere costae pinnarum l-seriatim dispositi. Indusium sulcatum margine integram vel sinuatum.



**Fig. 121.** *Dryopteris (Lcutorea) sublaxa* HAYATA; a, the plant; b, a sori on the rhizome; c, a sori on the underside of a pinna; d, a pinna; e, a sori; f, the indusium with more crenate margin.

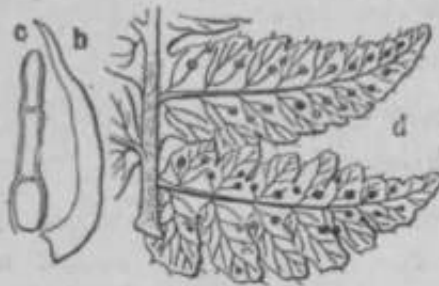
HAB. Ai-isan, leg. B. HAYATA, 1912, Jan.

Near *D. hwa*, but differs from it by the not ciliate indusium and loss of wiry fronds.

**Dryopteris** (*Ctenitis*) *tenuifrons* HAYATA sp. nov. (Fig. 122). Rhizoma?



Stipes 40 cm. longus, parvo squaratus, squamis lanceolatis 4 mm. longis 1 mm. latis, sub lente pubescentibus. Frons longe triangularis 60 cm. longa 40 cm. lata apice triangulari-acuminata basi in ambitu obtriangulari-acuta, inferius bipinnata, pinnis inferioribus a se 8-10 cm. remotis a rachilibus 70°-90° (P) divaricatis, pinnis inferioribus triangularibus 20 cm. longis basi (P) breviter petiolatis (petiolo 1 cm. longis) inferius lateralibus latere superiore 8 cm. latis, latere inferiore 14 cm. latis, pinnulis inferioribus a se 3 cm. remotis a costis plusquam angulo 80°-90° divaricatis, pinnulis inferioribus (latere inferior) longissimis superioribus gradatim brevioribus, inferioribus longissimis lineari-lanceolatis 14 cm. longis 3 cm. latis apice acuminatis basi truncatis latissimis breviter petiolatis vel sessilibus pinna bifidis vel pinnatifidis, lineari-oblongis 17 mm. longis 5 mm. latis apice obtusis



margine crenulatis, crenulis ± ascendentibus; stipites, rachis costaeque toto castaneo-rubescens; frons

Fig. 122, *Dryopteris tenuifrons* HAYATA; a, the foot; b, a node on the stipe; c, a hair on the surface of a pinnule; d, a portion of a pinna. *Frondes* tomentosae herbaceo-membranaceae supra plus minus pubescentes, pilis

pluricellulis. Sorbentioque latere costulæ loborum prope marginem 1-seriatim dispositi.

HAB. Kotoahū, leg. T. KAWAKAMI et S. SASAKI, Juli., 1912.

Dryopteris (*Dryopteris*) *thrichorhachis* HAYATA sp. nov. (Fig. 123). Rhizoma? Stipes 70 cm. longus basi dense sursum parce squamatus castaneorum basi sensus, squamis inferioribus latioribus lanceolatis 1-2 cm. longis 2-4 mm. latis apice subnato-acuminatis castaneo-nigris striatis validiusculis patentibus, squamis superioribus angustioribus linearibus vel setiformibus patentissimis; rhachis striata. Squamis setiformibus utraque disperse, *Bolonia* persistentibus persistentibus fissis. Frons ovato-triangulata 55 cm. longa 50-55 cm. lata basi tenuissime

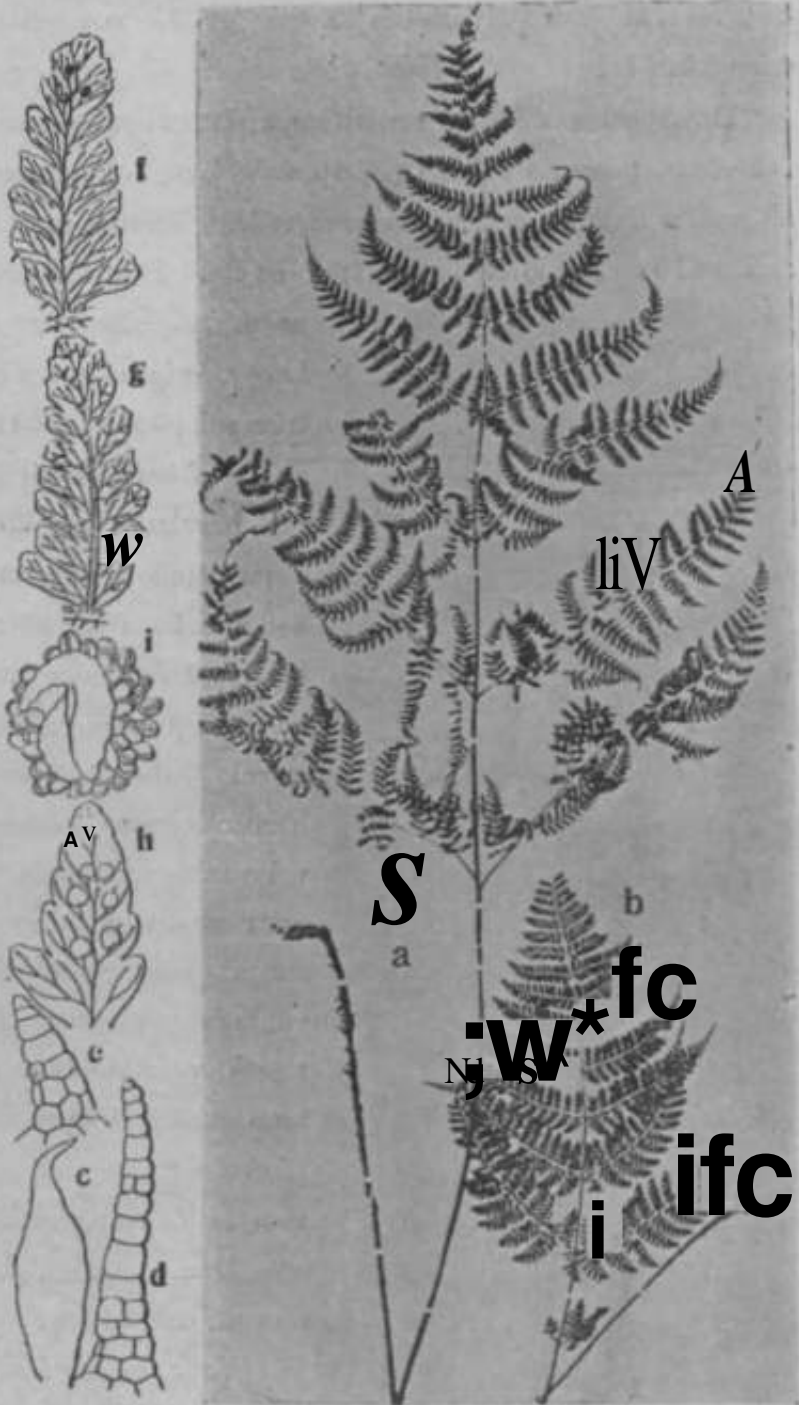


Fig. 123, *Dryopteris thrichorhachis* HAYATA; a, the type specimen; b, a younger specimen; c, a scale on the stipe; d, a hair on the underside of a costa of the same pinnule; e, a tip of a pinnule from the younger (specimen, seen from below); f, the underside, seen from above; g, a second pinnule of the middle pinna; h, a portion of a pinnule; i, a portion of a pinnule; j, a portion of a pinnule.

acuminata basi in ambitu obfusa tripinnata, pinnis inferioribus angulo  $45^\circ$  a rachibus divaricatis a se 10-15 cm. remotis, iufimis longissimis trianglari-lanceolatis 40 cm. longis 15 cm. latis apice tenuissime acuminatis (aeuminibus linearibus serratis) Litoro superiore angustioribus latere inferioribus latoribus, pinnulis infimis (latere superiore) lanceolatis 7 cm. longis 2 cm. latis, ab asillis rhachis frondis 2 cm. remotis, pinnulis infimis (latere inferiore) ab axillis 10 cm. remotis lanceolatae 12 cm. longis 3 cm. latis apice tenuissim



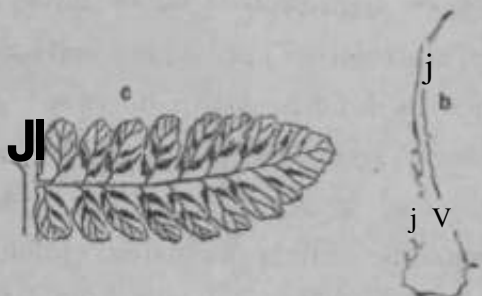
Fig. 124-A, *Jirgopteris* (*Leptogrammitis*) *fraxinea* C. Chr.; a, the plant.

umnuatis basi truncatis, petiolulis 3 mm, longis, pinnulis ordinis secundarii infimis triangulari-oblonga 18 mm. longis 1 cm. latis apice obtusis basi subtruncatis sessilibus vel brevissime petiolulatis pinnatifidis, segmenta longe rectangularibus 8 mm, longis 2-3 ram. latis apice rotundatis margine integris vel obscure creulatis, pinnulis inferioribus a se 3 cm. remotis, a rachibus planis angulo  $80^\circ$ - $100^\circ$  divaricatis. Textura rigida herbacea, pagina supra paucis ad costulas venulas parvis satiformibus dispersa, costulis supra caudiculatis subtus elevatis, subtus pilis minutis tenuissimis dispersa, venis venulae supra non visae subtus distincte visae leviter elevatis pilis minutis tomentosis dispersis. Sori versus apicem pinnularum ordinis secundarii vel segmentorum pinnularum ordines Beotndaru siti.

HAU. Arisjui, fig. B. HAYATA et S. SASAKI, 1912, Jan.

Very near *Lcwtreea spectabilis* WALL. (BEDD. *ILmdb. Fer, Brit. Ind, p. 257, fig. 132=D. Bendereoni* C. CH.). The smaller, perhaps younger form in the accompanying figures always given accords pretty well with

BEDDOME'S figures, save this position of the aori which at 6 in our specimens is located only towards the apex of the pinnules or of the segments of the latter. I am hesitating to regard this fern as distinct from *L. spcdaUix*.



**Dryopteris (Leptogramma) africana**  
(Dm.) (Fig. 124, A-B.) C. Cii. Ind.  
**251. Neplirodium Totta** DIEUJ.

HAH. **Axisan**, leg. B. HAYATA et S.  
SASAKI, Jan., 1012. "  
Compared with

Fig. 124-B, *BryopterU nficanA* C. a specimen So la-  
CH.; b, n nctifa on tlio ifetemne; c, ft pinm. i ii  
herbarium. I am merely following C. CHRISTENSEN'S  
Index in taking *J). afrlcana* for this fern.

**Dryopteris (Mfodryoperk) transmorrisonensis**  
HAYATA n. n. *Polt/sfinJium transmorrisonRW* HAYATA  
**Mater. FL Formos. p- 427.**

*Jlxit.* la monto MoiTison, ad  
1\*2000 ped. nit., leg. T. KAWAKAMI  
ot D. Mori, Oct., 1906, (No. 2502).

**Dryopteria iEydryopt&ris)**  
**Yabei** HAYATA (Fig. 125), Mater.  
**FL Pormos. p. 424. Stlpites**  
**rabeSoantes** 30 cm. lough basi  
[tuunati (squamis 1 in ear i bus  
nigricantibus 1-1^- cm. longis vel  
brev«n\*ibns **rubesoentibus**) supra  
bisulcati basi 4 mm. lati ad totam  
longitudiueni ptircisshno muricati.  
Frons in cimuimscriptiione ovata 45  
em. longa 30 cm. latu apioe ciispi-  
data basi obtnsa subglabra eoriacea  
bipinnata, partibns infimia rarins  
subtripinuatiss, pinnw modus angiiis-



Fig. 125, *DryopUrU Yatei*HAYATA; a, tb«  
iilliint; b, ft sonic on tb« rhizome; c, a i)in-  
subtripinuatiss, pinnw modus angiiis-  
nule; d, a <sup>notus</sup>.

tato-lanceolatis 15 cm. longis basi latissimis 5 cm. latis apice acuminatis plus minus petiolatis, pinnis infimis conformibus longioribus latissimis, pinnis utroque latere rhachis frondis 15-16 inferioribus 5 cm. a se remotis, pinnis basi pinnatis sursum pinnatifidis, (segmentis falcato-recurvis apice acutis mediocribus 1½ cm. longis 4 mm. latis a basi contractis vel plus minus dilatatis margine obscure dentatis vel distincte dentatis); pagina supra viridis subtus pallidissime plus minus rubescens utraque glabra. Bliachis frondis supra bi-tri-sulcata piloso-squamata, squamis densiusculis rubris, subtus convexa minute parcissime muricata; rliaciiis pinnarum complanata supra plano-sulcata glabra subtus elevata squamata, venis et venulis liberis. Sori secus venas loborum pinnarum vel pinnularum sub quoque dente siti ab apice dentium 2 mm. remoti, vel sursum ad sinus dentium siti. Indusium persistens orbiculari-cordatum 1½ in. in diametro rubrum margine paucissime eroso-ciliolatum.

HAB. Kusshaku et Shintengai, leg. K. MIYAKE, 1899.

Near *NepJirodimi acutum* HOOK., but differs from it by the shape of the lowest pinna.

**Dryopteris viridescens** (BAKER) O. KTZE. ; C. CH. Ind. p. 300. *Nephrodivm viridescens* BAKER Syn. p. 275.

HAB. Arisan, 7000-8000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

Compared with a Japanese specimen so labelled in the herbarium at Tōkyō. This common Japanese fern is found in Formosa only in high elevations.

### ***Aspidium* Sw.**

**Aspidium submembranaceum** HAYATA sp. nov. (Fig. 126). Rhizoma? Stipes 30 cm. longus nitidus basi purpureo-nigrescens vel atro-castaneus sursum rub rubescens basi densissime squamatus, squamis linearibus rubro-castaneis usque 2 cm. longis 1 mm. latis margine remote ciliatis vel non ciliatis. Frons in ambitu ovato-cordata 30 cm. longa 18 cm. lata bipinnata apice acuta basi in ambitu cordata, pinnis oppositis a rhachibus frondis angulo 70°-80° divaricatis, inferioribus a se 5 cm. remotis, infimis triangularibus arcuatis insequilateralibus 16 cm. longis 13 cm. latis, latere superiore basi 4 cm. latis, latere inferiore latioribus basi 9 cm. latis apice arcuato-acuminatis basi latis-

simis truncatis pinuata pinnulis infimia latere superiore ab axillis 7 ram. distantibus 4 cm. longis, pinnulis infimis (latere inferiore) ab axillis 2 cm. remotia 10 cm. longis 3 em. latis apice mucronatis lanceolatis basi truncatis sessilibus asque ad J pinnatifidis, (rhachibus 6 mm. latis), segmentis rectangularibus apice obtusis 11 mm. longis 5 mm. latis inargenteo reticulatis; venis anastomosantibus, areolis costalibus linearibus angustissimis; pagina membranacea in exsiccato rubescens -utraque pilis minutis brevissimis parcissime dispersa, costulis venis venisque supra elevata distincte vix subta subplauis; inter segmenta vel lobos pinnularum dentibus minutis ram. longis sitis. Sori prope apicem vel prope marginem proximis vel segmentum siti.



Fig. 126, *Aspidium subtriphyllum* (Hook.) J. Sm., 1912.

HAB. Urai, log. B. HAYATA et S. SASAKI, Uruma, 1912.

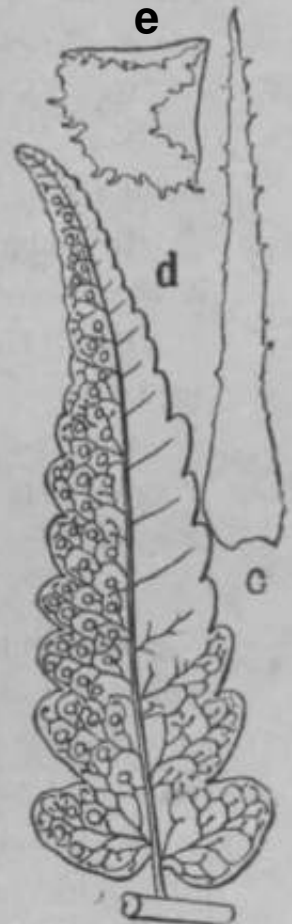
HAB. Urai, log. B. HAYATA et S. SASAKI, Uruma, 1912.

Very near *Didyopleris ciliatogrammica*

I

pinnule, x2.

T



BEDD. (*Aspidium Tnentbranifolium* KTK.),

BEDD. Haub. Fern. Brit. Ind. p. 300, fig. 155.

**Aspidium subtriphyllum** HOOK. form, **cuspidatopinnatum** (Fig. 127).

HAB. Prope Botauaha, leg. K. MIYAKE, Jan., 1900.

This fern extremely variable. Our specimens *betula* figured are so widely

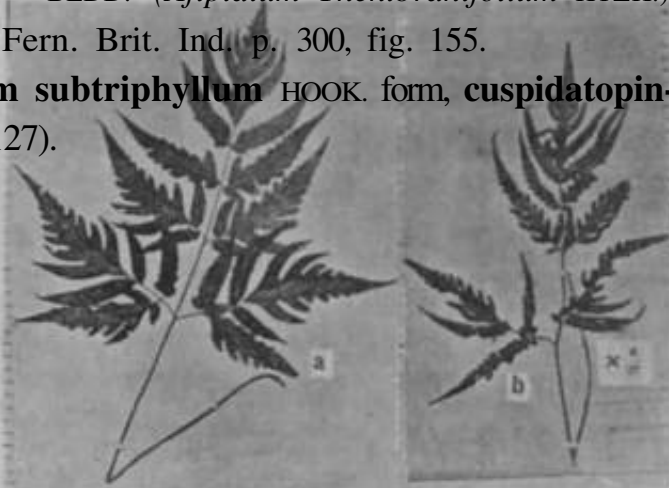


Fig. 127, *Aspidium subtriphyllum* HOOK. form, *cuspidatopinnatum*; a, the sterile frond; b, the same, fertile frond; c, a sori on the stipe; d, a pinnule; e, an indurium.

< I inherent from the type of

*mihtriphtjUum*. that it should otherwise claim to be a distinct species.



*Polystiehuni* ROTH.

*Polystichum aculeatum* ROTH.; ΠΑΥΑΤΑ et MATSUM. Emno. EL Formos. p. 581.

HAD. Mt. Artsan, ad 7000 ped- alt., leg. 15. HAYATA et S. SASAKI, 191-2, Jan.

*Polystichum atroviridissimum* HAYATA sp. nov. (Fig. 128). Rhwoma erectim. Stipes 25 cm. lougus basi apatlmlato-dflatutuR aqaNBm&aa, stjuimib

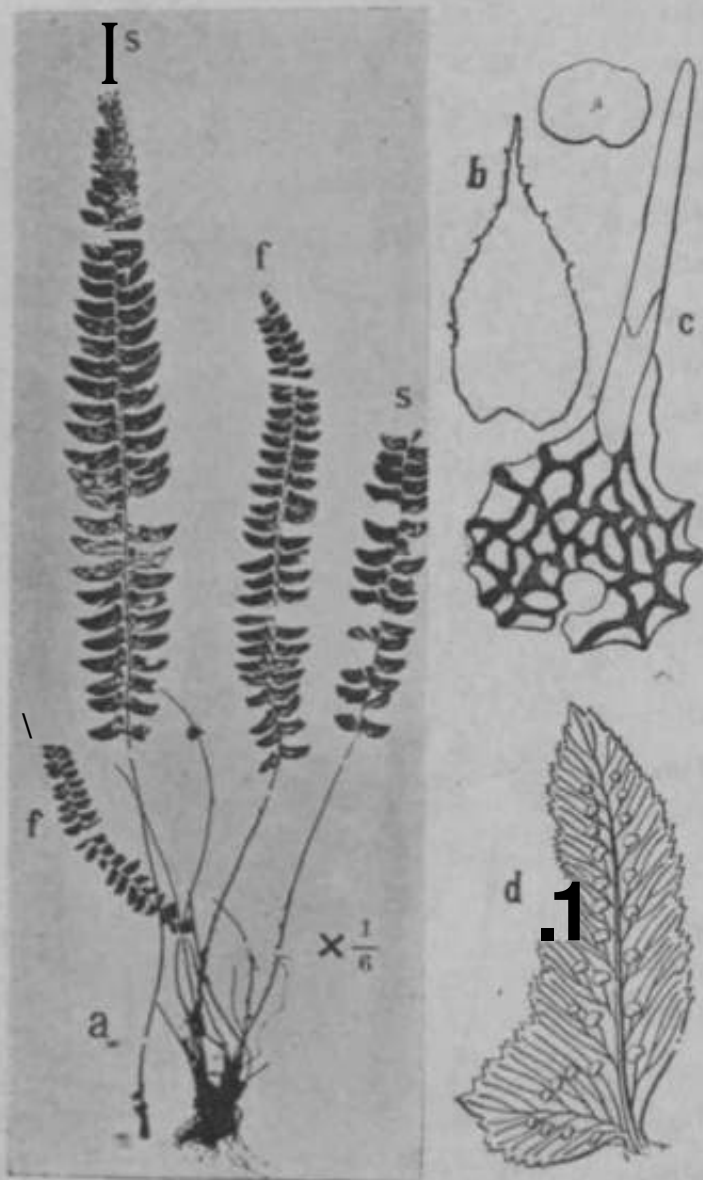


Fig. 128, *Polystichum atroviridissimum* ΠΑΥΑΤΑ et MATSUM. a, the plant, s = sterile fronds, f = fertile fronds; b, c, magnified views of the sori; a, nomenclature of the lower part of the sori; d, magnified view of the pinna; e, magnified view of the sori.

inferioribus linearibus  
 Superioribus ovatis  
 paleaceis apice cuspidato-  
 acuminatis basi rotundatis  
 7 mm. longis 3 mm. latis  
 nervis distinctis  
 Setae longae  
 longae linearibus  
 4-5 cm. longae  
 6-7 cm. longae  
 latissimas basi  
 multas apice acuminatissimas,  
 acuminibus in  
 nervis  
 mediis a » »  
 13 mm. longis  
 in minoribus  
 dentes 3 mm. longos  
 distinctas, pinnis fere  
 horizontaliter patentibus,  
 modis 3-4 cm. longis  
 1 cm. latis  
 orbiculatis plus  
 minus falcatis apice  
 aristato-acutis basi  
 truncatis latera  
 superioribus  
 latissimas basi  
 1-2 cm. longis  
 1-2 cm. longis

parallelis), basi inferiore cuneato-aeufcis **aeatiUbtu TO!** brwvissiint\* **petiolaias** margine aristato-serrulatis ; rliaelfts supra sulcata tennis squan.ata, costis venis pinna tennissiinis utraque pagine ulovatia distinctis; pagiuu snpra nitida atro-viridissima gLibm subtns Tfgn-lariter secus venas venulas costalalque squamis minntis oblecta, HijiniiniH persistoutibiis svibmlu is i<sup>1</sup>, mm. latis ciiBpiduto-rotimdjitis denticulatis l'asi ooniatis ; tuxtnni tonuiter coriacej\*. Fn>us fertilis i] u; i m sterili rniu in lanceoliita 30 em. longa 4-5 cm. lata **safatm** soris utroquo latere costtp **fare** uniscrititiin **denae** iusiructa. Pimiro skiriles tit fertilea nuu^inu tenuiter **atbo-iaaxga&flte**. In<lusium pftlUtiin i-(>tiindntum matgiue in^egulariter cienato-integnim li mm. in diametro.

ILVK. In monte Arisan, ad 8000-7000 ped. alt., **leg. V>**. HATATA ot S. SASAKI, l'J12, Jan.

**Polystichum constantissimum** HAYATA sp. nov. (Fig. 120). *Dryajjteria oooidantimima* HAYATA in sched Herb. Taihoku. Ithiwnriii ? Stijx s ;30 cm. loijj^iis fusoo-straminena ba»i squamutns, sqnamis ninricantibus, in magnitudine variabilibus majwribiis lanctx.tln.tis linetu'llnu\* **Vid** ovatis acuminafcissimis basi auriciilato-cortlatis v>l triincatis 6-7 mm,



**Fig. 1** \*iy, l'»h)xtir!,nui consbjmtiasbnam HAVITA ; » Uie pltiut; b. a fmlc nt the bnse of the stipe; c, tme of the smulkttt aailcs on the stipe; il. a Lair OD the mnitr strfjit^ of the frond; e, a pinna; t, mi ri l'ium.

longis, minoribus 1½ mm. longis. Frons in ambicu cordata apice acuminata basi cordata tripartita 35 cm. longa 20-23 cm. lata, pinnis infimis longissimis 16 cm. longis breves petiolatis oblique cuspidato-triangularibus apice acuminatis basi oblique truncatis latissimis 13 cm. latis, (pinnulis infimis ordinis primarii latere inferiore longissimis 11 cm. longis, iis infimis latere superiora 3 cm. longis) pinnulis infimis ordinis primarii latere inferiore 11 cm. longis 3 cm. latis apice acuminatis basi plus minus rotundatis sessilibus, pinnulis infimis latere superioro 3 cm. longis triangulari-ovatis apice obtusis basi truncato-cuneatis sessilibus, pinnulis infimis ordinis secundarii triangulari-oblongis sessilibus margine lobulatis, lobis ascendente-patentibus infimis oblongis 4 mm. longis 2-3 mm. latis margine remote aristato-serrulatis; pagina subtus toto (exceptis pin-

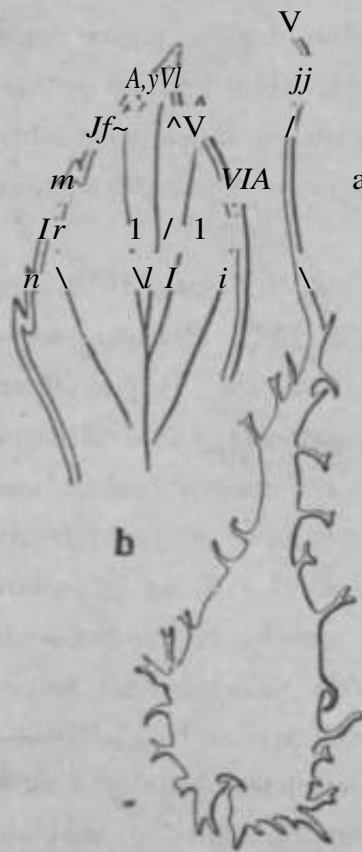


Fig. 130, *Polystichum falcatispinnum* HAYATA; a, one of the smallest scales on the stipes; b, a portion of a pinnule.

nulis inferioribus pinnarum infimarum) sorifera; rhachis frondis et pinnarum supra profunde sulcata superioTe anguste canaliculata aequata, costulis pinnularum supra canaliculatis subtus elevatis, venis lateralibus supra non visis subtus phis minus visis; pagina coriacea margine aristata supra glabra subtus minute pilosa, pilis minute 1 mm. longis, squamis ad rhachin pinnarum vel pinnularum imis sacciferis.

