札幌博物學會報

第十五卷 第二號

TRANSACTIONS

OF THE

SAPPORO NATURAL HISTORY SOCIETY

FOUNDED IN 1891

VOL. XV, PT. 2

PUBLISHED BY THE
SAPPORO NATURAL HISTORY SOCIETY
HOKKAIDO IMPERIAL UNIVERSITY, SAPPORO, JAPAN
DECEMBER, 1937

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Contributions to the Flora of Northern Japan IX

By

Kingo MIYABE and Misao TATEWAKI

(宮部金吾・舘脇　操)

With 3 text figures

153. ***Quercus serrata*** THUNB.: MIYABE & KUDO, Fl. Hokk. & Saghal. IV. (1934), 476.

NOM. JAP. *Ko-nara, Ishi-nara.*

HAB. *Yezo.* Prov. Tokachi: Toyokoro-mura (H. YOKOYAMA, VIII. 16, 1937).

DISTRIB. Yezo (Oshima, Iburi, Hidaka, Ishikari & Tokachi), Honshu, Shikoku, Kyushu, Korea, Manchuria and China.

Remarks. New to the Province Tokachi.

154. ***Melandryum hidaka-alpinum*** MIYABE ET TATEWAKI, sp. nov.

Rhizoma repens. Radix simplex. Caulis basi lignescens et ramosus, ramis simplicibus 3.5-10 cm altis retrorso-puberulis foliatis. Folia radicalia oblanceolato-spathulata anguste spathulata vel oblanceolato-linearia prominente uninerviata margine ciliata, apice acuminata mucronato-acuminata acuta vel obtusa, basi attenuata vel longe attenuata, utrinque scabriuscula, 3.5-6.0 cm longa 3-10 mm lata; folia caulina opposita 3-4-juga, superiora sursum gradatim minora, oblanceolato-oblonga vel ovato-lanceolata vel lineari-oblonga sessilia, margine ciliata, apice apiculata et nigro-purpurea, basi connata subcrassa purpurata, utrinque scabriuscula. Flores terminales solitari interdum in dichotomo 2-floro dispositi saepe longe pedicellati. Pedicelli filiformes puberuli calyce longiores vel rarius breviores bracteolati, bracteis minoribus oppositis ovato-lanceolatis. Calyx ca. 12 mm longus coloratus tubuloso-campanulatus extus puberulus, striis 10 nigro-purpurascentibus, dentibus deltoideo-ovatis purpurascentibus 3-4 mm longis margine cilioratis apice obtusis et nigro-purpurascentibus. Petala rosea fauce coronata, coronis obovato-oblongis, 1.5-2.0 cm longa 1.0 cm lata, laminis rotundato-obreniformibus ca. 8 mm longis apice cordato-bilobis basi obsolete appendiculatis, unguibus cuneato-linearibus 8 mm longis 1 mm latis. Stamina 10 alterna petalis opposita et petalis breviores, antheris oblongis. Styli 3 petalis breviores. Anthophorum conspicuum glabrum 3 mm longum.

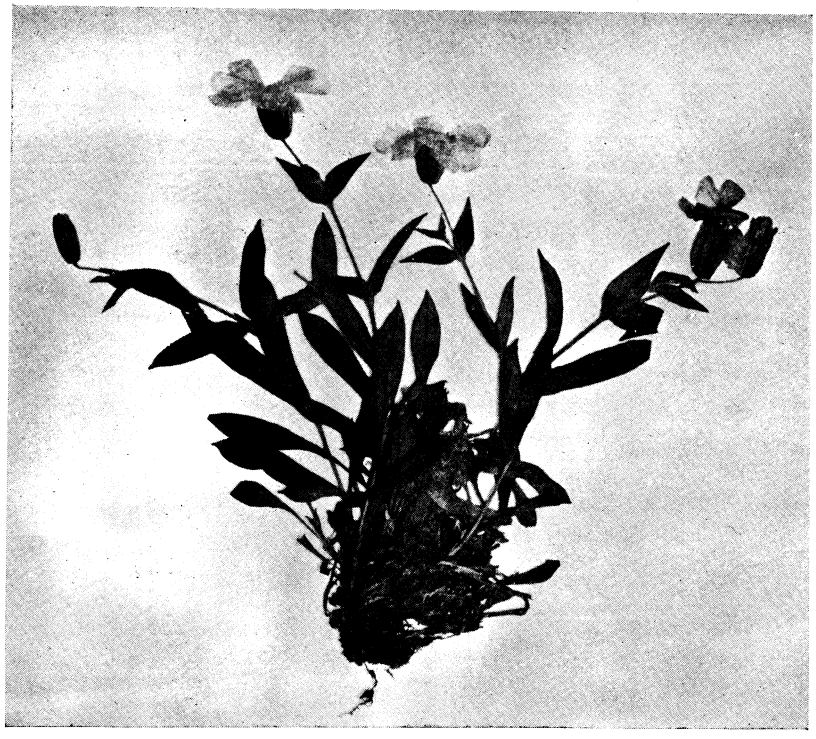

Fig. 1. *Melandryum hidaka a.ſinum.*

NOM. JAP. *Kamui-biranji.* (Y. TOCHINAI)

Hab. *Yezo.* Prov. Tokachi: Mt. Kamui-ekuushikaushi (Y. TOCHINAI & B. ISHIDA, VIII. 11, 1937—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. This alpine plant was found only growing in crevices of granite rocks near the summit of Mt. Kamuiekuushikaushi which is located at the central part of the Hidaka mountain range.

155. ***Aquilegia parviflora*** LEDEB. in Mém. Acad. Sc. Pétersb. V. (1815), 544, et Fl. Ross. I. (1842), 57; TURCZ. Fl. Baic.-Dah. I. (1836), 71; TRAUTV. ET MEY. Fl. Ochot. (1856), 10; MAXIM. Prim. Fl. Amur. (1859), 24; REGEL, Pl. Radd. I. (1861), 64; KOMAR. Fl. Mansh. II. (1904), 246; KABANOW, in Bull. Far East. Br. Acad. Sc. USSR. No. 15, (1935), 59; BULAVKINA, in KOMAR. ET SCHISCHKIN, Fl. URSS. VII. (1937), 88, *t. VII, fig. 2.*

Aquilegia thalictroides SCHLECHT. in Linnaea VI. (1831), 581.

NOM. JAP. *Karafuto-hime-odamaki.* (n. n.)

HAB. *N. Saghalien.* Tymi (KABANOFF).

S. Saghalien. Distr. Shikka: Mt. Sekkaizan (B. YOSHIMURA & M. HARA, VII. 15, 1937).

DISTRIB. Saghalien, Ussuri, Amur, Ochotsk, E. Siberia and Mongolia.

Remarks. New to the flora of Japan.

156. ***Ilex leucoclada*** MAKINO, in Bot. Mag. (Tokyo), XIX. (1905), 148.

Ilex integra THUNB. var. *leucoclada* MAXIM. in Mém. Acad. Imp. Sc. St.-Pétersb. sér. 7, XXIX. (1881), 41.

var. ***angustifolia*** MIYABE ET TATEWAKI, var. nov.

A typo differt, foliis angustioribus oblanceolatis cum petiolis 10–12 cm longis 1.8–2.5 cm latis.

NOM. JAP. *Hosoba-himemochi.* (n. n.).

HAB. *Yezo.* Prov. Shiribeshi: Yoichi (I. YAMAMOTO, V. 19, 1931; VII. 6, 1936).

Remarks. Endemic.

157. ***Sium Ninsi*** L.: MIYABE & KUDO, in Trans. Sapporo Nat. Hist. Soc. VI. (1917), 172.

NOM. JAP. *Mukago-ninjin.*

HAB. *Yezo.* Prov. Tokachi: Ohtsumura (H. Yokoyama, IX. 19, 1937).

Remarks. The present new locality is the north-eastern limit of the distribution area of this species.

158. ***Chamaepericlymenum canadense*** ASCHERS. ET GRAEBN. Fl. Nord. Flachl. (1898), 539; NAKAI, Fl. Sylv. Korea. XVI. (1927), 65, *tab. 18.*

Cornus canadensis L. Sp. Pl. ed. 1, (1753), 118.

form. ***purpurascens*** MIYABE ET TATEWAKI, form. nov.

A typo differt, involucris supra purpurascentibus.

NOM. JAP. *Murasaki-gozentachibana.* (n. n.).

HAB. *S. Saghalien.* Distr. Toyohara: Tonnai (N. SHIRASAKA, VII. 11, 1937—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

159. ***Ligustrum Yuhkianum*** KOIDZ. in Yuhki, Fl. Yamagata-praef. (1934), 78, cum *fig.*, et in Acta Phytotax. et Geobot. III. (1934), 150; SUGIMOTO, Key Tr. & Shr. Jap. (1936), 335 et 338; NEMOTO, Fl. Jap. Suppl. (1936), 592.

var. ***glabrescens*** TATEWAKI, var. nov.

Rami juveniles puberuli. Folia utrinque glabra, sed subtus ad costam in-

terdum pilosa, petiolis glabris. Cetera ut in typo.

NOM. JAP.: *Yezo-hamaibota.* (n. n.).

HAB. *Yezo.* Prov. Oshima: Fukuyama (M. TATEWAKI, T. YAMANAKA & B. YOSHIMURA, VII. 25, 1936—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

160. ***Mertensia kamtschatica*** (*Kamczatica*) DC. Prodr. X. (1846), 91; LEDEB. Fl. Ross. III. (1847–9), 136; HERD. Pl. Radd. Monopet. (1872), n. 165; Hult. Fl. Kamtchat. IV. (1930), 82, *pl. 1, fig. f-h*; TATEWAKI, in Bull. Biogeogr. Soc. Jap. IV. (1934), 295.

Lithospermum Kamczaticum TURCZ. in Bull. Soc. Nat. Mosc. XIII. (1840), 75.

? Pulmonaria pumila SCHRANK, in Nov. Act. Nat. Curios. IX. (1818), 101.

Mertensia paniculata MIYABE, Fl. Kuril. (1890), 252; YABE & YENDO, Pl. Isl. Shumushu, (1904), (193); SUGAWARA, Pl. Saghal. (1937), 269, (non G. DON).

Mertensia paniculata Don, var. *pubescens* KUDO, Fl. Isl. Paramushir, (1922), 153.

Mertensia pumila HULT. Fl. Kamtchat. IV. (1930), 84, in nota.

NOM. JAP.: *Takaokasô.*

HAB. *S. Saghalien.* Distr. Shikka: Mt. Ohutoro (A. HIRUTA, X. 1932—cult. fl. VIII. 1933; fr. IX. 1, 1935).

DISTRIB. Kuriles (Shumushu, Paramushir & Onnekotan), Saghalien (Mt. Shikka—S. SUGAWARA & Mt. Ohutoro), Kamtchatka, Gishiginsk and Chukch Peninsula.

161. ***Lactuca triangulata*** MAXIM. Prim. Fl. Amur. (1859), 177, et in Mél. Biol. IX. (1874), 356; KOMAR. Fl. Mansh. III. (1907), 777; NAKAI, Fl. Korea. II. (1911), 55, et Fl. Sylv. Korea. XIV. (1923), 114; MATSUM. Ind. Pl. Jap. II. (1912), 655; KOMAR. ET KLOV.-ALIS. Key Pl. Far East. Reg. URSS. II. (1932), 1098; KITAMURA, in Acta Phytotax. et Geobot. III. (1934), 134; SUGAWARA, Pl. Saghal, (1937), 317.

NOM. JAP. *Miyama-akinogeshi.*

HAB. *S. Saghalien.* Distr. Honto: Todomari.

Yezo. Prov. Kitami: Nokkeushi (T. MATSUDA, 1937).

DISTRIB. Saghalien, Yezo, Honshu, Korea, Ussuri, Manchuria and Amur.

Remarks. New to the flora of Hokkaido.

162. ***Taraxacum nambuense*** H. KOIDZ. in Journ. Jap. Bot. IX. (1933), 263.

NOM. JAP. *Nambu-shirotampopo.*

HAB. *Yezo.* Prov. Oshima: Fukuyama (K. WATANABE, 1937).

DISTRIB. S. Yezo and N. Honshu.

Remarks. New to the flora of Hokkaido.

163. *Sasa Ishiharae* TATEWAKI, sp. nov.

Culmus erectus vel ascendens 1–1.5 m altus 3–4 mm latus simplex vel ramosus primo hispidulo-puberulus sed demum praeter apice glabrescens, nodis haud incrassatis hispidulo-tomentosis. Setae orales paucae patentes facie setulosae. Vagina foliorum primo intra venas molliter velutina margine ciliata. Folia in

Fig. 2. *Sasa Ishiharae* Chanai, Prov. Kushiro.
(V. 28, 1936).

apice culmi 2–4 lanceolata vel oblongo-lanceolata interdum inferiora ovato-lanceolata minora ca. 16–24 cm longa 3–6 cm lata, basi acuta vel subrotundata in petiolum 3 mm longum alato-mucronata, apice acuminata vel longe attenuato-acuminata, margine spinulosa et in autumno partim albido-marginata, supra glabra, subtus glaucina molliter piloso-velutina.

NOM. JAP. *Chanai-zasa.* (n. n.).

HAB. *Yezo.* Prov. Kushiro: Chanai (M. TATEWAKI, n. 25116, V. 28, 1936—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. The present species is very much like to *Sasamorpha mollis* NAKAI, but it differs from the latter by the thinner texture and smaller size of leaves, and also by the presence of a few oral setae.

164. *Sasamorpha lasioclada* TATEWAKI, sp. nov.

Culmus erectus simplex vel ramosus 1–1.5 m altus primo hispidulo-pubescens

sed demum praeter apice glabrescens, nodis haud incrassatis tomentoso-hispidis. Culmus et vagina toto vel partim purpurei. Setae orales destitutae. Folia in apice culmi 3–4, vaginis purpurascentibus tomentoso-velutinis margine ciliatis, laminis lineari-lanceolatis 20–25 cm longis 3–5 cm latis basi cuneatis in petiolum planiusculis apice longe attenuatis margine antrorsum spinulosis supra viridibus glabrescentibus subtus glaucinis velutino-hispidulis. Flores nostris ignoti.

NOM. Jap. *Kitami-suzu.* (n. n.).

HAB. *Yezo.* Prov. Kitami: Shiitokoro, Okedo (M. TATEWAKI, n. 26116, X. 25, 1936—type in Herb. Fac. Agr. Hokkaido Imp. Univ.; VII. 17, 1937).

Remarks. Endemic.

165. *Sasamorpha purpurascens* NAKAI, var. ***borealis*** NAKAI, in Bot. Mag. (Tokyo), XLVI. (1932), 41.

Sasamorpha borealis NAKAI, in MIYABE & KUDO, Fl. Hokk. & Saghal. II. (1931), 181.

NOM. JAP. *Yezo-suzudake, Ji-dake.*

HAB. *Yezo.* Prov. Kitami: Shiitokoro, Okedo (M. TATEWAKI, n. 26128, X. 25, 1936); Onneyu (M. TATEWAKI & T. YAMANAKA, VII. 17, 1937).

Remarks. New to the Province Kitami.

166. *Hierochloe Bungeana* TRIN. in Mém. Acad. Sc. Pétersb. sér. 6, V. (1839–40), 82; ROSHEVITZ, in KOMAR. Fl. URSS. II. (1934), 62.

Hierochloe odorata MIYABE ET MIYAKE, Fl. Saghal. (1915), 559; KUDO, Contr. Fl. N. Saghal. (1923), 20, et Rep. Veg. N. Saghal. (1924), 50; HONDA, in Journ. Fac. Sc. Imp. Univ. Tokyo III. (1930), 220; MIYABE & KUDO, Fl. Hokk. & Saghal. II. (1931), 126, (non WAHLB.).

Hierochloe borealis A. GRAY, Bot. Jap. (1859), 329; MAXIM. Prim. Fl. Amur. (1859), 322; RGL. Tent. Fl. Ussur. (1861), 169; FR. SCHM. Fl. Sachal. (1868), 201; FR. ET SAV. Enum. Pl. Jap. II. (1879), 157; MIYABE, Fl. Kuril. (1890), 269; TAKEDA, Fl. Isl. Shikotan, (1914), 495, (non ROEM. ET SCHL.).

Hierochloe odorata WAHLB. var. *pubescens* KRYL. Fl. Alt. (1914), 1553.

Hierochloe odorata WAHLB. var. *sachalinensis* PRINTZ, Pl. Sachal. (1917), 8, *t. 1.*

Hierochloe odorata WAHLB. var. *Trautvetteriana* V. Petr. Fl. Jakut. I. (1930), 130.

Hierochloe Trautvetteriana V. PETR. l. c.

NOM. JAP. *Kôbô.*

HAB. *Yezo.* Throughout the island.

Saghalien. Throughout the island.

Kuriles. Kunashiri, Shikotan, Etorofu.

DISTRIB. Saghalien, S. Kuriles, Yezo, Honshu, Manchuria, Ussuri, Amur, E. Siberia and Mongolia.

167. ***Poa ochotensis*** TRIN. in Mém. Acad. Pétersb. sér. 6, I. (1831), 377; GRISEB. in LEDEB. Fl. Ross. IV. (1853), 377; ROSHEVITZ, in KOMAR. Fl. URSS. II. (1934), 395, *tab. XXX, fig. 8, a.*

NOM. JAP. *Karafuto-miyama-somosomo.* (n. n.).

HAB. *S. Saghalien.* Distr. Shikka: Mt. Sekkaizan (B. YOSHIMURA & M. HARA, VII. 15, 1937).

DISTRIB. Saghalien and Ochotsk.

Remarks. New to the flora of Japan.

168. ***Carex gynocrates*** WORMSK.: MIYABE & TATEWAKI, in Trans. Sapporo Nat. Hist. Soc. XIII. (1934), 382.

NOM. JAP. *Kanchi-suge.*

HAB. *Yezo.* Prov. Nemuro: Goyomai (M. TATEWAKI, n. 26367, VI. 16, 1930).

Remarks. New to the flora of Yezo.

169. ***Ericaulon Miquelianum*** KOERN.: MIYABE & KUDO, Fl. Hokk. & Saghal. III. (1932), 287.

NOM. JAP. *Inu-no-hanahige.*

Hab. *Yezo.* Prov. Tokachi: Ohtsu (H. YOKOYAMA, IX. 19, 1937).

Remarks. New to the Province of Tokachi.

170. ***Polygonatum mediobracteatum*** OHWI, in Journ. Jap. Bot. XIII. (1937), 443.

var. ***yezoense*** MIYABE ET TATEWAKI, var. nov.

Polygonatum yezoense TATEWAKI, in sched.

Glaberrima, rhizomate repente tereti 3–4 mm crasso elongato, caule tereti striato erecto sursum parum ascendente 30–40 cm alto supra medium ca. 7-foliato superne angulato. Folia elliptica vel oblongo-elliptica septata membranacea ca. 7 cm longa ca. 3 cm lata, apice obtusa, basi acuta vel cuneata, sessiles, supra viridia, subtus glaucina glabrescentia. Inflorenscentia axillares biflora, pedunculo 3–10 mm longo crasso nudo arcuato, pedicellis subaequilongis plerumque 7–12 mm longis medio vel supra medio bracteatis vel ebracteatis, bracteis membranaceis ovatis vel ovato-lanceolatis ca. 2 cm longis 8 mm latis viridibus plurinervis apice acutis. Flores penduli ca. 2 cm longi, perigonii tubo tubuloso viridio-albescente glabro basi rotundato vel subtruncato, segmentis 3 mm longis

triangularibus apice rotundatis vel obtusis dense papillosis, staminibus supra medium perianthii adnatis longe alato-decurrentibus, filamentis linearibus, antheram ochroleucam aequantibus, stylo recto 15 mm longo apice subbilobo, ovario obovoideo.

NOM. JAP. *Yezo-waniguchisô.* (n. n.).

HAB. *Yezo.* Prov. Ishikari: Makomanai (M. HARA, VI. 14, 1937—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. The present variety differs from the type species by the broader leaves and the broader bract with acute apex.

171. *Amitostigma Hisamatsui* MIYABE ET TATEWAKI, sp. nov.

Amitostigma Kinoshitai MIYABE ET KUDO, Fl. Hokk. & Saghal. III. (1932), 357, p. p. (non SCHLECHTER) (quoad pl. Insl. Kuril.).

Perennis terrestris 15-23 cm alta, tuberibus oblongo-cylindricis vel oblongo-ovoideis crassis 1–2 cm longis 2–4 mm latis, radicibus simplicibus paucis. Caulis erectus gracilis simplex viridis teres glaber ad medium monophyllus basi 1–2 vaginatus, vaginis membranaceis apice obtusis acutisve caulem amplectentibus. Folia erecto-patentia viridia crassiuscula lanceolato-linearia vel late linearia integra trinervata, apice acutiuscula, basi cylindrico-vaginata, utrinque glabra, 3.5–5.5 cm longa 2–5 mm lata. Racemus glaber abbreviatus florifer ad ca. 1 cm longus 2–5-floratus, bracteis quam pedicellis brevioribus vel longioribus subulatis anguste lanceolatis vel rarius ovato-lanceolatis acuminatis glabris 2–5 mm longis. Flores albescentes glabri, pedicellis paulo curvatis. Sepala concava erecto-patentia trinervata; sepalum intermedium rotundato-ellipticum ca. 2.5 mm longum; sepala lateralia sepalo intermedio majora late ovata obliqua apice rotundato-obtusa. Petala quam sepalum intermedium minora membranacea conniventia concava rotundato-ovalia plus minusve obliqua apice rotundato-obtusa uninerviata ca. 2 mm longa 1.5 mm lata. Labellum sessile trilobatum 6–7 mm longum 1.8 mm latum, lobis lateralibus erecto-patentibus leviter recurvatis apice acutiusculis 2–3 mm longis, lobo intermedio oblongo-lingulato quam lobis lateralibus longiore 5 mm longo apice truncato-rotundato retuso, calcare 1.5 mm longo 0.5 mm lato clavato-oblongo apice rotundato leviter curvato. Columna erecta brevis. Ovarium pedicellatum, pedicellis 2–4 mm longis, elliptico-cylindricum 5–7 mm longum 2 mm latum.