HAB. Monte Arisau, leg. B. HAYATA et S. SASAKI, 1912, Jan.

Near *P. varitum* Pn.; but differs from it by the very much unequal sided lowest pinnule with the longer lowest pinnules on the lower side, which pinnules are as twice long as the next pinnules.

*Polystichum falcatispinnum* HAYATA sp. nov. (Fig. 130). Ectozoma erecto-ascendens cum rutiliculis stipitem 5 cm. in diametro. Stipes 20 cm. longus frondibus brevior, squamis variabilibus hnearibus vel lanceolatis latioribus vel angustioribus, majoribus 1½ cm. longis 4-5 mm. latis apice cuspidatis, minoribus lanceolatis eus-

pidatis 2 mm. longis £ mm. latis margine ciliatis. Frons lanceolata 40-60 cm. longa 10 cm. lata apice acuminatissima medio latissima basi minus lata 6 cm. lata pinnata, pinnis mediis longissimis deorsum paullo brevioribus sursum gradatim brevioribus in acumine ad dentem reductis, pinnis mediis longissimis 6 cm. longis 2 cm. latis lanceolatis apice aristato-acuminatis basi latissimis brevissime petiolatis (petiolis 2 mm. longis) pinnatifidis, basi latere superiore latioribus auriculato-truncatis, basi latere inferiore cuneato-acutis, deorsum pinnatifidis, pinnulis latere superiore basilaribus auriculiformibus 13 mm. longis 6-7 mm. latis oblique ovatis apice in ambitu obtusis margine aristato-serrulatis sed latere inferiore integris, pinnulis vel lobis juxta lobum infimum valde minoribus sursum ad dentem reductis (dentibus aristatis), margine tenuiter cartilagineo-albo-marginatis. Sori utroque latere costae 1-seriatim dispositi; rhachis frondis squamata, squamis linearibus; costa pinnae supra canaliculata subtus leviter elevata, venis supra non visis subtus tenuiter distinctis; pagina coriacea supra nitida viridissima subtus glauca supra parce squamis minutis disperse, subtus secus venas venulas regulariter squamata, squamis minutis cuspidato-ovatis *-fa* mm. latis.

HAB. Arisan, ad 7-8000 ped. alt., leg. B. HAYATA et S. SASAKI, 1912, Jan.

**Polystichum globisorum** HAYATA sp. nov. (Fig. 131). Rhizoma erecto-ascendens, apice cum reliquis stipitum 3 cm. in diametro. Stipes 50 cm. longus basi densissime squamatus, squamis fulvocastaneis longe filiformi-linearibus 1cm. vel plus longis 1-Jmm. latis apice filiformibus basi oblique cordatis vel truncatis margine remote obscure setulosis vel subintegris, superiore subglabratus cum rhachibus stramineo-rubescens. Frons in ambitu cordato-pentagona 50 cm. longa 43 cm. lata apice ambitu triangulari-acuta, subito-acuminata basi ambitu cordata quadripinnatifida, pinnis infimis longissimis tripinnatifidis 30 cm. longis 23 cm. latis subtriangularibus basi latissimis, apice acuminatis (petiolis 2 cm. longis), pinnulis infimis latere inferiore longissimis ea altera multo longioribus 18 cm. longis 6-7 cm. latis pyramidalilanceolatis apice acuminatis (acuminibus linearibus serrulatis) basi latissimis (petiolulis 1cm:longis), pinnulis ordinis secundarii infimis (latere inferiore) longissimis triangulari-oblojigis 4 % cm. longis 1£ cm. latis apice acutis basi obliquis (petiolulis 2-3 mm. longis) pinnatifidis, segmsntis infimis (latere su-

periore) longissimis rhomboideo-ovatis 1½ em. longis 7 mm. Iatis apice aristato-  
;u:titis basi oblique euneatis margine serrata Tel duplicato-sermtis, serris apioe  
uristatis tenuiter eaitilagineo-inargiatis, suginentis pinnularum ordinis  
secundnrii sursuin nd dentem reducts; piniis inferioriibus a se

10-5 cm. remotis, sn-  
l«rioribus gradatim  
reductis, pinnulis  
ordiais primarii  
pimiat; infjaco a am  
4 cm. reraotis, pinnu-  
lis ordinis socundarii  
inferioribiis asa !2cm.  
remotis; pagina supra  
nitidn viridissima  
**glabta BTttoi** glab-  
**iata** vol paucissime  
squamata, squamis  
minutis lincjiribus;  
testura tenuiter  
coriacea; pinnis a  
rhacliibus frond is,  
pinnulis a rliachibus  
pinnae angulo 45°  
di\aricatis, sed pin-  
nulis inñmis a rbnci-  
**bffl** pinnae angulo  
recto divaricatis;  
rbat-hns frondes et  
pimso supra profunde  
sulcata) sureum cana-  
lioulnta>, latere cana-  
liculorum costiiljito-  
elevatw, COstuliS



Fig. 1d1, *PotipBehum fjtobtonm* H m u; n. the phut; b, i -walo  
tbo rLizoinp; o, n pinniilo ; d, mrgin o( the gnu ; .. an indnaJmo.

*pinnularum* ordinis secundarii supra canaliuulatis, venis lateralibus supra **im-**pressis vel non vix infra plus minus distinctly. Sori ad totam paginam (exceptis apicibus pinnae et pinnulae) utroque latoe costulae 1-seriatim dispositi globoso-cordati 1/8 mm. in diametro globosculati. Indusium rutundato-ovoidatum margine denticulatum.

HAB. Ariuan, iid 7000-8000 ped. alt., log. B. HAYATA et S. SASAKI, 1912, Jan.

Near *P. hserpitiifditim*, but differs from it by the far much larger fronds with inflexed basal pinnules.

**Polystichum horridipinnum** HAYATA sp. nov. (Fig. 132). Rhizoma erectum vel ascendens cum reliquis stipitem 3 cm. in diametro sectionis apice frons copiosissima. Stipes 4-5 dm. longus dense squamatus, squamis in magnitudine variabilibus 3 mm.-10 mm. longis cuspidato-ovatis usque ad laucouletis minutis cordatis minute auriculatis vel band auriculatis **tenuissima** minutis auriculatis.

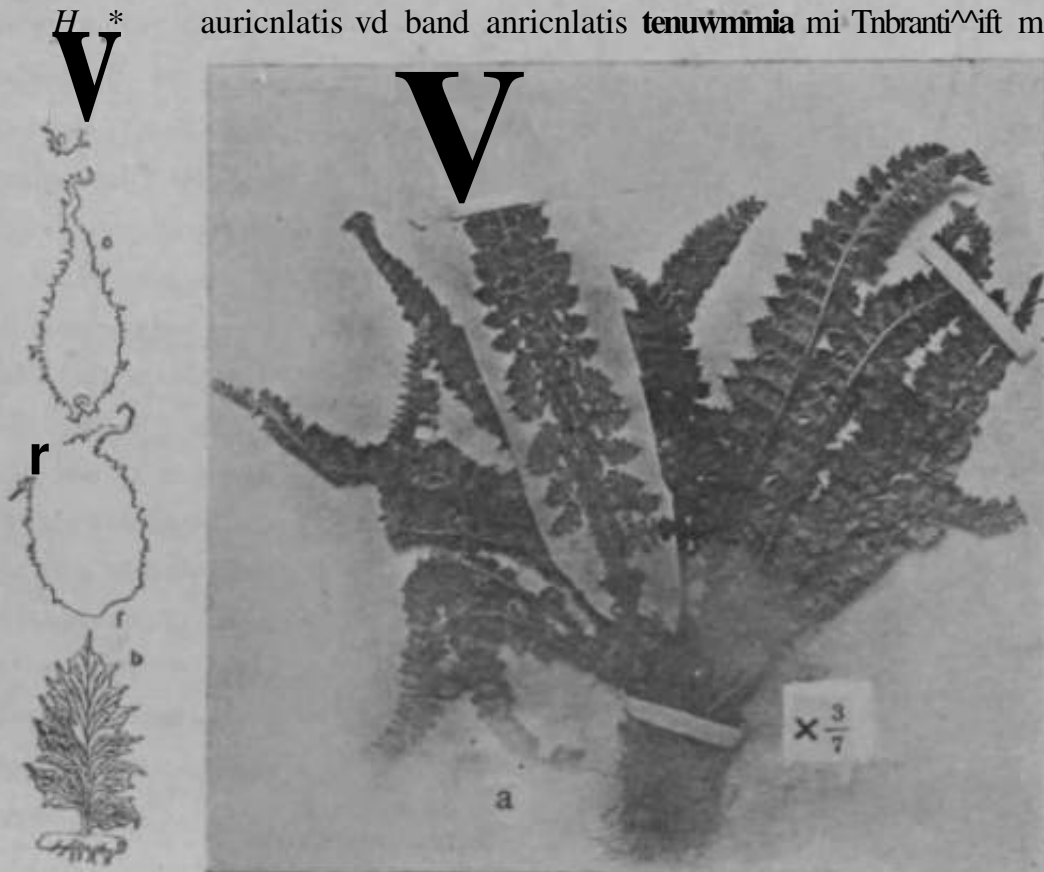


Fig. 132, *Polystichum horridipinnum* HAYATA; a, die pWu, b, a pmtui; c, d, f, vno kinds of scales on the rhizome, stipe or rachis; e, settles on the lower surface of the frond.

gine irregulariter ciliato-serrulatis vel denticulatis. Frons lanceolata 15 cm. longa 3 cm. lata apice aristato-acuminata basi latissima truncata pinnata, pinnis infimis longissimis superioribus gradatim minoribus, inferioribus a sead insertionem 1 cm. remotis vix vel haud imbricatis pinnatifidis, infimis triangulari-oblongis vel lanceolatis 2 cm. longis 12 mm. latis apice aristatoacutis basi truncatis latissimis sessilibus pinnatifidis obliquis latere superiore latioribus, segmentis infimis oblique rotundatoovatis apice aristato-triangulari-acutis basi cuneatis margine 1-2 dentibus aristatis instructis, aristis validis 1- $\frac{1}{2}$  mm. longis. Textura valde crasso-coriacea, pagina supra nitida glabra viridissima subtus pallida parce squamata, squamis interdum piliformibus crispatis. Rhachis frondis supra latiuscule sulcata, inferiore subtus  $\pm$  squamata, superiore glabra supra toto glabra, costis et venis pinnarum supra impressis subtus subimpressis distincte visis. Frons a medio usque ad apicem sorifera.

HAB. Montibus centralibus, leg. U. MORI, 1909, Dec.

Near *Aspidium LmcMtia* (LOWE Brit. Exot. Fern, VI. t. 22) in the outline and size of the fronds; still nearer *PdysticJium U^/dium* DON (BEDD. Fern. Brit. Ind. p. 206, fig. n. 103). The latter may be proved to be identical with our fern, when close examination will be made with herbarium-materials.

*Polystichum integripinnum* HAYATASP. nov. (Fig. 153)=*Aspidium integripinnum* HAYATA. Khizoma? Stipes? Frons pyramidali-lanceolata 73 cm. longa infra medium latissima 30 cm. lata basi minus lata 25 cm. lata superiore angustior apice subito acuminata (acumine lineari) simpliciter pinnata, pinnis inferioribus longissimis 7 cm. a se remotis angulo 45° divaricatis lineari-lanceolatis circ. 20 cm. longis 24 mm. latis apice acuminatis basi  $\pm$  latioribus subito acutis sessilibus obliquis latere superiore latioribus basi leviter auriculiforme dilatatis margine integris vel obscure undulatis sursum serrulatis rectis, pinnis superioribus gradatim minoribus versus suinum ad dentem abeuntibus  $\pm$  falcatis. Rhachis frondis recta squamata, squamis oblongo-lanceolatis lanceolatis 2-6 mm. longis apice cuspidatis acuminatis basi profunde cordatis (lojpis cordis imbricatis) margine fimbriato-ciliolatis, costa pinnae supra tenuiter impressa subtus elevata, venis lateralibus utraque pagine non visis vel subtus vix visis, venis lateralibus a costa 45° divaricatis 4-5 mm. a se remotis ramosis versus marginem anastomosantibus areolas formantibus, areolis cum

venulis liberis; pagina frondis supra globis subtus ad costam et ad paginam squamata, squamis costae et rhachis subsimilibus, squamis paginae anicebo-

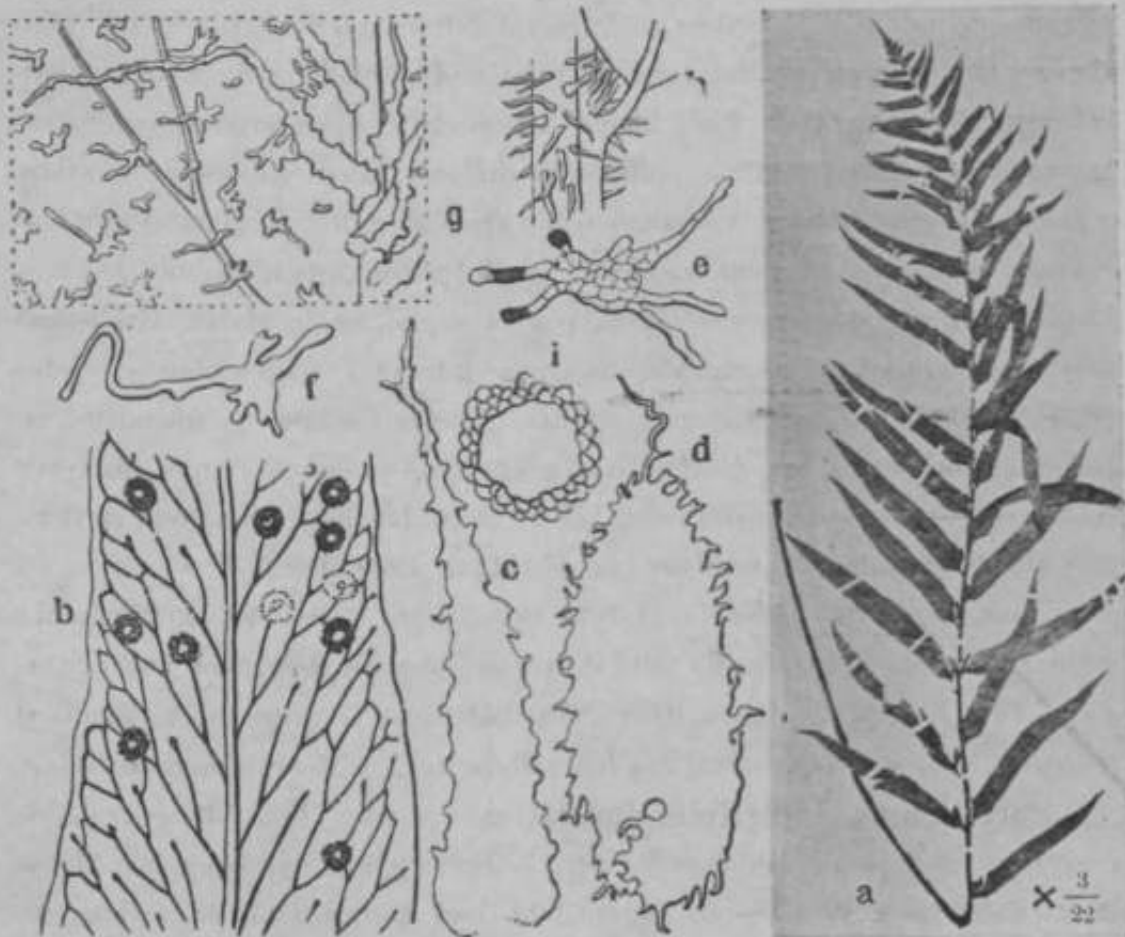


Fig. 133, *Polystichum integrum* MAXIM.; a, the plant; b, a portion of a pinna; c, a scale on the stipe; d, a scale on the rachis of the sterile frond; e, f, scales on the upper and lower surfaces of a pinna; g, a portion of the sori on a pinna; h, a portion of the rachis; i, a sori.

deis multiradiatis in forma variabilibus. Textura herbario-vivaceae. Sori a medio sursum frondis irregulariter dispositi.

HAH. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Most near *Aspidium nidivivum* WALL. (HOOK. et GREV. IC. Fil. t. 171); but differs from it by the much longer fronds with nearly entire narrower pinnae. The fern is as well referable to *Aspidium*, as to *Polystichum*. Also somewhat resembles *Polystichum lonchitoides* (CHRIST) DUCKW. (Herb. Corea. tested by Dr. T. NAKAI), but differs from it by the not auricled pinnae with entire margin.

*Polystichum prionolepis* HAYATA sp. nov. (Fig. 134). Rhizoma erecto-



asoendens. Stipes 20 cm. longug frondem Dsquans *baai* densisaiame squamatus  
 snperiore minus dense squanmtna, squamis castaneis dimorphis, squamis  
 basis atipitnm liDearibus vcl filiformi-Hnearibna circ. 12 mm. loDgis acuniiuatiR  
 •J-1 mm. luti, sfjmunis in medio stipitum liitioribns Linceolatis ovatis 12-15 mm.  
 longis 2-3-4 mm. ktis apice ciispidatis (cnspidibus



Fig. 134, *Ptitsia priontsepii* HAYATA; n, the plait; b. n HC\*1« on the stipe; c, the  
 mar^nof thofa-ne; il. a acite on tlio tbwhU; o. raicgin of the same; f, \* BOUAQ the luer  
 surface of a pinna; g, n pinna.

filiformibus), generaliter squamis linearibus et ovatis intermixes. Frons lanceolato-triangularis vel lanceolata in longitudine stipitem requans **15-18** cm. longa 7-8 cm. lata apice acuminata basi latissima truncata pinnata\* pinnis utroque latere circ. 16 a rhachibus frondis angulo recto divarioatis, pinnis infimis plus minus retrorsum reflexis longissimis 4 cm. longis 1 cm. latis a se 1½ cm. remotis oblique lanceolatis sessilibus apice aristato-acutis basi obliquis latere superiore recto-auriculatis, (auriculis vel dentibus infimis 8 mm. longis 7 mm. latis) latere inferiore cuneato-acutis margine grosse serrato-dentatis, dentibus subrotundatis aristato-apiculatis margine serrulatis superioribus gradatim minoribus ad serrulam simplicem reductis, pinnis superioribus gradatim minoribus sursum ad dentes reductis; rhachis frondis squamata, squamis linearibus castaneis; pagina frondis valde coriacea supra nitida glabra ad costam impressa minute fugacio-hirtellata subtus plus minus glauca minute pauceque squamifera. Sori utroque latere costro 1- vel 2-seriatim dispositi.

HAB. Arisan, ad 8000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., **1912**.  
Semewhat near *P. cespitosum* WALL. (HOOK. Sp. Fil. t. 213).

**Polystichum rectipinnum** HAYATA sp. nov. (Fig. 135). Khizoma? Stipes 25-30 cm. longus toto densiuscule squamatus, squamis in forma variabilibus linearibus vel lanceolatis ovatis margine ciliato-denticulatis apice cuspidatis, iis ovatis 1 cm. longis 3 mm. latis castaneis. Frons sterilis lanceolato-triangularis vel lanceolata 35 cm. longa 15 cm. lata apice acuta basi subtruncata pinnata, pinnis inferioribus longissimis 8-9 cm. longis lanceolatis 8-9 cm. longis 2 J cm. latis sessilibus apice acuminatis basi oblique truncatis pinnatifidis vel inferiore pinnatis, pinnulis vel segmentis vel lobis infimis (latere superiore) maximis 10-12 mm. longis quadrangularibus 6 mm. latis valde obliquis latere superiore latioribus apice apiculato-aristato-acutis margine obscure crenatis vel subintegris, lobis superioribus minoribus brevioribus sursum ad dentem reductis, dentibus ascendentibus aristato-apiculatis; pinnis infimis retrorsum reflexis, mediis horizontaliter patentibus sursum plus minus descendentibus gradatim minoribus ad dentem reductis, inferioribus 1-2 cm. a se remotis subalternis; rhachis frondis supra sulcata squamata, squamis linearibus; costa pinnarum supra sulcata subtus elevata, venis

lateralibus supra non visis subtus plus minus elevatis distinetis; pagina eoriacea. Frons fertilis quam eis sterilibus multo angustior lanceolato-pyramidalis quam stipite in longitudine brevior 25 cm. Longitudo basi latissima 13 cm. Lata pinnata, pinnis totis horizontaliter patentibus Tel plus minus retrorsum reflexis, inferioribus 3 cm. a se remotis, superioribus minoribus sursum ad dextra rotatis, inferioribus longissimis lanceolatis 6-7 cm. longis 23 mm. latis apice



truncatis basi oblique truncatis sessilibus pinnatis vel pinnatifidis, pinnae inferioribus longissimis cum rufis filamentis parallelis oblongo-lanceolatis 12 mm. longis 4-5 mm. latis apice aristato-apiculatis basi oblique auriculato-truncatis 1; illi in **Burseria** valde latioribus margine obsolete denticulatis vel subintegris. <sup>1311</sup> Vires supra viridissima plus minus squamis linearibus instructa, subtus dense soriferis squamis. Sori utroque latere utrinque pinnae uni-seriatim a basi frondis usque ad apicem dispositi.

ILVI. Ariau, ad 7000-8000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.



Fig. 185, *Iutystichum rectijinnvm* HAYATA; n, n sterile frond; b, fertile fronds; c, sori of the sterile frond; d, sori of the fertile frond; e, H [tortion of « pinnae].

*Polygitauni* Tsus-Simene J- & M. Compared with a Japanese specimen in the Tokyo herbarium.

HAB. Arisan : pi-opo Senuinbora, leg. B. HAYATA et T. IT6, Mart., 1914.

*Gymnopteris* BERNH.

*Gymnopteris dichotomophlebia* HAYATA sp. nov. (Fig. 136). Khizoma repens 2-3 mm. in diametro squamis dense obtectuni, squamis oordato-ovatis apice obtusis vel acutis 2-3 mm. longis basi alte oordatis (lobis cordis profunde imbricatis) apice obtusis vel acuminatis. Stipes cum rhizomate continuus hand articulatus. Frons sterilis cum stipitibus lanceolata vel elliptico-lanceolata 20-25 cm. longa 3-3<sup>^</sup> em. lata apice triangulari-obtuua basi gradatim adgustata attenuata ad stipitem brevissinmm 3-4 mm. longum al(euri> margine integra membranaoea in exsiccato pellucida distincte venosa, eostis tomubns utraque pagine distinct\*) eleTatis, venis lateralibus plerumque dichotome ramosis reticulato - anastomosanti-

bus (areolis costalibus subtriangularibus 7-8 mm. longis venulam libemm singulam furcato-ramosnm i IM ludontibus), venis venulisque utraque pagine distincte elevatis tenuibus; pagina membranaceo-clartacea margine integra vel sensim rapanda. Frons fertiltw longe stipitata,

Stipitibus tenuibus fronde tequillongis 27 cm. longis

glabris subcomplanatis 1J mm. in diametro. Lamina angustissime liuearis stipitom sequaus T^I brevior 23 cm. longa 3-3£ mm. lata apice acuminata basi gradatim attenuata ad stipitom abeuns supra glabra, costa elevata, marine integra leviter desnper recurva subtus toto sorifera; paraphyses linoares apice plus minus clavato.

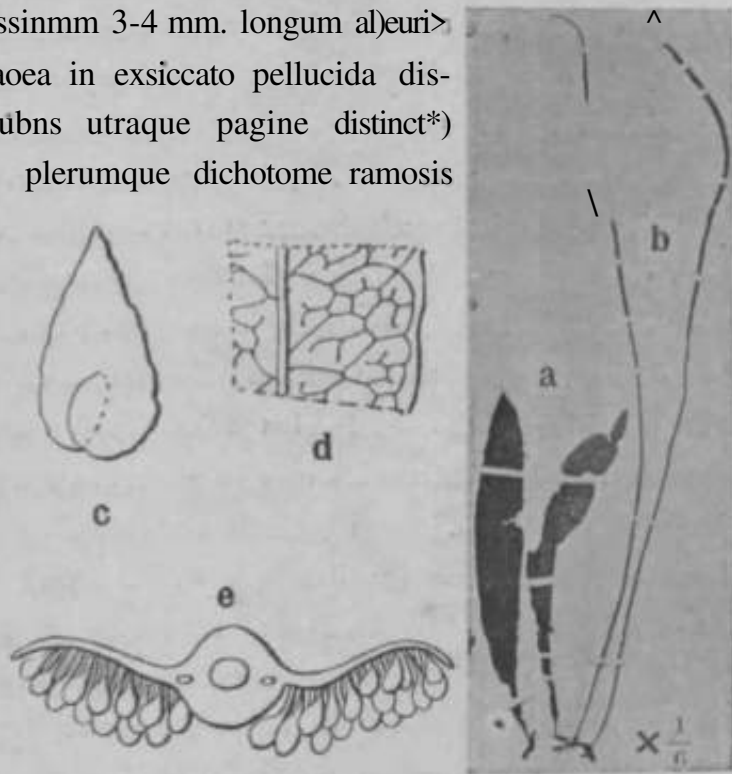


Fig. 130. *Gymnopteris dichotomophlebia* HAYATA; a, sterile frond of the plant; b, fertile fronds; c, detail of the rhizome; d, portion of a sterile frond; e, cross section of a fertile frond.

HAB. Hainan, leg. Z. KATSUMADA, 1911.

***Leptochilus diclwamoplilebia* HAYATA in sched. herb. Taihoku.**

Near *Gymnopteris variabilis* (BEDD. Fern. Brit. Ind. t. 272 and Handb. Fern. Brit. Ind. p. 429, fig. 258), but differs from that by the lanceolate sterile fronds which are in our species much obtuse at the apex and are gradually attenuated towards the base, and by the very short stipes; also near *Gymnopteris Fed* MOORE (BEDD. Fern. South Ind. t. 48), but differs from it by the linear fertile fronds. Lateral veins in our fern are nearly feathery towards the apex, but usually dichotomously branched downwards. Whether the stipes are articulated to the rhizomes or not is very questionable. There are seen faint lines, in which they are articulated, at the very base of the stipes. The lines, however, are not clear so as to decide the existence of articulation by themselves.

***Hephrolepis* SCHOTT.**

***Nephrolepis tenuissimum*** HAYATA sp. nov. (Fig. 137). Rhizoma ascendens vel subrepens densiuscule foliosum, cum reliquis stipitum 1½ cm. in diametro. Stipes basi dilatatus nigricans supra basin sursum castaneo-stramineus basi densiuscule squamatus sursum gradatim glabratus, (squainis nigro-castaneis triangulari-lanceolatis basi plus minus rotundatis margine integris vel obscure remote dentiusculis apice acuminatis usque 3-4 mm. longis 1-} mm. latis) usque 10 cm. longus gracillimus erectus supra profunde sulcatus plus minus minute pilosus vel subglabratus. Frons lanceolata usque 20 cm. longa 5 cm. lata apice tenuissime attenuato-acuminata (acuminibus linearibus) basi leviter angustior simpliciter pinnata, pinnis mediis horizontaliter patentibus longissimis a se 1 cm. remotis 22 mm. longis 6 mm. latis oblique oblongo-linearibus apice obtusis basi latere superiore auriculato-productis (auricula triangulari-oblonga latere interiore 8 mm. longa latere exteriori 4 mm. longa apice rotundata basi latissima 4 mm. lata margine obscure denticulata) basi latere inferiore cuneato-acutis breve petiolatis (petiolo 1 mm. longis) margine obtuse remoteque obscure serrulatis, pinnis inferioribus plus minus reflexis plus minus gradatim brevioribus, infimis 18 mm. longis, superioribus gradatim brevioribus plus minus ascendentibus versus summum ad dens 3 mm. longis abeuntibus; rhachis frondis glanduloso-hirsuta, pilis uni-

cellularibus brevissimis apice plana minus claratis, supra canaliculata, petiolis pinnarum supra canaliculatis cum rhachibus frondium articularis; textura membranacea ad marginem valde tenuissima, costis venis vix utraque pagine planis subtus leviter elevatis distincte visis parce pilis glandularibus uni-

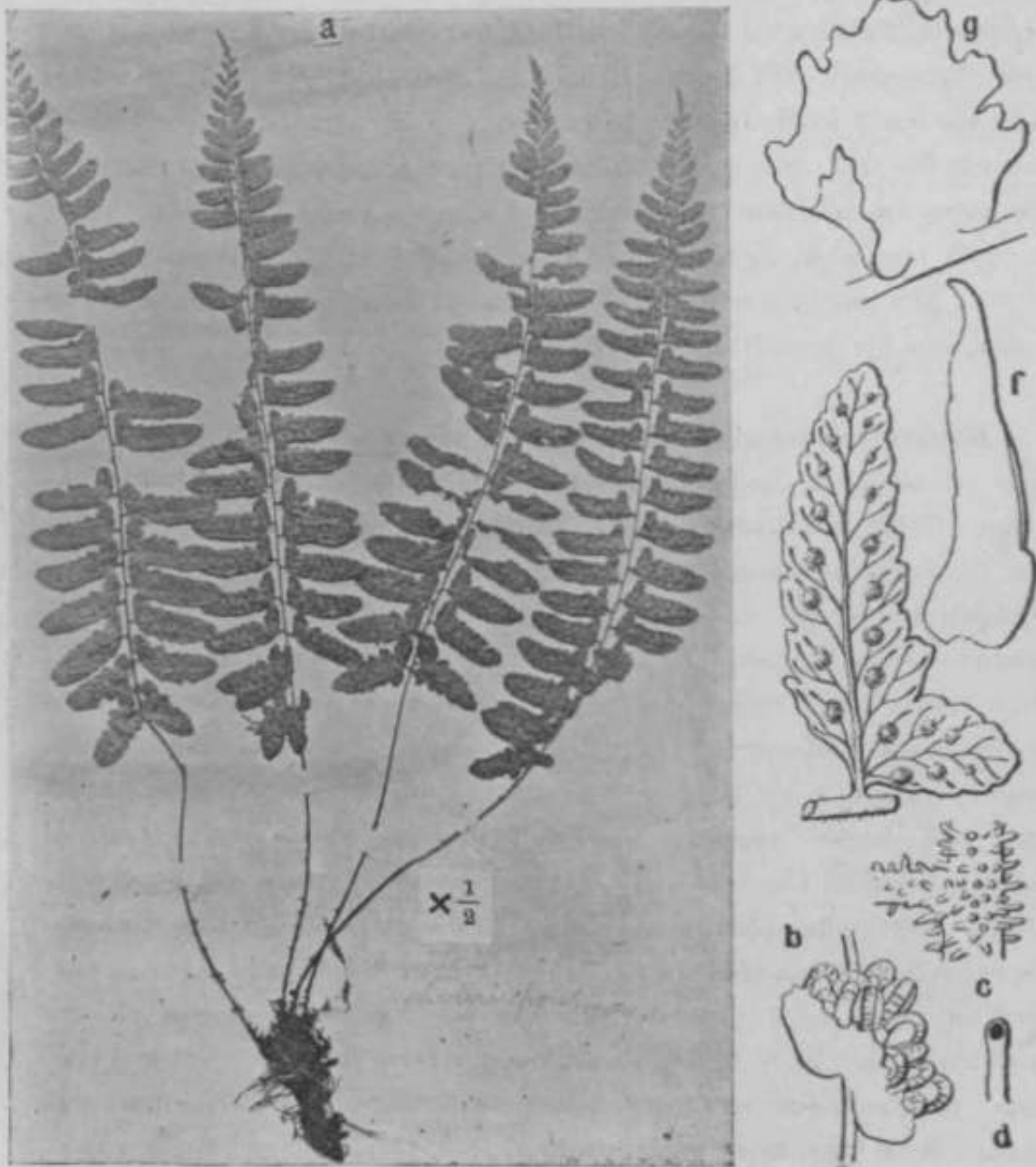


Fig. 137. *Vitis tenuissima* HAVATA: a, the plant; f, a scale on the rhizome; c, part of a rachis with a petiole; d, a glandular hair on the stem; e, a pinna; b, a cluster of fruits; g, a leaflet.

cellularibus instructis; pagina supra fusco-viridis subtus palhdior. Sori medio inter costam et marginem utroqno latere cost© pinnro vel costid® auriculate pinnse 1-seriatim dispositi rotundati. Indusium rottndatum ad basin adnatum roargine eroso-denticulatum 1| mm. latum latius quam longius.

HAD. Arisan, ad 8000-7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan. 1912.

General aspect of this new species is just the same as thiat of *Dryopta-is*. But the relationslup of thlis fern and *ArUiTcpteris ramosa* is very close in the venation, sori and especially in the glandular hail's on the rhachis. Our fern differs from that genus only in having unarticulated fronds. So far as I am aware, thlis is the most tiny form of all the known species of *Nephrdepix*.

### *Javallia* SM.

***Davallia stenolepis*** HAYATA sp. nov. (Fig. 138). Ithizoma repens



Fig. 138, *Daoailia stenolepis* HAYATA; n. the plant; b, n  
•wile on the rhizome; c, margin of tha tame; A, n pinnule: o. n.  
portion of the same; f, a aorua.

crassiusculum  
tereti-subcorupla-  
natuni 4-5 mm. in  
dinmetro squamis  
**deage obteotvm,**  
sqnamis liueari-  
ovatis basi ad  
apicem 1cm.  
longis basi peltatis  
(partibus peltatis  
ovatis 2 mm. longis  
1^mm.latia) modin  
ltnearibos ^ mm.  
bitis npirc filifor-  
mibus margiue re-  
mote serrulatis.  
Stipes subteres 20  
cin. longus basi  
plus mi mis squa-  
matns supra basiq  
su

toto glaber. Frons trianglari-rhoraboidea 30-40 cm. longa totiusque lata quadripinnatifida vel tripinnata (pirmis ordinie tertii pinnatifidis) apice triangulalii-acnta, pinnis inferioribus a se 5-6 cm. remotis a oosta aiigulo 60° divariatitis; pinna infima 20 cm. longa oblique triangulari 14 cm. lata apice u-ciiinatissima breve petiolata, piunulis I. infimis triangulari-lanceolatis 8 cm. longis 4-5 cm. latis a se 3 cm. reinotis breve petiolulatis, pinnulis II. oblongia 2\$ cm. longis brevissime petiolulatis pinnatifidis, segmentis infimis 8 mm. longis inciso-lobatis, lobis oblongts 1-2 mm. longis apice obhisis vel acutis; rhacbis pin-narum tenuiter alata; testura herbaceo-membranacea utraque pagine glabra.

HAB. Taitd: Daironkoslia, leg. U. MORI, 1908, Nov. (No. 2359); Musha (No. 2408); Arisan, leg. B. HAYATA et S. SASAKI, 1912, Jan.

Near *I. biMata* WALL., but differs *horn* it by the tliinner texture and by the shape of the sonis-bearing lobes.

*Leueostegia* PEESL.

*Leucoategia parvipinnula* HAYATA n. n. (Fig. 139). *Davallia parvl-*

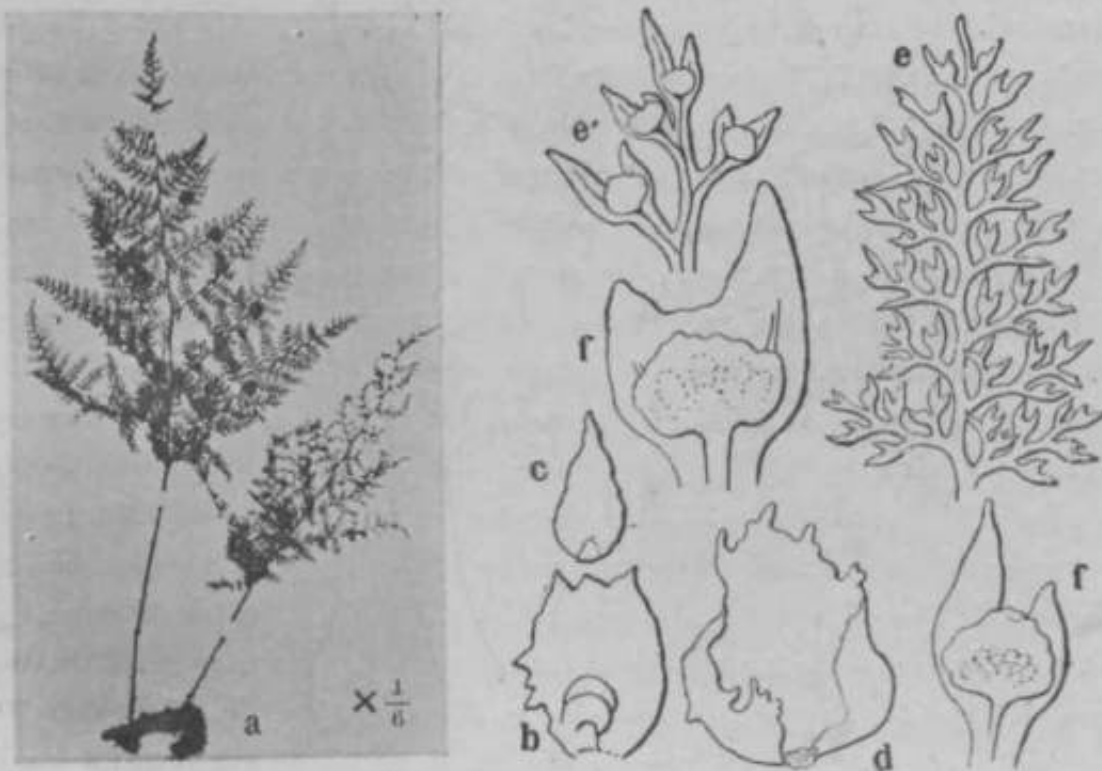


Fig- 139, *Dtmiltia poroiptwwJa* HAYATA; a, the plant; b, a acde on the rhizome; c, a scale on the stipe; d, a stipple-like scale on the inflexion of a pinnule; e, a portion of a pinnule; f, a segment of a pinnule with a sori.



*pinntda* HAYATA Mater. Fl. Formos. p. 431. *Davallia Olarhei* HAYATA in Tōkyō Bot. Mag. XXIH. p. 27 (non BAKER).

HAB. Mt. Arisan; epiphyta ad trunoos *CJiamcBcyparis* et *Taiivanice*, leg. S. SASAKI, Mai., 1913.

Stipites 14 cm. longi glabri stramineo-rubescens basi plus minus purpurascentes subteretes (supra) profunde 1-sulcati sursum 2-3-sulcati glabri hand squamati basi parce squainati, squamis elongato-triangularibus tenuibus leviter rubescentibus margine erosis apice obtusis. Frondes triangulares 19 cm. longa basi 20 cm. late, pinnis utroque latere 15, infimis 3-pinnatis 10 cm. longis, inferioribus bi-pinnatis 6-7-8 cm. longis a se 3-4 cm. remotis, superioribus brevioribus simpliciter pinnatis 3-4 cm. longis a se 1-2 cm. remotis, sursum minoribus 3 mm.-1 cm. longis a se 3 mm. remotis; pinnis infimis sessilibus lanceolato-ovatis 10 cm. longis 4½ cm. latis, latere inferiore latiore 2½ cm. lato; pinnulis I. infimis brevioribus, (inferioribus longioribus sessilibus angustato-quadrangularibus a se 1-2 cm. remotis pinnatis); pinnulis U. ovatis inferioribus 6 mm. longis obtusis angustatis remote profundeque pinnatifidis, segmentis angustissimis remotis cochlearibus bicornutis cum cornibus 1-3 mm. longis 1-1 mm. latis basi stipitatis, (cornibus exterioribus longioribus interioribus brevioribus), sinibus inter cornua rotundatis; rhachis frondium supra leviter tenuissime bisulcata subtus convexa utrinque glabræ; rhachis pinnarum subcomplanate supra plus minus sulcata subalata; paginae membranaceae utraque glabra. Sori ad sinus furcæ venularum vel interdum ad angulos venularum flexarum ad centrum segmentorum pinnularum II. siti solitarii. Indusium semiglobosum 1 mm. latum 1 mm. longum basi leviter cordatum vel truncatum.

In addition to the original description, I may mention the following characters which are most important, so far as the modern pteridology is concerned. The rhizomes are creeping like that of *Davallia* and *Ilumata*, but the stipes are never inserted by articulation on the rhizomes. The fronds have scales which are very like stipules in flowering plants, on the point of ramification of pinnae, pinnules and segments, as is the case with *Acropiorus*.

The habit of this fern is extremely like that of *Davallia*. It is impossible to separate this species from that genus but for the difference of fructification

and the absence of articulation on the rhizomes. The present fern is somewhat near *LoxoscapJie gibberosum* MOORE (BAKER Syn. Filic. p. 100) from which it is distinguishable in having much narrower pinnules. It is, as I stated in my former paper, most closely allied to *DavaUia Clarkd* BAKER (= *Humata Hookeri* T>TELB=*AcropJwrus Hookeri* MOORE) in its pinnatifidation of fronds and its subcordate indusia. So far as is concerned the delimitation of *Humata*, *Davallia* and *Acrophorus*, as stated by Prof. L. DIELS in ENGL. U. PRANTL Natiir. Pfl.-fam., the present fern is different from *DavaUia* in its having inarticulated stipes (which are not joined on the rhizome) and subcordate indusium. It comes nearer to *Humata* in its subcordate indusia and creeping rhizomes, but it is separable from that genus by the inarticulated stipes. It resembles *Acrophorus* in the inarticulated stipes, subcordate indusia, and in the presence of stipules, but widely different from that genus in the ramification of fronds, venation and in its creeping rhizomes. If these latter characters should necessitate the separation of our fern from *Acrophorus*, and the inarticulated stipes from *Humata*, it should constitute a special genus, *Iteucostegia* PRESL. to which *Leucostegia immersa* and others are referred. Through the courtesy of Mr. E. D. MERRILL, I was so very fortunate as to know the opinion of Dr. COPELAND who was so kind as to send me the following note on this plant. According to Dr. COPELAND "this fern is congeneric with *DavaUia athamardica* CHRIST, *Acrophorus HooJceri* MOORE (*Leucostegia*, BEDD., *Davallia Clarkei* BAKER), *Acrophorus pseudo-cystopteris* MOORE (*Leucostegia*, BEDD., *DavdLw*\*, KZE.) and *Leucostegia ptdchra* J. SM. (*DavaUia*, DON, *AcropJiorus*, MOORE). I would call it *Leucostegia* n. sp. None of the above species has a functional articulation of the stipe. And the base of some stipes of HAYATA'S fern shows a vestigial articulation. The fern is related to *DavaUia*, but not nearly to *AcropJiorus*. The chaff at the base of the pinnra does indeed suggest *Acrophorus* strongly, but this is only an accidental resemblance. There are no such thickenings of the rhacliis as in *AcropJiorus* and its relatives *Diaccdpe*, *Monachosorum* etc., and frond form and rhizome are very different."

*Microlepia* PRESL.

*Microlepia grandissima* HAYATA sp. nov. (Fig. 140). Khizoma?

Stipes 90-100 cm. longus stramineus utriusque basi 1 cm. in diametro. Frons in ambitu triangularis bipinnata circa, 100 cm. longa 90 cm. lata apice triangulata, pinnis infimis longissimis, superioribus gradatim brevioribus



Fig. 140, *Murolepis graniissima* HAVATA; n, the plant; b, a portion of a pinnule; c, a portion of the frond; d, the same, with, *in*hom.

sursnm ad segmenta pinna) termiiiiis aboutibus, pinnis infrais 60 cm. longia oblique cuspidato-triangularibns basi 30-40 cm. latis apice cuspidato-acuminar-tis l»isi triaogulari-acutis i^tiolatis, petiolis 3 cm. longis, pinuulis infimis (lateris inferioris) longissimis, piunulis auperioribus gradatim brevioribus ad

segmenta pinnulse terminalis abeuntibus, pinnulis infimis 5 cm. a se remotis petiolulatis (petiolulis 2 cm. longis) triangulati-lanceolatis 22 cm. longis 8 cm. latis apice recto-acuminatis basi latissimis triangulati-truncatis deorsum fere ad rhachin inciso-lobatis sursum dentatis, segmentis vel lobis infimis triangulati-ovatis 4 cm. longis 2 cm. latis plus minus falcatis vel rectis apice acutis latere superiore latioribus margine subcartilagineo-marginatis serratis, serris acutis, segmentis lobis superioribus gradatim minoribus apice acutis vel obtusis sursum rotundatis gradatim minoribus sursum ad crenam reductis; pinnis inferioribus a se 25 cm. remotis, a rhachibus angulo 60° divaricatis; rhachis frondis inferiore recta sed superiore repando-flexuosa, rhachis pinnularum et costa segmentorum repando-flexuosa superne non elevata dense hirsuta (pilis recurvis brevissimis) subtus elevata glabra, costis segmentorum a rhachibus pinnularum angulo acuto divaricatis, venis lateralibus supra non visis subtus tenuissime elevatis distinctis liberis simplicibus vel furcatis, venulis rectis; pagina superne glabra nitida viridis subtus sub lente pilis minutis parcissime dispersa; textura membranacea vel tenuiter coriacea. Sori sub serris singulis loborum solitariter siti ab apice serrarum 2-1 mm. distantes venulas terminantes. Indusium reniforme 2 mm. latum 1 mm. longum margine superiore liberum crenulatum margine inferiore adnatum.

HAB. Arisan : Arisan-TOzan, ad 8-9000 ped. alt., leg. B. HAYATA et S. SASAKI, 1912, Jan.

*Humata grandissirna* HAYATA in sched. herb. Taihoku.

Near *Davattia platyphylla* DON (HOOK, et BAKER Syn. Fil. p. 99.=*Microlepia platyphylla* (MOORE) BEDD. Fer. South Ind. 1.13) and *D. lonchitidea* WALL. HK. Sp. Fil. I. p. 173 t. 46, Brit. Exot. Fern. t. 19); but differs from them by the much larger fronds with more shallowly lobed pinnae and pinnules. The sori are very much like those of *Humata*. The specimen lacking rhizomes, it is at present impossible to decide whether this is referable to *Microlepia* or *Humata*.

**Microlepia subpinnata** HAYATA, sp. nov. (Fig. 141). Ithizoma subrepens teres 2-3 mm. in diametro pilis obtectum, pilis rubro-castaneis 1 mm.-1 mm. longis. Stipes 20 cm. longus intus (supra) profunde sulcatus subglabratus brevissime hirsutus. Frons ovato-lanceolata 50 cm. longa 24 cm. lata apice acuminata basi obtusa ad medium latissima subbipinnata vel

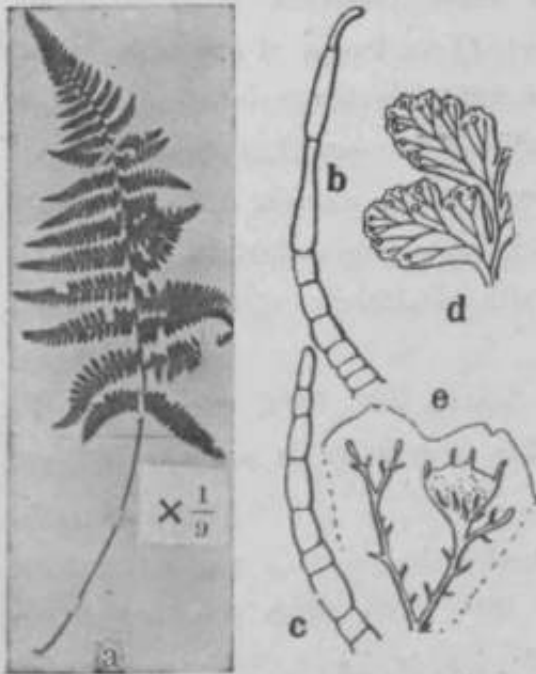


Fig. 141, *Microlepia tibetana* HAYATA; a, the plant; b, hair on the rhizome; c, portion of a pinna; d, portion of a pinnule; e, portion of a pinnule with sori.

1899.

Near *Microlepia tibetana*, but differs from it by the bipinnate fronds with subentire or lobed pinnules.

***Microlepia trichocarpa*** HAYATA sp. nov. (Fig. 142). Rhizoma? Stipes 25 cm. longus teres basi 3-4 mm. latus patenter hirsutus intus (supra) profunde sulcatus, pilis patentissimis 1-3 mm. longis pluricellularibus. Frons ovata apice acuto-acuminata infra medium latissima basi minus lata ab apice truncata 40-50 cm. longa 22 cm. lata bipinnata, pinnis longissimis unari-lanceolatis 12 cm. longis 3 cm. latis angulo recto a costa divaricatis apice acuminato-obtusis (a se 3 cm.

bipinnatifida, pinnis mediis lanceolatis 12 cm. longis basi latissimis 3 cm. latis sessilibus apice acuminatis a se 4-5 cm. remotis, pinnulis inferioribus oblique quadrangularibus 2 cm. longis 1 cm. latis apice obtusissimis basi cuneato-acutis sessilibus basi obliquis lobulatis truncatis vel subtruncatis; costa et costula supra glabra profunde sulcata subtus densissime brevissime hirsuta, pilis sulcatis pressis; testura membranacea tenuissima brevissime hirsuta vel subglaberrima. Sori submarginales vel a margine 1-1 mm. distantes.

IL. R. Ho, fig. K. MIYAKE, Oct.



Fig. 142, *Microlepia trichocarpa* HAYATA; a, the plant; b, hair on the stem; c, portion of a pinnule; d, a portion of the sori.

remotis basi truncatis subsessilibus vel breve petiolatis, (petiolis 3 mm. longis), pinnulis quadrangulatis-oblongis 1½ cm. longis 7 mm. latis apice rotundato-obtusis basi latere superior late truncatis latere inferior anguste acutis ad petiolulum 1 mm. longum abeuntibus vel sessilibus duplicato-lobulatis, lobis vel lobulis rotundato-obtusis brevissimis; rachis, costa vel costula toto hirsuta; textura membranacea tenuis utraque pagina hirsuta. Sori marginales ad sinus lobulorum approximati. Indusium cupuliforme pilosum margine libero ciliatum.

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

Near *M. sulcipinnata* HAYATA, but differs from it by the setulose indusium and very much more hirsute fronds.

*Lindsaya* DRY.

*Lindsaya kusukusensis* HAYATA sp. nov. (Fig. 143). Rhizoma rostratum teres 1 mm. in diametro parvis squamulis Kernerianis vel uniformibus non adpressis 1 mm. longis castaneis. Stipes 5 cm. longus 8 mm. in diametro glaber tenuis intus (superius) leviter sulcatus.

Frons hirsuta 30 cm. longa 1½ cm. lata apice gradatim attenuata; lobis obtusis basi gradatim attenuata pinnata, pinnis utroque latere 50-60, mediis semi-lunatis

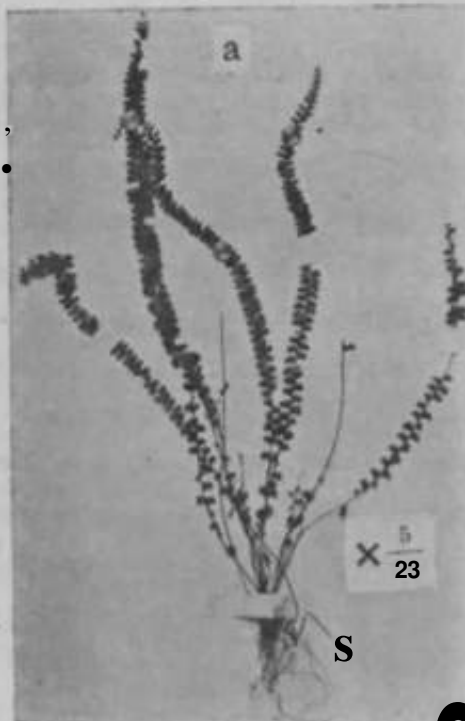


Fig. 143, *Lindsaya taunikitxeris* HAYATA; n, the plant; c, a pinnule; A, a pinnule on the rhizome.

1½ cm. a se remotis 7 mm. longis 7 mm. latis unilateralibus latere superiore late rotundatis (basi latere superiore truncatis 4 mm. longis) basi subito cuneatis ad petiolulum subnullum abeuntibus margine remote leviter lobulatis, lobulis

latissimis 3 mm. latis | mm. longis apice trineatis; venis subfurcatis; textura membranacea. Sori in lobulis singulis solitini lftissimi marginales.

HAB. Kusukusu, Jun. 1912, leg. B. BATATA et S. SASAKI.

Near *L. ctdtrata* Sw., but differs from it by the much narrower and longer fronds with smaller and broader pinnae; also allied to *IAndmTja Unearis* Sw. (in KUNZE Famkränter I. t. 16-1) and *Lindsaya grac\$is = Lindsaya seeurifdia* PKESL. (KITNZE Farnkräuter I., t. 85-1), in the linear lanceolate simple yuimfl'te fronds. Perliaps ft form of *L. cultrcda*. Sw.

*niplasium*, Sw.

*Diplazium arisanense* HAYATA sp. nov. (Fig. 144). Rhizoma ascendens erectum. Stipes tenuis 30cm. longiis teres 2 mm. latus basi squamatus sursum gUibrar tus, squamis castaneis linearibus lanceolatis usque 8 mm. longis usque 1^ mm. latis. Fi^ins 40 cm. longa 16 cm. lata ovato-laneeolata apice acuminata basi in ambitu rotundata bipinnata vel bipinnatifida, piunis iufimia minus Imigis, modiis longissimis lanceolatis 13 cm. lougis 3£ cm. latis apice aenmiuatissimis Iwisi latissimis trni-

catis pinnatis vel pinna^ifi-dis snbseasilibus vel inferioribus brevissime petiolatis, pinnnlis itifimis longis-



Fig. 144, *Diplazium arisanense* HAYATA; a, the plant; b, a portion of a pinna; c, a sorus of the *Hie At?njrium*-type; (1, another sorus) of the *Diplazium*-type.

sim\*s ovato-oblongis 2icm.

lougis lo mni.