NOM. JAP. *Hisamatsu-chidori.* (n. n.).

HAB. *S. Kuriles.* Isl. Kunashiri: Seseki (M. TATEWAKI, n. 3006, VII. 20, 1923); Tomari (M. TATEWAKI, n. 25373, VIII. 19, 1936—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. The present species is closely related to *Amitostigma Kino-*

shitai MAKINO from which it differs by the smaller flowers, longer intermediate lobe of labella and shorter elliptico-cylindrical ovaries. The plant is named in honour of the Chamberlain S. HISAMATSU who explored the Kuriles in 1936 in obedience to the Imperial command.

172. ***Dactylostalix ringens*** RCHD. f.: MIYABE & KUDO, Fl. Hokk. & Saghal. III. (1932), 384.

var. ***punctata*** MIYABE ET TATEWAKI, var. nov.

Folia supra purpureo-punctata. Cetera ut in typo.

NOM. JAP. *Hime-uzura-hitoharan.* (n. n.).

HAB. *Yezo.* Prov. Kushiro: Kamioboro (M. TATEWAKI, VI. 14, 1937—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

173. ***Habenaria yezoensis*** HARA, in Journ. Jap. Bot. XI. (1935), 512, *fig. 20.*

Habenaria linearifolia MAXIM. var. *brachicentra* HARA, in *idid.* IX. (1933), 520.

var. ***longicalcarata*** MIYABE ET TATEWAKI, var. nov.

A typo differt, calcaribus longioribus ca. 15 mm longis.

NOM. JAP. *Chishima-mizutombo.* (n. n.).

HAB. *S. Kuriles.* Isl. Kunashiri: Zenbekotan (M. TATEWAKI, n. 25642, VIII. 22, 1936—type in Herb. Fac. Agr. Hokkaido Imp. Univ.

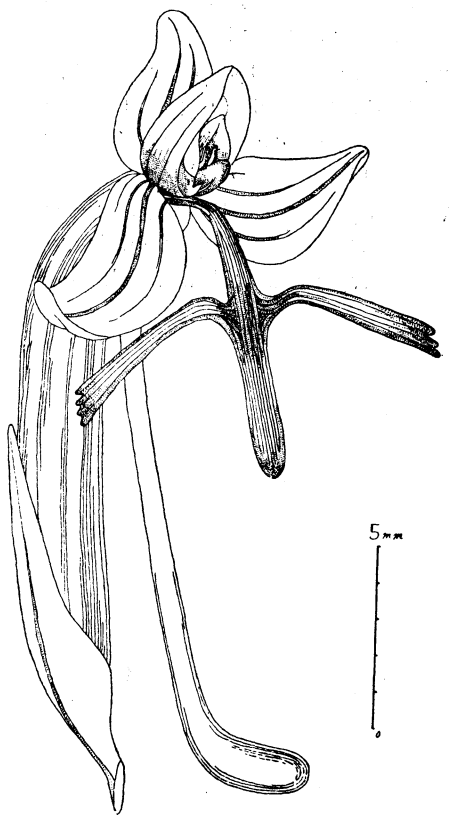

Fig. 3. *Habenaria yezoensis* var. *longicalcarata*

174. ***Liparis auriculata*** BL. ex MIQ. in Ann. Mus. Bot. Lugd. Batav. II. (1866), 203, Prol. Fl. Jap. (1866), 135; F. MAEKAWA, in Journ. Jap. Bot. XII. (1936), 93, *fig. 17.*

Liparis yakushimensis MASAMUNE, in Bot. Mag. (Tokyo), XLIII. (1929), 250 et in Mem. Fac. Sc. Agr. Taihoku Imp. Univ. XI. Bot. IV. (1934), 585; MAKINO ET NEMOTO, Fl. Jap. ed. 2,

(1931), 1656.

NOM. JAP. *Gibôshiran.*

HAB. *Yezo.* Prov. Shiribeshi: Isl. Okushiri, Tsurikake (K. TOGASHI, VII. 31, 1935); Shikaribetsu (I. YAMAMOTO, X. 11, 1937).

DISTRIB. SW. Yezo, Honshu, Shikoku, Kyushu and Isl. Yakushima.

Remarks. New to the flora of Hokkaido.

175. *Listera Yatabei* MAKINO, in Bot. Mag. (Tokyo), XIX. (1905), 8, et in *ibid.* XX. (1906), 44, *fig. 1-4*; OHWI, in Acta Phytotax. et Geobot. II. (1933), 264.

Listera Savatieri MAXIM, in sched. ex parte; KOMAR. Fl. Mansh. 1. (1901), 526; MIYABE & MIYAKE, Fl. Saghal. (1914), 444; KRAEZLIM, in Journ. Russ. Bot. (1913), 46, et in Fedde Repert. Beih. LXV. (1931), 80, p. p.

Listera major NAKAI, in Bot. Mag. (Tokyo), XXVIII. (1914), 327; NEVSKI, in KOMAR. Fl. URSS. IV. (1935), 614, *tab. XXXVIII, fig. 3*; SCHISCHKIN, Fl. Syst. Pl. Vas. II. (1936), 116, cum *fig.*

NOM. JAP. *Takane-futabaran.*

HAB. *Yezo.* Prov. Kushiro: Kamioboro (E. TASHIMO & T. YAMANAKA, VIII. 14, 1936). Prov. Nemuro: Onnetô (M. TATEWAKI, VIII. 23, 1934).

DISTRIB. Saghalien, Yezo, S. Kuriles, Honshu, Korea and Manshuria.

Remarks. New to the flora of Yezo.

摘　　要

北日本植物誌料 九

153. コナラ 十勝植物に新追加、日高山脈以東に産すること明となれり。

154. カムイビランヂ（新稱） 日高山脈カムイエクウシカウシ山頂附近の花崗岩の罅隙に生ずる美しき高山植物の一新種、栃内吉彦及び石田文三郎兩氏採集す。

155. カラフトヒメオダマキ（新稱） オダマキの一種にして花の頗る小形なるもの、日本に新報知の植物、樺太敷香支廳石灰山にて吉村文五郎及び原松次兩氏採集す。

156. ホソバヒメモチ（新稱） ヒメモチの狹葉變種、後志國然別にて山本岩龜氏採集す。

157. ムカゴニンジン 十勝植物に新追加、從來は渡島國函館附近よりのみ知られたるもの。

158. ムラサキゴゼンタチバナ（新稱） 苞片の紫色品種、樺太富内にて白坂信巳氏採集す。

159. エゾハマイボタ（新稱） オクハマイボタの無毛品、渡島國福山の產。

160. タカヲカサウ 樺太產。

161. ミヤマアキノゲシ 北海道植物に新追加、北見國の產。

162. ナンブシロタンポヽ 北海道植物に新追加、渡島國福山の產。

163. チヤナイザサ（新稱） 一見ケスヾに似たるも葉鞘の肩毛を有し、葉の幅狹く、質薄き新種、東部北海道森林の探究調査を共にせし北海道廳林業試驗場長林學博士石原供三氏を記念せるものなり。釧路國茶内の產。

164. キタミスヾ（新稱） 葉鞘、稈に有毛、節に剛毛を有する新種、北見國置戸森林の產。

165. エゾスヾダケ 北見植物に新追加。

66. カウバウ 學名の變更。

167. カラフトミヤマソモソモ（新稱） 日本に新報知の植物、樺太敷香支廳石灰山にて吉村文五郎及び原松次兩氏採集す。

168. カンチスゲ 北海道本島植物に新追加、根室半島の產。

169. イヌノハナヒゲ 十勝國大津海邊砂丘後方水溜に生ず。ムカゴニンジンと共に今日まで渡島國函館附近の濕地にのみ知られしもの、兩種共横山春男氏の採集に係る。

170. エゾワニグチサウ（新稱） カウライワニグチサウに最も近く、葉形と苞形を異にする變種、石狩國眞駒内にて原松次氏採集す。

171. ヒサマツチドリ（新稱） コアニチドリに近似するも花形小、唇辨長く子房は短く、楕圓狀圓壔形を呈する新種にして、昭和十一年聖旨を奉じ千島を巡行せられたる侍從久松重孝氏を記念す。南千島國後島の產。

172. ヒメウヅラヒトハラン（新稱） ヒメヒトハランの葉上に紫點を有する一變種、釧路國上尾幌森林の產。

173. チシマミヅトンボ（新稱） エゾミヅトンボに似て距の長き變種、國後島泊の產。

174. ギバウシラン 北海道植物に新追加、何れも西南部より採集せらる。後志國奥尻島（富樫錦吾氏）と然別（山本岩龜氏）の產。

175 タカネフタバラン 北海道本島に新追加、釧路、根室兩國の產。

Fungi of the Bonin Islands II.

By

Seiya ITO and Sanshi IMAI

(伊藤誠哉・今井三子)

1. ***Clavaria Zippelii*** LÉV.

Ann. Sci. Nat. 3 sér. II, 215, 1844—SACC. Syll. Fung. VI, 712, 1888—BRES. Ann. Myc. V, 239, 1907—PETCH, Ann. Royal Bot. Gard. Peradeniya, IX, 334, 1925—KILLERM. in ENGLER & PR. Naturl. Pflanzenf. 2 Aufl. VI, 156, f. 102FGH, 1928.

Clavaria cyanocephala BERK. et CURT. Journ. Linn. Soc., Bot. X, 338, 1869.

Lachnocladium giganteum PAT. Journ. de Bot. III, 34, t. 1, f. 1, 1889—SACC. Syll. Fung. IX, 254, 1891.

Lachnocladium Englerianum P. HENN. in ENGLER & PR. Naturl. Pflanzenf. I, 1**, 138, f. 73FGH, 1897; in ENGLER's Bot. Jahrb. XXV, 499, 1898—SACC. Syll. Fung. XVI, 209, 1902.

Clavaria aeruginosa PAT. Bull. Soc. Myc. Fr. XIV, 189, 1898—SACC. Syll. Fung. XVI, 204, 1902.

Gregarious, strongly branched, up to 9 cm. high and wide, 4–5 times dichotomously branched; branches rather short and thick, crowded, cylindrical, apex somewhat truncated and slightly dentate, with subterete stipe about half the total length of plant and 1 cm. or more thick, mikado-brown to warm-sepia and paler at the apices; spores brownish, yellowish under the microscope, ellipsoidal or long ovate, provided with spines up to 2μ long, often slightly curved at the narrow end, 12.5–17.5 × 7–10μ.

Hab. on the ground under trees. Chichishima: Ômura-Kiyose (Oct. 28–30, 1936, M. OKABE), Mt. Asahiyama (Nov. 12, 1936).

Distr. Ceylon, Sumatra, Java, Celebes, New Guinea, Philippine, Bonin Islands, Cuba.

Jap. name. *Tobiiro-hôkitake* (n. n.).

2. ***Clavaria amethystina*** (BATT.) BULL. ex FR.

Syst. Myc. I, 472, 1821; Epicr. Myc. 571, 1838; Hymen. Eur. 667, 1874—BERK. in SMITH, Engl. Fl. V, (2), 174, 1836; Outl. Brit. Fung. 279, t.

18, f. 2, 1860—CKE. Handb. Brit. Fung. I, 331, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 308, 1872; Ench. Fung. 217, 1886—GILL. Hymen. Fr. 764, 1874—KARST. Myc. Fenn. III, 327, 1879; Hattsv. II, 166, 1882—SACC. Syll. Fung. VI, 693, 1888; Fl. Ital. Crypt., Hymen. 1229, 1916—MASS. Brit. Fung. Fl. I, 76, 1892—W. G. SM. Brit. Basid. 430, 1908—COTTON & WAKEF. Trans. Brit. Myc. Soc. VI, 180, 1919—BURT, Ann. Mo. Bot. Gard. IX, 41, t. 8, f. 62, 1922—REA, Brit. Basid. 706, 1922—COKER, Clavaria U. S. & Canada, 90, t. 24–25, 28, t. 84, f. 5, 1923—BOURD. & GALZIN, Hymen. Fr. I, 106, 1927.

Coralloides amethystina BATT. Fung. Agr. Arim. Hist. 22, t. 1, f. C, 1755.

Clavaria amethystina BULL. Champ. Fr. t. 496, f. 2, 1790.

Ramaria amethystina HOLMSK. Beata Fung. Dan. I, 110, f. 28, 1799.

Clavaria amethystea PERS. Syn. Fung. 590, 1801; Myc. Eur. I, 165, 1822.

Densely caespitose and forming small and very compact tufts, 2–5 cm. or more high, irregularly branched; branches thick, rather short, cylindrical, not attenuated upward, usually erect, smooth or somewhat rugulose, apices at first somewhat sharply pointed into a few sharp teeth, but then becoming rather blunt or obtuse, pale vinaceous-lilac, light brownish-vinaceous or light grayish-vinaceous; stipe subconcolorous or whitish, equal, slender; spores white in mass, subglobose or ovate, smooth, 4–6 × 3.5–4μ.

Hab. on the ground. Chichishima: Ôgimura-Futako (Nov. 7, 1936), Ômura Kiyose (Nov. 14, 1936).

Distr. Europe, North America, Japan.

Jap. name. *Murasaki-hôkitake.*

3. ***Clavaria boninensis*** S. ITO et IMAI, sp. nov.

Gregaria, bis ad quinquies dichotome ramosa, alba, circa 1.5 cm. alta, apicibus ramulorum acris brevissimisque, basi albo-villosuli; sporis albis, subglobosis vel subovatis, apiculatis, laevibus, 5–7.5μ in diam.

Gregarious. Fructification about 1.5 cm. high, 2–5 times dichotomously branched, white, then becoming yellowish, especially when dried, apex of branches acute and very short, base white and short villous; spores white, subglobose or subovate, apiculate, smooth, 5–7.5μ in diam.

Hab. on the ground in shady woods. Chichishima: Fukurozawamura-Kobikidani (Nov. 15, 1936).

Distr. Endemic.

Jap. name. *Ogasawara-shiro-himehôkitake* (n. n.).

The fungus is closely allied to *C. Kunzei*, from which it is distinguished by the smooth spores. From *C. cristata* and its allies, it differs by the more

delicate fructification which is regularly and dichotomously branched.

4. ***Clavaria fragilis*** HOLMSK. ex FR.

Syst. Myc. I, 484, 1821; Elench. Fung. I, 232, 1828; Epicr. Myc. 578, 1838; Hymen. Eur. 675, 1874—BERK. in SMITH, Engl. Fl. V, (2), 176, 1836; Outl. Brit. Fung. 283, 1860—KICKX, Fl. Crypt. Flandr. II, 124, 1867—CKE. Handb. Brit. Fung. I, 337, 1871—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 310, 1872; Ench. Fung. 221, 1886—GILL. Hymen. Fr. 762, cum icone, 1874—KARST. Myc. Fenn. I, 335, 1876; Finl. Basidsv. 378, 1889—WINT. Die Pilze, I, 307, 1884—SACC. Syll. Fung. VI, 721, 1888—SCHROET. Pilze Schles. I, 445, 1888—MASS. Brit. Fung. Fl. I, 84, 1892—W. G. SM. Brit. Basid. 435, 1908—REA, Brit. Basid. 717, 1922—BRES. Icon. Myc. XXIII, t. 1100, 1932.

Clavaria vermiculata SCOP. Fl. Carn. ed. 2, II, 483, 1772.

Clavaria cylindrica BULL. Champ. Fr. t. 463, f. 1, 1789.

Clavaria fragilis HOLMSK. Beata Fung. Dan. I, 7, t. 2–3, 1790.

Clavaria gracilis SOW. Engl. Fung. t. 232, 1797.

Clavaria eburnea PERS. Syn. Fung. 603, 1801.

Clavaria vermicularis FR. Syst. Myc. I, 484, 1821; Hymen. Eur. 675, 1874—BERK. in SMITH, Engl. Fl. V, (2), 176, 1836—CKE. Handb. Brit. Fung. I, 335, f. 9, 1871—GILL. Hymen. Fr. 763, 1874—QUÉL. Ench. Fung. 221, 1886—SACC. Syll. Fung. VI, 720, 1888—MASS. Brit. Fung. Fl. I, 83, 1892—W. G. SM. Brit. Basid. 435, 1908—COTTON & WAKEF. Trans. Brit. Myc. Soc. VI, 183, 1919—BURT, Ann. Mo. Bot. Gard. IX, 48, t. 9, f. 74, 1922—REA, Brit. Basid. 716, 1922—PETCH, Ann. Royal Bot. Gard. Peradeniya, IX, 330, 1925—BOURD. & GALZIN, Hymen. Fr. I, 110, 1927.

Clavaria vermiculata PERS. Myc. Eur. I, 184, 1822—FR. Epicr. Myc. 577, 1838—BERK. Outl. Brit. Fung. 282, 1860—QUÉL. Champ. Jura Vosg. I, in Mém. Soc. D'Emul. Montb. 2 sér. V, 310, 1872—KARST. Hattsv. II, 172, 1882—SACC. Fl. Ital. Crypt., Hymen. 1246, 1916—COKER, Clavaria U. S. & Canada, 45, t. 5–6, t. 82, f. 5–6, 1923—VAN DER BYL, S. Afr. Journ. Sci. XXIX, 319, 1932.

Clavaria pistilliformа PERS. Myc. Eur. I, 183, 1822.

Clavaria simplex RETZ. apud KARST. Hattsv. II, 172, 1882.

Clavaria nivea QUÉL. Champ. Jura Vosg. 22 Suppl., in Assoc. Fr. XXX, 496, t. 3, f. 11, 1901.

Fasciculate, simple or very rarely somewhat corniculate at the apex, cylindrical-clavate and terete at first, then compressed and longitudinally wrinkled and becoming long fusiform and twisted, usually acute at the apex and attenuated

at the base, 2–8 cm. or more long, 2–4 mm. or more thick, milky white, becoming tinged with yellowish color at the tip, not deliminated from the stipe; spores white in mass, broadly ellipsoidal or subovate, smooth, 5–6×4–5μ.

Hab. on the ground in woods. Chichishima: Ôgimura-Renjudani (Nov. 7, 9, 1936). Hahashima: Kitamura-Sekimonzan (Nov. 20, 1936).

Distr. Europe, North America, Japan, Australia, Africa.

Jap. name. *Shiro-sômentake.*

5. ***Clavaria laeta*** BERK. et BR.

Journ. Linn. Soc., Bot. XIV, 76, 1875—SACC. Syll. Fung. VI, 718, 1888—PETCH, Ann. Royal Bot. Gard. Paradeniya, IX, 330, 1925.

Clavaria sanguineo-acuta VAN OVEREEM, Icon. Fung. Malay. t. 3, f. 8, teste PETCH.

Fasciculate, simple, connate at the base, 0.6–7 cm. long, cylindrical-clavate, narrowed at the apex, terete and even at first, then compressed and rugulose or sulcate, not distinct from the stipe, salmon-orange, capusine-orange, scarlet or peach-red, fading to paler when old or dried, stuffed; spores white in mass, globose or subglobose, apiculate, usually 5μ in diam., rarely up to 7.5μ.

Hab. on the ground in woods. Chichishima: Ôgimura-Renjudani (Nov. 5, 7, 1936).

Distr. Ceylon, Malay, Sumatra, Philippine, Bonin Islands.

Jap. name. *Akebono-sômentake* (n. n.).

6. ***Clavaria subargillacea*** S. ITO et IMAI, sp. nov.

Fasciculata, 2–4 cm. longa, clavato-cylindracea, apice primo attenuata dein subobtusa, primo cylindrica demum compressa rugulosaque, "naples-yellow"; stipite a clavula distincto, "straw-yellow"; sporis in cumulo albis, globosis, apiculatis, laevibus, 4.5–5.5μ in diam.

Fasciculate. Fructification 2–4 cm. long, clavate-cylindrical, at first attenuated at the apex, then becoming somewhat obtuse, at first cylindrical and nearly smooth, finally compressed and furrowed or rugulose, naples-yellow; stipe distinct from the clavula, straw-yellow; spores white in mass, globose, apiculate, smooth, 4.5–5.5μ.

Hab. on the ground in shady woods. Chichishima: Ôgimura-Renjudani (Nov. 9, 1936).

Distr. Endemic.

Jap. name. *Munin-kiashi senkôtake* (n. n.).

The fungus is closely allied to *C. argillacea* in the macroscopic features, but it is sharply distinguished by the globose spores instead of ellipsoidal spores

of the latter.

7. ***Clavaria subacuta*** S. ITO et IMAI, sp. nov.

Fasciculata, clavato-cylindrica, 2–4 cm. longa, gracilis, teretis, 1–1.5 mm. crassa, apice attenuata vel obtusa, alba, a stipite determinata, stipite 0.6–1.5 cm. longo, clavula tenuioro, albo, transparente; sporis in cumulo albis, ellipsoideis vel subovatis, laevibus, $5 \times 3\mu$.

Fasciculate. Fructification clavate-cylindrical, 2–4 cm. long, slender, terete 1–1.5 mm. thick, attenuated or obtuse at the apex, white, determinated from the stipe; stipe 0.6–1.5 cm. long, slender than the clavula, white, transparent; spores white in mass, ellipsoidal or subovate, smooth, $5 \times 3\mu$.

Hab. on the ground in shady woods. Chichishima: Ôgimura-Renjudani (Nov. 9, 1936).

Distr. Endemic.

Jap. name. *Munin-yarinohotake* (n. n.).