Litis apico in ambitu obtusis basi lafco euneatis ad insertionem 3 mm, latis sessih'bens paullo imi>quilateralibus maxgine leviter lobulatis, lobulis paue

serratis, sensibus acutis ascendens, vel pinnula sursura serratis, siccis acutis; textura herbacea j pinnula a rhachibus frondium 50°-60° divaricate ascendente-recurviffi, pinnis inferioribus a a o 4 j cm. remotis, pinnulis inferioribus a se 1 cm. remotis; costa pinnarum surstun supra canaliculata secus canaliculum utroque remote setulosa, setulis cii-c. 1 mm, longis. Son secus oostukm utroque latere uniseriatim dispositi.

HAM. Arisan, leg. B. HAYATA et S. SASAKI, Jan. 1912.

### Diplazium

#### costalisorum

HAYATA sp. nov.

(Fig. 145). Bhi-

zoma? Stipes

40 cm. longus

parce squamatus

fusco-stramineus.

frons triangul< i !-

is 60 cm. longa

totiusque \tdn

apice in anabitu

triangul< i !-

ad summum

eugpk< i !-

latissima bipin-

nata, pinnis in-

fimis longissimis

30 em. longis ] 6

cm. Iatis ovato-

oblongis apice

cuspidato-acumi-

uata, (aciimini-

bus lineai-ibus

2-3 cm. longis 3

mm. latis ob-



Fig. 145, *Diplazium costalisorum* HAYATA; a, the plant; b, apical portion of a pinnule; c, a pinnule; d, a sorus of the *Allantodia* type.



scure dentatis vel subintegris) basi obtusis (petiolis 3 cm. longis), pinnulis mediis longissimis 7 cm. longis, inferioribus brevioribus 5 cm. longis totis lanceolatis sessilibus sequilateralibus apice acuminatis basi truncatis margine (excepto acumine) regulariter lobulatis, lobulis quadrangularibus 7 mm. longis 5 mm. latis apice truncatis margine subintegris; textura coriacea; pinnis a rhachibus frondium angulo 50° divaricatis, pinnulis a rhachibus pinnarum angulo 70°-90° divaricatis; pinnis inferioribus a se 10 cm. remotis, pinnulis inferioribus a se 2 cm. remotis. Sori secus prope costulas utroque latere uni-seriatim siti oblongo-lineares 3-4 mm. longi 1 mm. lati elevati.

HAB. Urai, leg. B. HAYATA et S. SASAKI, Juli., 1912.

**Diplazium isobasis** CHRIST Bull. Herb. Bois. 2<sup>m</sup> série IV. (1904) p. 618.

HAB. in declivitalibus humidis Takao, leg. U. FAURIE, Aprili. 1903.

**Diplazium bicuspe** HAYATA sp. nov. (Fig. 146). *Asplenium Ucvspe* HAYATA. Rhizoma erectum breve. Stipes caespitosus erectus 4 cm. longus complanatus 2 mm. latus squamatus, squamis fusco-nigrescentibus lineari-lanceolatis 3 mm. longis 1 mm. latis apice subulato-acuminatis basi truncatis. Frons lanceolata vel oblanceolata vel lineari-lanceolata 28-30 cm. longa 2 cm. vel 2.5 cm. lata apice acuminata saepe 2-3 lobata, (lobis cuspidiformibus triangularibus apice acuminatis, acuminibus recurvis vel erectis), basi gradatim longe attenuata ad stipitem abeuns margine irregulariter undulata vel remote denticulata vel subintegra; textura herbacea crassiuscula supra viridis subtus pallidior supra glabra subtus deorsum parce minute squamata vel subglabra sursum glabra, costa utraque pagina complanata elevata, venis et venulis utraque pagina non visis. Sori secus costam utroque latere 1-seriatim dispositi lineares a costa 1 mm., a margine 2-3 mm. distantes.

HAB. Arisan, ad 7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan. 1912.

Very near *Asplenium ensi/brme* WALL. (HOOK, et GR. IC. Fil. t. 71) and *Asplenium apoense* COPELAND, but differs from them by the entire involucre and in having fronds which are sometimes 2-4-lobed at the apex. The sori of this fern are usually of the *Asplenium-type*, but sometimes are of the *Diplazium-or Scdopendrium-type*.



Fig. 146, *Diplazium Kawakamii* HAYATA; a, the plant; b, a detail of the base of the stipe; c, a portion of the frond; d, a portion of the frond, showing two kinds of indusium.

***Diplazium Kawakamii*** HAYATA (Fig. 147). Heter. Fl. Formos. p. 435. Stipites 55 em. longi complanato-tetragoni 4-sulcati basi 7 mm. lati fuscescentes tota longitudine dense piloso-squamati, (squamis Hueaxibus iucrasatis sub-teretibus plus minus complanatis basi muricatis fuscentibus plus minus criatis 3-4 mm. longis patento-reflexis vel depresso-reflexis). Frondes

late ovate 87 cm. long © 60 cm. late apice acute basi obtusifolia tripinnata  
superioribus bipinnatis, pinnis lanceolatis utroque latere 10 a rachibus fron-  
diran angulo 40°-60° divaricatis inferioribus 40-45 cm. longis a so 13-17 cm.

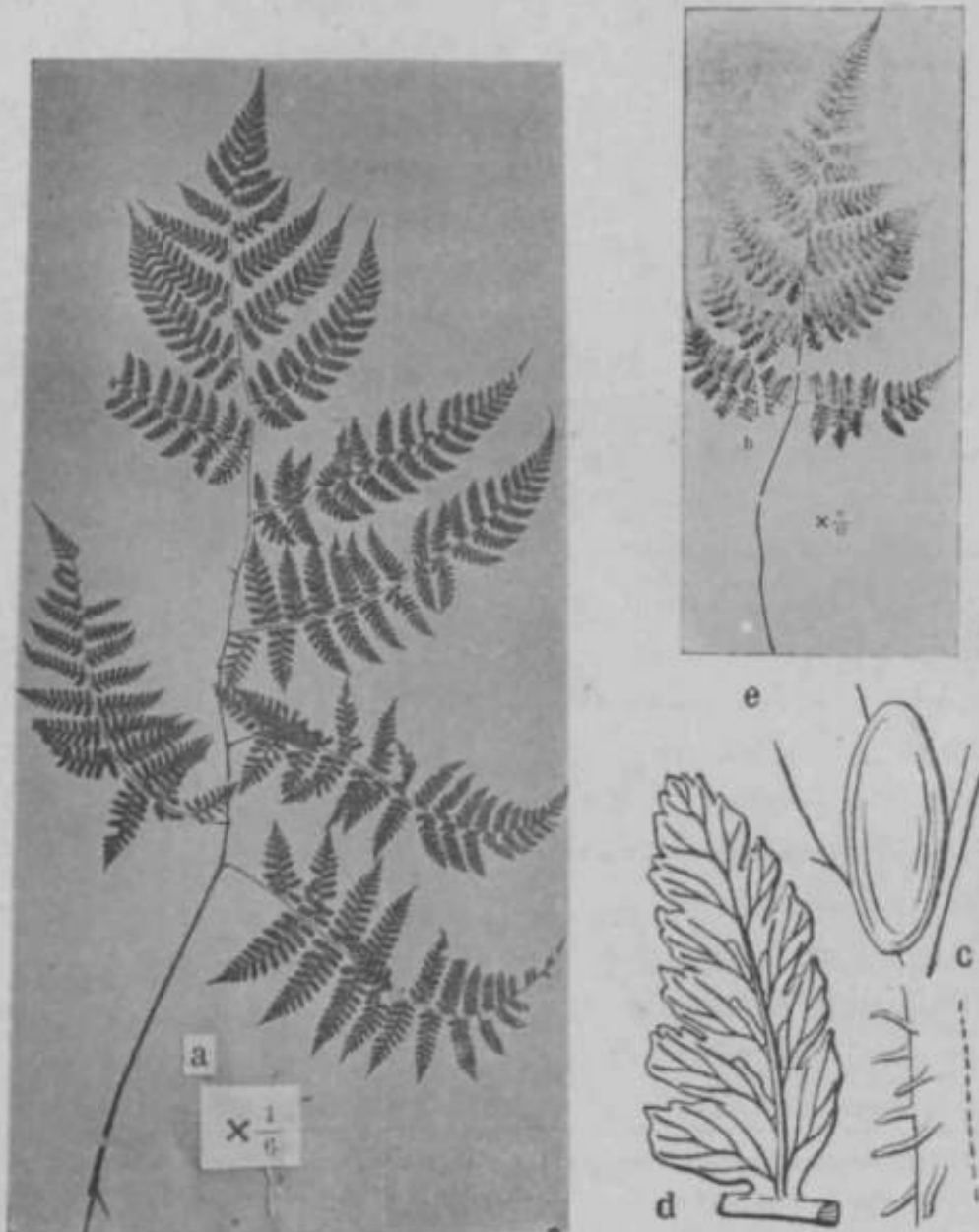


Fig. 147, *Mj&uiutn Kamiknviu IIAXATA*; a, the plant of a tripinnate form; h, the plant of a bipinnate form; c viscid hairs on the stem; d, A pinnule; e, a sori at the *AUantedia-t.Jito*.

remotis, pinnis infimis longissimis 45 cm. longis 17 cm. latis apice acuminatis obtusis longe vel breve petiolatis (petiolis 3-4 cm. longis), remote

pinnatis, pinnulis I. utroque latere 20 inferioribus 5 cm. a se remotis ovato-lanceolatis 10 cm. longis 33 mm. latis apice acuminatis (acuminibus linearibus) basi obtusis breve petiolulatis (petiolulis 3 mm. longis) etiamque pinnatis, pinnulis II. utroque latere 18 inferioribus a se 8 mm. remotis lanceolatis 11 cm. longis 6 mm. latis apice obtusis basi obtusis prope basin latissimis basi constrictis 2 mm. latis latere inferiore pinnis minus decurrentibus margine truncato-dentatis, (dentibus utroque latere 8 infimis longissimis obtusis interdum paucissime sessilibus 3 mm. longis 2 mm. latis apice truncatis ascendentibus); pinnulis I. apice attenuato-acuminatis dentato-lobulatis, lobulis vel dentibus truncatis ascendentibus; rhizoma frondium complanato-tetragonum supra et subtus late leviter sulcate vel simpliciter concave basi 4 mm. late inferiore dense superiore paucissimo squamato, squamis fuscatis filiformibus patente-reflexis; rhachides pinnarum complanate subtetragonum superius sulcate utroque latere (in medio sulcorum elevato-alata) subtus convexo stramineo subglabro; rhachides pinnularum complanate supra sulcatae subtus elevate latere alate etiamque secus sulcos utroque latere prominente verticaliter alate (alis secus sulcos laevae atque dexterae interstitiis 5 mm. latis); paginae siccatum supra fuscescentes glabrae subtus plus minus pallidiores subglabrae, venae et venulae supra impressae subtus leviter elevatae. Sori juxta costam sub quoque dente singuli ad nervulas unilaterales sed ad nervum bilaterales oblongi prominentes 1 mm. longi 2 mm. lati, quinque obtusi.

HAB. Tōsan, leg. T. KAWAKAMI et G. NAKAHARA, 1901.

**Diplazium leiopodium** HAYATA sp. nov. (Fig. 148). Rhizoma ascendente-erectum. Stipes caespitosus 16 cm. longus basi squamatus sursum glabratus purpureo-cinereus vel cinereus, squamis lanceolato-linearibus fuscatis nigrescentibus 6 mm. longis 1 mm. latis. Pinnis triangulatis 20 cm. longa imbricata 11 cm. lata apice gradatim caudato-acuminata basi truncata bipinnata vel sursum pinnata, pinnis mediis angulo recto a rachibus divaricatis a se 2 cm. remotis lanceolatis apice gradatim acuminatis basi truncatis subsessilibus 5 cm. longis 11 cm. latis a medio basi requiritis brevissime petiolatis nervis basin pinuatis sursum lobulatis, lobulis gradatim versus summum ad nervum abeuntibus, pinnulis

innmis oblODgis ovatia 8 mm. tougis 5 mm. laias apice tranoaias apice maxgineqne



**Fig. 148,** *Diplazium Mapodym* IKYATA; b, • Siiili> DF» the rhizome; c, u lobe of it tij>per pinna; d, no in-i-lusinm atitim Atfajrium-tyiw.

denticulatis basE  
snbito late acntis  
sessilibus vel aduatis;  
pinnis infimis plus  
minus desoper refle-  
xis; textura membra-  
nac\*to-coriaoea: costro  
pixuotaxnm su|>ra levi-  
ter canaliculato utro-  
que lat«m iutexrapie  
1-costuLitic, c« w( nl is  
remote sotulosis;  
eostaj aupi-a ^la»ne,  
snbtna pilis unicellu-  
laribus glandulosi-  
obtectffi; vinis viinn-  
**list]ue siipm nou**  
elevatis subtus el«va-  
tdg. Sort utroque  
lateve eostulffi I>LU-  
nnlnmm ot lobonim  
I.-st'iiatint tlistpiti  
wmi-oblongi.

HAB. Arisau,  
leg. B. HAJATA et  
3, S vsAKr, Jau.f  
1912.

Yny iK<sup>i</sup>ar *D.*  
*tenuhaule* HATTATA,  
but ilistijtgiilshabl;  
(mly by jL,t. *indusia*  
wllirli BXQ ill *D.*

*leipodium* denti-  
 culate, whild in  
 7J. *lenitica* »i•  
 they am nearly  
 ciiiiiv.

**Diplazium**  
**subrigescens**

HAYATA ap. HOY.

i Fig. 149). vt%

*rittm Stifrige*»*ens*

HAYATA En herb.

Tailiokii. Ehi-

zoma ascon-

tlento - eictnm,

Stipt:s us«jtui ad

20 cm. loagnfi

albo - stramineus

Imsi nigw>ens

basi phis minus

laBceIato-dilata-

tits baa ilensti

snp^riore paroe

squamatus mtr-

sam, gbibratns,

squamis iuferioribns

cuspidato-lanceolata

acuminatis luist

cordato-wtmidatis vel

rotundatis luiirgiiii;

iiiU-^ris usque 1 em.

limgis usque '2 mm.

latia nijrivsfentibus.

Frons cuspidatfvoviitu

usque 26 em. louga

usque 20 cm. btta

upice longe caiulatn

a mediu usqii« ad basin

seqnilata mnsam sabito

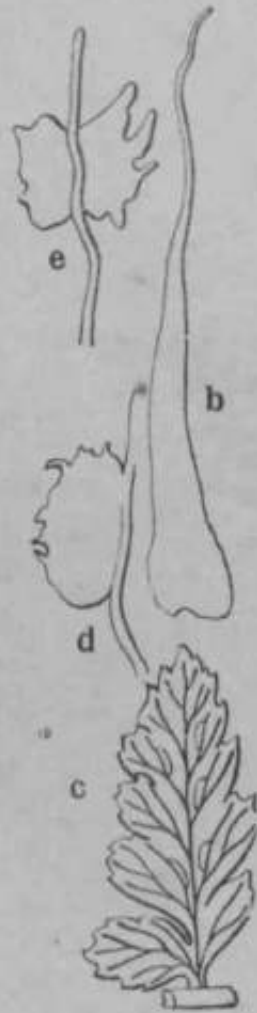


Fig. 149. *XHgtiam mitrtgescena* HAYATA; A, OK plant; h, «• scale of the rliizome; e, n pirinllo; &, fin iniltuiuin of Qu *grium*-type; e, another induaium « the D t E f t y p e.

ad eandam iiKiiii bipiinata,

pinnis mediis ve] basilaribns

subioqiialibiis laneolatis 10cm.

longis 2 cm. lutirt apioe

afuminatis (aoomiue liueari

teniiissimci 1-2 mm. latrj) basi

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tvuncatis nqoSateiaUbus,

piannlis sfjssin>us fere toto

Boquilongis, oblique obluugis \vl

aemitriaBgolaribnfl 1 cm. bngiB

» mm. lutls lateze superiom

I

" \* " " \* " • • • • • " • " " " • ' : : : : \* . . . . . !

apice in aibitn obfaista vel rotnndatis serralatis, semilis pimmlarum acutis.



Khacliis froudia albo-sti-aminea anpra sulcata in sulcis ± pulwsrfins; rliaclics phmsw angnste canaliculate in canal k-u ± pnbaseens supra remote alternatim setulosa; cmtida pinnularum supra impressa remote setnlosa.; pagina snl.)herbftcoa rigesfj^ns atraque suluglabra; piunis ;i rltiurhilmp i'rondis, jiiumdis a rhachibus pinnae angulo 80°-90° egressis, piuuus inferioribns a se 2^ em. remoiis. pinunlis a œ? 5 mm. a se remotis. Sori seciis costiilani utroque latei-e 1-seriatitu dis[K>s[ti, Juttim singulo veutu siti vel mrhis ofacoqne latere ymudldiapoaiti.

HATI. AMBSU?, ad 7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

Allied to - Vliyr'mm rigescen8-MKmo. Whether this new fern and its allied specie should be referred to Jiliyr&m or Dydtisinvi, is very qiifstuiiiable. The

habit of these fenw is ratlier n^ tin\* j4HW/nwj«-type, but tlwi sori arc sonn-1- times dF tlws Dyfazimn-iyv\*\*. Very remarkable for its hnviug \\*>xy l<mg slender tails at the ai»^x of the uiinno.

Diplazium tenuicaule HAYATA ap. nov. iFi^, 160). Itliizoma? Stipes

Diplazium tenuicaule HAYATA  
w \\ fl/i  
K V M 'jisf o  
Jv \\ f, // } 8  
^ V ^ yy \ \

a rliachibus frondium angulo 80° egressis longe lauceolatis 9 cm. longis basi latissimis 3 cm. latis truncatis apice acuminatis pinnatis sursum pinnatilobis, lobulis versus summuin ad semilas abeuntibus, pinnulis infimis oblongo-rectangularibus 15 mm. longis 8 mm. latis apice rotundatis Imsi truncatis margine apiceque denticulatis latere lobulatis, lobulis apice denticulatis. Textura herbacea, pagina supra ad costam remote setulosa subtus ad costam pilis unicellularibus glandulosis oblecta, cseterum glabra. Sori secus costas piimularuni vel loborum utroque latere 1-seriatim dispositi.

HAK. In moute Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

**Diplazium Textori** (MTQ.)

Compared with a specimen so labelled in the herbarium at Tōkyō.

HAD. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

*Aspleniwin* LINN.

**Asplenium adiantum nigrum** LINN. (Fig. 151)...

*Athyrium adiantum nigrum* (LINN.).

HAB. Montibus centralibus, leg. U. MOM, Dec. 1908. Observ.: lihizoma erectum. Stipes cwspitosus usque 7 cm. longus inferiors rubro-piupurascens sursum castaneus basi dense squamatus, sqmimis iuferioribus rabro-atropurpurascens subulato-lanceolatis 5 mm. longis |mm, latis apice subulato-filiformibus basi angulato-rotundatis peltatis margine subintegris, squamis superioribus filiformibus plus minus pilosis, sursum glaber. Frons triangulalii-oblonga vel ovato-oblonga 10 cm. longa 7 cm. lata apice acuminata ad summum obtusa basi ambitu rotundata bipinnata vel tripinnatifida, pinnis inferioribus longissimis a se 1½ cm. remotis angulo 45°-50° a rhachibus egressis, infimis longissimis 4½ cm. longis 24 cm. latis ovato-triangularibus apice lineari-acuminatis sed ad summum obtusis basi triangulari-acutis breve petiolatis (petiolis 3 mm. longis), rliachibus complanatis 1 mm. latis, pinnulis primariis inferioribus a se C mm. remotis angulo 45° a rhachibus egressis 1J cm. longis 6 mm. latis triangulari-lanceolatis apice lineari-acuminatis ad summum obtusis basi cuneatis breve petiolulatis (petiolulis 1|mm. longis) basi pinnatifidis, segmentis obovatis 4 mm. longis 2 mm. latis sursum margine serratis basi integris apice obtusissimis basi cuneatis; segmentis ultimis cum rhachibus luuiianuu subtequilatis. Textiu\*a herbacea cnissiuscula. Sori





Fig. 1B1, *JijrfeBiiHtt* udiojrfwm *nijrum* LINS; a, the plant; b, a scale; c, a pinnule; d, n soms w6>thu *Atlii/r'nim* type.

seciis costnlivs piinuilju'uiu **ntroqtie** liiteru **1-seriatim** tliis^wsiti iimie ap-  
 ]n>xiiua(i liniuliircs vid **intesdtim amcsnin firme reosrri**,

Cumpartxl with an **Eniopeaii** specimen so labelled in the herbarium lit  
 Tōkyō. Perhaps ouu ðf Ihii ^a,l•il;^s ul **Uis specios**.

*Asplenium iridiphyllum* HAYATA sp. nov. (Fig. 152). Rhizoma erectum brevissime squamatum, squamis cuspidato-lanceolatis (3 mm. longis 14 mm. latis apice cuspidatis basi rotundatis vel subpeltatis margine subintegris vel remote subdenticulatis. Stipes sessilissimas brevissimas vel nullas basi siliquatos, squamis sublanceolatis 4 mm. longis 14 mm. latis apice subulatis basi rotundatis subtulatis margine longo remoteque ciliatis fuscostriatis. Lamina lanceolata apice gradatim juncti ad summum obtusa basi attenuatissima ad stipitem brevissimam alnus subsessilis 27 cm. longa 28 mm. lata margine irregulariter cremilata striatoplicata simple versus apicem ascendente-denticulata supra glabra subtus prope costam vel versus apicem squamis minutis parce dispersa, squamis irregularibus

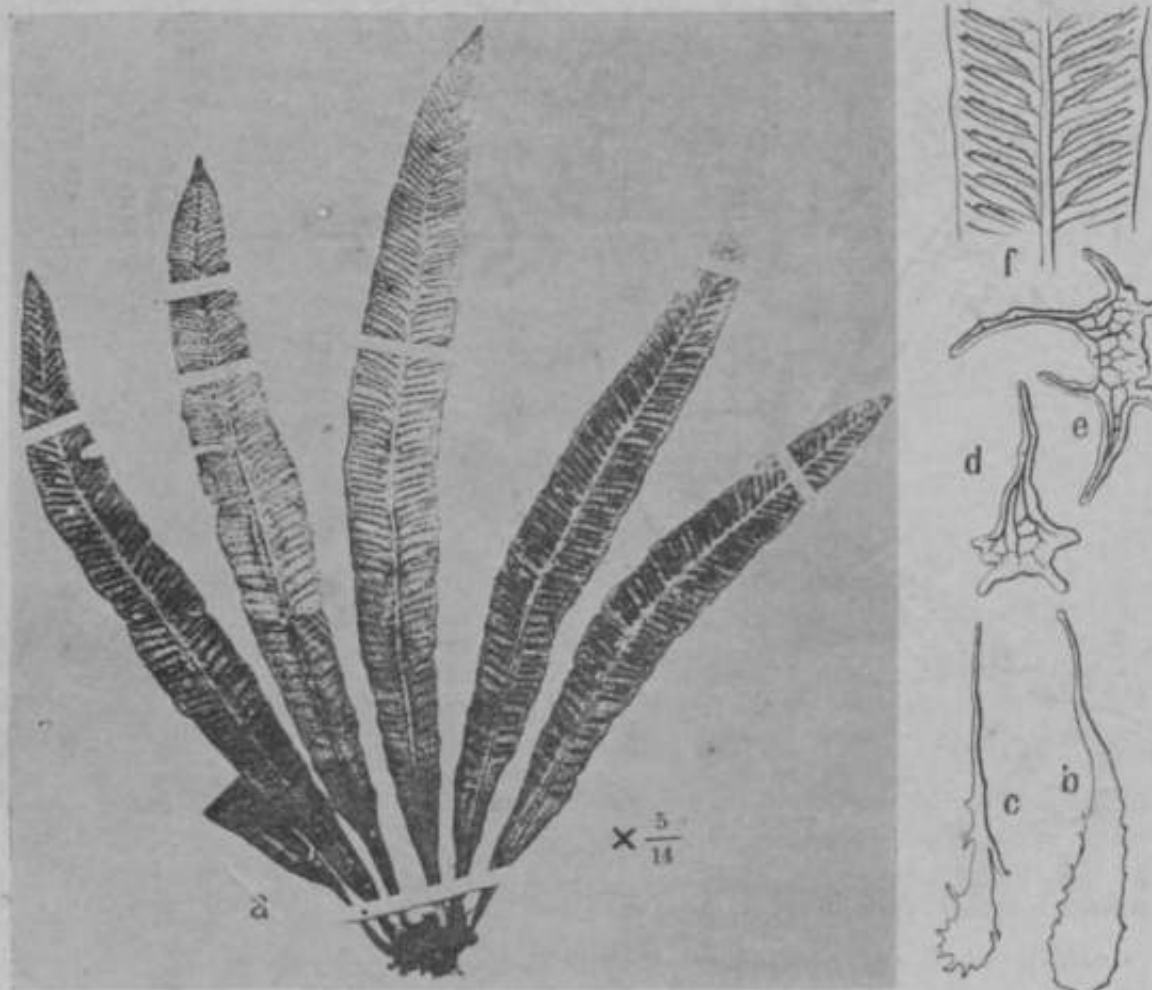


Fig. 152, *Asplenium iridiphyllum* HAYATA; A, the plant; B, a scale on the rhizome; C, a scale on the stipe; D, E, the underside of the upper portion of the frond

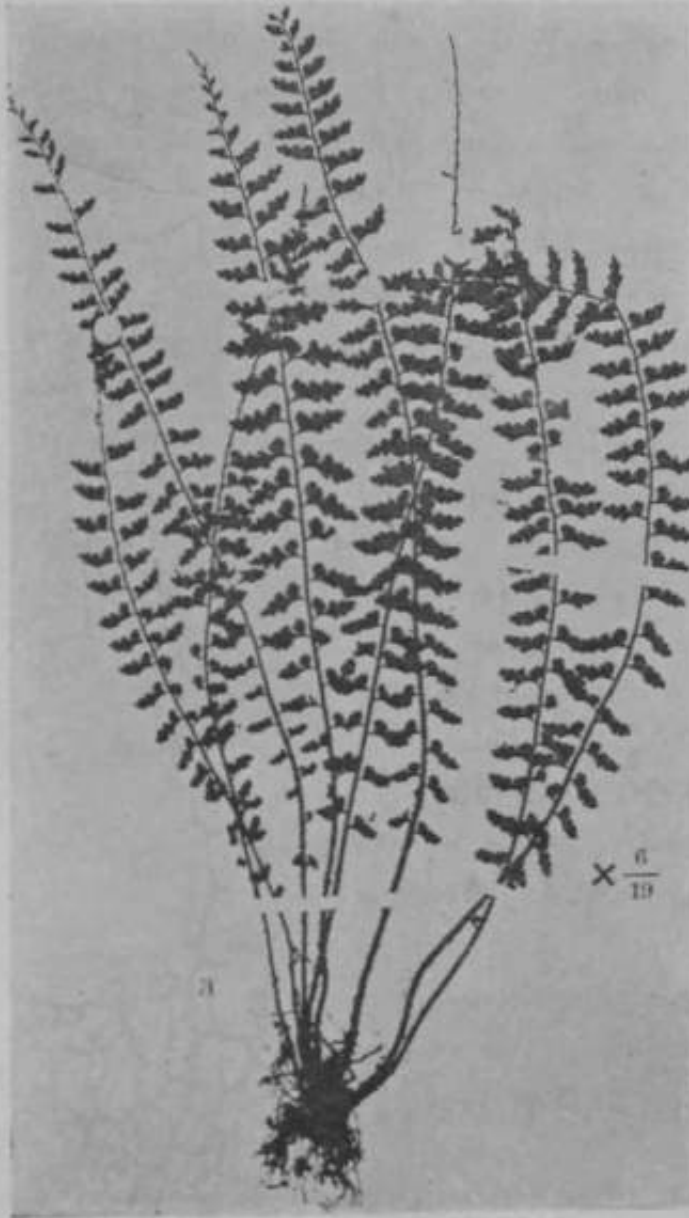


Fig. 153, *Asplenium laciniatum* Dos; a, the pinna; b, a scale on the rhizome; c, the young frond, soon to be mature; d, a young pinna, seen from above; e, a gemma.

amoeboides multinulatis  $\frac{1}{2}$  mm. in retro fusco-olivaceis; pagina superior primo parce squamata demum glabra, costis embriocatis, venis vultibus subcaulis visis. Textura rigidior bawia vel in tenax isoea.

HAB. Sliintiku: Goshōsai, leg. U. MORI, Juni., 1906.

The sori are of a kind of the *Affpctnvum-iywi*, but sometimes, though rarely, pass into the *Diplazium*-type. In this respect, the fern may also be referred to *Diplazium*.

*Asplenium laciniatum* DOH; (Fig. 153) HAYATA *et al.* Mont. J. V. J. JOS. p. 243.

HAB. Mt. Ariaan, Itig. BATATA *et al.* 8. SASAKI, Jan., 1912.

*Asplenium Makinoi* HAYATA n. n. (Fig. 154). *Diplazium*; item *Makinoi* YAJE in Sched. herb. Tokyo, in Mitsum. vi HAYATA Enum, PL Formos. p. 600. Rhizoma? Stipes 20-22 cm. longus

**flavo-stramosa sabglaber oomplanataa** 2^ mm. Intns jmroo squamatos, s<|n:t-  
 mis hit!ceolH.tis 4 mm. longis mgrimutibus. FI"OHB 23cnL.longa totaasque  
 hilti hi ftmbitii snbtutiudutti apicc in amhitn **ratandata basi** im am-  
 bitu **aofco-trnnoata** simplicitei- pinuata, pi i mis **utroque** latera 2-3, ]>inn;t  
 terrainali iis Inteiulibus **oonformi seqailouga** lauceolabi 14 cm. **Iunga 21**  
 mm. lab i apioe **Uneari-aoamiiiata** (jiciimiiw 2om.Iongo 1-2 wau lato)  
 Iwsi **Babito attenuata** ;wl petiolam abettnti (petado 2<an.longo) matgine  
 in-ogulaiiter **dentiotilato-oi'entilata tenuitear** disanper **acgnatiasuoe recurva**.  
 Testniu **herbaeoa craasinaGola** subtns **paHskaafctta** **etapra glabxa** **subtus**  
**squa** mis **ouspidato-ovatis** vel **amceboidaHbns** miuntis **paree disperse** ix>l-  
 1 in\*klii, costis uti-aqne ]>ii^iin; **elerato-oomplanatis**,  
 yenis vrimlis uinupm **pagine** iwinussimis disiincte  
 visis, **pinnie lateialibtis Bobsessilibaa** vel brovissimu  
 j>-tii>l;dis; **thachia ai^nstissbne** iilubi. Sori piupe  
 costam seeus oostam 1-seriatlm iilio<]Uc Iatcro dis-  
 positi a cosU 2 mm...a miU'gine 3-4mm. remoti.

HAI;. **Dtaisba, leg. S. SASAKI, Oct., IiK'.**

The fern was named sevtnil years a^i by **Mr. Y. YABE**; **but the anfeor's origuial** description lms **never been published.** ' Th< above **description** is i liu ii tVnm a spsdmea whicli is quite ifUmtical with tlhi-typo. So far a» I have examined, the sori **axe** of the > K/"''''''''''-ty ]\*3, bul not of th< • **Dipladvn-type,**

Nt^u" **Aspkudum WijMiainm, WAIX. ngiiimtl in** **HooKKK Sp. Fil. III. p. 105 t. 1<7.**

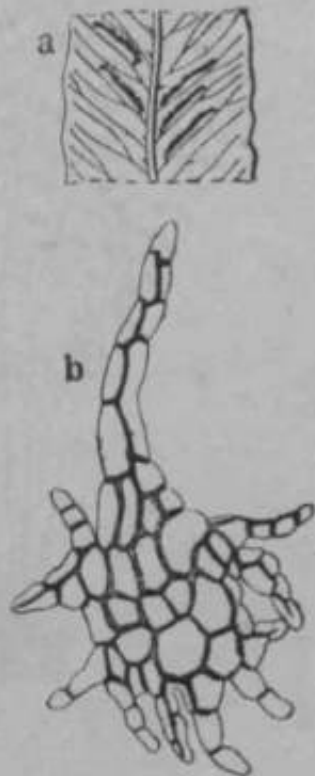
**Asplenium MatsiunuraB CHILST. -**

HAS. Tutōshō, leg. T<sup>1</sup>. **KAWAKAW et S.SASAKI,** Juli. 1912. • MW "..." II tv.m ;

< ompared with a ootype preserved in the hm- **baritun itt Tokyo.**

**Asplenium morrisonense HAYATA n. u.**

**Aqplerditm taaerpUuftilium XIAM. vai'. mommmoMe HAYATA Matiar. Fl.** luruos. p. 438.



Rjg 15/+i v;J,i;.....  
 ii, u por-  
 (0) th(• muliyr BlrfiUtl oftlie  
**fromi**

HAB. Axiaan, log. 1). HAYATA et S. SASAKI, Jan., 1912.

*Asplenium planicaule* WALL.

HAB. Aisan, ad 7000-6000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

Compared with a Japanese specimen BO labelled in the herbarium (Tokyo).

*Asplenium resectum* fcm. *adiantifrons* (V. 155).

HAB. Arisan, ad 7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

This form is so widely different from the ordinary; one of *A. resectum* that I thought it to be a distinct species. But, examining closely, I have found that there are many transitional forms between this and the ordinary one.

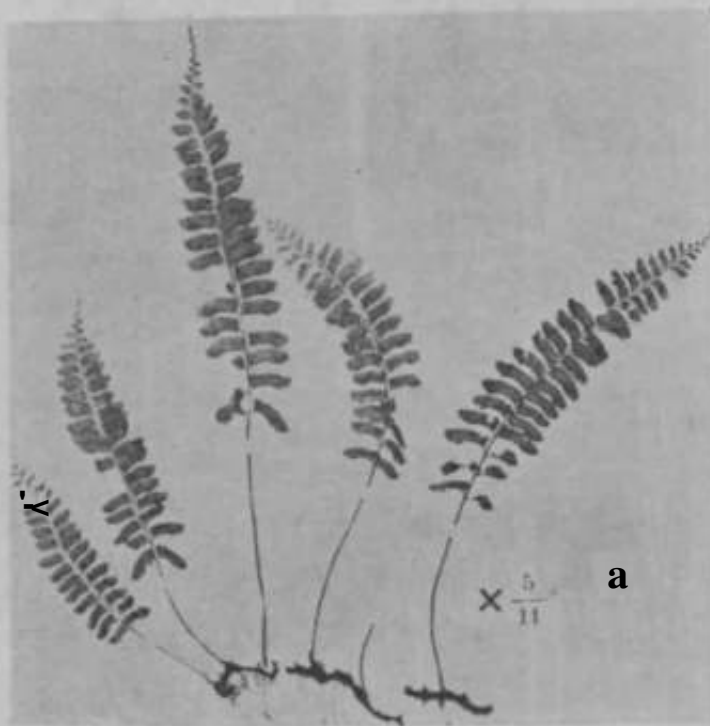


Fig. 138, *Asplenium resectum* SM. form. *adiantifrons*; a. the plant; b, a portion of the frond.

This form, though strikingly different from *A. resectum*, will not claim to be a distinct species, nor even a variety of the latter.

*Asplenium ritoense* HAYATA sp. nov. (Fig. 156). Rhizome areolate, brevissimum apice squamis dense obtectum, squamis ovato-lanceolatis 2 mm. longis, basi obtusis vel acuminatis basi usque cordatis vel truncatis ferrugineo-fulgida margine attenuatis. Stipes 2-3 cm. longus frondibus brevioribus minus squamiferis toto fere longitudine (breviter excepto) adnatis 1-2 mm. longis. Pinnis elongato-triangularibus 8 cm. longis 1-2 cm. latibus apice obtusis basi late truncatis, a basi ovatis 5 mm. a se remotis lato ovatis

9 tmii. longis 7 mra. latis apice obta-  
 sis vel tmoatis lwsvi siibito cuneatis  
 subpetiolulatis ineiso-lobatisi lobis  
 lirevissimis ± acutia sorimi singii-  
 llr 11 gereu tibus ;r] laelris fn »Jitli urn slab L  
 •nni alis U nit ii. Lita; textmtv herbactai x  
 otraqoe pagint: ^labni, costis vonis  
 lateralibus auprti (1isiiiic« OIBVEIUS sul>-  
 ;IIS non elevatifi obsoaris. Bori lateve  
 laboram Bingnlo [roxim« sifci, Iinltisiuni  
 lunulare margine iiiL-asrjiitim rabro-  
 punctatum 1. mm. loughnm .} mm. latara.

SAB. Mi. Bitussan, ad 6500 ped.  
 alt, lge. T. KAWAKAMI, Juli. 1913.  
 Xear A. davaUioides BOOK.

*Asplenium rut\*folium* KmZE.

*A#plettiitm preHongaivm* HOOK. f.

HAIS. Ari.sau, *Us. Ii.* HAYATA el S. SASAKI, Jan., L91&

Compared with ;t specimen so labelled in the Tokyo kerharinm.

*Asplenium scolopendrifrons* JIAYATA sp. DOV. (Fig. 157). Rln»>ma  
 breve ei-ectum aqnamatom, squamia enspidato-lanoelafcia !osco-«wtaiu is  
 3-4,mm. Inii^is; ] mm. latis apioe subnlatis



Fig. 1B6, *Asptenfam riftwnw* HAYATA;  
 ii, tlif p3a&1; b. n fn»»1; <. n »calo an  
 tlif- chisame; A, ftpkatt jwrtioii of « frand:  
 B, ;iDOther i«irtiim of the from! uit.li mi  
 imlusinm before opnnii>g: f, mnrRi'i »<sup>flll</sup>  
 indnaiEam.



Fig. 167, *ASJ. eolqiendrflma* Ilv. a; n, the plant; b, a scale on Lin-  
 rhizome; i, d, Kncwlwida! BMOB on vlif tmrat mnfae of thfifaond; B, aportion of the  
 Erontl: r. no indsjum.

ba3i rofcmidatis subpeltatis maxgine remote dentato-ciliolatis vel snbintegrifl. Frons obtiuceolata 13 cm. knga l£ cm. lata apice obtasa vel obtiisissima basi lo»ge attenuata a<l stipifcem brovissimim abeana maxgine tmuiissime recur va, irregulariter {•niiilniii **snpia** subglabiu snbtus parce squartlis ilisjua'sji, wjuainis minntia amoeboides mulfciradiatis j- mm. **in diometro**. IVxiii **berbaoea**. S\* i lmnlati «iciis **costaa** pmi>e **maxginem** exteusi **approximati** utif»qn« latere 1-**seriatuoa** dis[K>siti.

HAU. Arisaii, leg. S. SASAKI.

Near *Aatfeniwn seclcpendrioufex* J. SM. but differs from il by tho much smaller fiimds **with** ^ely obtnae apex.

*Asplenium tenuicaule* HAYATA sp. nor. (Fig. 158). Rhiaana enectom

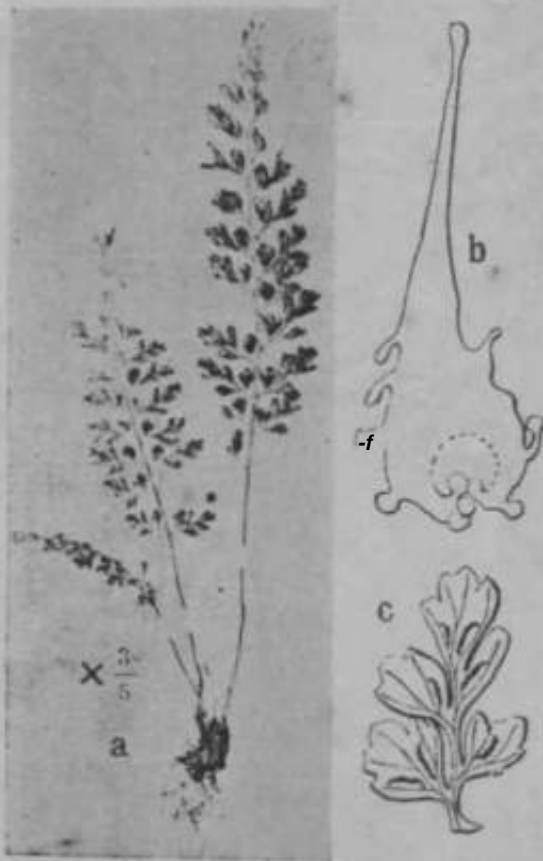


Fig. 158, *Asplenium tenuicaule*: HAYATA; a, the plant; b, ft acnlo on the rhizome; c, a pinna.

HAB. Arisan, ad 6000-7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

brovissiinniri. **Stipes cscapitoEH** teanarimnB Som.lougos sabtos (extras) atro-rabn Hpttrpmaaoena bad squamatus sni-sum glabratus, apamis inferioribaa cospidato-IanoeoLitif! ;; mm. longis ¶ miu. latis basi oordato-deonrrentibus cotnndatia umrgiuo integris remote panoeqte glanduloso-ciliolatis vel nbsoletis, anpeiEtovibna lineari-bns minoribus. Frona lanceolaia \» -1 lineari-lanceolatn 8 cm. luuga '2 cm. laU apice aetimmata basi obtusa bipimjatifida, piuiis oblongis 13 mm. [ongis (i mm. latis iipice obtusissimis Im^i ciincjitis, iHitiulis 2 inni. longis, **pimmlifl** <>btriangulai'i-Ims vol (ibrvtatis ;i)ioe **lobatls** Iwisi august, hounatte, lobas **BOMB**. Text an tenuissime herbaoi<sub>sa</sub>. Sori lineares limiiljiti 3 mm. Iougi.

Near *Upl. aiwn pzMrmae* HANCE, but differs from it by the broader lobes of the pinnules.

*Asplenium tenuissimum* H.VYATA sp. nov. (Fig. 159). Rhizoma brevissimum etum fauna Stipes otespitoea s«mit<ir(is Issvis teonisBimna 15em. lougiis liitidus intus isupra) eanalieilntt>-plami« viridia sulitns astna convexns nigro-rabro-pnrpmasoens nitidiasimiis parce sqaatnatmi, Bqnamis inffvioriliis onspidditis 3 mm. losgis baea 1 mnu lntiw, snperioribns Ibiaftribnfl

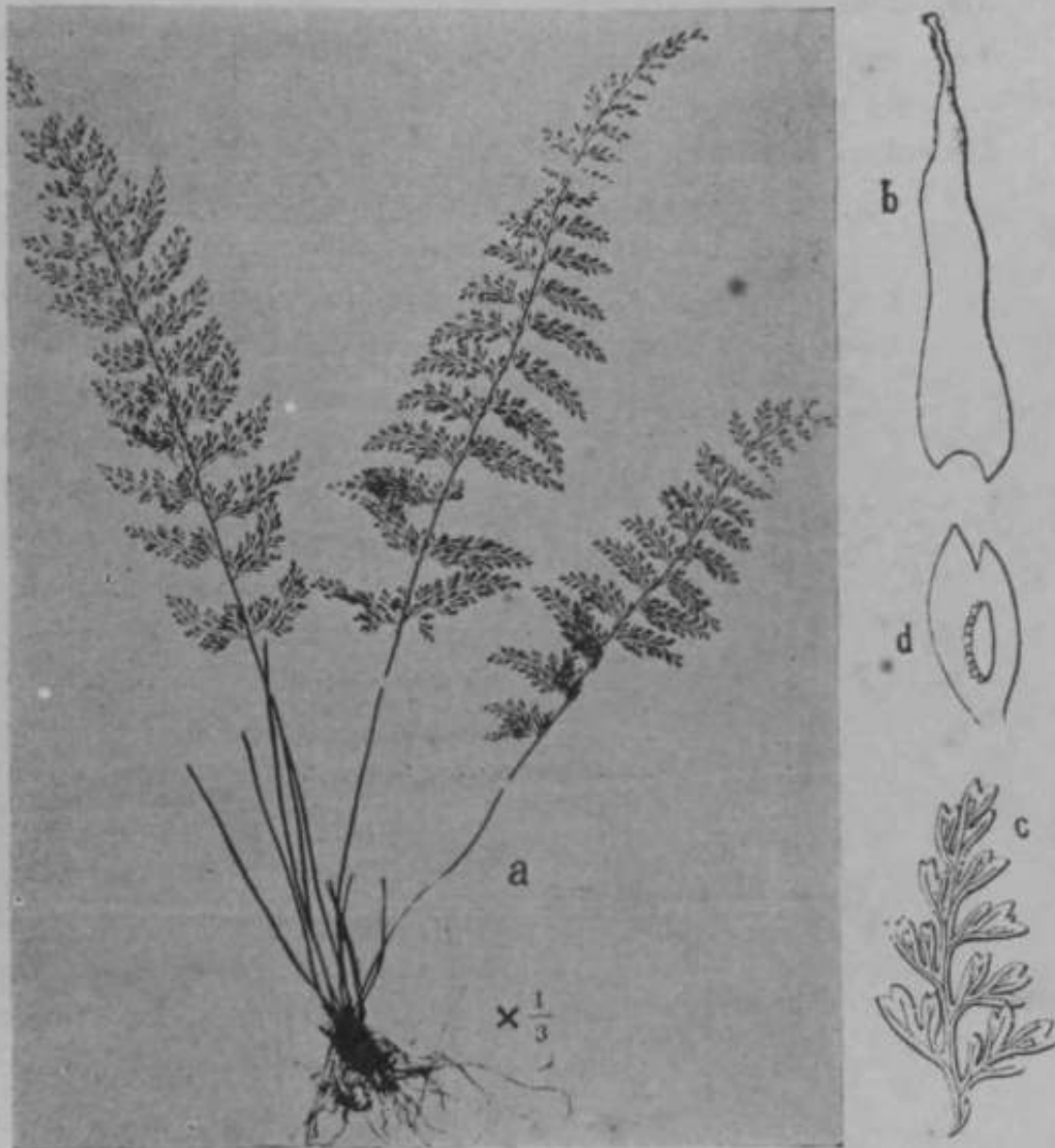


Fig. 159, *Asplenium tenuissimum* HAYATA; a, the plant; b, a scale on the rhizome; c, a pinnule; d, apical portion of the same with a sorus.



piliformibus 2-6 mm. lobiis **rabro-purpureo-aequantibus**. **Frona** **herbacea** viridissima laevigata **apice** **aenminata** basi **truncata** **25 cm. longa** 7.1 cm. Ita. tipinnatis vel tripinnatis pinnae oblongo-lanceolatae, **infrioribus longioribus**, hinc **patentibus**, mediis a **caeteris** cm. nunquam inaequalibus frondibus hinc **divaricata** oblongis vel oblongo-lanceolatis apice **obtusis** basi acutis vel ubique truncatis 3 em. longis **IV** era. Litis latera superiore latioribus quam latere inferiore, pinnulis ordinis primariis infimis latere superiore



Fig. 160-A, *Asplenium unilaterale* IAM. var. *obliquissimum* H. J. TAXI; B, the plant.

axilla 1-2 mm. remotis, a se 5 mm. remotis oblongis apice **obtusis** basi acutis 1 cm. longis **C** mm. latis, pinnulae ovatis secundariis oblongis integris vel 2-3 **lobatis** apice acutis basi **truncatis** 3-4 nunquam inaequalibus **pinnae** **obtusis** **1-2** mm. longis. **Scad sablobo** **pinnae** **obtusis** **1-2** mm. longis. **Scad sablobo** **pinnae** **obtusis** **1-2** mm. longis. **Scad sablobo** **pinnae** **obtusis** **1-2** mm. longis.

11 \ B. Ariwau, J. V. H. G-7 (MW) psd. alt., leg. B. HATATA et S. SASAKI. 1912, Jan. ..

Near *Asp. lenticulatum* Do\*, (H(X)K. 2nd Gut. **Fern. t. 29, BEDD. Fern. Smith Cod. t. K-H, Hfindb. T. u. Brit Titd. p. 161, fig. n. 7 H i, but differ- s Fimmi it by th<; narrower fronds with much n-uioh v pmsa.**

*Asplenium unilaterale* Tur, var. *obliquissimum* HAYATA n. v. [Fig.

L60A-B). liliwmii' n]MMs terea tettuissunmn 1.1 nun. in diametro sqnamatnm. Stipes usque 9 cm. longus nitidns fuseo-purpnræeens 1 mm. in diametro seotionifl gracillimus glaber basi dzsquamatus. Frons lanceolata apice acnminatissima (iwumiim lhu«irrii j. medio usijim ad basi tequilatii l»i«i snbtruncata asque ad 17em. longa usqw- ;id '2\ cm. lata pinnufci, ]>innis mediis inftiriuribiis snbeeqnOongiB, superioribus minoxTbns versus apioem ad dentem brevem abeuntibus, pinnis tnferioribus a se 8 nm. remofcis augnlo 50° a rhacMbus frondium ditari- eitfs obli(que lectniigularibus li cm. longis 4 mm. latis versus apieem obtnso- a<sup>TM</sup>tis ad snmraum obtusis ± ascenduntibiiK l»asi ocnto-onneatia eobsessilibna vel Immssiine petiolatis valde infiqnilateralibus, latere superioris basi G mm. lato, latere infeiore subnullo, margine anperinrt; uliscure crenatLs marguoe inferioia snbiutegris; pagiu a ntxaque glabra tenuissim^ membranacea sfjinihya- lina. Sori a medio t'nmdis snxsn] dispositi.

HAB. Arisan, ad 7000 pad, alt, leg. B. HAYATA et S. SASAKN .Tan., 1912.

This fern is of a form so strikingly difikvent from ordinary one of thn type. But, the transition from this extreme form to tlir ordinary oue lias led mo to l'ijgnrd the former as a variety of thn latter, nr imuv likftly as a mer. • foxia of the sunn; species.

*Asplenium viridissinunn* HAYATA sp. nov. (Fig. 1(H). RUizoma? Stips 40cm. longus bsysi [«irce sqnamatns pnrpureo-virideso tns snparue glabratua anbriiidesoens, squamis angnsto-ltnearibus 13 mm. longis li mm. latis vrl valde tnioribus et pilifonnibus. Frons lanceolata 70 cm. longa 35 cm. lata apiuu acuta VB! acuminata basi in ambitu i-otnndata tripinnati- :ida, pinnis inferioribns longissiinis, infimts plus minus brtmoribus, superi- ortbus gradatim minoribus, ])hmis longissimis pyramidali-lanoelatis 20 cm. longis 8 cm. latis obltquis (latere superiore Intiorn Iwsi 6 cm. lato, Intern Lnferiore minus lato 4 cm. lato) basi 10 cm. latis apice acnminatis (acumini- Jbtis pinnarmn lineaxibns dentatis), pinnis inlimts 5^om. longia Scm, latis apioa obtaso-acutis piuuati\* vol pinnatiMia pyramidalibufi luusi ktLs- simis petiolokfcis (petiolulis 3 mm. longis), pinnulia ordinis primarii utroque latera pinme inferioris 0-7, infimia ovatis 18 mm! longis L0 mm.



Fig. 160-B, 1.  
iKtrtion of the front L.



Fig. 161, *Asplenium* ... *tr. Missbnum* HA-  
*KXXJL*, a, the pbit: b, » soale en the Btipe;  
 C, n hffir-ijKc scnl.- .hr .stij»' j<sup>iiiiiii</sup> i

[atis apioe obfauais Uisi aouto-  
 onneatts ad petioluluin 2 ram. kragtun  
 aH uutilms margine simplieitei<sup>1</sup>  
 v<il duplicato deutato-lobulatis,  
 lobnlia aoutas; bextora herbaeea,  
 jiagiua snpra viridissina, snbtus  
 minus viridi. Son. sub lobnlia pbum-  
 larmn priinnvinnrnni w! socundiiriuniiti  
 ^Iiij;uJi iil)<nij^i 2j mm. longi. Pin-  
 na<sup>1</sup> medui<sup>1</sup> et sniHTj'invs ;t rhachibns  
 innulinm aupjiil\*) 50<sup>1</sup>11i varicfteQ; Ji IIIa  
 infenores a rbachiboa Erondis angnlo  
 90Pdraricate. Jthfcliis fpondis cttm-  
 planato-teres sttpi-a uugiistt-; snbalata;  
 rhachis pinnarum presertim superi-  
 ornrm et i)iunnlavum distinate aJata,  
 oum ulis 31 mm. Ifita ; t-Mstis mediis  
 rhachianun fcennibna ntroqxie diaktnte  
 elevatia, costolis pinxtulamni snpni  
 ilistincte subtus obscure tliiwitis.

IIAI; Aiiisut, leg. B. HAYATA ot  
 s. SASAKI, -hiu., 1912.