The fungus is closely allied to *C. acuta* from which it is easily distinguished by the smaller spores, and from *C. fragilis* by the more slender fructification and distinct stipe. *Clavaria filiformis* P. HENN. from Java is also closely allied to this fungus, but having the subglobose or ovoid spores it distincts from the fungus under consideration.

8. ***Phillipsia domingensis*** BERK.

Journ. Linn. Soc., Bot. XVIII, 388, 1881—SEAVER, Mycologia, V, 192, t. 89, f. 3, t. 90, f. 7, 1913; North Amer. Cup-fungi, 182, t. 17, f. 2, 1928—BOEDIJN, Bull. Jard. Bot. Buitenz. 3 sér. XIII, 59, f. 1, 1933.

Peziza domingensis BERK. Ann. Mag. Nat. Hist. 2 ser. IX, 201, 1852.

Peziza Boninensis BERK. et CURT. Proceed. Amer. Acad. Sci. IV, 127, 1860.

? Peziza hirneoloides BERK. Journ. Linn. Soc., Bot. X, 365, 1869.

Peziza (*Sarcoscypha*) *crispata* BERK. et CURT. Ibid. X, 367, 1869.

? Peziza hirneoloides BERK. in CKE. Mycogr. 127, t. 56, f. 220, 1876.

Helotium pururatum KALCHBR. in THUEM. Myc. Univ. 1614, 1880, teste SEAVER.

? Phillipsia polyporoides BERK. Journ. Linn. Soc., Bot. XVIII, 388, 1881—SACC. Syll. Fung. VIII, 151, 1889—CKE. Handb. Austr. Fung. 258, 1892.

Phillipsia Kermesiana KALCHBR. et CKE. Grev. IX, 25, t. 136, f. 21, 1880—SACC. Syll. Fung. VIII, 151, 1889.

Phillipsia subpurpurea BERK et BR. Trans. Linn. Soc., Bot. II, 69, 1882—SACC. Syll. Fung. VIII, 151, 1889—CKE. Handb. Austr. Fung. 258, t. 19, f. 151, 1892—MASS. Journ. Linn. Soc., Bot. XXXI, 472, t. 16, f. 9, 1896.

? Otidea hirneoloides SACC. Syll. Fung. VIII, 96, 1889.
Otidea domingensis SACC. Ibid. VIII, 97, 1889.
Humaria boninensis SACC. Ibid. VIII, 139, 1889.
Lachnea crispata SACC. Ibid. VIII, 169, 1889.
Phillipsia gigantea SEAVER, North Amer. Cup-fungi, 183, 1928.

Solitary or gregarious. Apothecia 1–3 cm. or more broad, shallow cup-shaped, subdiscoid or subturbinate, not truly cupulate, regular or unequal-sided, attached by a broad base which is often extended into a thick stipe; hymenium concave or nearly plane, hellebore red, rocellin-purple or paler or darker than these colors, usually becoming paler when old to salmon-color or pale flesh-color, becoming darker and shrinkage in drying; external white, powdery-flocculose on the edge, smooth at the base, discolored when dry; stipe up to 1.5 cm. long or nearly wanting; asci cylindrical above, gradually attenuated below, 250-400 × 14–18μ; spores uniseriate, ellipsoidal, blunt or rarely narrowed at the ends, unequal sided, striate, the striations consisting of a few bands extending the length of the spore, containing one or two guttae, 21.5–30 × 11–13.5μ; paraphyses filiform, slightly enlarged above.

Hab. on dead wood in shady woods. Chichishima: Ôgimura-Renjudani (Nov. 5, 7, 9, 1936); Asahiyama (Nov. 12, 1936); Fukurozawamura-Kobikidani (Nov. 15, 1936). Hahashima: Okimura-Kuwanokiyama (Nov. 18, 1936); Kitamura-Sekimonzan (Nov. 20, 1936).

Distr. Cuba, ? Mexico, Ceylon, Java, Bonin Islands, Australia, Africa.

Jap. name. *Nettai-beni-chawantake* (n. n).

9. ***Phillipsia straminea*** S. ITO et IMAI, sp. nov.

Solitaria vel gregaria. Apothecio 1–3 cm. lato, breve cupulato, subdiscoideo vel subturbinato, non vere cupulato, regulare vel irregulare, breve stipitato, hymenio concavo vel subplano, "straw-yellow or massicot-yellow", extus albo, acie furfuraceo-flocculoso; ascis apice cylindricis, basi gradatim attenuatis, 250-375 × 14–17μ; sporis monostichis, ellipsoideis, utrimque obtusis vel raro attenuatis, ventricosis, uni- vel bi-guttulatis, 22.5–30 × 12–13.5μ; paraphysibus filiformibus, apice leviter incrassatis.

Solitary or gregarious. Apothecia 1–3 cm. broad, shallow cup-shaped, subdiscoid or subturbinate, not truly cupulate, regular or unequal-sided, attached by a broad base which is often extended into a thick stipe; hymenium concave or nearly plane, straw-yellow or massicot-yellow; externally white, powdery-flocculose on the edge; stipe very short or nearly wanting; asci cylindrical above, gradually tapering below; 250–375 × 14–17μ; spores uniseriate, ellipsoidal, blunt or rarely narrowed at the ends, unequal-sided, 22.5–30 × 12–13.5μ; para-

physes filiform, slightly enlarged above.

Hab. on decorticated decaying branches of trees in shady woods. Chichishima: Fukurozawamura-Kobikidani (Nov. 15, 1936).

Distr. Endemic.

Jap. name. *Nettai-ki-chawantake* (n. n.).

The fungus is easily distinguished from the other species in this genus by the straw-yellow colored hymenium.

10. ***Boedijnopeziza*** S. ITO et IMAI, gen. nov.

Peziza § *Trichoscypha* CKE. Mycogr. 252, 1879, p.p.

Trichoscypha SACC. Syll. Fung. VIII, 160, 1889, p.p.

Cookeina O. K. Rev. Gen. Pl. II, 849, 1891, p.p.

Apothecium stipitatum, extus fasciculato-tomentosum, lente carnosum. Ascii cylindrici, octospori. Sporae fusoideae, hyalinae, laeves. Paraphyses filiformes, apice valde septatae constrictaeque, saepe reticulatae.

Typus: *Peziza insititia* BERK. et CURT.

BOEDIJN carefully studied and stated in detail the characters of the type species, *Peziza insititia* BERK. et CURT., and after discussion on its systematic position he placed the fungus in the genus *Cookeina*. We, however, consider that it quite differs in the form of spores from the other species of *Cookeina*, and it is better to classify as a represent of a new genus. The generic name is given in honour of Dr. K. B. BOEDIJN.

10bis. ***Boedijnopeziza insititia*** (BERK. et CURT.) S. ITO et IMAI.

Peziza insititia BERK. et CURT. Proceed. Amer. Acad. Sci. IV, 127, 1860.

Peziza (*Macropodia*) *insititia* BERK. in CKE. Mycogr. 116, t. 51, f. 201, 1876.

Peziza (*Trichoscypha*) *insititia* BERK. et CURT. in CKE. Mycogr. 252, 1879.

Trichoscypha insititia SACC. Syll. Fung. VIII, 161, 1889.

Cookeina insititia O. K. Rev. Gen. Pl. II, 849, 1891—SEAVER, Mycologia, V, 190, t. 89, f. 2, 1913—BOEDIJN, Bull. Jard. Bot. Buitenz. 3 sér. XIII, 73, f. 2 ade, f. 3 fj, f. 4cf, 1933.

Trichoscypha magnispora LLOYD, Myc. Notes, No. 65, p. 1050, t. 179, f. 1950, 1921.

Gregarious, solitary or subcaespitose. Apothecia 4–10 mm. deep and wide, urceolate to turbinate, stipitate, white to yellowish, externally clothed with long coarse hairs which are more numerous around the margin, forming an incurved fringe; hairs flat, 1–2 mm. long, with a broad base up to 1 mm., gradually tapering toward the pointed apex, but in younger specimen they partly form a continuous, subconical sheat, which closes the apothecium and afterwards splits

up into separated hairs; stipe 5–20 mm. or more long, 1–2.5 mm. thick, equal or slightly enlarged at the base, cylindrical or slightly compressed laterally, concolorous, furfuraceous under lens, fistulose; hymenium concolorous with outer surface, smooth; asci cylindrical, very long, thick-walled, 8-spored, 375–420 × 13.5–15μ; spores monostichous, fusiform, hyaline, smooth, ventricose or slightly curved, 40–50 × 8.5–10μ; paraphyses filiform, branching and often anastomosing near the periphery, forming an irregular network, hyaline, in the upper part strongly septate and constricted at the septa which form a moniliform appearance.

Hab. on dead fallen branches or wood on or in the ground in woods. Chichishima: Ôgimura-Renjudani (Nov. 5, 7, 1936), Asahiyama (Nov. 12, 1936), Fukurozawamura-Kobikidani (Nov. 15, 1936). Hahashima: Okimura-Kuwanokiyama (Nov. 18, 1836).

Distr. Bonin Islands, Sumatra, Java, Talaud Islands.

Jap. name. *Shiro-kopputake* (n. n.)

摘　　要

本文ハ小笠原島産篦茸科7種、茶椀茸科3種ヲ報告セリ。

1. 鳶色篦茸、*Clavaria Zippelii* LÉV. 南洋諸島及キューバニ分布スル大形ナル暗褐色ノ菌デアル。

2. 紫篦茸、*Clavaria amethystina* (BATT.) BULL. ex FR. 北半球各地ニ分布スル普通ノ菌デアル。

3. 小笠原白姫篦茸、*Clavaria boninensis* S. ITO et IMAI. 白姫篦茸ニ酷似スルガ胞子ガ平滑ナ點デ異ル。

4. 白素麺茸、*Clavaria fragilis* HOLMSK. ex FR. 世界各地ニ廣ク分布スル菌デアル。

5. 曙篦茸、*Clavaria laeta* BERK. et BR. 南洋諸島ニ分布スル菌デ、赤長刀茸ニ酷似スルガ熱帯産デ、胞子ガ球形ヲナス點デ區別サル。

6. 無人黄脚線香茸、*Clavaria subargillacea* S. ITO et IMAI. 黄脚線香茸ニ酷似スルガ、球形胞子デ區別サル。

7. 無人鎗ノ穂茸、*Clavaria subacuta* S. ITO et IMAI. 鎗ノ穂茸ニ似ルガ小形胞子デ區別サル。

8. 熱帯紅茶椀茸、*Phillipsia domingensis* BERK. 小笠原島カラ *Peziza Boninensis* BERK. et CURT. トシテ報告サレタ菌ハ本種ト同一種デアル。熱帯地方ニ廣ク分布スル。

9. 熱帯黄茶椀茸、*Phillipsia straminea* S. ITO et IMAI. 前種ト形態ハ同一デアガ、子實層部ガ淡黄色ナ點デ區別サレル。

10. 白コップ茸、*Boedijnopeziza insititia* (B. et C.) S. ITO et IMAI. 小笠原島カラ *Peziza insititia* B. et C. トシテ報告サレタモノデ、近來 *Cookeina insititia* O. K. トシテオル種類デアルガ、本種ハ新屬ヲ建ケルニ價スルモノト思フ。

Phycological Observations III

On the juvenile thallus and the renovation of lamina of *Arthrothamnus kurilensis* RUPR.

By

Jun TOKIDA

(時 田 郁)

With 5 text-figures

Arthrothamnus kurilensis RUPR. is one of our most interesting endemic species growing restrictively in the middle Kuriles and the so-called MAKAROV's spot[1] in southern Saghalien. Since RUPRECHT[2] established the species, our knowledge concerning its morphology has been almost limited to the mature form found from summer to autumn. In last April the author had a good fortune to collect a late spring form in the vicinity of Cape Notoro, Saghalien. In the collection are found a quite young stage of the species still remaining without auricles, as well as the older ones renovating their blades.

The young plants before us measure 55–70 cm. in height, and 8–12.2 cm. in width in the broadest portion of the lamina. The rhizoidal hapteres are rater thick, somewhat complanate, dichotomously branched, and arise verticillately at the base of the stipe. The stipe is very short, cylindrical below, and compressed above. The lamina is broadly oblanceolate in shape, gradually attenuated toward the base, more or less deeply split into several narrow segments in the upper portion, and with a row of rough bullae along both sides of the median fascia. The bullation has been observed by Dr. K. YENDO[3] and Dr. Y. YAMADA[4] in *Arthrothamnus bifidus* (GMEL.) J. AG. on the newly formed lamina of an old frond. In the species under consideration, the bullation is always present on the primary lamina while young, as mentioned above,

1) Cf. MIYABE, K., On the Occurrence of a Certain Behring and Kurile Species of Laminariaceae in a Small Isolated Region off the Southern Extremity of Saghalien. (Proc. Third Pan-Pacific Sci. Congr., Tokyo, 1926, p. 954).

2) RUPRECHT, F. J., Bemerkungen über den Bau und das Wachsthum einiger grossen Algen-Stämme etc. (Mém. de l'Acad. Imp. des Sci. Nat., vol. 6, 1848).

3) YENDO, K., *Hedophyllum spirale*, sp. nov. and its relation to Thalassiophyllum and Arthrothamnus. (Bot. Mag., Tokyo, vol. 17, p. 165, 1903).

4) YAMADA, Y., On *Arthrothamnus bifidus* J. AG. (*in Japanese*). (Journ. Jap. Bot., vol. 10, no. 11, p. 732, figs. 1–2, 1934).

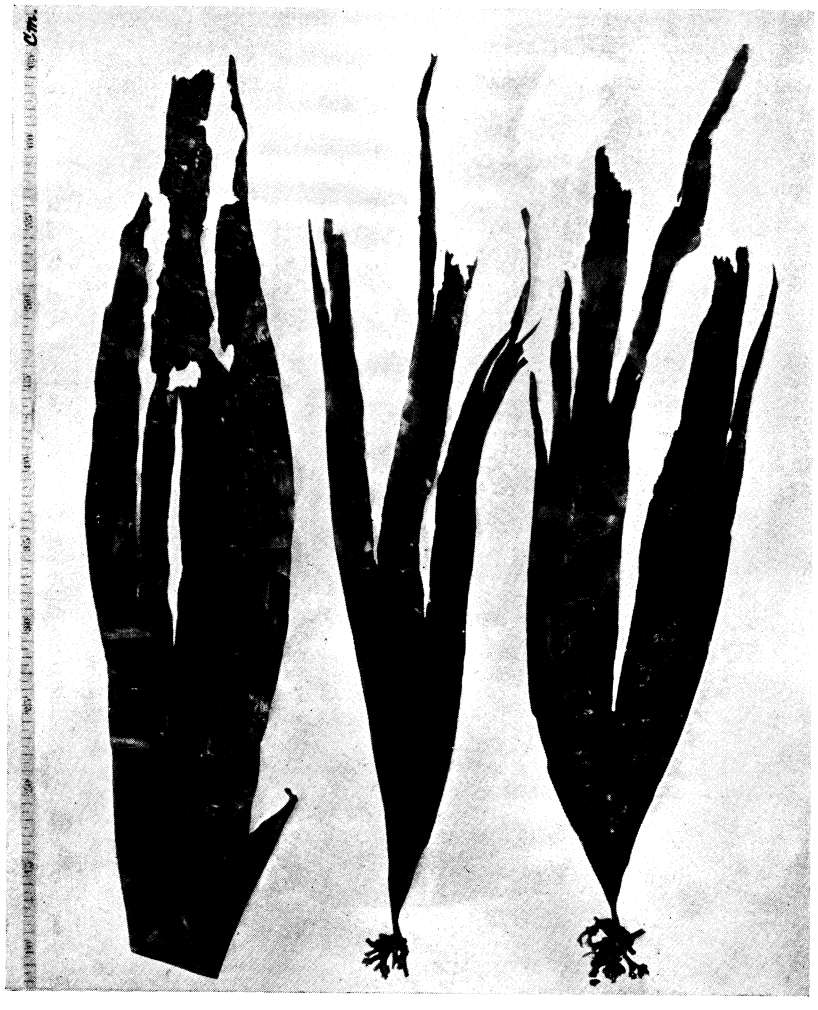

Fig. 1. *Arthrothamnus kurilensis* RUPR.
From a photograph of a group of young plants.

usually disappearing as the lamina grows larger, but sometimes persistent as shown in Fig. 5a. The mucilage lacunae are present in both hapteres and lamina but absent from the stipe. On close examination it was revealed that in general the primary stipe lacks the lacunae in the lower half of its length, and the secondary as well as the successive stems are also destitute of them at least in the lowermost portion just above the scar, that is to say in the portion belonged to the stipe proper. On the other hand, the upper half of

the stems is originally the basal portion of a lamina, and it is no wonder that the lacunae should be present there.

As to the process of renovation of lamina it is essentially the same as in the case of *Arthrothamnus bifidus* which has been studied by Dr. YAMADA[1]. The so-called auricle at the base of the lamina of a summer plant is shown

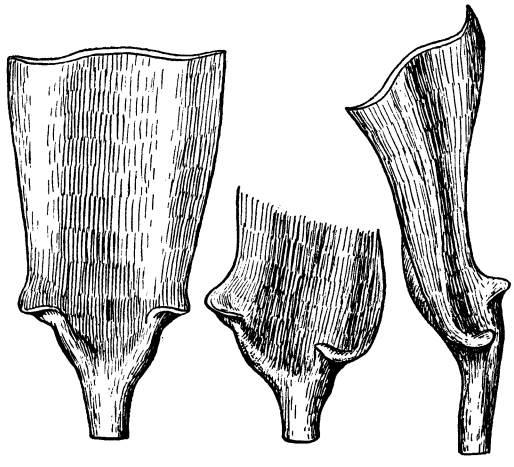

Fig. 2. *Arthrothamnus kurilensis* RUPR.
Habit sketches of the basal portion of a lamina of a summer plant collected in July 1932, at Cape Notoro. Reduced.

in Fig. 2. It is a marginal outgrowth of the lamina at the transition region, scrolled inside for one turn. The auricle is not itself the initial of a new shoot, but its margin develops in winter into a thin leaflet, fairly auriculate in shape, up to 5 cm. in length, 2.5 cm. in width, usually furnished with a row of irregular bullae. As season advances the auricle first begins to wear away and then the old lamina, leaving their scars on the stems. In some of our specimens the auricles are already partially worn away. The basal margin of the lamina is gradually thickened in the portion beneath the auricle so as to become almost cylindrical, and constitutes later on the basal part of a new stem which grows out at the axil between the inner edge of the auricle and the lamina. In other words, the new shoot springs out at the summit of the thickening margin of the lamina base as will be understood by Fig. 4b. In that figure the old lamina and the two new ones are all shown to be depressed on the same surface. In the natural state, as the result of the scrolling, the surface of the

1) YAMADA, Y., 1934. *l. c.*

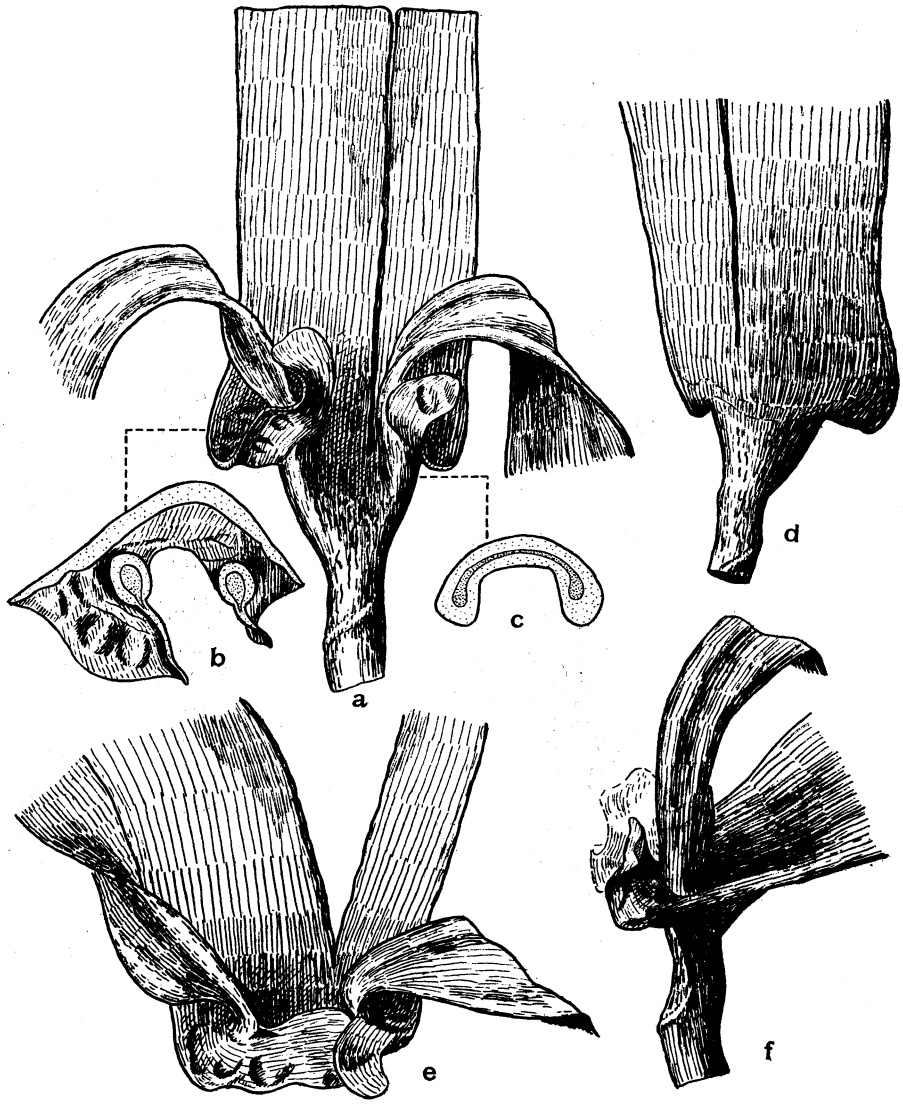

Fig. 3. *Arthrothamnus kurilensis* RUPR.