Nari c *Aerpt&ritm* *STerlensianvm*  
**KZE.**, but diftem fmra it by Mm mnch  
**broader** fertile pinnules. Ateo near

Fig. 161, *Asplenium* ... *tr. Missbnum* HA- *Asp. offim* Sw., but distinguishable  
*KXXJL*, a, the pbit: b, » soale en the Btipe; \*<sup>iiiiiii</sup> If . III i<sup>TM</sup>  
 C, n hffir-ijKc scnl.- .hr .stij»' j<sup>iiiiiii</sup> i N.MIMIJ, much  
 ... apimi portion of u « «un ^ pimate ;,iiH(S I)f hfirtMoera teitaie.  
 Aspkuium Wrig. -rj.V:tl- aristato-ser. uia tUm HAYATA n. v. (Fig.  
 •'•-./o aw\*<sup>TM</sup>\*<sup>1</sup> K7tw -s-ujiii. ladiameteo castaneo-nlgreH-  
 Wa glabemmns. Krona in atAffiato-lanoeJate SOcnuloogia 25om.latn  
 apioft cuudato aiianinat'i basi in ambitii aotftaQ^^ mmia tonninali li neari  
 acuto-uncinato-dentata 7em.bmga mwmiiiafa, p.....,.....^..... inf^m,...

longissimis lanceolato-ovatis 14-15 cm. longis basi 13 mm. latis apice acuminatis. Venis basi latissimis gubito cum-ato-acutis ad petiolum 5 mm. longum abeuntibus margine duplicatoserratis, serris apice uncinato-recurvatis, primis mediis a se 2-3 cm. remotis, petiolis alatis. Testina herbacea, pagina viridissima, costis et venis utraque paginae elevatis, venis tenuissimis subfurcatis; rachis supra sulcata nigro-castanea, glabra inferiori non alata superiore alata cum alis 2 mm. latis. Sori lineares a prope costas usque ad sinus serrarum extensi utroque latere costae nriseriatim approximativim Imsi pinnarum utroque jul apicem dispositi.

HAB. Urni, I. #. B. HAWAII, Tuli., 1912.

DIFFERS a *U. lyx* (MAKESO Dianexog. et Pterid. I. t. 5) by the more sharply acuminate teeth curving downwards, more closely arranged, and by a much thicker texture. Also near *Asp. conlissim* KLF., but quite distinguishable by the sori reaching nearly to the margin.

*Athyrium erythropodum* Worn.

### *Athyrium erythropodum*

HAWAII sp. nov. (Fig. 163). Rhizoma. Stipes 40 cm. longus gracilis 2 mm. in diametro. Musci pure squamati laudantur. Leviter jo-purpurascens. Frons ovato-triangularis 23 cm. lata tenuissime ensidato-recuminata. Imsi latissima subtenuata bipinnatis, & inferioribus a se 4 cm. remotis angulo 50° a rachibus egressis, primis mediis longissimis triangulari-lanceolatis 15 cm. longis 5 mm. latis apice lineari-acuminatis tenuissimis (acuminibus nearboea natsxm BUTM subsubulitis) basi petiolatis (petiolis 5 mm. longis), primariis inferioribus triangulari-oblongis Mem. longis basi 7 mm. latis



FIG. 163. *Athyrium erythropodum* Worn., var. *hihihi* XI rufifolium HAWAII; a, the plant; b, the frond.

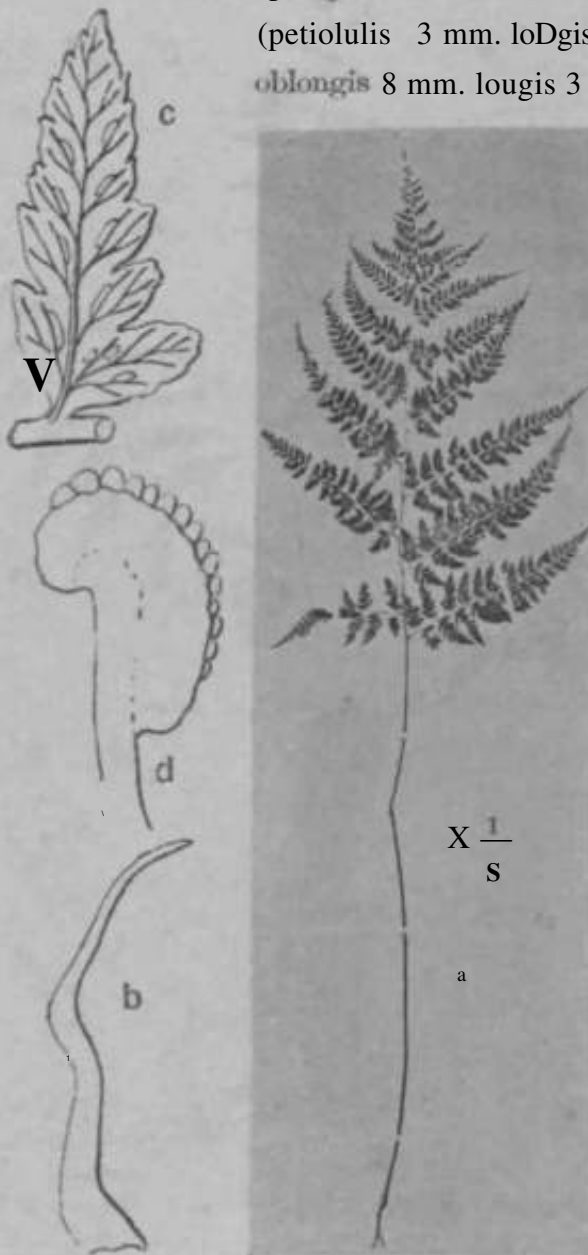


Fig. 163, *Athyrium reflexipinnum* HAYATA; a, the plant; b, a sori on the underside of a leaflet; c, a leaflet; d, a sori of the *Athyrium*-type,

apice aetis basi lato aetis vel rotundatis petiolulatis (petiolulis 3 mm. longis), pumatifidis, segments iiifimis oblongis 8 mm. longis 3 mm. longis apicinato-aoulas l>asi

onnetm contmifcis. Textura horbaea. Sori utii wj uo latero secns costiilas segmeutoriim 1-seriatim <lisjx>siti sj'mi-obloiiigi recniTati.

HAB. Ioute AvLsaii, leg. K. HATATA tit S. SASAKI, Jan., 191-2.

Nwir Athi)l'inn macroi••<>-pum (BL.).

### *Athyrium reflexipinnum*

HAYATA sp. uov. (Fig. H'AK Rliizoma erectum loughiiscuhim cam reliquis sfcipitum 1cm. in dtiUiietro. Stipes caespitosns n^!ue 5 cm, longiis straminens

basi sqoamatiis Bmaqm glabev, aquamie Lineaii-Ioncaolatis osqtie 7 mm. longls g mm. latis ftp sulml;itis basi Latissimis fartinoati fiHCHIitibiis. Frons lau^eolata <\*1 ovato-kincaolata 11cm. lougha, 34 c-iu. Uita apice acnminatis?

lacumiutj linear!) basi in ambit ti tibtusa pinnatii, piuuis pftb

I»iis sni);jfiiribua a rhacUibus oO'-0(r egrassis, modiis lioriaon<sup>4</sup>. ili

ten pafceutibrts, inferioribia downer r^flexis, metliis Iougissimis, infimis InitvirihiH, snporioribus brovioribiis versus Bommum al deut^m aoombiie retluctis, metliis a SB 1 cm. remotis iriiLn^ulnri-hiucoolvtis 2 cm. loughis 12 mm. latis apiee acutis basi truucutis sessilibus basi lutore sui>eriore

quain Intere in-  
 feriors, pin-  
 liatifidis Tel  
 pinnatibisi,  
 I obis infini-  
 (latere anp3ti-  
 ore) ovatis 5  
 mm. kmstis 3  
 mixulatusapioa  
 iii :ii til > tn ob-  
 tusis basi plus  
 minuscontractis  
 margine  
 Hscendentu-  
 deufcatis apioa  
 tri. (J < N 1 :tt IS,  
**dentibus tri-**  
**angularibus**  
 .acutis i mm.  
 longis: rli.i-  
 ohis pimrmu  
 biisi suj>ra  
 lobos in&nosl  
 mm. lata, oos-  
 tis pinnarum

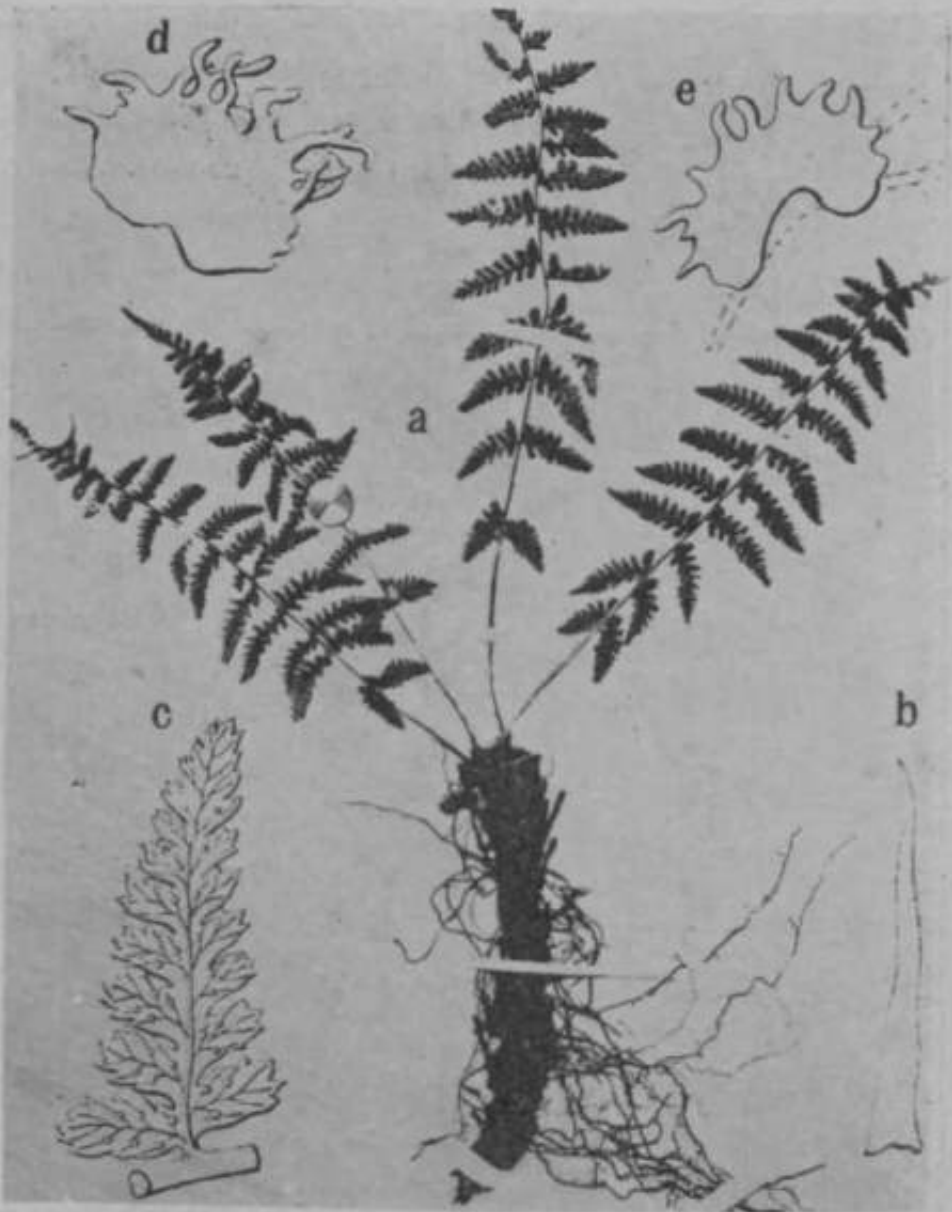


Fig. 164, *Athyrium tozanense* NAYATA; a, iha plnnt; h. « flaal  
 I toai " » wm- . . . . . e, unothar one of lik»

tiis ± iiluvntis; toxtura herbaeoa. Sn-i hems oostaa pimumua wi seeus  
 oostnks loborum piitnsrant otanqoe ktere l-aeriatim dispositi Bemio-  
 pln5 minus r-cnrvl wl somi-orbicuUras. Indusimn breve snbcordahun rei  
 recurvato-lunulare.

HAS. IU moute Mocriaon, leg. S. SASAKI et T. KAWAKAMI, Oct., 1909.  
*Athyrium tozanense* NAYATA U. n.

*Blechnum integrifolium* HAYATA Mater. FL Forinos. p. 440.

HAB, Ariaan, kg. B. HAYATA et S. Sasaki, 1912, Jun.

*Blechnum, luss.*

*Blechnum integrifolium* HAYATA sp. nov (Fig. 165). Rhizoma erectum acrostichium relictum stipitibus nectum teies cum reliquis stipitibus

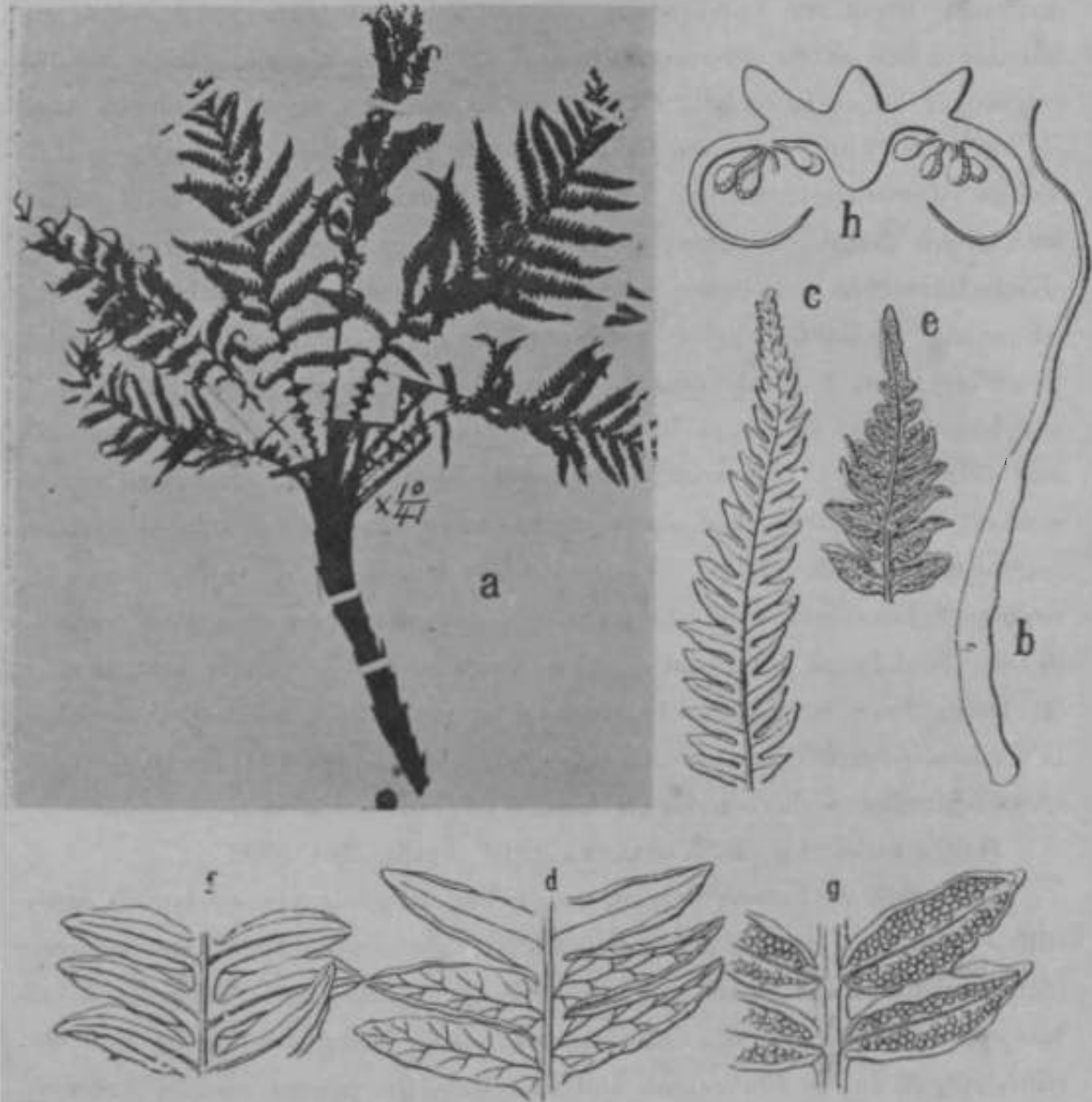


Fig. 165. *Blechnum integrifolium* HAYATA; ft, the plant; b, ft scale on the rhizome; c, a pinna of a sterile frond; (d, « portion of the fertile frond; e, a pinna at a different angle; f, a portion of the fertile frond (upper surface); g, the same (under surface); h, cross section of the fertile pinna; a magnification of x10/4; a natural size; others more magnified).

1½ cm. in diametro plus quam 15 cm. longum pdrimiliter supra terrain erectum (supraterraneum) apice frondes skriles et fartilesque profuse emittens. Frons sterilis: stipes brevis 3-4 cm. longus squamis dense obtectus, squamis linearibus 1 cm. longis basi 1 mm. latis apice acuminatis filiformibus basi obscure peltatis margine integris; frons obovato-lanceolata 20-25 cm. longa 10 cm. lata recto-patens pinnata vel pinnatifida apice acuta vel acuminata basi subito attenuate ad stipitem brevem abeuns, pinnis mediis longissimis lineari-lanceolatis 6 cm. longis 12 mm. latis apice acuminatis basi contractis a se 1½ cm. remotis ad rliachin pinnatifidis, segmentis mediis oblique lineari-triangularibus 7 mm. longis 2½ mm. latis apice subito acutis vel obliquis margine integris; rhacliibus pinnarum subalatis, alis irregulariter oblique inciso-fidis, segmentis alas iis pinnarum ffiquantibus; pinnis infimis subito ad pinnam auriculiformem reductis, auriculis oppositis vel alternis gradatim minoribus a se 6-7 mm. remotis, superioribus angustato-quadrangularibus 7 mm. longis 3 mm. latis basi dilatatis apice obtusis a rhachibus frondiurn angulo recto divaricatis; pianis superioribus angulo 50° divaricatis, inferioribus angulo recto egressis; textura sul)coriacea pagina glabra, rhacliibus costulisqua utrarjuo pagine elevatis toto glabris. Frons fertilis: fronde sterili suba3quilonga ± angustiore lanceolata 6 cm. lata pinnata, pinnis a se 1 cm. remotis lanceolatis, mediis 3 cm. longis 7 mm. latis apice longe caudatis, caudis linearibus 1 cm. longis 2 mm. latis apice obtusis, basi ± petiolulatis, inferioribas gradatim mlnoribus, pinnatifidis, segmentis linearibus 6 mm. longis 1-2 mm. latis, subtus toto longitudine soriferis; rhacliis frondis angustissime alata.

HAB. Taitō: leg. T. KAWAKAMI, 1910, Aprili. (No. 4902).

Quite near *B. Fraseri* LUEKSS. and its variety *philippinense*; but distinctly differs from them by the smaller fronds with entire pinnules. The occurrence of this group of the genus in Formosa is very interesting. There are in all two species and a variety; one species exists in Newzealand, a variety of the same species in the Philippines and the other, the present one, in Formosa.

### *Coniogramme* FEE.

***Coniogramme parvipinnula*** HAYATA sp. nov. (Fig. 166). *Bhizoma?* Stipes 40-50 cm. lougus subgkber stramineus. Frons ovata vel ovato-triangularis 60 cm. longa 40 cm. lata apice triangulari-acuta basi in ambitu late obtusa



bipinnata, pinnis inferioribus longissimis superioribus minoribus sursum atque pinnae simplices lanceolatas reductas, pinnis inferioribus pinnatis (petiolis 3-4 cm. longis) a seorsum 13 cm. remotis pinnatis utroque latere rariachis frondis 6-7; pinnis superioribus simplicibus (i.e. non pinnatis) utroque latere 8; pinnis inferioribus pinnatis lanceolatis 30 cm, longis basi

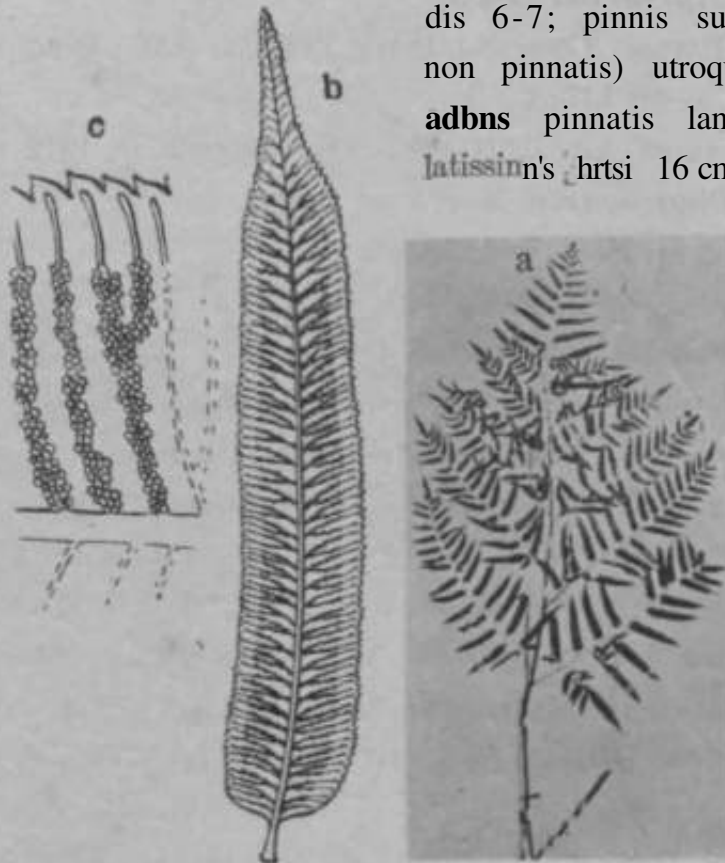


Fig. 166, *Coniogramme* *tricuspidata* II. \*L. the plant; b, ft pinnule; c, n ortion of the *annc*.

superioribus vel pinnis superioribus minoribus laetioribus stissilibus 27 mm. longis 6 mm. latis; pinnis a rariachibus frondis angulo 45°, pinnulae a rariachibus pinnarum angulo 80°-90° egressis; venis **foto** liberis fereatis, ramis ad prope apicem serrularum attigentibus, ramis ad apicem clavatis. Teitura herbaceo-membranacea. Pori lineares a costa usque ad 3 secus venas extensi. Indusium nullum.

**HAB.** Arisan, L-g. li. HAY AT A .1 S. ASAKI, Jan., 1012.

I have much pleasure to describe this fern as a **species distinct** from *C. fraxinea* FUE. In general appearance, this **species** differs from the latter in **having bipinnate fronds** with **much smaller** pinnules. In close examination, however, the **pinnule and pinnules** of our fern show many **tran-**

latissimis basi 16 cm. latis apice cuspidato-acuminatis basi trineatis, pinnulis utroque latere rariachis pinnatis 14, pinnis laterali lanceolata superioribus lateralibus majore, [pinnulis inferioribus maximis lineari-lanceolatis 9 cm, longis 12 mm. latis apice lineari-recto-tumidis basi truncatis margine minute **regulariter** reticulatis, pinnulis 11-12 pinnatis, petioli 1 cm. longis; pinnules

sitional forms from smaller to larger ones in one and the same specimen. Further study in the field and exhaustive comparison with rich materials will prove that this is a compound form of *C. fraxinca* FÉE.

***Hypolepis* BERNH.**

***Hypolepis tenuifolia* BERNH.** COPELAND Polyp. Philipp., p. 95; DIELS Natür. Pfl.-fam. Pterid. p. 278, fig. 147-A.

HAB. Kōshūn, Mt. Hieranzan, leg. B. HAYATA et S. SASAKI, Juni., 1912.

***Plagiogyria* METT.**

***Plagiogyria adnata* BEDD.** Fern. Brit. Ind. t. 51.

HAB. Shinkō: Shibaraku, leg. U. MORI, Juli., 1906.

Compared with a Japanese specimen so labelled in the Tōkyō herbarium. Pinnule of the fertile frond are more straight, (not crispate) longer and stronger, than those of the Japanese specimen. Perhaps a variety of the type.

***Plagiogyria euphlebica* METT.** HAYATA Mater. Fl. Formos. p. 443.

HAB. Arisan, ad 7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

***Plagiogyria falcata* COPEL.** in Philip. Journ. Sci. Bot. IL-2. p. 133, t. I.-B. *Plagiogyria Ilayateana* MAKINO in Tōkyō Bot. Mag. XX. p. 245.

*Plagiogyria MaisumurcB* HAYATA (non MAKINO; Fl. Mont. Formos. p. 244.

HAB. Arisan, ad 8000-7000 ped. alt., leg. B. HAYATA et S. SASAKI, 1912, Jan.

***Plagiogyria stenoptera* DIELS.**

HAB. Arisan, ad 8000-7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan. 1912.

Compared with a specimen so labelled in the herbarium at Tōkyō.

***Pteris* Lixx.**

***Pteris dactylina* HOOK.** Sp. Fil. II. p. 160\* t. 130-A; HOOKER et BAKER Syn. Fil. p. 155; BEDD. Handb. Fern. Brit. Ind. p. 108 fig. no 5fi et Fern. Brit. Ind. t. 23.

HAB. Taitō: Chakankei, leg. U. MORI.

DISTRIB. Nepal to Sikkim and Khasya, ascending to 9000 ft.

***Pteris ezcelssissima* HAYATA** sp. nov. (Fig. 167). Rhizoma? Stipes 150 cm. longus glaberrimus basi castaneo-ferrugineus superiore intus stramineus intus profundo sulcatus validissimus basi 2 era. in diametro strobilii. Front\*

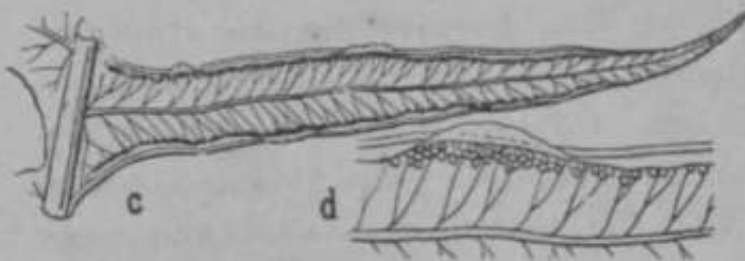


Fig. 167, *Isoetes macrospora* HAYATA: a, the frond; b, n young frond; c, n pinnule of the frond; d, n pinnule of the frond.

latis apice acuminata Uisl d. innmtodilatulis 22 mm. latis cnin its proximalis cunctiuitis (siuibas inter **sc<sup>^</sup>mentn obtnoB** 15 mm. latis) **nuogine** integris; Pimm tonninali 20 cm. longii **onspidaia avaA\*** LOon. lata ad rlj. icliin **pinnifidifHrii**

**iii** ainbitu late ovata 130 cm. loiiiga 90-100 cm. lata **apice** in ambitu late triaugiilari-acnta b i -1 r i -pinnatifida **^lax^** rima subeoriacea vel mem- lliuuaceo-coriifca, pin- nis utroque latere 9 mediis a se 12 cm. remotia linejiri-lanceo- latis pinuatif'li^j ]in- iiis infimis a rliaolu- lms frondium angulo 50° divaricatis lon- gissimis (iutivrdnm2- partitis 60 cm. longis 18 **can**, latis lanceolatis subsessilibnR ad rlia- cliin piimutifldis, seg- nii'uto termiiali • lougi- ssimo liueai-i 14 cm. longo I (Mi. **Iato ftptee** k->Nge ;vcumimiti) basi jtvpiilato inargiuo integro, seg- ini i • J 11 is juxta ttjrminalem 'i intinu's brovissimis • ! am, lon^is 1 **cat**, latia ti tangulari-jwut-is, **pin- iinlis** im-**cliis** lougiori- biw 10 cm. loDgis 1 cm.

segmento terminali longe lineari 10 cm. longo; pinnis juxta terminalem 16 cm. longis; textura membranaceo-subcoriacea; pagina margine sorifera integra, sed prope apicem non sorifera minute crenata. Isthachis pinnarum supra, profunde sulcata utroque latere sulcorum 1-lamellata et remote setulosa, setulis 2 mm. longis latere complanatis a se 1-1 1/2 cm. remotis; costa vel costula segmenti supra impressa glabra subtus elevata, venis lateralibus liberis plerumque duplicato-furcatis (venis a basi furcatis, ramis venarum furcatis). Sori marginales a prope basin segmentorum usque ad supra medium extensi, ab apice segmentorum 1 cm. distantes.