Habit sketches of the basal portion of an old lamina detached from a several years old plant collected in April 1937, at Cape Notoro, showing the full grown auricles and the new laminae. Reduced.

a. Seen from the upper surface; b & c. Cross sections through the transition region at two different leveles; d. Seen from the under surface; e. Seen from above, showing the connection between the suricles and the new lamina; f. Side view.

new lamina is often nearly perpendicular to that of the old lamina, with the depressed surface facing outside. Rarely, the new lamina gets twisted for one more turn at its basal portion as shown in Fig. 4 a. The relative position of these laminae can be also recognized in the illustration of Dr. K. OKAMURA in his Icones of Japanese Algae, vol. 5, no. 6, pl. 228. In his plant, which represents a more advanced stage of development as compared with our plant, the auricles have entirely fallen off from the base of the old lamina and the new auricles are already recognizable in the lower portion of the new laminae. The new lamina of our plants dose not form auricles yet, and in early stages it resembles so closely the young primary lamina above described in having two rows of the bullae and several segments split downward from the apex,

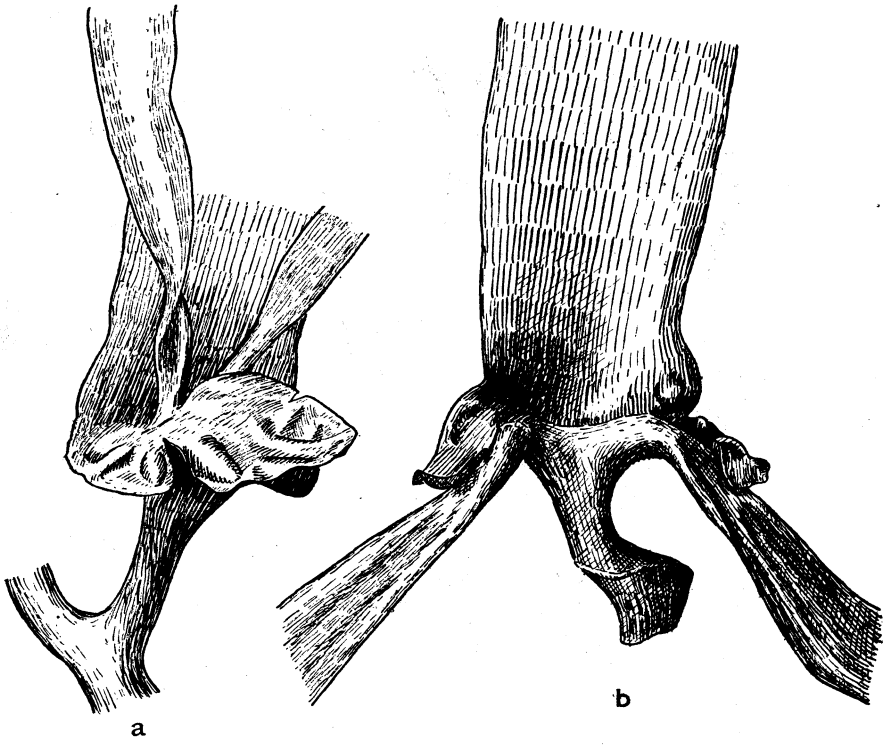

Fig. 4. *Arthrothamnus kurilensis* RUPR.

Habit sketch of the basal portion of two old laminae. Reduced.

a. Showing a large auricle and a new lamina twisted at its basal portion; b. Showing the continuity between the thickened basal margin of the old lamina and the new stems. To draw the figure b, the plant was stretched by force unrolling the inwardly scrolled portion beneath each auricle.

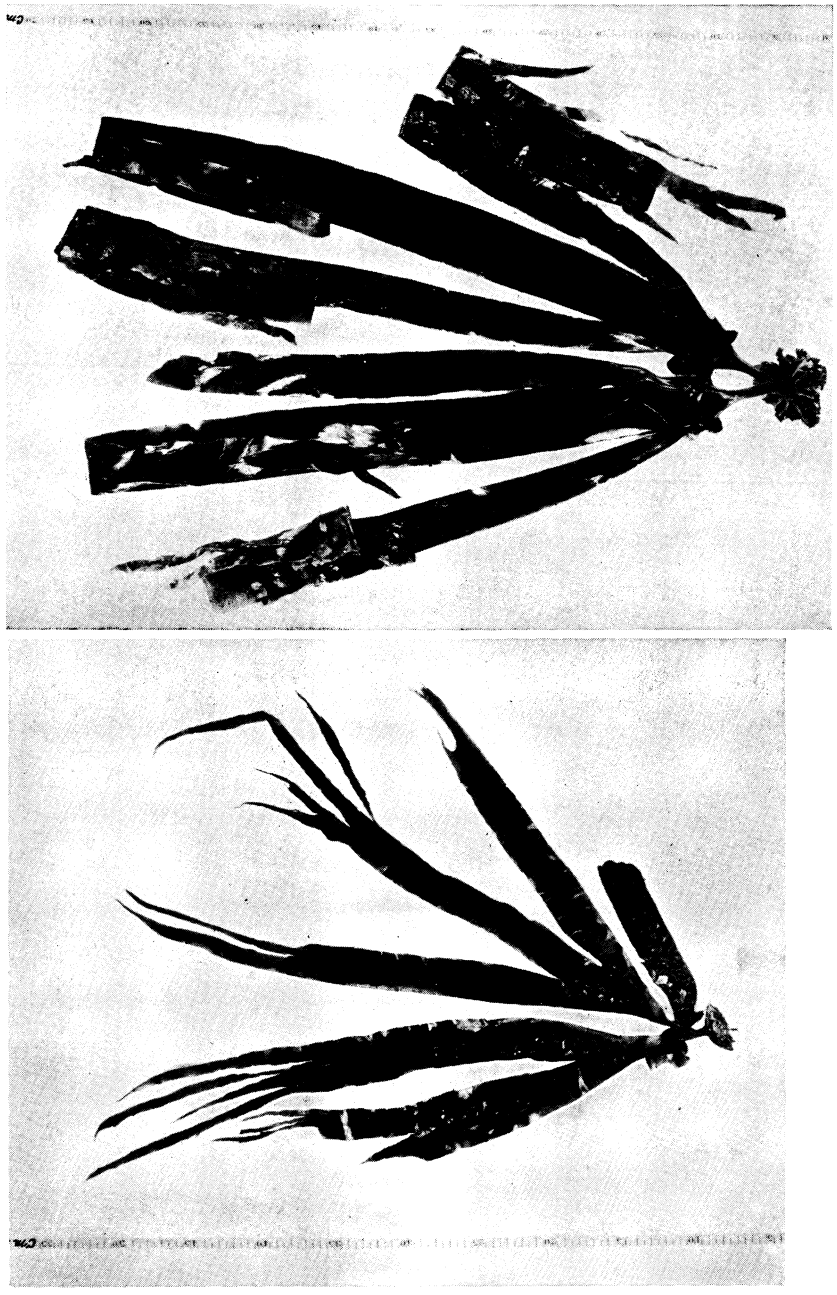

Fig. 5. *Arthrothamnus kurilensis* KUPR.
a. From a photograph of a 2-years old plant.
b. From a photograph of a 3-years old plant.

from which we can refer without hesitation our young plant as that of the present species. (Cf. Fig. 1 & 5 a). Such a digitate form was found growing near the low water mark and we are uncertain whether it is a normal form of the juvenile lamina of this species or not.

Accompanied with the renovation of lamina a whorl of several thick hapterer appears at the base of the primary stipe, entirely covering the old holdfast. (Cf. Fig. 5 b).

In conclusion, the writer wishes to acknowledge his indebtedness for the fund granted by the Hattori Hôkôkai for collecting a part of the materials devoted to the present study. His hearty thanks are also due to Emeritus Prof. K. MIYABE for his valuable suggestions.

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摘　　要

藻　類　觀　察　III

チシマネコアシコンブの幼体並に葉部の更新に就て

チシマネコアシコンブの形態は從來、夏季採集の材料に就て知るのみであつたが、昭和十二年四月下旬、樺太西能登呂岬附近で、本種の耳形体形成前の幼体と葉部更新中の成体とを採集することが出來たので、其等の形態を記述した。

Contributions to the Knowledge of the Systematics of *Morus* in Japan VIII

Morus in Cultivation (VI)

[Continued from Bot. Mag. (Tokyo), Vol. LI, No. 607, p. 688 (1937)]

By

Teikichi HOTTA
(堀 田 禎 吉)

With 4 text-figures

Key to the varieties and form of *Morus bombycis* found in cultivation*

1. Upper surface of the leaf is more or less scabrous or slightly smooth and even. 2
   Upper surface of the leaf is more or less asperate and rugose. .... var. *Negoyatakasuke* HOTTA
2. Buds are usually brown or reddish-brown, upper surface of the leaf is green or greenish-blue and matt. 3
   Buds are blackish-brown, upper surface of the leaf is deep green colour and lustrous. ..... var. *Shimanouchi* HOTTA
3. Teeth of the leaf argute. 4
   Teeth of the leaf usually undulate or crenato-dentate or irregular dentato-serrate. 5
4. Teeth of the leaf arguto-dentate, base truncate or rounded. .... var. *Tanakaoshyu* HOTTA
   Teeth of the leaf usually arguto-dentate, base shallowly cordate. ... . var. *Tanbakunitomi* HOTTA
5. Leaf 2–4 (-6) lobato or not lobate. 6
   Leaf subpalmate, teeth of the leaf undulate or crenato-dentate. .... var. *Shirazuru* HOTTA
6. Apex of the leaf rather long acuminate, base of the leaf truncate, densely branched. ..... var. *Takahashi* HOTTA
   Apex of the leaf abruptly acuminate or acuminate. 7

* The varieties and forms reported in previous papers are excluded in this paper.

7. Under surface of the leaf rather light greenish-blue. ..... var. *typica* HOTTA
Under surface of the leaf has mor or less an oily lustre and hirsute on the veins, variously lobate. ..... var. *Kurojiku* HOTTA
8. Leaf ovate or ovato-elliptical. 9
Leaf somewhat angularly cordate upper surface scabrous, apex is linear caudate. ..... f. *Zenzo* HOTTA
9. Base of the leaf shallowly or deeply cordate, apex acuminate or abruptly acuminate. 10
Base of the leaf truncate, apex of the leaf subulate or long acuminate. ..... f. *Mukade* HOTTA
10. Under surface of the leaf hirsute only on the principal veins. 11
Under surface of the leaf hirsute on the veins, base truncate or shallowly cordate. ..... f. *Yomeiwase* HOTTA
11. Leaf symmetrical or more or les unequal. ..... f. *normalis* HOTTA
Leaf unequally lobate, teeth of the leaf large and obtuse. ..... f. *Tsurutawase* HOTTA

Dolichostylae KOIDZUMI

Imp. Sericult. Exp. Stat., II, 1, p. 3 (1923).

Morus bombycis KOIZUMI, Bot. Mag. (Tokyo), XXIX, p. 313 (1915).

Syn. *Morus bombycis* KOIDUMI, var. *Kosaka* KOIDZUMI, Bull. Imp. Sericult. Exp. Stat., VI, 3, p. 103 (1921) nom. seminud. (nov.).

Morus japonica AUDIB., var. *pubescens* YENDO, Traité sur la Cult. du Mûr. au Jap. p. 17 (1930) nom. seminud. pro parte (nov.).

Nom. Jap. *Yama-guwa*: *Mikinokobore**, *Mizukuguri*, *Mizushimawase*, *Muneshige*, *Uchidawase*, *Ukiana-guwa* (*Yaso*)**, *Wachuji*, *Waseoseda*, *Wasetakasuke* (*Jiguwa*), *Yadome* (*Yamauchikunitomi*), *Yagoro*, *Yaguwa* (*Kameya-guwa*) *Yakuno*, *Yakura*, *Yamada*, *Yamagatakunitomi*, *Yamatokobore*, *Yamatonishiki*, *Yamatowase*, *Yaye-guwa*, *Yohei*, *Yonezawawase*, *Yoshinouchi*, *Yoshitoku* (*Yohei*), *Zarukuwa*.

var. ***Negoyatakasuke*** HOTT, comb. nov.

Syn. *Morus alba* LINN., var. *argutidens* KOIDZUMI. Bull. Imp. Sericult. Exp. Stat., II, 1, p. 30. (1923). pro parte.

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* The Japanese names written in italic are of the cultivated races.

** The Japanese names written in the parenthesis are synonyms or vernacular names of the cultivated races.

Folium ovatum vel ovato-oblongum, supra fere asperatum rugosumque, margine fere crenato-dentata, apice incurvo, basi aperte cordata vel truncata.

Nom. Jap. *Negoyatakasuke* (*Awokitakasuke*, *Takasuke*, *Jiguwa*).

Hab. Japonia: in hortis culta.

Remarks. Leaf is ovate or ovate-oblong, upper surface of the leaf is more or less asperate and rugose, margin is rather crenato-dentate, the apices of the teeth are incurved, base of the leaf is shallowly cordate or truncate. S. MATSUI transplanted from the mountains in Kozuke in 1830 (the era of Tempo) and first it was called Joshu-guwa and in 1887 was cultivated at the Nagaoka Agricultural School and named *Nagoyatakasuke*.

var. ***Shimanouchi*** HOTTA, var. nov.

Syn. *Morus bombycis* KOIDZUMI, var. *argutidens* KOIDUMI, Bull. Imp. Sericult. Exp. Stat., II, 1, p. 30 (1923). pro parte.

Gemmae fuliginosae. Folium ovatum vel ovato-oblongum supra valde viride nitidum, apice longiacuminato vel acuminato; margine dentato-serrata, apice incurvo.

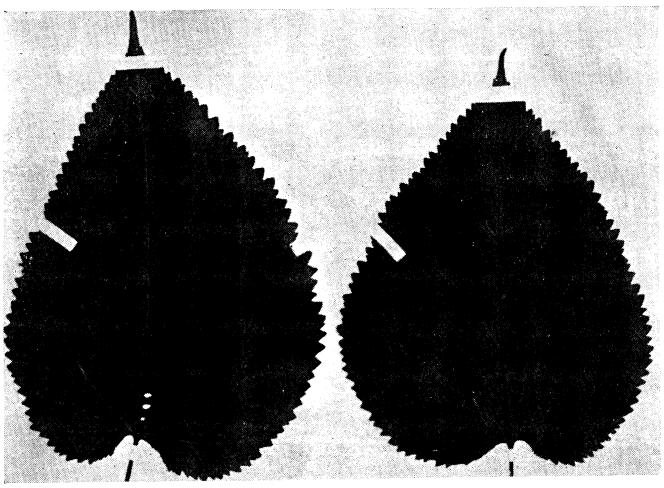

Fig. 1. *M. bombycis* KOIDZ., var. *Shimanouchi* HOTTA

Nom. Jap. *Shimanouchi-guwa* (*Banto*, *Kuroshodo*, *Sakamoto*, *Taiyo*, *Tanikaze*, *Tsuruta*).

Hab. Japonia: in hortis culta.

Remarks. Buds are blackish-brown. Leaf is ovate or ovate-oblong, and was usually incruved in one side, apex of the leaf is long acuminate or acuminate, upper surface of the leaf is deep green colour and lustrous, margin dentato-serrate.

The Place of origin of *Shimanouchi-guw* was Tamura district, Prov. Iwashiro. As to the morphological characters the leaf is rather similar to that of *Akagi* and *Tsuruta*.

var. ***Tanakaoshyu*** HOTTA. var. nov.

Folium ovato-oblongum vel ovatum, apice longicaudato vel longiacuminato; margine fere argutidentata, apice breviaristulato, basi plerumque truncata vel rotundata.

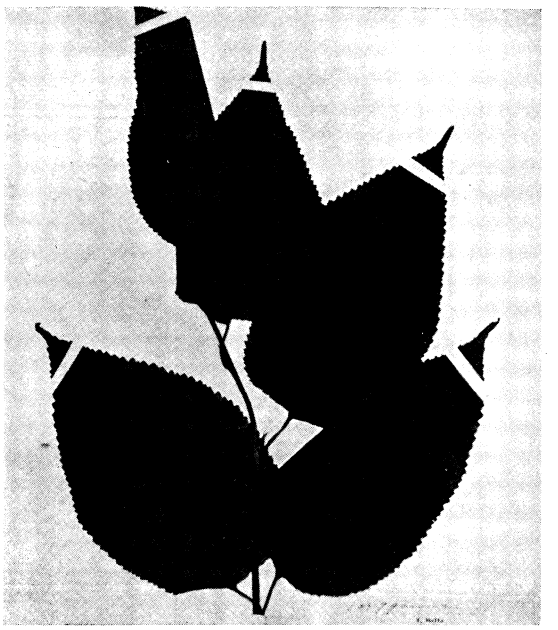

Fig. 2. *M. bombycis* KOIDZ., var. *Tanakaoshyu* HOTTA

Nom. Jap. *Tanakaoshu.*

Hab. Japonia: in hortis culta.

Remarks. Leaf is ovate-oblong or ovate, apex is long caudate or long acuminate, the apices of the teeth are shortly apiculate, margin is rather arguto-dentate, base is usually truncate or rounded.

var. ***Tanbakunitomi*** HOTTA. var. nov.

Folium ovatum vel ovato-oblongum, margine plerumque argutidentata, basi aperte cordata.

Nom. Jap. *Tanbakunitomi.*

Hab. Japonia: in hortis culta.

Remarks. Leaf is ovate or ovate-oblong, margin is arguto-dentate, base

of the leaf is shallowly cordate.

var. ***Shirazuru*** HOTTA. var. nov.

Folium subpalmatum, apice acuminato vel fere longiacuminato, margine repanda vel crenato-pentata, petiolo 3–4 cm. longo.

Nom. Jap. *Shirazuru.*

Hab. Japonia: in hortis culta.

Remarks. Leaf is various lobate, margin is undulate or crenato-dentate, apex acuminate or slightly long acuminate, petiole is 3-4 cm. in length.

var. ***Takahashi*** HOTT, var. nov.

Ramuli fere multicaules tenues. Folium fere horizontale, apice fere longiacuminato, basi truncata.

Nom. Jap. *Takahashi.*

Hab. Japonia: in hortis culta.

Remarks. Densely branched. Leaf is more or less horizontal, apex rather long acuminate, base is truncate.

This variety was originated from Takahashi village, Nishiyamanashi district, Prov. Kai.

var. ***Kurojiku*** HOTTA. var. nov.

Folium varie lobatum, subtus fere inunctum, apice longiacuminato vel acuminato; margine fere argutiserrata, vel dentato-serrata, apice leviter incurvo.

Nom. Jap. *Kurojiku.*

Hab. Japonia: in hortis culta.

Remarks. Leaf variously lobate, the under surface hirsute on the veins, and

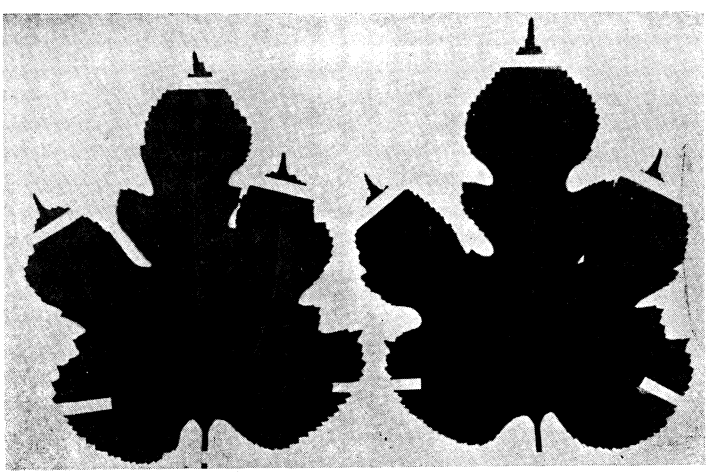

Fig. 3. *M. bombycis* KOIDZ., var. *Kurojiku* HOTTA

has a more or less oily luster. Margin is more or less argutiserrate or dentato-serrate, and the apices of the teeth are slightly incurved.

The place of the origin of *Kurojiku* was Prov. Kai. It was introduced by M. HARADA of Tamakawa village, Suwa district from Prov. Shinano.

form. ***Zenzo*** HOTTA, var. nov.

Folium angulariter cordatum supra scabrum, subtus fere laeve, apice longi-acuminato, basi profunde cordata.

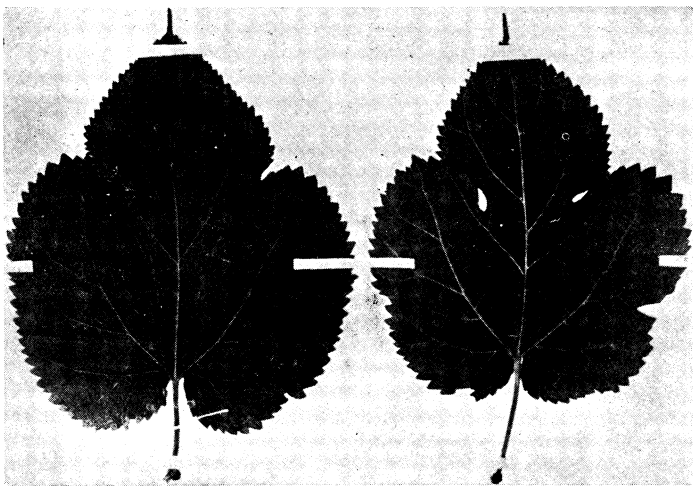

Fig. 4. *M. bombycis* KOIDZ., f. *Zenzo* HOTTA

Nom. Jap. *Zenzo* (*Zenzooha*).

Hab. Japonia: in hortis cult.

Remarks. Leaf is somewat angularly cordate. Upper surface of the leaf is scabrous, under surface more or less smooth, apex rather linear caudate, and the base deeply cordate.

Zenzo was originally found out in 1848-52 (the era of Kayei) by Z. NISHIKAWA in Mitake village, Amata district, Prov. Tanba.

form. ***Mukade*** HOTTA. f. nov.

Folium 2-3 (-4) lobatum, apice subulato vel longiacuminato, basi truncata.

Nom. Jap. *Mukade-guwa.*

Hab. Japonia: in hortis culta.

Remarks. Leaf is 2-3 (-4) lobate, apex is subulate long acuminate, and base truncate.

form. ***Yomeiwase*** HOTTA, f. nov.

Ramulus rufus; gemmae nigrirufae. Folium supra fere laeve, subtus fere

pubescens, basi truncata vel aperte cordata.

Nom. Jap. *Yomeiwase.*

Hab. Japonia: in hortis culta.

Remarks. Branch is reddish-brown, buds are blackish red-brown. Upper surface of the leaf is rather smooth, under surface is hirsute on the veins, and base of the leaf is truncate or shallowly cordate.

form. ***Tsurutawase*** HOTTA, var. nov.

Folium subcordatum, utrinque 2–4 (–5) lobatum, inaequaliter lobatum, serratis irregulariter magniobtusis.

Nom. Jap. *Tsurudawase.*

Hab. Japonia: in hortis culta.

Remarks. Leaf subcordate, unequally lobate, usually is 2–4 (5) lobate, teeth of the leaf is irregular large and obtuse.

Botanical Institute, Faculty of Agriculture,
Hokkaido Imperial University,
Sapporo, Japan.

摘　　要

邦産桑屬の分類學的知見(八)

M. bombycis KOIDZ. var. *Negoyatakasuke*, var. *Shimanouchi*, var. *Tanakaoshyu*, var. *Tanbakunitomi*, var. *Shirazuru*, var. *Takahashi*, var. *Kurojiku* の七新變種、f. *Zenzo*, f. *Mukade*, f. *Yomeiwase*, f. *Tsurutawase* の四新品種を創定した。

尙 *M. bombycis* KOIDZ. に包含すべき栽培種二十件種を確認し，更に是等變種及品種に屬する栽培種の起原も可及的報告した。

Eine neue *Niponius*-Art aus Sachalin (*Col.*)

Von

Hiromichi KÔNO

河 野 廣 道

Mit 1 Figur

Vor kurzer Zeit erhielt ich von Herrn K. TAMANUKI eine kleine Sendung zur Bestimmung. Darunter befand sich eine interessante *Niponius*-Art, die von Herrn K. TAMANUKI in den Gängen von *Ips japanicus*, unter der Rinde von *Picea jezoensis*, aufgefunden wurde. Ich beschreibe sie wie folgt:

Niponius tamanukii n. sp.

Schwarz, glänzend; Fühler und Beine rostrot, Schenkel verdunkelt.

Kopf länger als breit, Vorderrand in 2 stumpfen, kurzen Zipfeln vorgezogen; Scheitel zerstreut punktiert; Stirn feiner und dichter punktiert, vorn fein quergerunzelt, vorn in der Mitte mit einer tiefen, glatten Längsfurche. Halsschild fast quadratisch, mit abgerundeten Hinterwinkeln, hinten schwach verjüngt, hinter dem Vorderrand am breitesten, vor der Mitte undeutlich verschmälert, auf der Oberseite in der Mitte mit einer deutlichen Längsfurche; beiderseits der Längsfurche vor und hinter der Mitte schwach quer vertieft, dort mit grösseren Punkten und im übrigen fein und nicht dicht punktiert. Flügeldecken fein punktiert, nur die inneren 3 oder 4 Punktreihen deutlich, an den Seiten fast parallel, an der Basis etwas breiter als der Hinterrand des Halsschildes; die erste Punktreihe gut eingeprägt, an der Basis gefurcht, die 2te und 3te Punktreihe sehr schwach, hinten verschwunden. Propygidium mit 4 rundlichen Gruben in einer Querreihe, von denen die inneren 2 etwas kleiner sind als die anderen. Pygidium fein punktiert, hinter dem Vorderrand mit 2 grossen, etwas rundlichen Gruben. Vorderbrust vor der Mitte fein quer gefurcht, vor der Vorderhüfte mit 2 schrägen Kielen; Prosternalfortsatz gerandet. Mittel- und Hinterbrust in der Mitte längsgefurcht.

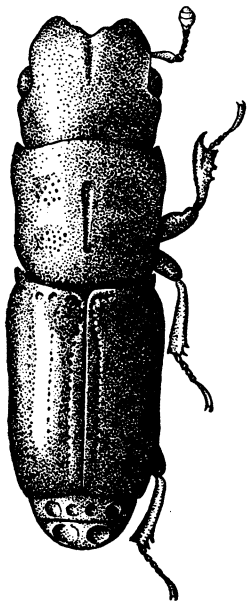

Fig. 1.
Niponius tamanukii n. sp.

Körperlänge: 5 mm.

Fundort: Sachalin (Horo, 1 Ex., 10/IX. 1937, leg. K. TAMANUKI).
Holotypus in meinem Besitz.

Dieses Tierchen ist mit *Niponius impressicollis* LEWIS (1885) nahe verwandt, Halsschild aber feiner punktiert und ohne deutliche runde Gruben, vielmehr mit einer tiefen Mittelfurche, die zipfeligen Vorsprünge des Kopfes kürzer und stumpfer.

摘　　要

樺太産ホソエンマ屬の1新種

(トドマツ、エゾマツの害蟲調査報告 第四報)

筆者は最近樺太中央研究所の玉貫光一氏から、ホソエンマ屬の1種の學名調査を依頼された。この甲蟲は同氏によつてエゾマツ樹皮下のヤツバキクヒムシの孔道中で發見されたものであるが、新種と認む可きものであるから、

Niponius tamanukii KÔNO (n. sp.) タマヌキホソエンマ (新種)

なる新種名を與へて發表した。

從來ホソエンマ科 *Niponiidae* の種類はキクヒムシ類の天敵であらうと想像されて居るから、本種も恐らくエゾマツ類の大害蟲たるヤツバキクヒムシの卵、幼蟲等を捕食する有益蟲であらう。

Geophilus-Arten aus Japan

Von

Yosioki TAKAKUWA

(高桑良興)

Mit 9 Abbildungen

Von einer neuen *Geophilus*-Arten, *G. monoporus*, die in Japan vorkommt, ist eine bereits von mir früher in „Transaction of Sapporo Natural History Society" Vol. VII, pt. 4, 1935 deutsch beschrieben worden, aber später sammelte ich hier und da eine ganze Reihe von Exemplaren und fand noch 4 weitere neue Species. Diese sind schon einmal in August 1937 in „Zoological Magazine" Vol. 49, No. 8, japanisch veröffentlicht worden. Folglich gibt es jetzt 5 japanische *Geophilus*-Arten. Der Schlüssel folgt.

1. Endbeinhüfte mit 1 Porus, alle Sternite ohne vordere Gruben. .... *G. monoporus* TAKAKUWA
   Endbeinhüfte mit 4–8 Porten, einige der vorderen Sternite haben eine vordere Grube. 2
2. Ventralporen bei einigen hinteren Segmenten in 2 Haufen geteilt, an den Sterniten vor dem Endbeinsegment finden sich je zwei sehr kleine Porengruppen ..... *G. bipartitus* TAKAKUWA
   Ventralporen nicht in 2 Haufen zerfallend, keine Poren vor dem Endbeinsegment 3
3. 1. Maxille mit 2 Paar Aussentastern, alle Hüftporen neben dem Sternitrand, vorderes Beinpaar mit sehr langen Borsten, die viel länger sind als die Glieder ..... *G. longicapillatus* TAKAKUWA
   1. Maxille mit 1 Paar Aussentastern, eine der Hüftporen liegt entfernt auf der Unterseite nach dem Hinterrand zu 4
4. Eine der Hüftporen ist klein und liegt weiter entfernt, Ventralporenfeld rhombisch, Endbein ventral an den 4 proximalen Gliedern mit mehreren kurzen Borsten. ..... *G. rhomboideus* TAKAKUWA
   Eine Hüftpore ist gross und ein wenig entfernt, Ventralporenfeld vorn geradlinig, Hinten convex, Poren darin gering. .... *G. sounkyoensis* TAKAKUWA

1. ***Geophilus sounkyoensis*** TAKAKUWA

Körperlänge 40 mm, Beinppare 55, Farbe gelblich, Antennen fadenförmig, Clypeus polygonal gefeldert, Zahl der Borsten gering. Mittelteil des Labrums mit 5 kräftigen, runden Zähnchen, die Seitenteile in der medianen Hälfte lang befranst. 1. Maxille mit ein Paar fein geschuppten Aussentastern, an der Hüfte rudimentär. Endkralle der 2. Maxille lang und spitz, die benachbarten Borsten überragend. Die geschlossenen Kieferfüsse erreichen nicht ganz den Stirnrand, Chitinlinien verkürzt, Vorderrand der Hüften ungezähnt, nur Tarsus mit einem schwachen Basalzahn. Ungulum innen glatt. Tergit zweifurchig, Beborstung spärlich. Sternit mit einem medianen und zwei seitlichen Längsgrübchen. Das vorders 3.–18. Sternit hat eine Quergrube am Vorderrand und einen Vorsprung am Hinterrand, die Grube nimmt höchstens ¾ der Sternitbreite

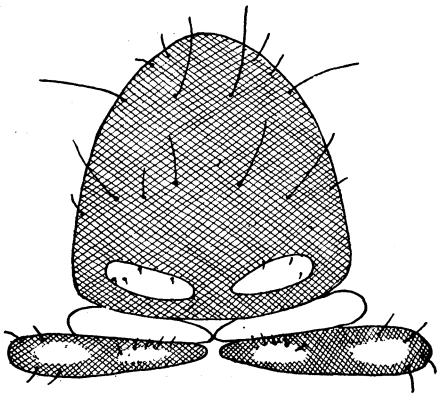

Fig. 1. *G. sounkyoensis* 1. Sternit × 120

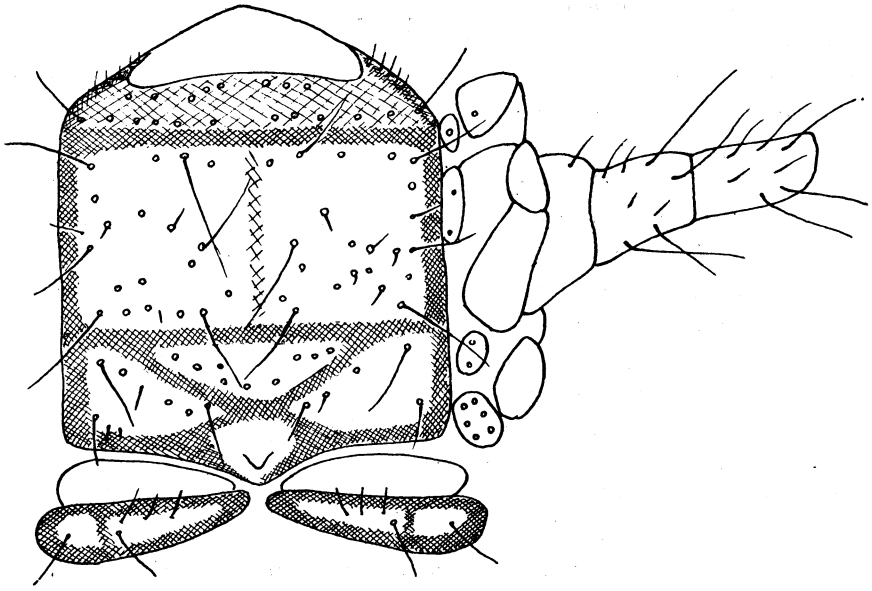

Fig. 2. *G. sounkyoensis* 8. Sternit × 120

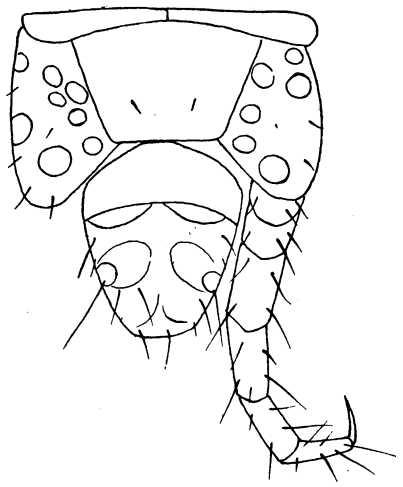

Fig. 3. *G. sounkyoensis*
Hinterende von unten gesehen × 60

ein. Bei diesen Sterniten sind Metasternit, Prosternit und Mesosternit durch je eine sehr schmal gefelderte, gerade Linie von einander abgegrenzt. Metasternit mit einem medianen Querporenfeld, das ½ so breit ist wie das Sternit, vorn geradlinig begrenzt, hinten convex, worin höchstens 15 oder nur wenige Poren enthalten sind. Ausserdem liegen auf der ganzen Fläche des Sternits mehrere Poren verstreut. Jedes Sternit mit vielen ungefähr paarweise zusammenliegenden langen Borsten, ausserdem mit verstreuten winzigen Spitzchen. Prästernit doppelt, vorderes und hinteres. Endsternit sehr breit, nach hinten verschmälert, Hinterrand fast geradlinig, Hüfte mit 6-8 mittelgrossen und grossen Poren, von denen eine von den anderen etwas weiter entfernt nach hinten zu liegt. Endbein mit Kralle, beim ♂ verdickt, ventral dichter beborstet, beim ♀ normal. Analporen vorhanden. Fundort: Sounkyo (Hokkaido).

2. ***Geophilus rhomboideus*** TAKAKUWA

Körperlänge bis 30 mm, Beinpaare 43-49, Farbe gelblich, Kopfschild fast so breit wie lang, Antennen fadenförmig. Clypeus polygonal gefeldert, Zahl der Borsten gering. Mittelteile des Labrums mit 5–6 kräftigen, runden Zähnchen, die Seitenteile in der medianen Hälfte lang befranst. Endkralle der 2. Maxille lang und spitz. 1. Maxille mit 1 Paar Aussentastern am Telopodit, an der Hüfte nur spurweise vorhanden. Die geschlossenen Kieferfüsse erreichen nicht ganz den Stirnrand, Chitinlinien verkürzt, Vorderrand der Hüften ungezähnt, nur Tarsus mit einem schwachen Basalzahn, Ungulum innen glatt. Basalschild breit, hinten so breit wie das folgende Tergit. Tergit zweifurchig, Beborstung spärlich. Sternit mit drei Längsgrübchen. Das vordere etwa 2.–18. Sternit hat eine Quergrube am Vorderrand und einen Vorsprung am Hinterrand, die Grube nimmt höchstens ¾ der Sternitbreite ein. 1.–18. Sternit mit Porenfeld, das entwickelteste Porenfeld springt nach vorn und hinten rhombisch vor und enthält etwa 150 Poren. Sternit mit 4 langen Borsten, eine in jeder Ecke, und mit zerstreuten kurzen Borsten. Alle Beine sind mässig lang beborstet. Endbein beim ♂ ziemlich verdickt, ventral mit sehr vielen kurzen

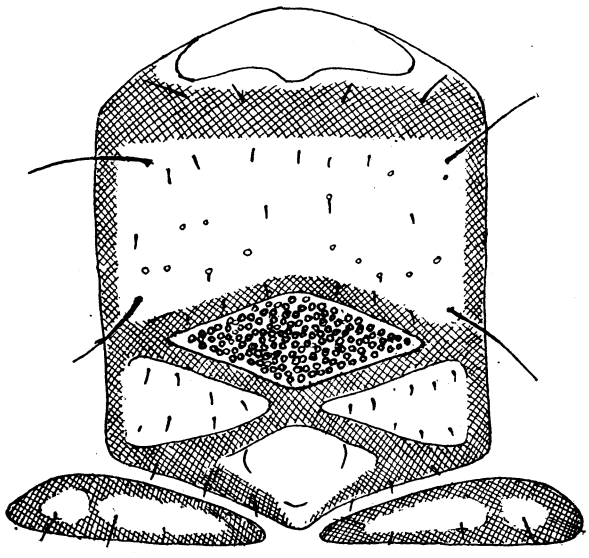

Fig. 4. *G. rhomboideus* 9. Sternit × 120

Borsten besetzt, beim ♀ ventral an den 4 proximal Gliedern ein wenig dichter und kürzer behaart. Endbeinhüfte sehr breit, hinten verschmälert, Endhüfte mit 4–5 grossen Poren neben oder unter dem Sternitrand, ausserdem ein kleiner

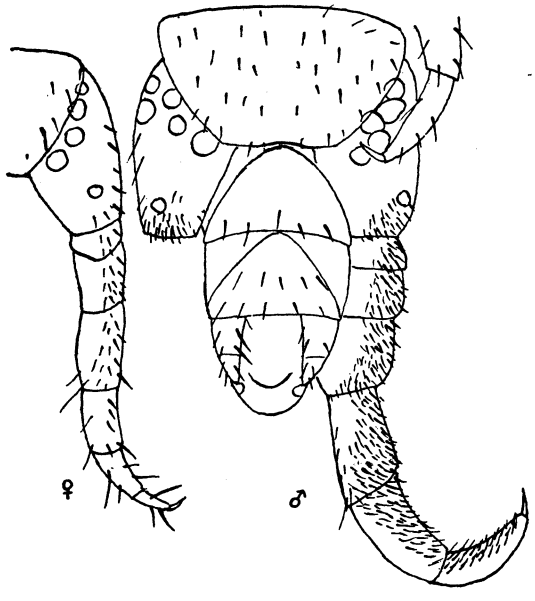

Fig. 5. *G. rhomboideus* Hinterende von unten gesehen × 60

Porus weiter entfernt auf der Unterseite. Analporen vorhanden.

Fundort: Diese Art ist bei Sachalin (Tomaruoru, Maoka, Sirutori) und Hokkaido (Nemuro, Wakkanai) gefunden worden.

3. *Geophilus longicapillatus* TAKAKUWA

Körperlänge 30 mm., Beinpaare 47–55, Farbe gelblich, Mittelteil des Labrums mit 2–4 kräftigen Zähnchen und einige Borsten. 1. Maxille mit 1 Paar Aussentastern am Telopodit, und 1 Paar kleineren an der Hüfte. Das vordere etwa 2.–19. Sternit hat eine Quergrube am Verderrand, die höchstens 3/5 der Sternitbreite einnimmt. 1.–20. Sternit mit rhombischen Porenfeld, das höchstens etwa 90 Poren enthält. Alle Beine sind mässig lang beborstet, an den vorderen, stärker beborsteten Beinpaaren zeigen sich namentlich unten an Präfemur, Femur und Tibia je ein oder zwei sehr lange Borsten, die viel länger sind als diese Glieder. Endsternit sehr breit, reichlich behaart, Hüfte mit 4–7 grossen Poren neben oder unter dem Sternitrand, kein Porus liegt abgesondert. Die anderen Merkmale ausserden oben beschriebenen sind ungefähr dieselben wie bei *G. rhomboideus*.

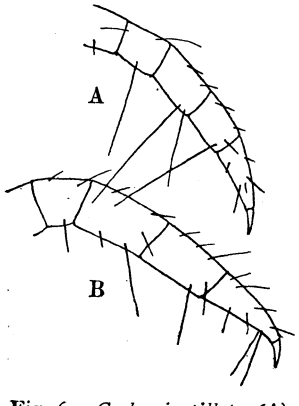

Fig. 6. *G. longicapillatus* (A) und *G. rhomboideus* (B) 5. Bein × Ca. 80.

Fundort: Asamushi.

4. *Geophilus bipartitus* TAKAKUWA

Körperlänge 15 mm., Farbe gelblich, Kopfschild etwas länger als breit, mit 4 Querreihen von Borsten, ♂ 35, ♀ 39 Beinpaare. Seitenteile des Labrums mit einigen Borsten. Mittelteil mit einigen Borsten und 2–3 kleinen Zähnchen besetzt. 1. Maxille mit einem kurzen Aussenter am Telopodit, an der Hüfte keiner. 1. Sternit median gelegenem, kleinem, rundem Porenfeld. In diesem Felde sind nur einige Poren vorhanden. Porenfeld wird vom 2. Sternit an nach und nach grösser und bekommt rhombische gestalt. Auch die Zahl der darin enthaltenen Poren wächst immer mehr bis zum Maximum von ungefähr 60, aber das Porenfeld wird im 12. oder 13. Segment wieder klein und teilt sich im 14. plötzlich in 2 kleine Häufchen auf, worin nur je 5 Poren enthalten sind, dann verschwindet es im nachfolgenden 15. und 16. Segment ganz spurlos. An drei Sterniten vor dem Endbeinsegment finden sich je zwei Häufchen blasser Poren. Die vorderen, etwa das 2.–10. Sternit, haben eine Quergrube am Vor-

derrand und einen Vorsprung am Hinterrand. Die Grube nimmt höchstens 3/5 der Sternitbreite ein. Alle Beine sind mässig lang beborstet, aber sehr lang Borsten fehlen. Endsternit sehr breit, Endbeinhüfte mit 4–6 grossen Poren

Fig. 7. *G. bipartitus* Labrum × 250

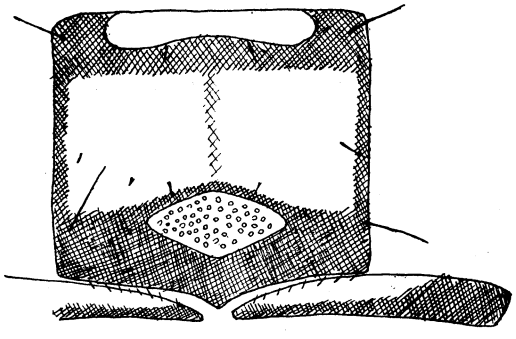

Fig. 8. *G. bipartitus* 9. Sternit × 200

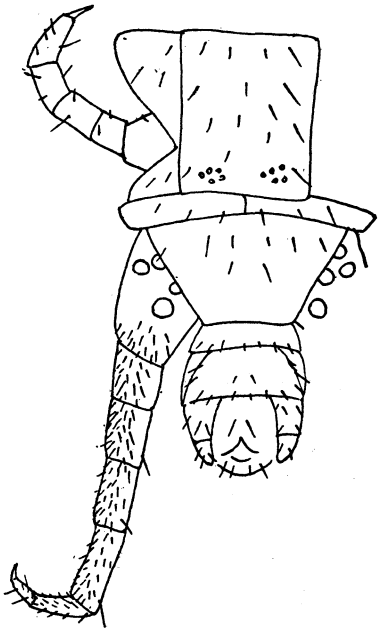

Fig. 9. *G. bipartitus* ♂
Hinterende von unten gesehen × 120

neben und unter dem Sternitrand. Endbein bei ♂ weing verdickt, ventral mit mehreren kurzen Borsten, Kralle kleiner als die vorgehende. Die anderen Merkmale ausserdem oben beschriebenen sind ungefähr dieselben wie bei *G. rhomboideus*.