HAB. Arisan, fere 7-6000 ped. alt., leg. B. HAYATA et S. SASAKI, 1912, Jan.

Very near *Pteris excelsa* GAUD. (HOOK. Sp. Fil. II. p. 183 t. 136; BEDD. Fern. Brit. Ind. t. 218; and Herb. Korean. tested by Dr. T. NAKAI); but ours is different from that in having pinnules or segments with broader base and very much more acuminate linear apex. It should be better regarded as a variety of the same species and should be named *P. excelsa* var. *czecofimima*.

### ***Pteris pellucida* Pn.**

HAB. Arisan, leg. B. HAYATA et S. SASAKI, Jan., 1912.

Formosan specimen is considerably different from the named species by the narrower pinna) of the fertile and sterile fronds, as far as I can draw from the descriptions given in HOOK. BAK. Syn. Fil. and HOOK. Sp. Fil. In the Philippine specimen, there is a fern labelled *P. pellucida* which is exactly identical with our fern. I conjecture that this *Pteris* may vary a very wide range. At present, I am merely following the Philippine plant to take this name for our fern. The description in HOOK. et BAKER Syn. Fil. p. 154. shows that the fern has often lower pinna) 8 in long 1 in. broad the figure given in HOOKER Sp. Fil. II. t. 120-H shows also a form with broader fronds than those of ours.

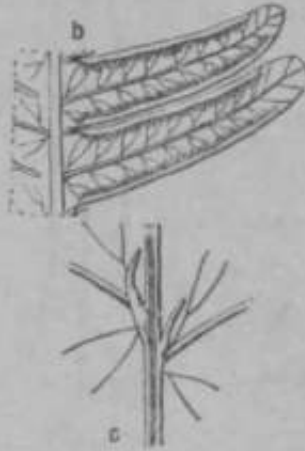
***Pteris setuloso-costulata* HAYATA sp. nov.** (Fig. 168). Rhizoma? Stipes 30-40 cm. longus 3 mm. latus stramineus glaber. Frons oblongo-lanceolata 60 cm. longa 30 cm. lata apice triangulari-acuta pinnata vel bipinnata in partibus infimis, pinnis suboppositis inferioribus a se 4-8 cm. remotis a rachibus angulo 60° egressis, pinnis infimis majoribus 18 cm. longis semitriangularibus basi 14 cm.

Letis latere inferioris pinnulis 3-4 gerentibus **latsro B&periore** hmid pinnulifimis snbsessiltbns vel breve pefciolatis, pnnulifi infimis a rhaehibus pinnarutn angulo 70°-90° divaricatis aessilibus late linearibus 13 em. longis 2-j em. l;iii-



Fig. 168, *Pteris nutoao-coettiata* IUYATA; n, ttfi pWit; b. a i»rlian of n pinnule; 0, estates on the cjRtn.

bosi trrneatis ad apieeni subito acntis ad ueumina abauntibua (acnminibus linearibus 2 cm. longis 3 mm. lalis margino ereniUntis ad siimum acntis) n/1 rhaclun pinnatifidis, segmentis altemis linearibus a rlmcliiljiis piniulanim acgulo 80° divaricatis 15 mm. longis 3£ mm. lati's .ipico wtimdato-obhisLs basi plus minus dilatatis 5



mm. latis ivl basin s», continnis ;i)proximatis imirgiiKi **integlis** muTo-margiuatis. Textora char-tacea supra glabra, costulisutraque pagine elovatis venis veimlisque liberis a l>asi vel a medio fnrcufk venulis ad narginem attingenti-bus supra sobglabxis snbtus Invcissime niimtoqne sub leuto i^L'tinhrlnsii-pilosiR; **ootolifl** pinna- inn i ntrnqiitt elovatis supiii pto- fuude swlcatts, iitiiiqne latere snlcumin angns to lamella ••is,

lanaellis remote minute setnloeis, sohilis aoatis oomplanatis, s«ginentis inargine toto latere (ixcepto basi ikpioeqoe) sorifdrin.

HAH. Mt. Morrison, ad 600() i>od. alt.. k& V. Mmu, L909, (No. 18G7); Mt. Arisan, log. B. HAVAI'A et S. SASAKI, Jau., 1912.

Near *Pieris biatrita* LINN. (HOOKER et GBEV. !<. l'il. t. US), bntdi&rs from it by tli» lowest pinme, which ue nol Wpiwted, bat liave 2-3-pinunlw on UK' lower ade. Tins is ntill n.nivr *Pieru fuadricatrita* var. *utigera* (HOOK^ (BEDD. Fem. Brit lu.l. t. 202), which bae setaloeae rhm-lus liki- that <f the present feni.

### *Pteris tripartita* Bw.

!/<. Taito: Nanrio, leg. G. NaxASAHA, Jan., Jtto\*. rNa 7<3).



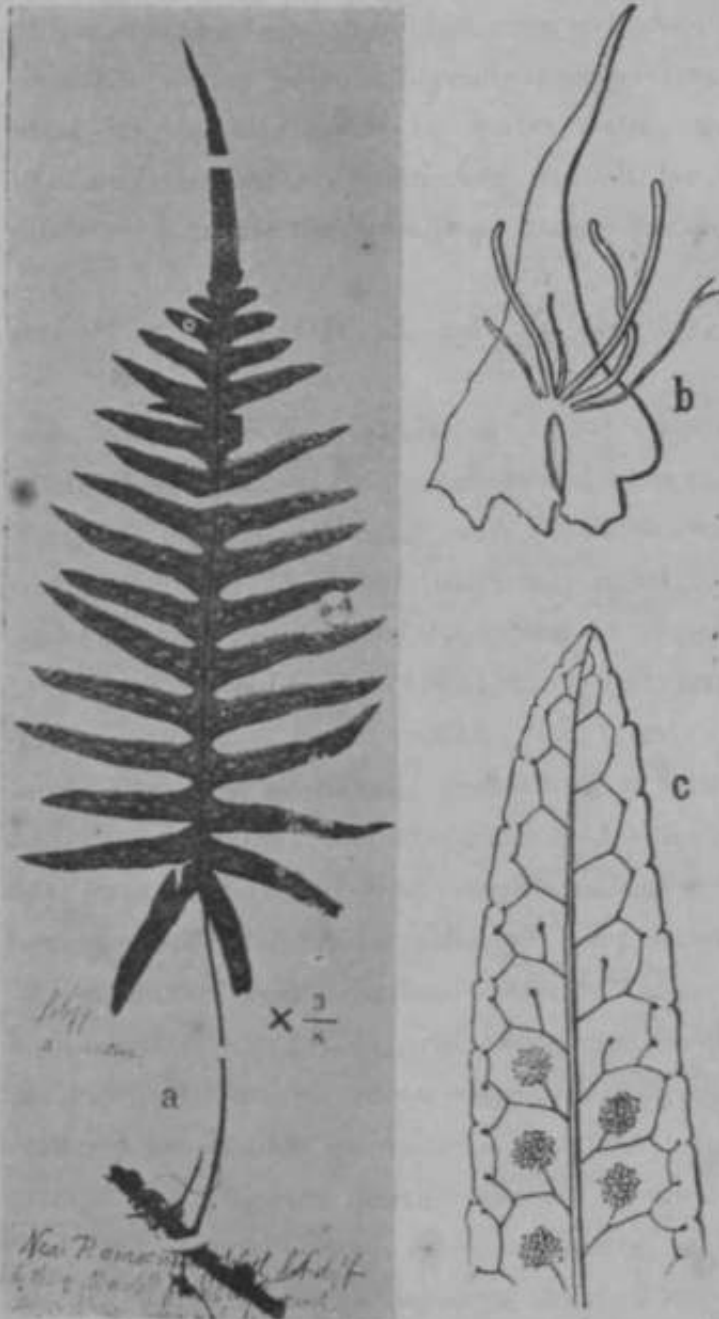


Fig. 170. *fdtgyodi* Hayata; b, a scale on the sori; c, a portion of the leaflet.

Vel rotundatis a m-ehilms fruidium SIT (^n-o^ia, B8gmontta uofariaribaa gnidatim loii^iuribus, se^mautia infm modi inn lougift^imix a rliachilm^ Erondlnsl cixe\_ ^' ^ egressis 55 uiu. longls 10 mm. latia lineanbiH apioe runtniatLs ad sommm obtasi^ boa iatteimis dilafcatis, sinibus intar \*igmoutoram obtasifl Jipiee a oosta rluicbis frondis 3mm.distant!! us, segmen va inihnis desuper

Htuamatus. Frons eau- dato-ovato - laiecolata pinnatifid/i 26 cm. longa 10 cm. lata apice longe ca in lata, piuna vel seg- mento tormhuili loiiigsi- simo lineari 8 em. cmgo 8 mm. lato apico lincari- acumuato ad summmu obtaao basi baud coutraeto teuuter serrulato, sfirulle oblnsis asotmdautibtis h»- vissimis approximataa 2 mm. a se distant ihis latere inferioro 2mm. longis costI cum OOatfl parallel latore supertoro £~\ mm. longis, areolis ooeatflboa subrectangularibus 3) mm. longis totinscjue latis wnnlas libtirag singtilas in- cludentibus, venulis lib- ris soro terminatis; segmentis vel piini^ latonliboa juxta pinnam Wiuirial.m bro- viasimis trlauvulari-oblon- gis CUM\* s nun. Inugis 5 nun. Luts upioe obtiisi-;

reflexis brevioribus 4 J. cm. longis; costis segmentorum supra plano-elevatis, subtus acuto-elevatis; areolis costalibus secus rhachin frondis linearibus mediis 1 1/2 cm. longis 1 1/2 mm. latis; costis venis venulisque utraque pagine distincte nigro-coloratis; pagina supra glabra & subtus ad costas venasque sub lente minute parvissime squamata vel demum glabrata. Textura membranacea. Sorus dorso ad paginam superiorem elevati, partibus elevatis rotundatis medio umbonato-impressis.

HAB. Aisan, ad 8000-7000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

Near *Polypodium formosum* BAKER, but differs from it by the more acuminate pinnae which are more or less ascending, but not quite horizontally arranged like those of *P. formosum*. Also near *P. amicum* WALL. = *Goniopodium amicum* J. SM. (BEDD. Fern. Brit. Ind. t. 5), but distinguishable from it by the quite naked fronds with much longer linear terminal lobes.

**Polypodium decrescens** CHRIST (Fig. 171) var. **blechnifrons** n. v. Rhizoma repens teres tenue minus 1 mm. crassum dense squamatum dense radicans dense foliosum, squamis fusco-castaneis tenuissimis lanceolatis 4 mm. longis 1 mm. latis apice acuminatis basi rotundatis subcordatis non peltatis. Stipes brevis usque 1 cm. longus semiteres supra (intus) planus densiuscule pilis horizontaliter patentibus obtectus, pilis 1-seriatim pluricellularibus castaneo-rubrescentibus 1 mm. longis apice clavatis, praeterea pilis brevissimis 2-cellularibus apice clavatis latioribus parce dispersus. Frons lanceolata vel oblongo-lanceolata 13 cm. longa 3 cm. lata apice acuta vel caudato-acuminata (caudis linearibus 2 1/2 cm. longis 24 mm. latis ad summum obtusis) vel ecaudata simpliciter acuta basi subito cuneata attenuata lineari-attenuata ad stipitem 1 cm. longum abeuns, (caudis attenuatis 4) cm. longis sursum 1 cm. latis deorsum 1 1/2-1 mm. latis margine undulato-repandis, luidulis gradatim minoribus demum ad nullum abeuntibus, undulis superioribus triangularibus 4 mm. latis 2 mm. longis apice obtuso-rotundatis, (caudis) toto circ. ad rhachin pinnatifidis, segmentis linearibus rectis circ. angulo  $IXP-fXP$  a rhachibus frondis egressis versus apicem angustioribus ad summum obtusis deorsum latioribus ad basin plus minus dilatatis, mediis 13 mm. longis basi 3-4 mm. latis a se (a





Fig. 171, *Polypodium decrescens* Kunze var. *Niktatyto M. BtUXki* •> the plant; b, «  
scale (mtherhizotno; c, a gburinlnr lmir on the stipe; ,1, hairs on the stipe; %\*\*<\*<\*<  
one of the wune hairs; f, bawl portion of the sanm; g. a portion •\* U>o frond.

raargine ad maiginem) 3mm. remotis maiiie iutegeiTinus plus rahnia  
desi il\*r rectmna, sinibus inter sogmentos **linearibofl** apioe obtuso-rotuntlutis.  
Tex tura crassiuscula tenuiter ooriacea, i>gina fiiibtis subplana ^inussimo  
**pflia** brevisaimia gkndiiliferis dispersa **npm** aubglabra aecas sulca ejosta-  
**mra** remotiasimo pnucisaimo biir>is ilisixii-s.1; rWhilras frondiom suprt  
sulcato-impresis, cmtulis s«gmooiU»mm snpni **nan virfs** tenuiter impressis.

Sari utroque latere ostra 1-seriathn Boboppoextim dispositi, a se 2-3 mm. reinoti oblongo-rotimdati 1½ mm. longi.

HAH. Arisan, inter Funkiko et Taroyen, ad 6000 ped. alt., leg. B. HAYATA et S. SASAKI, Jan., 1912.

Vory near the type which is known to exist in Celebes and the Philippines. I have not seen either the authentic specimen or original description. So far as is concerned a specimen from the Philippines labelled "*Fohjopodinn decrescens* CHRIST, teste OHBTOT, Uagnen, Lepanto, Luzon, (J500 ft. Nov. 1905, No. 191C," and figures given in the Philip. Joirrn. Sc. I. Supp. H. t. 17, the present fern is slightly different from the type in having broader fronds and longer stipes. This new variety is somewhat near *F. dliquirdu.m* DIJUDE, but quite distinguishable from it in having linear obtuse pinnae arranged in a much acute angle and by the elevated (not imbricated) rounded sori. It is also near *Pdypodium Thwaitesii* BEDD. (Handb. Fern. Brit. Ind. p. 310, fig. JG4 and Fern. Brit. Ind. t. 16(8.).

*P. rcpandulum*

METT. (BEDD, Handb. Fern. Brit. Ind. p. 313, fig. 107] and *P. subfalcatum* BL. (BEDD. Fern. Brit. Ind. p. 76 et 189), I met specimens from all of them and especially from the last one by the entire pinna or lobes of the fronds.

*Polypodium falcatopinna-*  
*tum* HAYATA S[.]

DOI\* (Fig. 172).

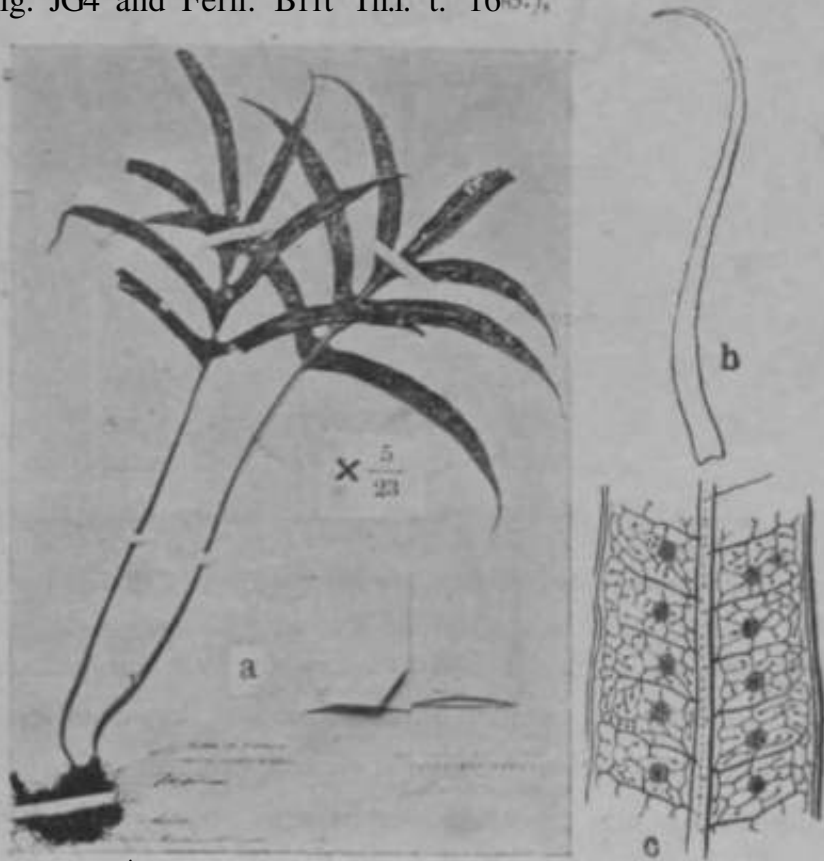


Fig. 172, *Polypodium falcatopinna-tum* HAYATA; a, the plant; b, n scale on the rhizome; c, a portion of the lamina.

rhizoma repens teres 4-5 mm. in diametro squamis dense obtectum, squamis valde adpressis ovato-cuspidatis- 2-3 mm. longis. Stipes 20-25 cm. longus glaberrimus esquamatus intus (supra) profunde sulcatus stramineus. Frons late triangularis stipitem in longitudine subnequans vel eo brevior 20 cm. longa 25 cm. lata pinnatifida, pinna terminali lineari 15 cm. longa apice longe acuminatissima 15 mm. lata margine plana undulato-crenata vel subintegra, pinnis lateralibus pinna terminali conformibus aequilongis falcato-recurvis apice acuminatis (acuminibus linearibus desuper falcatis) utroque latere rhachis frondis 3-4 suboppositis basi longe decurrentibus fere ad rhachin attingentibus 2 cm. a se remotis, sinibus inter pinnas latis rotundatis, costis et costulis supra subelevatis distincte sulcatis, pinnis a costa angulo 60° divaricatis patentibus, venis lateralibus utraque pagine elevatis tenuibus a costula angulo 70° divaricatis. Sori utroque latere costae pinnae uniseriatim dispositi inter venas solitarii.

HAB. Kōtōshō: leg. T. KAWAKAMI et S. SASAKI, Juli., 1912, (No. 5).

Near *P. palmatum* BLUME, but differs from it by the pinnae curving downwards.

***Polypodium gracillimum*** COPEL.

*Polypodium cucuratum* HAYATA Mater. Fl. Formos. p. 445 (Non NEES).

Compared with a specimen from the Philippines labelled "*P. gracillimum* COPEL. Mt. Apo, Mindane, alt. 6000 ft. Oct. 1904, No. 1526."

***Polypodium lineare*** THUNB. var. ***monilisorum*** HAYATA n. v. (Fig. 173). rhizoma repens gracile 1-1½ mm. crassum, squamis dense obtectum, squamis rubro-castaneis ovato-lanceolatis 2½ mm. longis ½ mm. latis apice acuminatis basi latissimis ovatis peltatis basi rotundatis vel plus minus angulatis a basi usque ad insertionem 1 mm. longis margine remote obscure denticulatis vel subintegris medio rubro-maculatis, maculis ovato-lanceolatis. Stipes circ. 1 cm. longus glaber. Frons linearis curva 15 cm. longa 3-4 mm. lata apice lineari-acuminata basi gradatim attenuata ad stipitem brevem abeimus in exsiccato inter soros plus minus moniliforme constricta supra glabra subtus secus costas squamis remote parceque dispersa vel glabrata supra in exsiccato pallido-viridis subtus pallidissima plus minus flavescens, costis utraque pagine elevatis. Textura tenax coriacea. Sori infra acumen 2 cm. longum 2 mm.

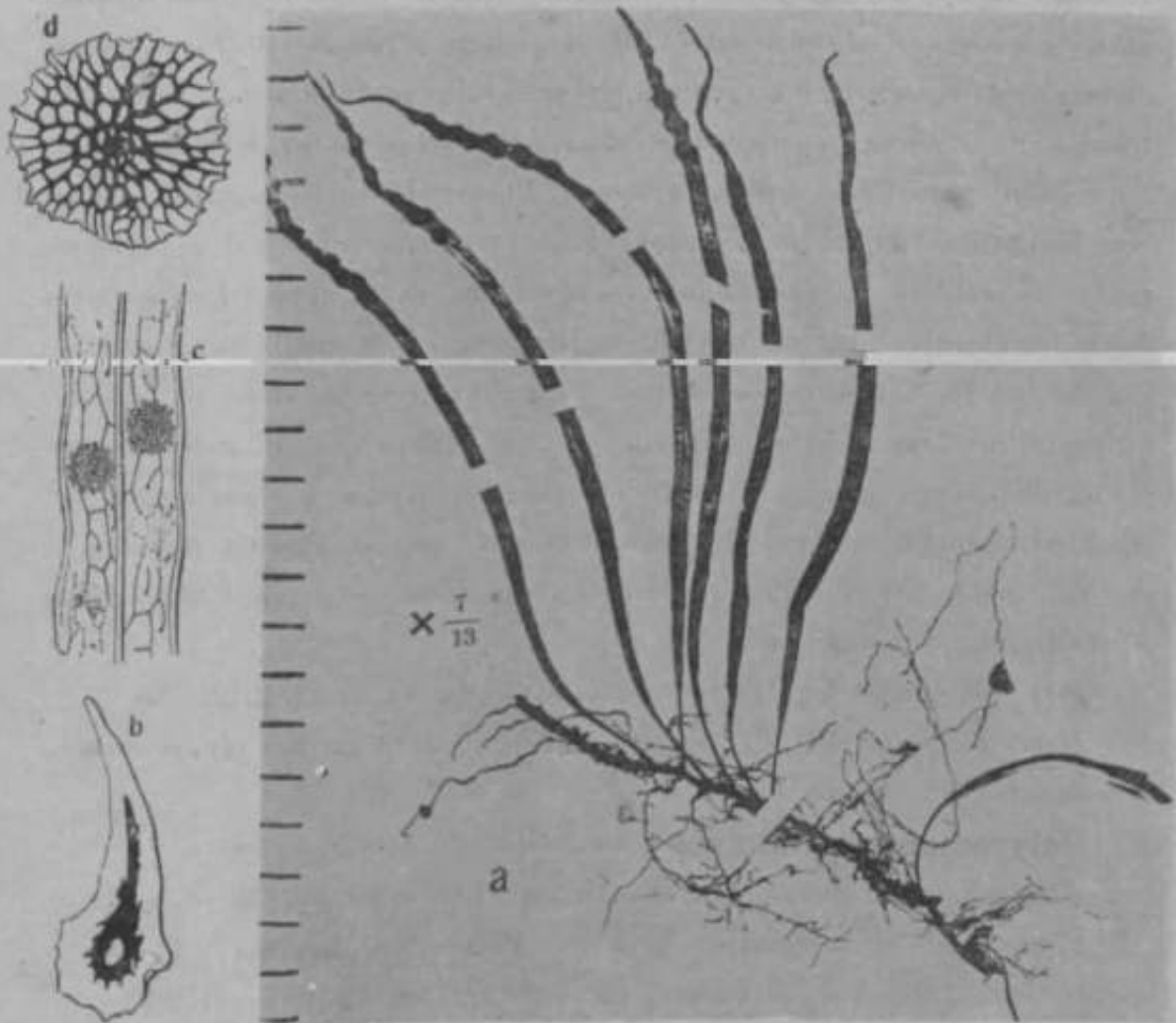


Fig. 178. *Polypodium Itnean* TKCSB. Tar, *monitorisum* HAYATA; a, the plant; b, a scale on the rhizome; c, a portion of the frond; d, a pinnaphysis.

**Stipulum** fimbriatis dorsum usque ad 3-4 cm. dispositi utroque latere costae 1-seriatim dispositi suboppositi elliptico-rotundati 3 mm. longi 2 mm. lati **Longiores** quam latiores inferiores a stipe 4 mm. remotis; pinnaphysis paulatim simpliciter incisa marginibus deenticulatis.

**HAB.** Monte **Arisan**, loc. B. HAYATA et S. SASAKI, Jan., 1912.

Differs from the type by the roundly jointed pinnaphysis of the sori, much narrower and less coriaceous frond and especially by the soriferous parts of the fronds which are moniliformly contracted when dried.

*Polypodium Meyenianum* (SCHOTT), HOOK.; MATSUM. et HAYATA *Eurom. Pl. Formos.* p. C34.

HAB. Hieranzan, prope Kiisuknsu, leg. B. HAYATA et S. SASAKI, JunL, 1912, Polypodium morrisonense HAYATA Mater. FI. Formos. p. 447.

Near *Ple&peUis ftemionitidm* MOORE.—*Pdypodkvm Jiemionttklevm* WALL., bnt differs from it by the thin mambraiiibceons texture.

*Polypodium pellucidifolium* HAYATA sp. nov. (Fig. 174). *Bhiaima repens teres squamis j)atentibns dense obtectim* 3-4 mm. in diametro, squamis <>y;Lto-lanceolfitiR peltjitis apico cuspidatia ^msi rotimdatis castaneis. Btipea 10-9cm. longus glabor intns (supra) profunde sulcatus. Frons linearis 35 cm. longa 22 mm. lata apice acnta basi acuta vel cuneato-acuta raar^ino iutegra vel orispato-uuduliita plus minus tenoitei desnper reciura vel plana supra nitida, eosta supra profundo sulcata Bnbntus prominente elevata, venis **latexaHboa** subrectis *n c< »stn augnlo 65° egressi*" supiu iiigr<.xTilomtis lovlter flexnosfs **valde** dlstinrtiK subtns tenni-ter elevatis projie mjirginem evsiiiascontibus, retiooHs **vennlarnm sipxa** visis; testuva tenuiter coriacett pellucida. Sdri uutseriatim a infra medium usque ad iipicru frondis dispositi, hi tor TPII/LS laierales **aolitaril**.

HAB. xAjism, leg. B. HAYATA et S. SAS un, Jan., 1912.