Fundort: Diese Art ist bei Otako (Shikuka) in Sachalin, das beinahe am Nordende Japans auf dem 49.3 Grad nördl. Breite liegt, gefunden worden.

Studies on the Echinostomatidae

Part II. A List of the Family Echinostomatidae, Trematode Parasites of Reptiles, Birds and Mammals, Arranged Systematically

By

Jiro YAMASHITA

(山 下 次 郎)

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Since the genus *Echinostoma* was proposed by Rudolphi in 1809, many systematical studies of the echinostome parasites have been published one after another. But I think that the classification of this family has not reached perfection yet. I have studied the Echinostomatidae since several years, and at first made a systematic study of this family. I have already published in Japanese "Key to the subfamilies and the genera of the family Echinostomatidae".

Nicoll (1923) published "A reference list of the trematode parasites of British birds", including 59 species of the echinostome parasites, arranged systematically. This investigation, as previousely mentioned, was confined to British birds.

The final hosts of the known echinostome parasites are reptiles, birds and mammals. Recently many of the new chinostome genera and species were reported by many students, and also some species were declared to be synonyms. At present this family includes 233 species according to my investigation.

Genus *Echinochasmus*, *Episthmium* and *Episthochasmus* were each distinguished only by the difference in the extention of the vitellaria by LÜHE, PRICE and VERMA. On the other hand, ODHNER and BHALERAO placed the genus *Episthmium* as a synonym of the genus *Echnochasmus*. There is a doubt about this according to my observations of *Glypthelmins rugocaudata*, the trematode parasites of the frog. I know that the extention of the vitellaria of this parasite varies even in the same species, and therefore such a difference in the extention of the vitellaria can not serve as a reasonable specific or generic distinction in this parasite. In view of these facts, I suppose that even in the other trematode

Trans. Sapporo Nat. Hist. Soc., Vol. XV, Pt. 2, 1937

parasites these varietes may be shown. But as I have not yet observed enough echinostome parasites, I can not at present decide whether such a difference is of a generic character in the family Echinostomatidae.

In this paper I made no distinction between the genus *Heterechinostomum* and the genus *Echinochasmus* according to the opinion of Price (1931).

The genus *Fascioletta* was stated to be the same as the genus *Echinostoma* untill 1931, but in this paper it is supposed to be the same as the genus *Euparyphium*, because *Echinostoma ilocanum* (=*Fascioletta ilocana*) was declared to be a synonym of *Euparyphium ilocanum* by Tubangui (1931).

In the near future I wish to give a definite reply to the questions which have been stated above. This will be possible after observing many echinostome parasites.

In this paper, I give a list which includes the echinostome parasites found in every country, according to the new reliable reports published by August of this year. This family includes 3 subfamilies, 33 genera including 17 unclassified genera and 233 species. The number of the species of the echinostome parasites found in Japan were 33. These are indicated by a mark (*) in the following list.

I wish to express my cordial gratitude to Professor Dr. S. YOSHIDA for his kind gu . ance, and also to Dr. S. IWATA for his encouragemet in this investigation.

A List of the Family Echinostomatidae

Family **Echinostomatidae** Looss, 1902

Subfamily Echinostomatinae Looss, 1899

Genus *Echinostoma* DIETZ, 1910 (includes 85 spp.)

Syn. *Echinostomum* RUDOLPHI, 1809

academicus SKRJABIN, 1915

acanthoides (RUD.) COBBOLD, 1860

Syn. *Distomum acanthoides* RUDOLPHI, 1819

acuticauda NICOLL, 1914

aejiptiaca KHALIL ET ABAZA, 1924

alepidotum DIETZ, 1909

anceps (MOLIN) STOSSICH, 1892

syn. *Distoma anceps* MOLIN, 1859

annulatum (DIESING) COBBOLD, 1860

syn. *Distoma annulatum* DIESING, 1850

aphylactum DIETZ, 1909

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* show the echinostome parasites found in Japan.

† show the type species.

apiculatum (RUD.) COBBOLD, 1860
syn. *Distoma apicalatum* RUDOLPHI, 1803
armatum FUHRMANN, 1904
armigerum BARKER ET IRVINE, 1915
australasianum NICOLL, 1914
batangnensis TUBANGUI, 1932
bhattacharyai VERMA, 1936
callawayensis BARKER ET NÖLLER, 1915
campi ONO, 1930
charadrii TUBANGUI ET MASILUNGAN, 1935
chloropodis (ZEDER) DIETZ, 1909
syn. *Distoma chloropodis* ZEDER, 1800
Fasciola crenata FRÖLICH, 1802 nec RUD. **1802**
Distoma uncinatum ZEDER, 1803
chloropodis var. *philippinensis* TUBANGUI, 1932
* *cinetorchis* ANDO ET OZAKI, 1923
coalitum BARKER ET BEAVER, 1915
columbae liviae MÜLLER, 1897
condignum DIETZ, 1909
coronatum (RUD.) STOSSICH, 1892
syn. *Distoma coronatum* RUDOLPHI, 1819
Distoma coronatum WAGENER, 1852
Echinostoma coronatum ANOIKTOST, 1899
* *corvi* YAMAGUTI, 1935
crecci VERMA, 1936
deparcum DIETZ, 1909
discinctum DIETZ, 1909
echiniferum (LA VALETTE) STOSSICH, 1892
syn. *Cercaria echinifera* LA VALETTE, 1855
Distoma echinifera LA VALETTE, 1855
echinocephalum (RUD.) COBBOLD, 1860
syn. *Distoma echinocephalum* RUDOLPHI, 1819
egregium DIETZ, 1909
elongatum NICOLL, 1914
emolitum NICOLL, 1914
erraticum LUTZ, 1924
exasperatum (RUD.) NICOLL, 1923
syn. *Distoma exasperatum* RUDOLPHI, 1819
Distoma rubeus DUJARDIN, 1845
exechinatum SOLOWIOW, 1912
exile LUTZ, 1924
fallax (RUD.) COBBOLD, 1860
syn. *Distoma fallax* RUDOLPHI, 1819
fragosum DIETZ, 1909
gadorum BENEDEN, 1870
* *gotoi* ANDO ET OZAKI, 1923
govindum MOGHE, 1932
gregale RAILLIET ET HENRY, 1909

herodiae MACCALLUM, 1918
hilliferum NICOLL, 1914
* *hortense* ASADA, 1926
ignavum NICOLL, 1914
imbutiforme (MOLIN) STOSSICH, 1898
syn. *Distoma imbutiforme* MOLIN, 1859
labracis (DUJ.) BENEDEN, 1870
syn. *Distoma labracis* DUJARDIN, 1845
limicola JOHNSON, 1920
lobulatum ODHNER, 1911
longicirrus VERMA, 1936
* *macrorchis* ANDO ET OZAKI, 1923
magniovatum STOSSICH, 1898
megacanthum KOTLAN, 1922
mesotestius SOLOWIOW, 1912
militare RUDOLPHI, 1803
minimus VERMA, 1936
* *miyagawai* ISHII, 1932
necopinum DIETZ, 1909
nephrocephalum (DIESING) COBBOLD, 1860
syn. *Distoma turdi* RUDOLPHI, 1819
Distoma nephrocephalum DIESING, 1850
nigroflavum (RUD.) BARBAGALLO ET DRAGO, 1903
syn. *Distoma nigroflavum* RUDOLPHI, 1819
niloticum ODHNER, 1911
operosum DIETZ, 1909
oxycephalum (RUD.) RAILLIET, 1896
syn. *Distoma oxycephalum* RUDOLPHI, 1819
* *paraulum* DIETZ, 1909
parvum LUTZ, 1928
piriforme BLANC ET HEDIN, 1913
* *ralli* YAMAGUTI, 1934
†* *revolutum* (FRÖLICH) DIETZ, 1909
syn. *Fasciola revoluta* FRÖLICH, 1802
Distoma echinatum ZEDER, 1803
Echinostoma echinatum (ZEDER) RUDOLPHI, 1809
Distoma dilatatum FISHER, 1840
Echinostoma dilatatum (FISHER) COBBOLD, 1860
Echinostomum revolutum (FRÖLICH) LOOSS, 1899
Echinostoma mendax DIETZ, 1909
* *revolutum* var. *japonicus* KURISU, 1932
* *robustrum* YAMAGUTI, 1935
sarcinum DIETZ, 1909
scabrum (MÜLLER) COBBOLD, 1860
syn. *Distoma scabrum* MÜLLER, 1788
siticulosum DIETZ, 1909
spiculator (DUJARDIN) COBBOLD, 1860
syn. *Distoma spiculator* DUJARDIN, 1845

stridulae (REICH) DIETZ, 1909
syn. *Distoma stridulae* REICH, 1801
Fasciola spiculata RUDOLPHI, 1802
Distoma spiculatum (RUD.) RUDOLPHI, 1809
sudanense ODHNER, 1911
tabulatum MÜLLER, 1897
transfretnum DIETZ, 1909
umbonatum ODHNER, 1902
uncatum DIETZ, 1909
uralense SKRJABIN, 1915
variospinosum ODHNER, 1911
volvulus ODHNER, 1911

Genus *Echinoparyphium* DIETZ, 1909 (includes 19 spp.)
aconiatum DIETZ, 1909
agnatum DIETZ, 1909
syn. *Echinostomum echinatum* (ZEDER) MÜHLING, 1898
baculus (DIES.) LÜHE, 1909
syn. *Distoma mergi* RUDOLPHI, 1819
Distoma baculus DIESING, 1850
Echinostoma baculus (DIES.) COBBOLD, 1860
* *brevicauda* ISHII, 1935
clerci SKRJABIN, 1915
contiguum BARKER ET BASTRON, 1915
† *elegans* (LOOSS) DIETZ, 1910
syn. *Echinostoma elegans* LOOSS, 1899
flexum (LINTON)
syn. *Distoma flexum* LINTON, 1892
Echinostoma (LINTON) STOSSICH, 1899
gizzardai VERMA, 1936
harveyanum JOHNSTON, 1917
* *japonicum* ANDO ET OZAKI, 1923
mordwilkoi SKRJABIN, 1915
oxyurum JOHNSTON, 1917
paraulum (DIETZ) SPREHN, 1929
syn. *Echinostoma paraulum* DIETZ, 1909
Echinostoma columbae ZUNKER, 1925
politum SKRJABIN, 1915
* *recurvatum* (LINSTOW) LÜHE, 1909
syn. *Distoma recurvatum* LINSTOW, 1873
Echinostoma recurvatum (LINST.) STOSSICH, 1892
Echinoparyphium koizumii TSUCHIMOCHI, 1924
recurvatum var. *indiana* VERMA, 1936
sisjakowi SKWORTZOW, 1934
splendens VERMA, 1936

Genus *Patagifer* DIETZ, 1909 (includes 6 spp.)
acuminatus JOHNSTON, 1917
† *bilobus* (RUD.) DIETZ, 1910
syn. *Distoma bilobum* RUDOLPHI, 1819

Echinostoma bilobum (RUD.) COBBOLD, 1860
consimilis DIETZ, 1909
fraternus JOHNSTON, 1917
* *parvispinosus* YAMAGUTI, 1933
wesleyi VERMA, 1936

Genus *Nephrostomum* DIETZ, 1909 (includes 3 spp.)
bicolanum TUBANGUI, 1933
limai TRAVASSOS, 1923
† *ramosum* (SONSINO) DIETZ, 1910
syn. *Echinostoma ramosum* SONSINO, 1895
Echinostoma garzettae MACCALLUM, 1904

Genus *Prionosoma* DIETZ, 1909 (includes only 1 sp.)
serratum (DIESING) DIETZ, 1909
syn. *Distomum serratum* DIESING, 1850
Echinostoma serratum COBBOLD, 1861
Echinostomum serratum STOSSICH, 1892

Genus *Euparyphium* DIETZ, 1910 (includes 12 spp.)
syn. *Fascioletta* GARRISON, 1809
Isthmiophora LÜHE, 1909
Artyfechinostomum LANE, 1915
† *capitaneum* DIETZ, 1909
guerreroi TUBANGUI, 1931
ilocanum (GARRISON) TUBANGUI, 1931
syn. *Fascioletta ilocana* GARRISON, 1908
Echinostoma ilocanum (GARRISON) ODHNER, 1911
incrassatum (DIESING) DIETZ, 1910
syn. *Distomum incrassatum* DIESING, 1850
Echinostoma incrassatum (DIES.) COBBOLD, 1860
inerme (FUHRMANN) DIETZ, 1910
syn. *Echinostoma inerme* FUHRMANN, 1904
jassyense LÉON ET CIUREA, 1922
longitestis VERMA, 1936
malayanum LEIPER, 1911
syn. *Echinostoma malayanum* LEIPER, 1911
* *melis* (SCHRANK) DIETZ, 1910
syn. *Planaria teres duplici poro* GOEZE, 1782 e.p.
Planaria meris GOEZE, 1782
Planaria putorii GOEZE, 1782
Fasciola melis SCHRANK, 1788
Fasciola putorii GMELIN, 1790
Fasciola armata RUDOLPHI, 1795
Fasciola trigonocephala RUDOLPHI, 1802
Distomum armatum ZEDER, 1803
Distomum trigonocephalum RUDOLPHI, 1809
Echinostoma trigonocephalum (RUD.) COBBOLD, 1860
Echinostoma melis (SCRANK) DIETZ, 1909
Isthmiophora melis (SCHRANK) LÜHE, 1909
Euparyphium trigonocephalum (RUD.) ODHNER, 1911

murinum TUBANGUI, 1931
sufrartyfex (LANE) DIETZ, 1910
syn. *Artyfechinostomum sufrartyfex* LANE, 1915
Euparyphium malayanum (LEIPER) of LEIPER 1924 and of LANE 1924
Echinostoma sufrartyfex FAUST, 1929
suinum CIUREA, 1921

Subfamily Himasthlinae ODHNER, 1910
Genus *Himasthla* DIETZ, 1909 (includes 8 spp.)
alincia DIETZ, 1909
elongata (MEHLIS) DIETZ, 1909
syn. *Distomum elongatum* MEHLIS, 1831
Echinostomum elongatum (MEHLIS) STOSSICH, 1892
Distomum elongatum (MEHLIS) DIETZ, 1909
harrisoni JOHNSTON, 1917
incisa LINTON, 1928
leptosoma (CREPLIN) DIETZ, 1909
syn. *Distoma leptosomum* CREPLIN, 1829
Echinostoma leptosomum (CREPL.) COBBOLD, 1860
Distoma militare RUDOLPHI, 1809
Echinostoma secunda NICOLL, 1906
Himasthla militaris (RUD.) DIETZ, 1909
Himasthla secunda (NICOLL) DIETZ, 1910
muehlensi VOGEL, 1933
quissetensis (MILLER ET NORTHUP) STUNKARD, 1934
syn. *Echinostoma quissetensis* MILLER ET NORTHUP, 1926
† *rhigedana* DIETZ, 1909
Genus *Acanthoparyphium* DIETZ, 1909 (includes 5 spp.)
* *marilae* YAMAGUTI, 1934
ochthodromi TUBANGUI, 1933
† *phoenicopteri* (LÜHE) DIETZ, 1910
syn. *Echinostoma phoenicopteri* LÜHE, 1898
spinulosum JOHNSTON, 1917
* *squatorolae* YAMAGUTI, 1934
Genus *Cloeophora* DIETZ, 1909 (includes only 1 sp.)
† *micata* DIETZ, 1909
Genus *Pelmatostomum* DIETZ, 1909 (includes 2 spp.)
† *episenum* DIETZ, 1909
mesembrinum DIETZ, 1909
Genus *Aporchis* STOSSICH, 1905 (includes 2 spp.)
syn. *Macrechinostomum* ODHNER, 1910
† *croaticum* (STOSSICH) STOSSICH, 1905
syn. *Distoma croaticum* STOSSICH, 1889
Echinostoma croaticum (STOSS.) STOSSICH, 1892
Macrechinostomum croaticum (STOSS.) ODHNER, 1910
rugosus LINTON, 1928

Subfamily Echinochasminae ODHNER, 1910
Genus *Echinochasmus* DIETZ, 1909 (includes 22 spp.)

syn. *Heterechinostomum* ODHNER, 1910
amphibolus KOTLAN, 1922
bagulai VERMA, 1935
beleocephalus (v. LINSTOW) DIETZ, 1909
syn. *Distoma beleocephalus* LINSTOW, 1873
Echinostoma beleocephalum (LINST.) STOSSICH, 1892
botauri BAER, 1923
† *coaxatus* DIETZ, 1909
dietzeri ISAJCHIKOV, 1927
* *elongatus* MIKI, 1923
euryporus (LOOSS) ODHNER, 1910
syn. *Echinostoma euryporum* LOOSS, 1896
* *grandis* KURISU, 1931
* *japonicus* TANABE, 1926
lüiputanus (LOOSS) ODHNER, 1910
syn. *Echinostoma lüiputanum* LOOSS, 1896
magnovatus (STUNKARD ET HAVILAND) PRICE, 1931
syn. *Heterechinostomum magnovatum* STUNK. ET HAV., 1924
mordax (LOOSS) PRICE, 1931
syn. *Echinostomum mordax* LOOSS, 1899
Heterechinostomum mordax (LOOSS) ODHNER, 1911
novalichesensis TUBANGUI, 1932
oligacanthus DIETZ, 1910
syn. *Echinostomum euryporum* LOOSS, 1899 nec 1896
* *perfoliatus* (RÁTZ) DIETZ, 1910
syn. *Echinostomum perfoliatum* RÁTZ, 1908
Echinochasmus perfoliatus RÁTZ, 1908
Echinostoma gregale RAILLIET ET HENRY, 1909
Echinochasmus perfoliatus var. *shieldsi* TUBANGUI, 1922
Echinochasmus perfoliatus var. *japonicus* TANABE, 1922
pitangi (LUTZ) PRICE, 1931
syn. *Monilifer pitangi* LUTZ, 1924
* *rediodupiicatus* YAMAGUTI, 1933
ruficapensis VERMA, 1935
* *ruficollis* ISHII, 1935
* *rugosus* YAMAGUTI, 1933
schwartzi PRICE, 1931

Genus *Episthmium* LÜHE, 1909 (includes 5 spp.)
† *bursicola* (CREPLIN) PRICE, 1931
syn. *Echinostoma bursicola* CREPLIN, 1837
Echinostoma cloacinum BRAUN, 1891
Echinostoma bursicola (CREPLIN) LOOSS, 1899
Echinostomum africanum STILES, 1901
Echinochasmus bursicola (CREPLIN) DIETZ, 1909
corvus (BHALERAO) PRICE, 1931
syn. *Echinochasmus corvus* BHALERAO, 1926
oscari TRAVASSOS, 1923
prosthovitellatus (NICOLL) PRICE, 1931

syn. *Echinochasmus prosthovitellatus* NICOLL, 1914
proximum TRAVASSOS, 1923

Genus *Episthochasmus* VERMA, 1935 (includes only 1 sp.)
† *caninum* VERMA, 1935

Genus *Allechinostomum* ODHNER, 1910 (includes 2 spp.)
† *crocodili* (POIRIER) ODHNER, 1911
syn. *Distomum crocodili* POIRIER, 1886
Echinostomum umbonatum ODHNER, 1902
Echinostomum crocodili (POIR.) ODHNER, 1911
famelicum (ODHNER) ODHNER, 1911
syn. *Echinostomum famelicum* ODHNER, 1911

Genus *Stephanoprora* ODHNER, 1902 (includes 14 spp.)
syn. *Mesorchis* DIETZ, 1909
Monilifer DIETZ, 1909
anomala TRAVASSOS, 1923
conciliatus (DIETZ)
syn. *Mesorchis conciliatus* DIETZ, 1909
† *denticulata* (RUD.) ODHNER, 1910
syn. *Fasciola denticulata* RUDOLPHI, 1802
Distoma denticulatum (RUD.) RUDOLPHI, 1809
Echinostoma denticulatum (RUD.) COBBOLD, 1860
Distoma pseudoechinatum OLLSON, 1876
Mesorchis polycestus DIETZ, 1909
Mesorchis denticulatus (RUD.) DIETZ. 1909
? *Echinostoma spinulosum* RUDOLPHI, 1809
denticulatoides (ISAJCHIKOV)
syn. *Mesorchis denticulatoides* ISAJCHIKOV, 1924
gilberti WARD, 1917
* *merulae* YAMAGUTI, 1933
ornata (ODHNER) ODHNER, 1911
syn. *Echinostomum ornatum* ODHNER, 1902
* *ozakii* (ASADA)
syn. *Mesorchis ozakii* ASADA, 1926
pendula (LOOSS) ODHNER, 1910
syn. *Echinostoma pendulum* LOOSS, 1899
Mesorchis pendulus (LOOSS) DIETZ, 1909
pennanti (VERMA)
syn. *Mesorchis pennanti* VERMA, 1936
reynoldi BHALERAO, 1926
singularis (LUTZ) BHALERAO, 1926
syn. *Mesorchis singularis* LUTZ, 1924
spinosa (RUD.) ODHNER, 1910
syn. *Echinostoma spinosum* DIETZ, nec RUD.
Monilifer spinulosum DIETZ, 1909 nec RUD., 1809
urna LINTON, 1910

Unclassified Echinostome Genera
(Subfamily "Parechinostominae" NICOLL, 1923)
Genus *Chaunocephalus* DIETZ, 1909 (includes 3 spp.)