Near *V. Inglei*, but differs from it by the shining semi-transparent hirgnr fronds with distinct **veins**,

*Polypodium obtusifrons* HVYATA Q. sp. (^Fig. 175), Kliiz/tma ropens teres 2 mm. crossum flquamls dense obttsctum, squamis castaneis cuspidato-rotundatia 2 mm. longis 1 mm. latis »pi<i v>btuse lateque cnspidatis Iwtii dilatatis rotuudatis profundo oordatis,

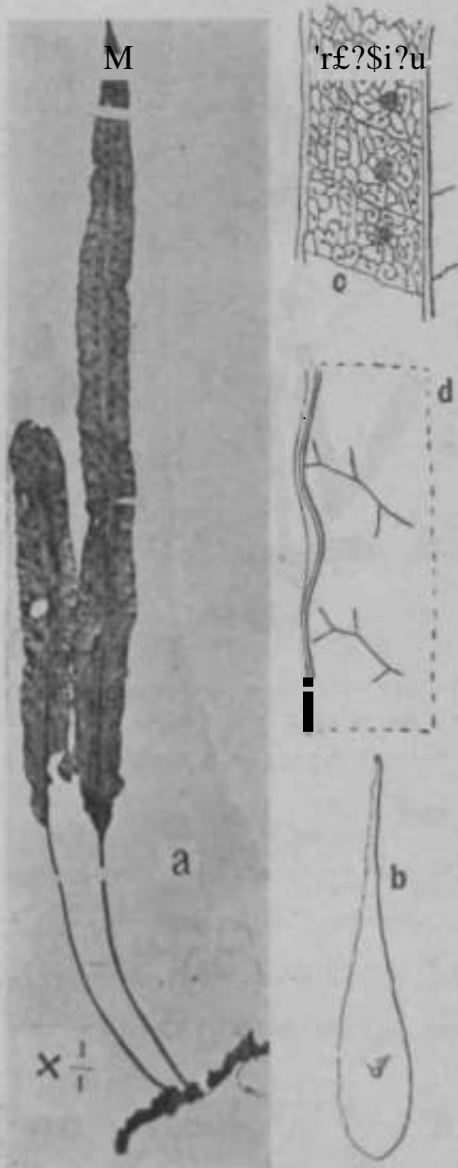


Fig. 174, *PotypodbanpeUwiilifitium* H.WATA; «, the plant; b, a scale cm the rhizome; c. & i>orti >u of the frond; d, margin of the same.

lobis cordatis (aide imbricatis) **jj** mm. **loigis**, margine sui-sum irregulariter ob-  
 que dentieulatis \vl submarginatis dooreum hisiniato-lobulatis, lobis lineaxilpiis  
 recurvis, vel ] x;ltatis i s i -I » 1 v d is. Stipes brevissimus 1 cm. longus com planatus supra  
 planis subnullis glabris. Frons spatulata vel lineari-spathulata 4 cm. In  
 usque 9 mm. lata sui-sum infra **apicem** 6 mm. latis **apice obfocasi**ne vel rotundata  
 v;ilili> **α&β** margins **integrima** tenuiora anguste subcartilaginea, costa

ntraque piigine a **MSI**  
**usque** id iuidim tenuiter  
**oboetne** viswa medio ad  
 apicem non visa haud  
 elevata; frons medio usque  
 ad pmpc apicem sorifera.  
 Sori a medio usque ad  
 pXOpe ; i pirnm fr \* III < I i s  
 utroque lat\*ue costis 1-  
 s\*rintim dispositi perfr !<  
 rotundati 2; nuu. in di-  
 metro supra ad paginam  
 plani, jjaraphysis nume-  
 rosis p#tatifl **angolato**  
 rotundatis vel margituo  
 sublobatis.

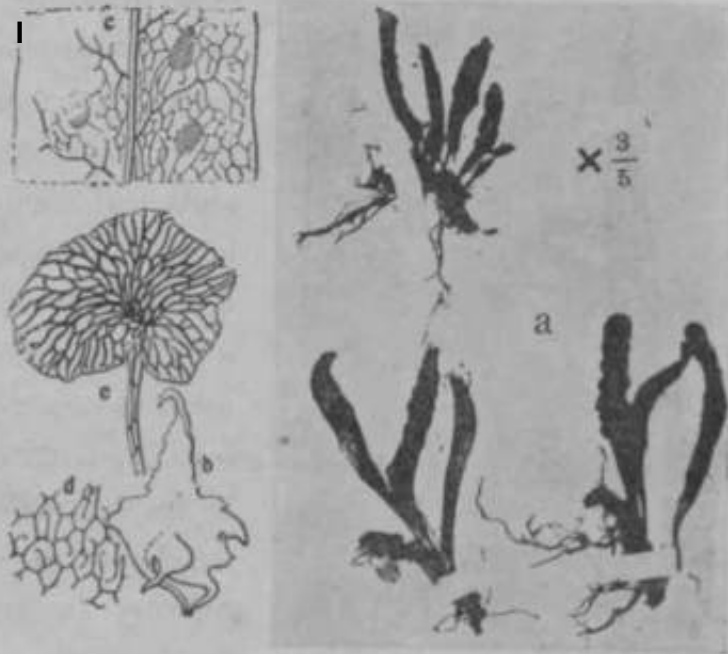


Fig. 17S, *Polypodium obtusifolium* HAYATA; a, the fronds; b, » soale oa the rhizome; c, a portion of the front; d, n-U^nlatiou of the TeinkitB; e, a ]mmpjisi&

HAB. Kwaunouzan, leg. T- STIMA, 1910, Oct.

Neij *P. linmre* TH. but differs from it by the very much **shorter** obtuse fronds with quite different venation. Still nearer to *Pdypodium Onori* Fr. et SAV, (MAKINO Piianerqg. et Ptorid. I. t 10), but differs from it by the much complicated reticulation of the fronds **which haw** more obtuse roundxl ajtex.

*Polypodium pseudotrichomanoides* HAYATA sp. nor. (1%, 176).

Kfiixomu **afloednto - cnMtnm** tire. 1 mm. crassutn deusssime rtulicans (radicibus fibnwis nmuerosis) deusissimo squamatum, squamis easttnoo-fuscentibus tenuissinus sub luw traverso flnvis ovato-lanceolatis iLsqm- 1| nun.

mm, latis **apice aonfcxibtoftiii** vel obhis basi **rotondatis**.

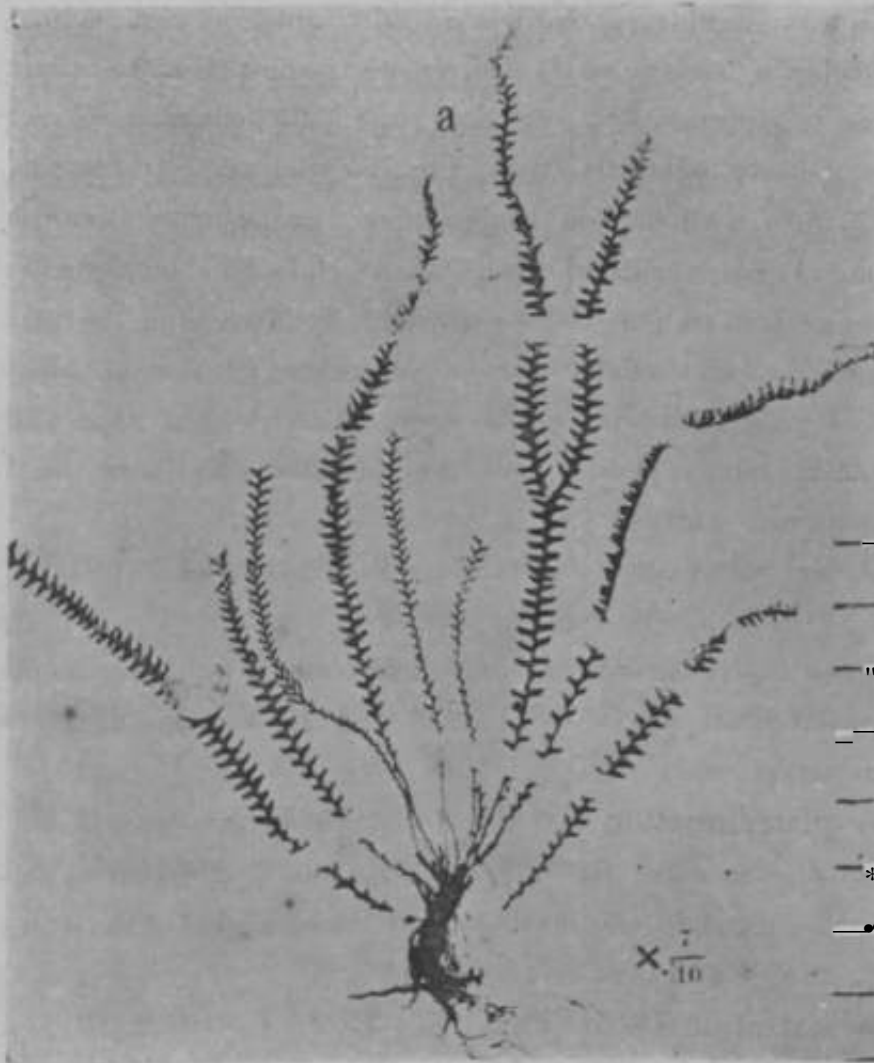


Fig. 176, *Volypodium psewlobrictomawriiles* HATATA; a, the plant; b, a scale on the rhizome; c, a portion of the frond; d, apical portion of the frond.

versus apice in  
rhizomatis dense  
cespitosus bre-  
vissimus 1 mm.  
Longus basi ad  
extremum  
2-3 squaratus  
semiteres. Frons  
linearis simplex  
vel a medio sur-  
sum furcata  
usque 13 cm.  
longa usque 6  
mm. Infractis apice  
gradatim au-  
gmentata ad sum-  
mum obtusa vel  
\* a globulo termi-  
nata basi angust-  
ata ad stipitem  
brevem abans  
pinnatifida; rari-  
tatis medio 1mm.  
lata; segmentis  
mediis triangula-  
ri-linearibus la-  
tere superiore 2  
mm. longis latere  
inferiore totis  
usque longis  
apice obtusis basi  
reticulatis.

latis pīMpe **basin** Roruni siugulum gorentibns nuirgiiie integrity cirt\*. angulo 90° vel S5° **B rhaehibua egceās** a se 1J- mm, reraotis, segrueutis superiuribos gradatim **minoribos** sis approximatis, segmento termiuali subnullo vel atl globnlmn miniitnni **redticto**, segmentis inferioribns gradatim iniuoribiis se plus remotis prope basin froudīs ad dentem triaBgnlarem / mm.-loiigum obtusum l'eductis a se 2 mm. vel plus remotis ad extrflmitatem frondlfi ad aUim an^ustis-simara reductis, segnmntis in sectione plauo-convexis p^ -foi'mibus snpwi couvexis subtua pLxnīs; psigiua subcrassinscnLa utraque preesertim ad costara *ymxee* ati'igoso-ijilosa, pilis validis castaneo-iiigi'is **IL=quo** 1 mm. longis, supra ad costiim angnste **suloata** snbtuH pinna, v<Miis **noo** elevatLs simplicibus hand ramosis, costis subtus uon suleatis.

**ECAB.** Ai-isan, leg. S. KUSANO; ibidem, leg. B. HAYATA et S. BASAKT, Jan., 1912.

Neai- *Pdypodium tricJtomanoidcs* Sw., but differs from it in having simple veins and entire scales; from *P. Okuboi* YATABE and *P. setosum* METI<sup>1</sup>. in having much **narrower** pinnae.

**Polypodium** quasipinnatum ILVYATA **Mater.** FL Formos. p. 447.

Near *Pkopdti\** **MvubneutensiB** BEDD. **Fein.** Brit. Ind. t. 205, but differs from it by the sori arranged in two or three rows on each side of the eastfe. Also very near *P. mcdacodon* HOOK.

**Polypodium rostratum** HOOK. (**Fig. 177**). HOOK. 1-sfc Cent. Eeru. t. 53,; BEDD. Peru. Brit. Iutl. t. 159 et Handb. Fevu. **Brit Ind. p.** 347 fig. 193 cum nomine *Pfaopeltui rostrata* HOOK.

**TIAB.** In monte Momson, ml 7(XX) **ped. alt,** leg. U. Mom, 1900, Dec. (No. 189G). Our fern closely resembles *P. rostratum* in the size, shape and texture of tb« fronds, but is a little different from it in the venation, as far as is concerned the figin^es in

**BEDD.** Fern. Brit. Ind. t. 159, and HOOK. IC. EL t. 953.

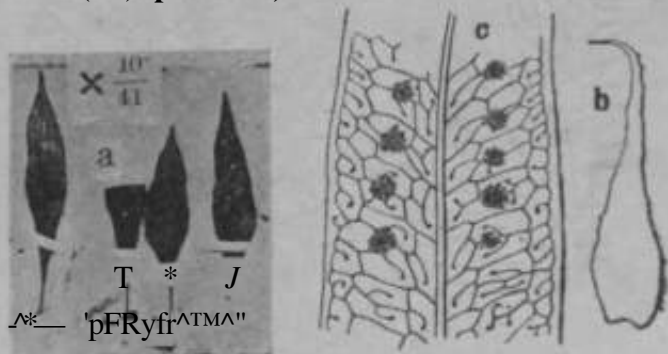


Fig. 177, *Polypodium rostratum* HOOK.; it, the plant; b, a scale; c, a portion of the frond.



The venation of our fern is more finely reticulated than that figured in HOOKER'S work, but more loosely reticulate than that figured in BEDDOME'S.

*Polypodium temussimum* HAYATA sp. nov. (Fig. 178). Rhizoma breve tenue erectum apice divaricatum; squamis apice stipites ciliatis, squamis lanceolatis, longis 1-2 mm. longis, basi apice obtusis bisetosis, basi ± rotundatis vel lobatis cordatis. Stipes brevissimus 1-2 em. longos ad apicem divaricatis capsitosis ad basin

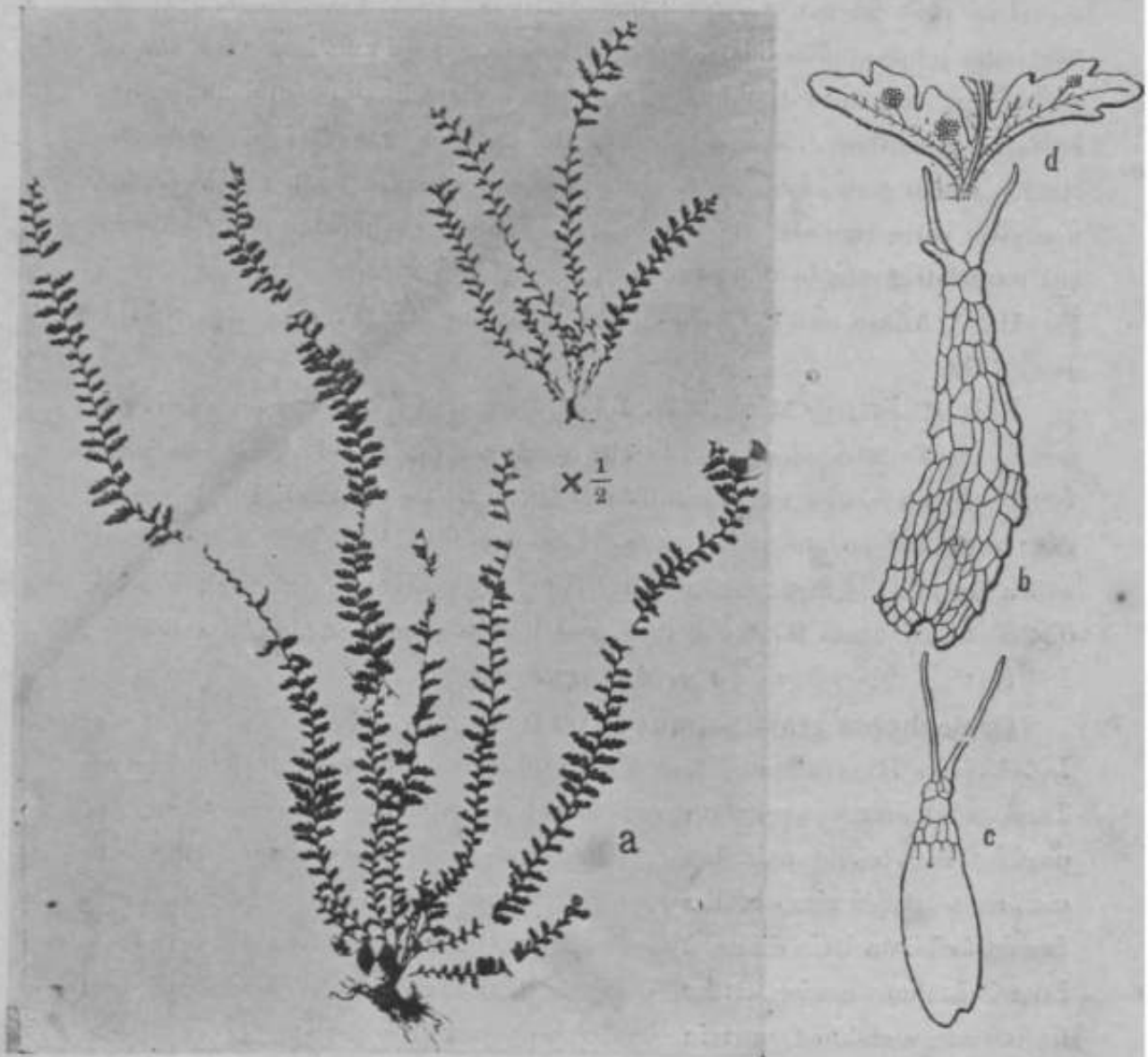


Fig. 178, *Polypodium temussimum* HAYATA; a, the plant; b, a scale on the rhizome; c, another sori; d, a portion of the frond.

squamatus supra basin sursum barbatus, barbibus liorizantaliter patentibus mollis-1-17 mm. longis tenuissimis fuscentibus. Frons tenuissima utraque pagine praesertim ad oostas venasque barbibus mollis dispersa herbacea scandens usque 20 cm, longa 13 mm. iuncta apice acuminata ad summum obtusa basi gradatim attenuata circ. ad rhachin pinnatifida, segmentis mediis circ. 6 mm. longis 1-2 mm. latis sublineari-oblongis a rachiibus frondis  $80^{\circ}$ - $70^{\circ}$  egressis a se 3 mm. remotis apice obtusis basi latere inferiore decurrentibus margine latere superiore plus lobulatis quam latere inferiore, lobis 1 mm. longis obtusis; segmentis prope apicem subito vel gradatim minoribus ad lobos 2 mm. longos abeuntibus, segmento terminali 2 mm. longo obtuso, segmentis inferioribus gradatim minoribus, infimis ad dentem triangularem 1 mm. longum rotundis; rhachis medio 1 mm. lata, costis utraque pagine elevatis, venis utraque pagine non visis parce ramosis. Sori sub basi lobulorum segmentorum singularity siti rotundati 1 mm. in diametro.

HAB. Arisan, ad 8000-7000 ped. alt., leg. B. HAYATA et S. SASAKI Jan., 1912.

Near *P. solidum* METT., but differs from it by the thinner herbaceous texture, bluntly lobed pinnae, and hirsute fronds and venis; also near *P. cuouatum* and *P. trichomanoides*, but separable from them by the dentately lobed pinnae; still nearer *Polypodium glandulosum* (HOOK. Sp. Fil. IV. p. 193, t. 276), from which our plant is distinguishable in having much narrower and much remoter pinnae of very much thinner texture, and by the absence of glandular hairs.

### *Cyclophorus* DESV.

***Cyclophorus grandissimus*** HAYATA sp. nov. (Fig. 179). *Niphobolium grandissimum* HAYATA Herb. Taihoku. Epiphytica. Rhizoma repens subterres 8 mm. in diametro squamis dense obtectum, squamis lanceolato-linearibus usque 7 mm. longis basi usque 1 mm. latis stramineo-castaneis. Stipes 40 cm. longus glaber complanatus vel tetragonus supra planus latere sulcatus castaneo-stramineus. Frons 40 cm. longa 8 cm. lata lanceolata, apice acuminata supra medium usque ad basin sequilata sursum abrupte acuminata basi leviter auriculato-dilatata basi fere truncata margine subintegra vel obscure repanda facie plana ad basin undulata pagine supra glabra subtus dense stellato-tomentosa, costis supra planis subtus elevatis, venis lateralibus tenuis-

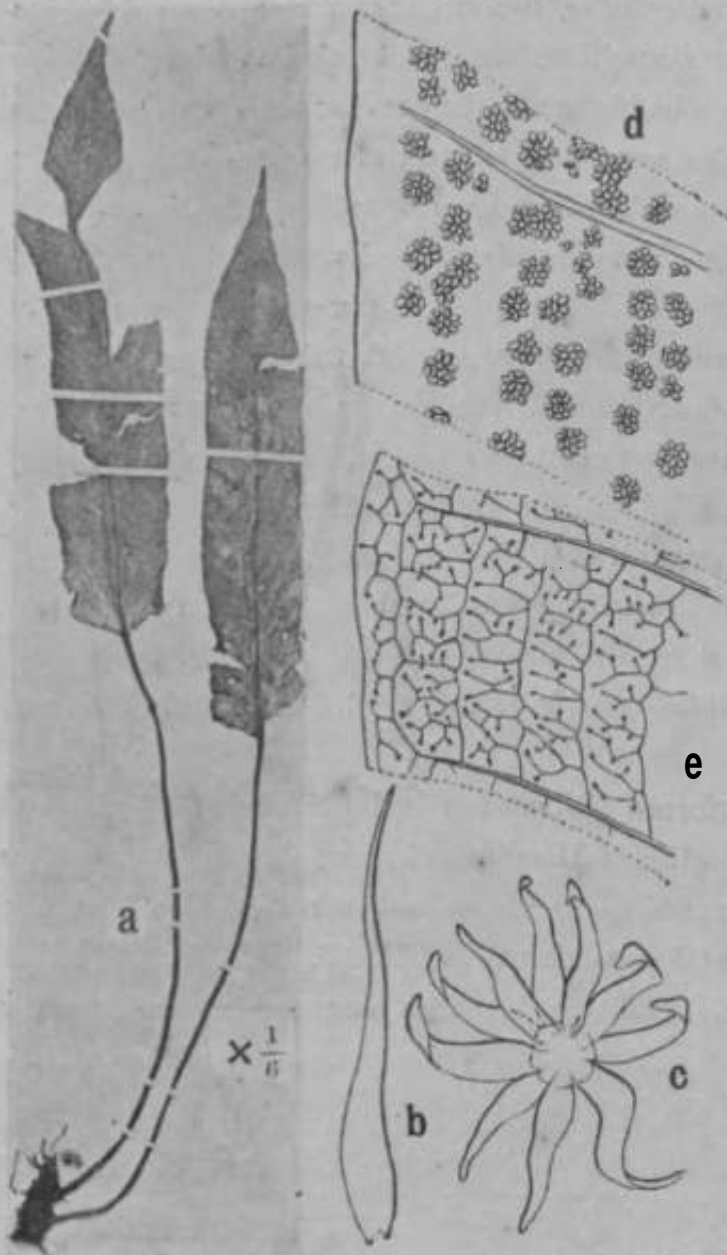


Fig. 179, *Cyclophorus grandis* HAYATA; a, the plant; b, a scale on the rhizome; c, a stellate hair on the frond; d, a portion of the frond, showing sori; e, the same, showing venation.

cordatis margine etUato-fimbriatis. Stipes 1 cm. longus non squamatus obscure subalatus dense pilosus, pilis stellatis. Frons lanceolata 3-5 cm. longa crassiuscula primuru utraque pagine densissimo stellato-pilosa dermim supra dense vel parce pilosa subtus semper densissime pQosa supra paroe

simis utraque pagine ilis-  
iiiicte visis a cotu 50°  
divaricatis rectis mediis a  
so £ ram. remofcis; pagin:<  
supra atro-viri< **LLwma** snb-  
tus dense ferrugineo-  
albescenti dense sorifera  
Sell If I Vt'UIIs l;d. )tlt< s lion  
sorifera.

HAH. Arisan, leg. B.  
HAYATA et S. SASAKI, Jan.,  
1912.

Near *Niphdiolyn* **Ktt-**  
**gm** and **^ . cottata** (WJ&L.)  
BEDD. Fern. Brit. Ind. t.  
120 but differs from them  
by the verj- much longer  
stipes and larger fronds  
with undulate margin and  
abruptly truncate some-  
what auriculato base.

*Cyclophorus* tr?ns-  
morrisonensis IUYATA  
sp. nov. (Fig. 18^ . Rlii-  
zomA breve suberectnni ?  
apice squamis dense ob-  
to«tum, squamis Linoao-  
latis 2i mm. latis acumi-  
natis basi latioribus

depresso-punctati apice attenuato-obtusata  
 vA obtusa basi gradatim attenuate, margine  
 in tegra exsiccato vel hinc inde striata  
 revoluta subtus deorsum sorifera; costis utraque  
 pagina non visa. SOB rotundati minus 1  
 mm. in diametro irregulariter dense approxi-  
 matim dispersi.

HAB. Muntinensis fluitans, ad L0000  
 ped. alt. leg. U. MOM, 1006, (No. 2363).

*Xiphophora trivincosa* BAYATA  
 in sched. herb. Tnhokn.

*Niphobolus fimbriatus* HAYATA Matet. Fl.  
 Formos. p. 448 (non BLUME). Naar *N. fimbriatus*  
 BLUME, sed differt a *N. fimbriatus* in  
 frondibus quibus pilositas utraque.

*Xiphophora glaberrima* SCHOTT.

Elaphoglossum conforme MOORE;  
 BEDD. Fern. Stm. Ind. t. 198 et Handb.  
 Fern. Brit. Ind. p. 416 fig. 247.

HAB. Aisan, 0000-7000 ped. alt., B.  
 HAYATA et S. SASAKI, Jan., 1912.

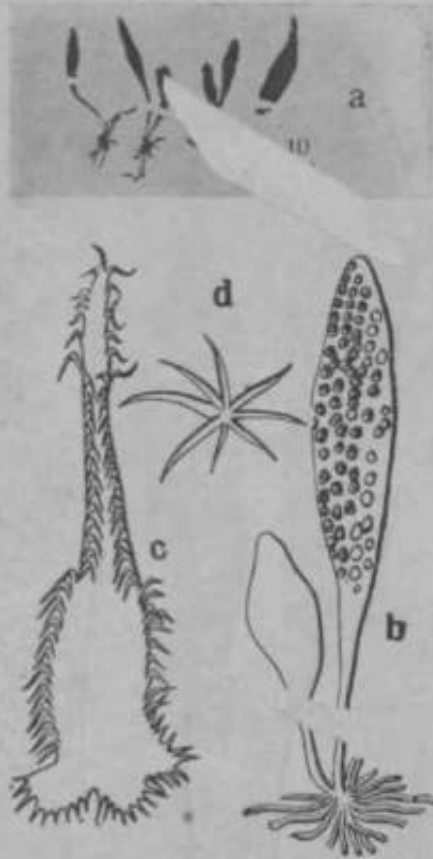


Fig. 180, *Xiphophora trivincosa* HAYATA; n. i. h. p. Lmt. (re-  
 duced); li, the stem; c, a scale on  
 the rhizome; d, 11 strobili on  
 the stem; li, natural size.

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