† *ferox* (RUD.) DIETZ, 1909
syn. *Fasciola ferox* RUDOLPHI, 1795
Distoma ardeae (GMELIN) ZEDER, 1803
Distoma ferox (RUD.) ZEDER, 1803
Echinostoma ferox (RUD.) BLAINVILLE, 1828
paduriformis TRAVASSOS, 1923
similiferox VERMA, 1936

Genus *Pegosomum* RATZ, 1903 (includes 4 spp.)
asperum (WRIGHT)
syn. *Distoma asperum* WRIGHT, 1879
Echinostoma asperum STOSSICH, 1892
bubulcum TUBANGUI ET MASILUNGAN, 1935
† *saginatum* (RÁTZ) RÁTZ, 1903
syn. *Distoma saginatum* RÁTZ, 1898
spiniferum RÁTZ, 1903

Genus *Balforia* LEIPER, 1908 (includes only 1 sp.)
† *monogama* LEIPER, 1908

Genus *Drepanocephalus* DIETZ, 1909 (includes only 1 sp.)
† *spathans* DIETZ, 1909

Genus *Paryphostomum* DIETZ, 1909 (includes 7 spp.)
indicum BHALERAO, 1931
novum VERMA, 1936
pentalobum VERMA, 1936
† *radiatum* (DUJAR.) DIETZ, 1909
syn. *Distoma radiatum* DUJARDIN, 1845
Distoma echinatum (ZED.) WEDL, 1857
segregatum DIETZ, 1909
tenuicollis (JOHNSTON) PRICE, 1931
syn. *Echinochasmus tenuicollis* JOHNSTON, 1917
testrifolium GOGATE, 1934

Genus *Sodaïs* KOWALEWSKI, 1902 (includes only 1 sp.)
syn. *Scapanosoma* LÜHE, 1909
† *spathulatus* (RUD.) KOWALEWSKI, 1902
syn. *Distoma spathulatum* RUDOLPHI, 1819
Echinostoma spathulatum (RUD.) KOWALEWSKI, 1898
Scapanosoma spathulatum (RUD.) LÜHE, 1909

Genus *Pseudechinostomum* ODHNER, 1911 (includes only 1 sp.)
† *incoronatum* ODHNER, 1911
syn. *Distomum spinulosum* of SONSINO, 1896

Genus *Cotylotretus* ODHNER, 1902 (includes 2 spp.)
syn. *Mesaulus* BRAUN, 1902
grandis (RUD.) ODHNER, 1902
syn. *Distoma grande* RUDOLPHI, 1819
Distomum grande DIESING, 1850
† *rugosus* ODHNER, 1902

Genus *Parorchis* NICOLL, 1907 (includes 3 spp.)
syn. *Zeugorchis* NICOLL, 1906
† *acanthus* (NICOLL) NICOLL, 1907

syn. *Zeugorchis acanthus* NICOLL, 1906
Cercaria purpurae LEBOUR, 1907
avitus LINTON, 1912
pittacius (BRAUN) NICOLL, 1907
syn. *Distoma pittacius* BRAUN, 1901

Genus *Parechinostomum* DIETZ, 1909 (includes only 1 sp.)
cinctum (RUD.) DIETZ, 1909
syn. *Fasciola cincta* RUDOLPHI, 1802
Distoma cinctum (RUD.) RUDOLPHI, 1809
Distoma tringae helveticae RUDOLPHI, 1819
Echinostoma cinctum (RUD.) COBBOLD, 1860

Genus *Hypoderaeum* DIETZ, 1909 (includes 3 spp.)
†* *conoideum* (BLOCH) DIETZ, 1909
syn. *Cucullanus conoideus* BLOCH, 1782
Echinostoma conoideum RUDOLPHI, 1809
Distoma frölichi KOWALEWSKI, 1894
Echinostoma frölichii KOWALEWSKI, 1894
Echinostoma conoideum (BLOCH) KOWALEWSKI, 1897
Psilochasmus lecithosus OTTE, 1926
magnocirrusa VERMA, 1936
mainpuria VERMA, 1936

Genus *Petasiger* DIETZ, 1909 (includes 8 spp.)
† *exaeretus* DIETZ, 1909
* *grandivesicularis* ISHII, 1935
* *linguiformis* KOKAME, 1935
* *lobatus* YAMAGUTI, 1933
minutissimus GOGATE, 1934
neocomense FUHRMANN, 1928
nitidus LINTON, 1928
pungens (V. LINSTOW)
syn. *Distoma pungens* LINSTOW, 1894
Echinostoma pungens (LINST.) STOSSICH, 1899

Genus *Stephanoproraoides* PRICE, 1934 (includes only 1 sp.)
† *lawi* PRICE, 1934

Genus *Dissurus* VERMA, 1936 (includes only 1 sp.)
† *farrukhabadi* VERMA, 1936

Genus *Pseudoechinochasmus* VERMA, 1936 (includes only 1 sp.)
† *satjivani* VERMA, 1936

Genus *Microparyphium* DIETZ, 1909 (includes 5 spp.)
asotum DIETZ, 1909
* *capellae* YAMAGUTI, 1935
* *corvi* OZAKI, 1923
† *facetum* DIETZ, 1909
montei VERMA, 1936

Genus *Echinostephilla* LEBOUR, 1909 (includes only 1 sp.)
† *virgula* LEBOUR, 1909

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The Growth of the Crania of Yezo Brown Bear*

By

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(With Plate II–IV and 10 text-figures)

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So far as the author is aware, almost nothing has been brought to light about the metric characters of the skull of the Yezo brown bear, *Ursus arctos yezoensis* Lydekker (Figure 3 and 4 in Plate II–IV), since the publication of the original description of Dr. Lydekker (1897) based on three specimens from Hokkaidô. The description seems rather incomplete in the absence of precise measurements.

The collection of Ursidae skulls in the Institute has been accumulated within the last few years including as the youngest specimen the skull of a five months old cub and many older ones whose sutures are fusing and almost disappearing with the extremely worn out teeth. In addition six adult specimens of the Japanese black bear (*Ursus japonicus* Schlegel, 1857) from Nagano Prefecture, Honsyû (Figure 1 in Plate II–IV), four adult specimens representing the Saghalien brown bear (*Ursus arctos* Linnaeus, 1758) (Figure 2 in Plate II–IV), were available through the kindness of Mr. S. Sugawara, Curator of the Government Museum of Saghalien, and Mr. S. Ôishi in the Institute of Geology of this University. To Dr. T. Inukai the author wishes to express here his heartiest gratitude for his kind guidance and unceasing encouragement during the course of the work.

The changing proportions in various parts of the mammalian skull throughout life have been studied by numerous authors; for instance, Schmitt (1903) on dogs, Rörig (1904) on deer, Schröter (1923) on pigs, Hinton (1926) on Microtinae, Castle (1923) on rabbits and on horses, etc. Recently the problem has been more clearly elucidated by the analysis using differential growth function, $y=bx^k$, as demonstrated by Huxley (1932) explaining in various organisms the continuous change of growth trend, instead of showing the absolute

* This study was aided in part by a grant to Dr. Inukai from the Foundation for the Promotion of Scientific and Industrial Research of Japan.

values and indices, thus HERSH (1932 and 1934) was successful in his study on dogs and on titanotheres (an extinct mammal somewhat allied to rhinoceros) and GREEN (1932) on mice. In the case of titanotheres when the basilar length (x) and the zygomatic width (y) of each skull are logarithmically plotted, we can obtain a straight line which has a different slope inclination according to the various genera. In this case the slope of each line is denoted by the constant k of the power function $y=bx^k$, which is generally given for a line in the double logarithmic plotting, otherwise by means of the ordinary plotting the above measurements result in an exponential curve. The value of k for the genera of titanotheres for example is as follows: Palaeosyops, 1.35; Dolichorhinus, 1.19; Metarhinus, 1.48; Brontops, 1.20; Allops, 1.91; Menodus, 0.75, etc. The constant b possesses by no means a slight biological significance as it only indicates the value of y when $x=1$. On the other hand the value of k, growth coefficient, is peculiar for each group. When the same mesurements are made for thirty two races of dogs, the results are represented by five distinct lines. GREEN (1932) showed the above feature clearly in the analysis of skull measurements of two species and their F_1 and back-cross hybrids, obtaining a different slope of line for each group.

In the present studies the measurements of the dimensions were obtained in mm with MARTIN's beam compasses and calliper compasses using the technique employed by DUERST (1926).

1. *The zygomatic width / basilar length relation.*

Dimension: Basilar length. Distance from the apex of intermaxillaries to the inferior edge of foramen magnum (Figure 1, a). (maximum, 351.0; minimum, 164.6) (Basion-Prosthion)
Zygomatic width. Distance between the zygomatic processes of the squamosals (Figure 1, b). (maximum, 257.0; minimum, 106.2) (Zygion-Zygion)

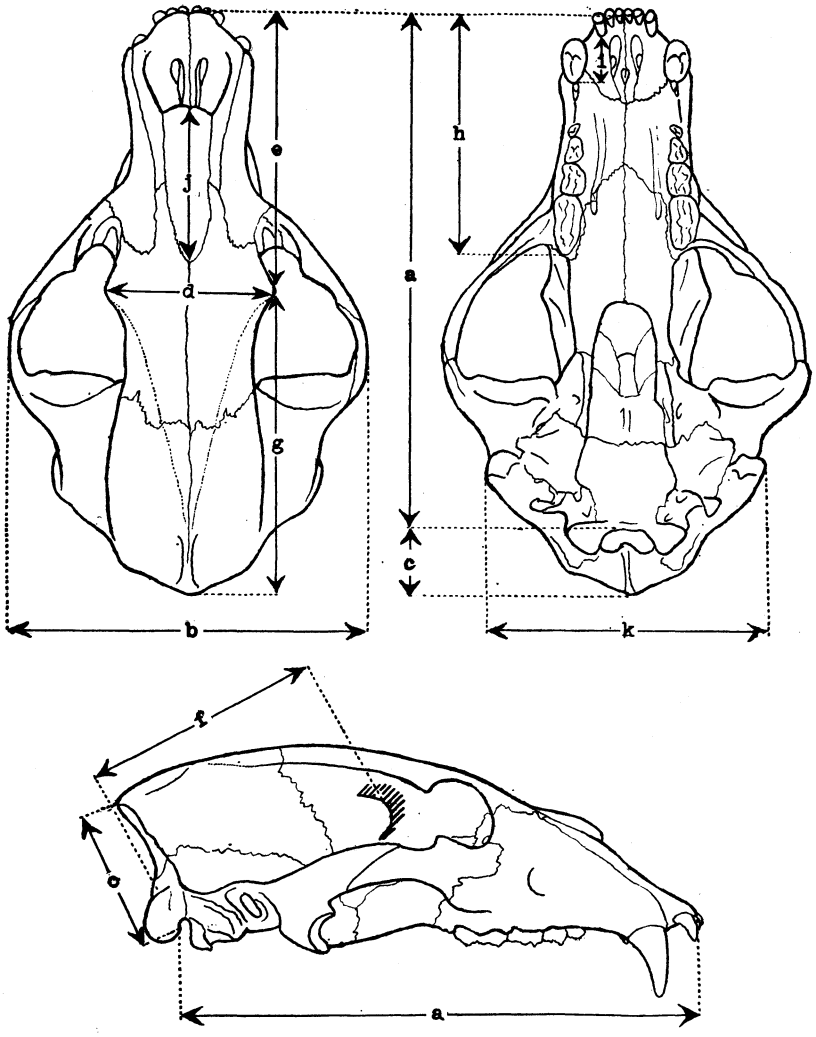

Fig. 1. Left, dorsal view; right, ventral view; below, lateral view.

a Basilar length	g Dorsal cranial length
b Zygomatic width	h Dental length
c Height	i Diastema
d Width of frontal	j Length of nasals
e Preorbital length	k Occipital breadth
f Length of brain	

When these two dimensions are logarithmically plotted for all the available *yezoensis* specimens, 97 in number, the points distribute between two parallel lines which are drawn at the limiting boundary making a narrow band (Figure 2). The nature of the points which appear at the terminal part of the band outside of the main (Figure 2), has already been explained by HUXLEY (1932) and others, they occur frequently when too young and too old specimens are measured.

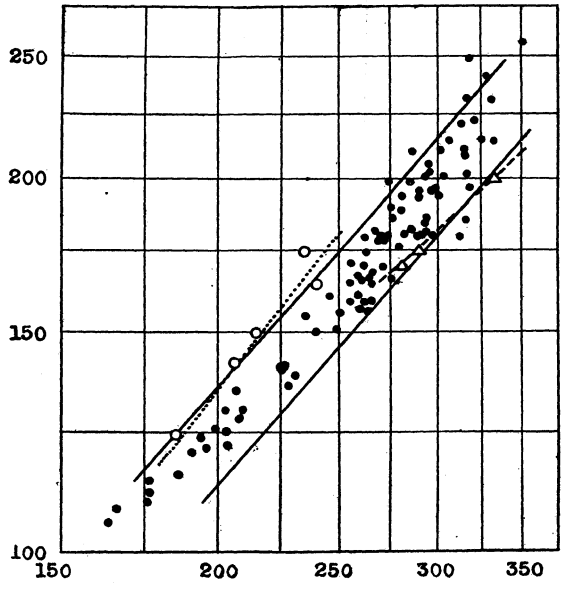

Fig. 2. Double logarithmic plot of the zygomatic width (y) against the basilar length of the skull (x). •, *yezoensis*; ○, *japonicus*; △, *arctos*.

The values of constants b and k are calculated and expressed by a straight line drawn in the middle of the band parallel to these. On this line most of the plotted points may aggregate. However, to avoid confusion, the line was not drawn in the present figure. The range of distribution of points is seen very clearly in the figure and also by the values given in parentheses in the table which is particularly useful for referrance in the case when there are many available specimens with individual variations.

y	x	*Ursus arctos* LINN.	
		k	b
Zygomatic width	Basilar length	0.932	0.894
Volume of cranial tetrahydron	Basilar length	3.025	$0.226 \cdot 10^{-4}$
Width of frontal	Preorbital length	1.230	$0.788 \cdot 10^{-1}$
Length of brain	Basilar length	0.214	24.900
Preorbital length	Dorsal cranial length	0.590	8.475
Dental length	Basilar length	0.978	0.547
Diastema	Basilar length	1.895	$0.533 \cdot 10^{-2}$
Length of nasals	Basilar length	2.492	$0.615 \cdot 10^{-4}$
Mastoid breadth	Height	1.905	0.030

Table 1. Values of b and k of the relative

As in the other mammals the basilar length of the bear increases as the eruption of the remaining incisors, canines, premolars and molars occurs. The building up of frontal sinuses and backward development of the lambdoidal crest proceeds with the age; the latter was particularly studied by MILLER (1912) in the European bear as the special character for the genus. The growth of the zygomatic breadth, or the greatest breadth of the bear skull, is chiefly effected by the extension of zygomatic arches through the strengthening of the muscles of mastication, as the braincase exerts little influence, as suggested by ALLEN (1910) in his work on the black bear of Labrador.

The *japonicus* and *arctos* skulls are similarly treated as in the above method (Figure 2). The slopes (k) for the three kinds of skulls are as follows: *yezoensis*, 1.151; *arctos*, 0.932; *japonicus*, 1.350. Though further materials are necessary for the determination of the exact value of constants for two forms, they are sufficient insofar as they serve just for comparison. When $k > 1$, as in the case of *japonicus*, the skull is progressively brachycephalic, that is, the zygomatic width is increasing more quickly than the basilar length; when $k < 1$, as in *arctos*, the skull is progressively dolichocephalic. In technical terms of differential growth, the increasing of a dimension of an organ at the same rate as other dimension, I. E., $k = 1$, is called isogonic. And if it is growing at a rapid or slow velocity as compared with the other dimension, $k > 1$ as in *japonicus*, or $k < 1$ as in *arctos*, it may be styled positive and negative heterogonic, respectively. The skull of *arctos* becomes narrowest and longest in proportion to the breadth as it grows, while in the *japonicus* skull the relation is reversed. The skull of *yezoensis* exhibits an intermediate character between the two. SWARTH (1911) described the same tendency as the peculiarities of an insular race among American black bear measuring the absolute dimension

Ursus arctos yezoensis LYD.			*Ursus japonicus* SCHL.	
k	b		k	b
1.151	0.278	(0.305~0.252)	1.350	0.104
3.050	$0.236 \cdot 10^{-4}$	($0.271 \cdot 10^{-4} \sim 0.206 \cdot 10^{-4}$)	3.407	$0.350 \cdot 10^{-5}$
1.228	0.187	(0.214~0.165)	1.656	$0.402 \cdot 10^{-1}$
0.602	4.350	(4.830~3.940)	0.797	1.435
0.747	3.500	(3.785~3.240)	0.662	4 090
0.595	4.770	(5.060~4.470)	0.557	4.976
1.640	$0.233 \cdot 10^{-2}$	($0.281 \cdot 10^{-2} \sim 0.195 \cdot 10^{-2}$)	0.145	8.707
1.051	0.215	(0.238~0.198)	0.191	18.617
1.420	0.269	(0.308~0.237)	0.922	2.643

growth function $y = bx^k$ for the three forms.

and the length-breadth index, the latter of which is a fundamental one for mammalian systematics, corresponding to the zygomatic width / basilar length relation above dealt with.

It is an interesting fact that the plotted points of 4 male skulls always distribute in the lower part of the band in the figure, whereas these of 5 female ones in the upper. Further research in detail is desired to secure full analysis in this point.

2. *The volume of cranial tetrahydron / basilar length relation.*

Dimensions: Height is measured from lower border of foramen magnum to occipital crest (Figure 1, c). (maximum, 119.2; minimum, 53.0)

(Basion-Opisthocranion)

Volume of cranial tetrahydron, which is governed by basilar length, zygomatic width and height, is calculated in cc by the following formulae, namely,

$$\frac{\text{Basilar length} \cdot \text{Zygomatic width} \cdot \text{Height}}{6}$$

(maximum, 1792.1; minimum, 155.3)

Available number of specimens was in *yezoensis* 92, in *arctos* 3 and in *japonicus* 5 respectively.

On a double logarithmic plot (Figure 3) the volume of cranial tetrahydron (y) is plotted against the basilar length (x). The points of each *yezoensis* specimens fall in a narrow band between two parallel lines, except at the upper part of the figure.

Table I shows again that the value of k exceeds 3 in every species. The rate of positively heterogonic growth in this case is the highest among the relations treated in the present paper. The special character of the insular race is here again expressed by the shortening of basilar length, in the meaning of relative growth, as is shown in the table by the value of k; the *japonicus* has

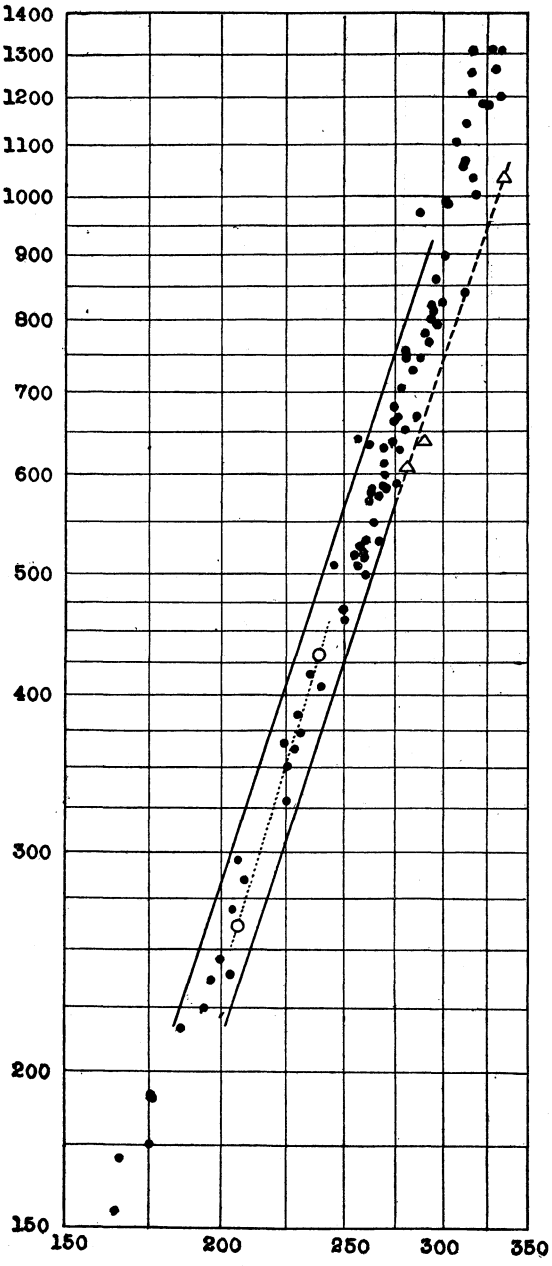

Fig. 3. Double logarithmic plot of the volume of cranial tetrahydron (y) against the basilar length of the skull (x). •, *yezoensis*; ○, *japonicus*; △, *arctos*.

3.407 as k which indicates a massive growth of the cranium, the *yezoensis* 3.050 is medium type while *arctos* 3.025 is the slenderest.

3. *The width of frontal / preorbital length relation.*

Dimensions: The width of frontal. Distance across postorbital processes (Figure 1, d). (maximum, 144.5; minimum, 56.4)

(Ectorbital-Ectorbital)

Preorbital length. Length from postorbital processes to apex of intermaxillaries in projection (Figure 1, e). (maximum, 199.7; minimum, 99.0)

(Ectorbital-Prosthion)

Available number of specimens: *yezoensis*, 130; *arctos*, 3; *japonicus*, 5.

When the width of frontal (x) and the preorbital length (y) of the different individuals are logarithmically plotted, the points distribute in a narrow band, (Figure 4) with the exception of the higher values.

The results obtained in this relation are also presented in Table I.

As already stated by ALLEN (1910) and SCHÄFF (1889) the lateral expansion of frontal is remarkable in Ursidae. In every form it increases more rapidly than the preorbital length, which repre-

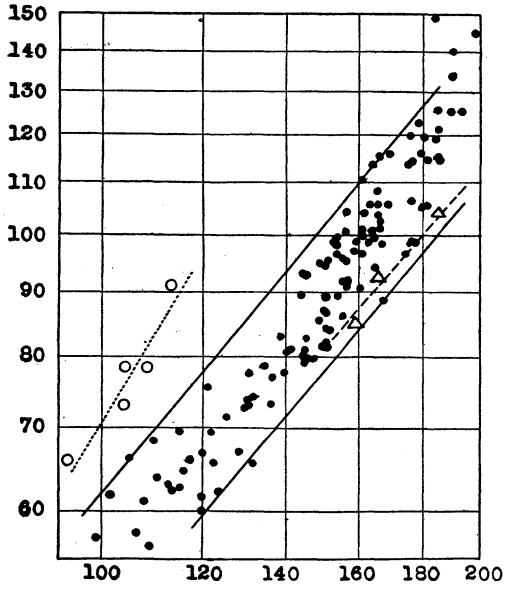

Fig. 4. Double logarithmic plot of the width of frontal (y) against the preorbital length (x).
•, *yezoensis*; ○, *japonicus*; △, *arctos*.

sents the foreward extension of the facial part of the cranium, the rate being higher than 1; this is positively heterogonic. The *japonicus*, which is recognized as an insular form, possesses the broadest face on the upper part, and the *yezoensis* the next broadest while the *arctos* the narrowest. In technical terms of index calculation they are called progressively brachyoprosopic. The fact that the *japonicus* has a shorter muzzle than that of brown bear agrees with the statement of LYDEKKER (1922).

4. *The length of brain / basilar length relation.*

Dimensions: The length of brain. The length from dorso-caudal border of foramen magnum to cribriform plate of ethmoid was measured using an iron stick with a diameter of 6 mm as suggested by DUERST (1926) (Figure 1, f). (maximum, 159.0; minimum, 99.5) (Opsthion–X)

When the length of brain (y) is plotted against the basilar length of the cranium (x) logarithmically, as in Figure 5, all the points of measurements for the *yezoensis* specimens fall in a narrow band. The value of exponent k was calculated as shown in Table I.

Available number of specimens: *yezoensis*, 87; *arctos*, 3; *japonicus*, 4.

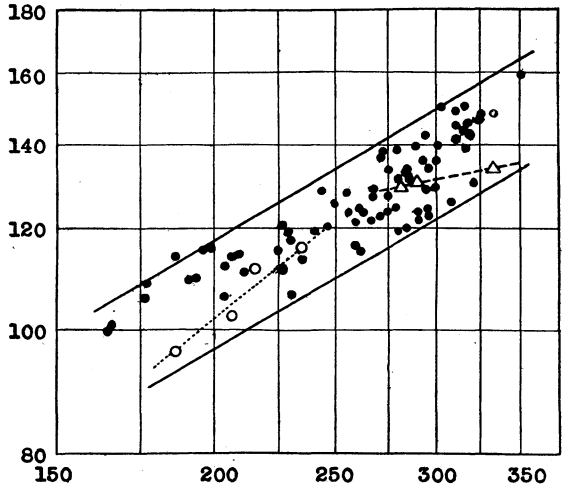

Fig. 5. Double logarithmic plot of the length of brain (y) against the basilar length (x) of the skull. •, *yezoensis*; o, *japonicus*; △, *arctos*.

The brain growth is found to be very slow or negatively heterogonic as compared with the basilar length. This is contrary to statements by many authors on various mammals and to SCHÄFF (1889) who working on Russian brown bears said there is no growth of the brain. The rate of the growth of the brain is the highest in *japonicus*, medium in *yezoensis* and the lowest in *arctos*.

5. *The preorbital length / dorsal cranial length relation.*

Dimension: Dorsal cranial length. Length from ectorbital process to occipital crest in projection (Figure 1, g). (maximum, 228.9; minimum, 92.5)
(Opisthocranion-Ectorbital)

Available number of specimens: *yezoensis*, 128; *arctos*, 3; *japonicus*, 4.

The preorbital length (y) and the dorsal cranial length (x) of the *yezoensis* skull fall within a narrow band when they are plotted in conformity with the power function (Figure 6).

Relative growth coefficients are given in Table I. These negative heterogonic values of k throughout the three forms indicate that the growth of the face is progressively slow as compared with that of the hind part of the skull which is chiefly affected by the development of the frontal sinuses, bulbous nasal region and the lambdoidal crest rather than by growth of the brain. The term of index explanation styles it progressively dolichoprosopic. From the ecological

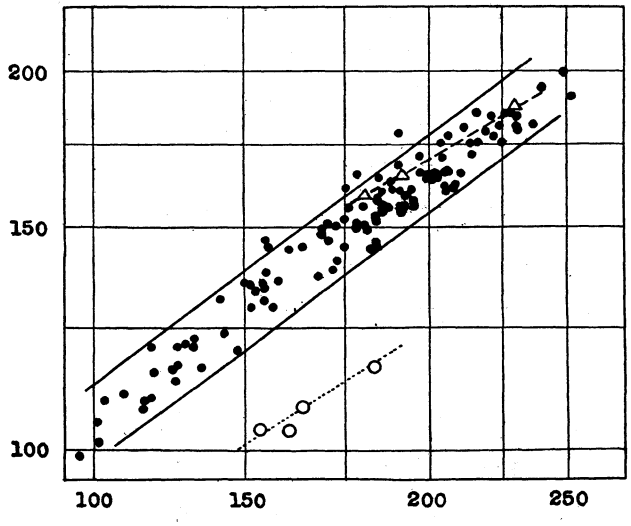

Fig. 6. Double logarithmic plot of the preorbital length (y) against the dorsal cranial length of the skull (x). •, *yezoensis*; o, *japonicus*; △, *arctos*.

viewpoints the active growth in the inner nasal region is quite natural as the power of scent of bears is the acutest of all their senses as FLOWER and LYDEKKER (1891) and others have explained. Comparison of the slope values between the three species reveals a condition which differs a little from the other relations of the skull, *japonicus* not falling between the other two forms in this respect.

6. *The dental length / basilar length relation.*

Dimension: The dental length. Distance from the middle of line connecting posterior margin of alveolus of last molar to apex of intermaxillaries (Figure i, h). (maximum, 156.0; minimum, 88.0) (Prosthion-Postdental)

Available number of specimens: *yezoensis*, 96; *arctos* and *japonicus* 3, respectively.

A graph very similar to the above figures is obtained by plotting the dental length (y) against the basilar length (x) of the skull (Figure 7).

Growth coefficients are shown in Table I. A rapid growth in dental length follows the eruption of the permanent dentition, namely the third incisor, canine, premolars and second molar, but it occurs rather slowly as compared with that of the basilar length. From the value of exponent they are all negatively heterogonic or should be called progressively brachyodont as expressed in terms

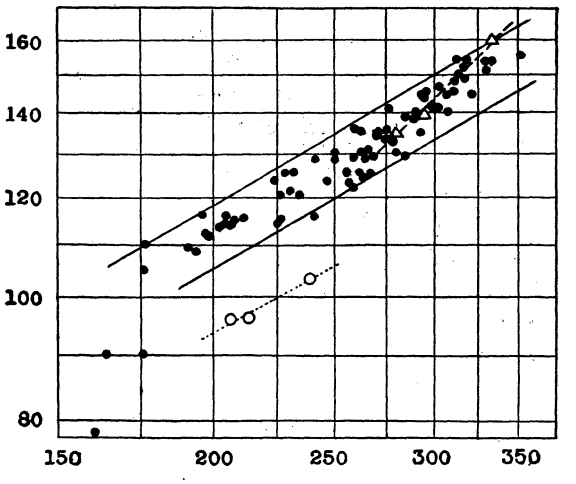

Fig. 7. Double logarithmic plot of the dental length (y) against the basilar length of the skull (x). o, *yezoensis*; •, *japonicus*; △, *arctos*.

of index treatment. The insular peculiarity is here again emphasized in the relation of k: *arctos*, the highest; *yezoensis*, the middle; *japonicus*, the lowest. The undermost point in the figure is not included in the limit of the band of later stages in which an abrupt increase of permanent teeth takes place.

7. *The diastema / basilar length relation.*

Dimension: Diastema. Length from the posterior border of the third incisor to the anterior of the first premolars (Figure 1, i). (maximum, 32.0; minimum, 8.4) (Incisivocaudal-Premolar)

Available number of specimens: *yezoensis*, 100; *arctos*, 3; *japonicus*, 3.

In Figure 8 the values of the diastema (y) are shown plotted against the basilar length (x), in conformity with the relative growth function. The specimens of each species fall within a narrow band (see also Table I).

The progressive shortening of the skull is peculiar for the insular race, occuring most conspicuously in *japonicus*, the growth rate in this part being inferior as compared with *yezoensis* which stands again lower in this respect than *arctos*. The same break as in the preceding relation is found at the lower part of the figure due to the canine eruption.

8. *The length of nasals / basilar length relation.*

Dimension: Length of nasals. Length of nasal bone in middle sutures

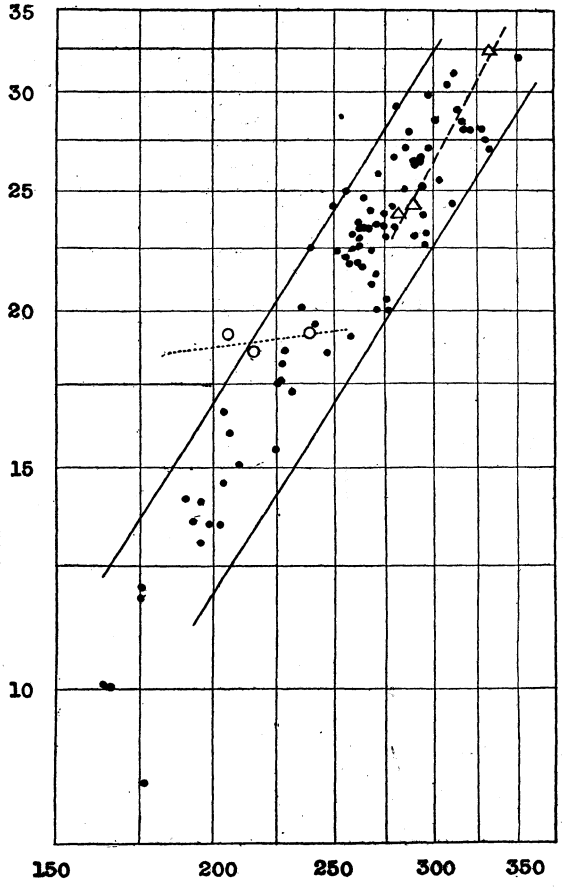

Fig. 8. Double logarithmic plot of the diastema (y) against the basilar length of the skull (x). ●, *yezoensis*; ○, *japonicus*; △, *arctos*.

(Figure 1, j). (maximum, 107.9; minimum, 42.2) (Nasion-Rhinion)

Available number of specimens: *yezoensis*, 96; *arctos*, 3; *japonicus*, 3.

When the length of nasals (y) is plotted against the basilar length (x) of the skull for all the specimens, the points distribute in a narrow band (Figure 9).

A glance at Table I shows that the rate of growth of nasal bone in *yezoensis* is nearly isogonic, that is, this extension keeps pace with that of basilar length, while in *japonicus* it is negatively heterogonic and in *arctos* positively heterogonic. The progressive shortening of the face expressed in *japonicus* agrees with the fact which NOACK (1903) explained.

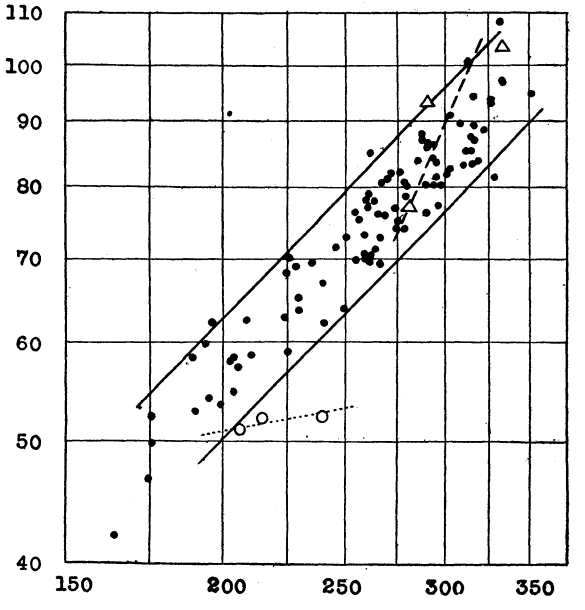

Fig. 9. Double logarithmic plot of the length of nasals (y) against the basilar length of the skull (x). ●, *yezoensis*; o, *japonicus*; △, *arctos*.

9. *The occipital breadth / height relation.*

Dimension: The occipital breadth. Distance between mastoid processes (Figure 1, k). (maximum, 207.9; minimum, 75.3) (Otion-Otion)

Available number of specimens: *yezoensis*, 91; *arctos*, 4; *japonicus*, 2.

When the two dimensions are logarithmically plotted, the points for the *yezoensis* specimens fall within a narrow band which conforms with the relative growth function (Figure 10).

The active lateral extension of mastoid processes has been stated as the special feature of the genus by ALLEN (1910). The increasing in breadth is most intense in *arctos*, making the cranium progressively low and broad at the hind part, while it is less expressed in *japonicus*. *Yezoensis* is intermediate in this respect.

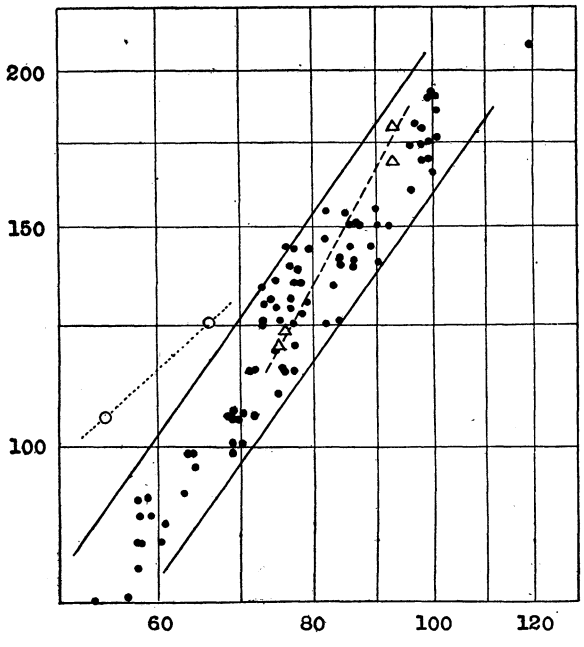

Fig. 10. Double logarithmic plot of the occipital breadth (y) against the height of the skull (x). ●, *yezoensis*, ○, *japonicus*; △, *arctos*.

Summary

The characteristic features of growth of the bear skull with the advance of age including individuals from the youngest whose milk second incisor still remains, to the oldest whose sutures are almost disappearing, are (1) the rapid extension of zygomatic arches because of the growth of the muscles seizing and masticating food, (2) the expansion of frontal bone from development of frontal sinuses, (3) the comparatively slight growth of brain-case, (4) the development of the nasal region resulting from growth of the organs of smell and respiration and lastly, the elongation of jaws for the eruption of the remaining permanent dentition.

The author is of the opinion, as are many other authors, that the Japanese black bear originates from a type other than the Yezo and Saghalien brown bear which originates from the holarctic. From the mathematical point of view the Yezo brown bear is closely allied to the Eurasiatic brown bear, but it has a distinct local variety. When mathematically analysed by the differential growth function, $y = bx^k$, the growth coefficient k of Yezo brown bear, in eight of

the nine dimensions, exhibits an intermediate value between those of the other two species. The Japanese black bear is particularized by its dwarfness as compared with the other two.

The progressive shortening or inferiority in forward and backward growth observed in *japonicus* and *yezoensis* is recognized as an insular peculiarity as compared with *arctos*. This cranial character is specially exaggerated in *japonicus*.

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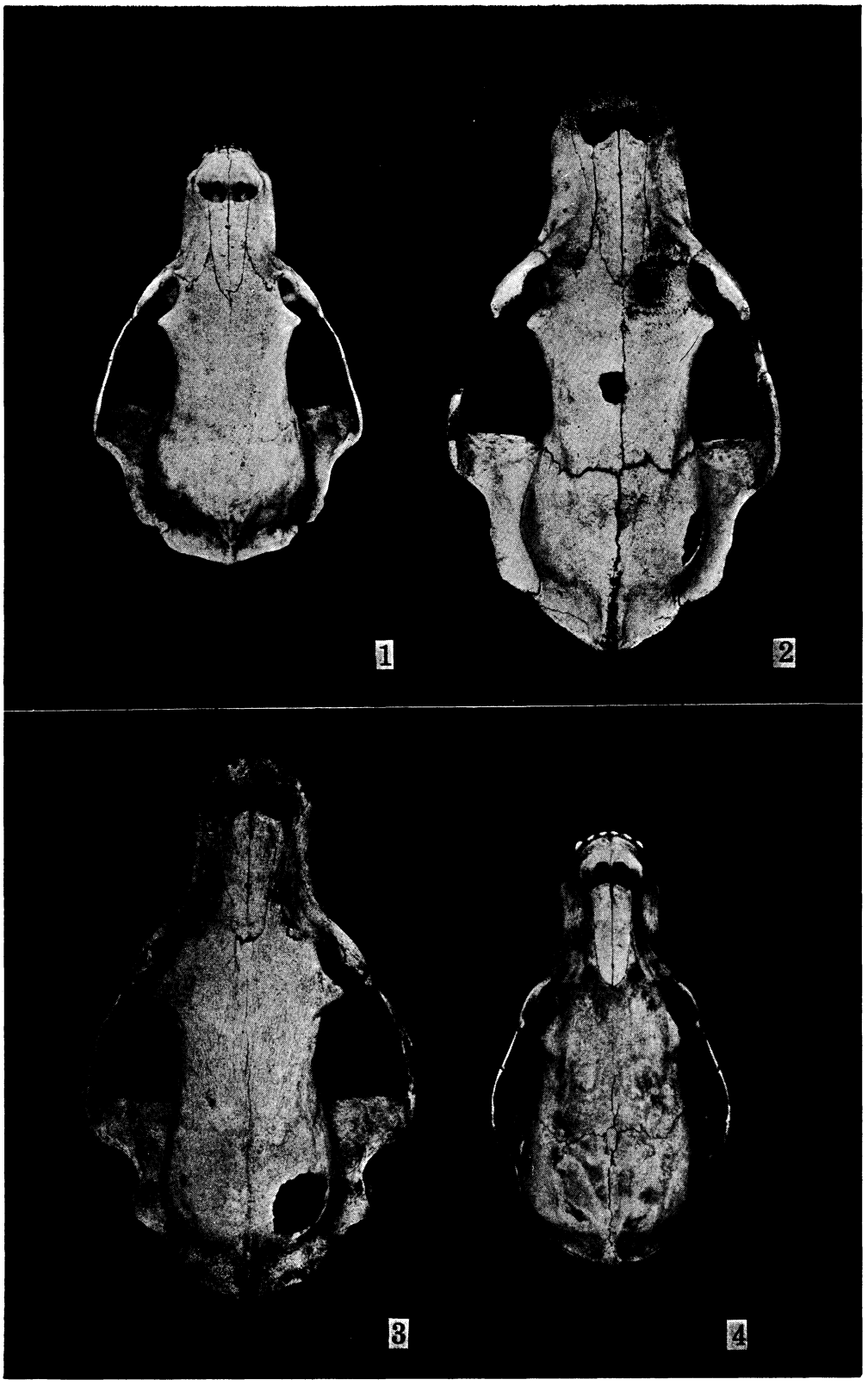
Explanation of Plates

Plate I Dorsal views, 1 : 0.29.

Plate II Ventral views, 1 : 0.31.

Plate III Lateral views, 1 : 0.30.

1. *Ursus japonicus* SCHLEGEL, 1857; no. J-4; adult female; Mount Kamanasi, Nagano Prefecture.
2. *Ursus arctos* LINNAEUS, 1758; no. 104; adult female; Saghalien.
3. *Ursus arctos yezoensis* LYDEKKER, 1897; no. 20; adult female; Mukawa, Hidaka Province, Hokkaidô.
4. *Ursus arctos yezoensis* LYDEKKER, 1897; no. 86; young female; Isikari Province, Hokkaidô.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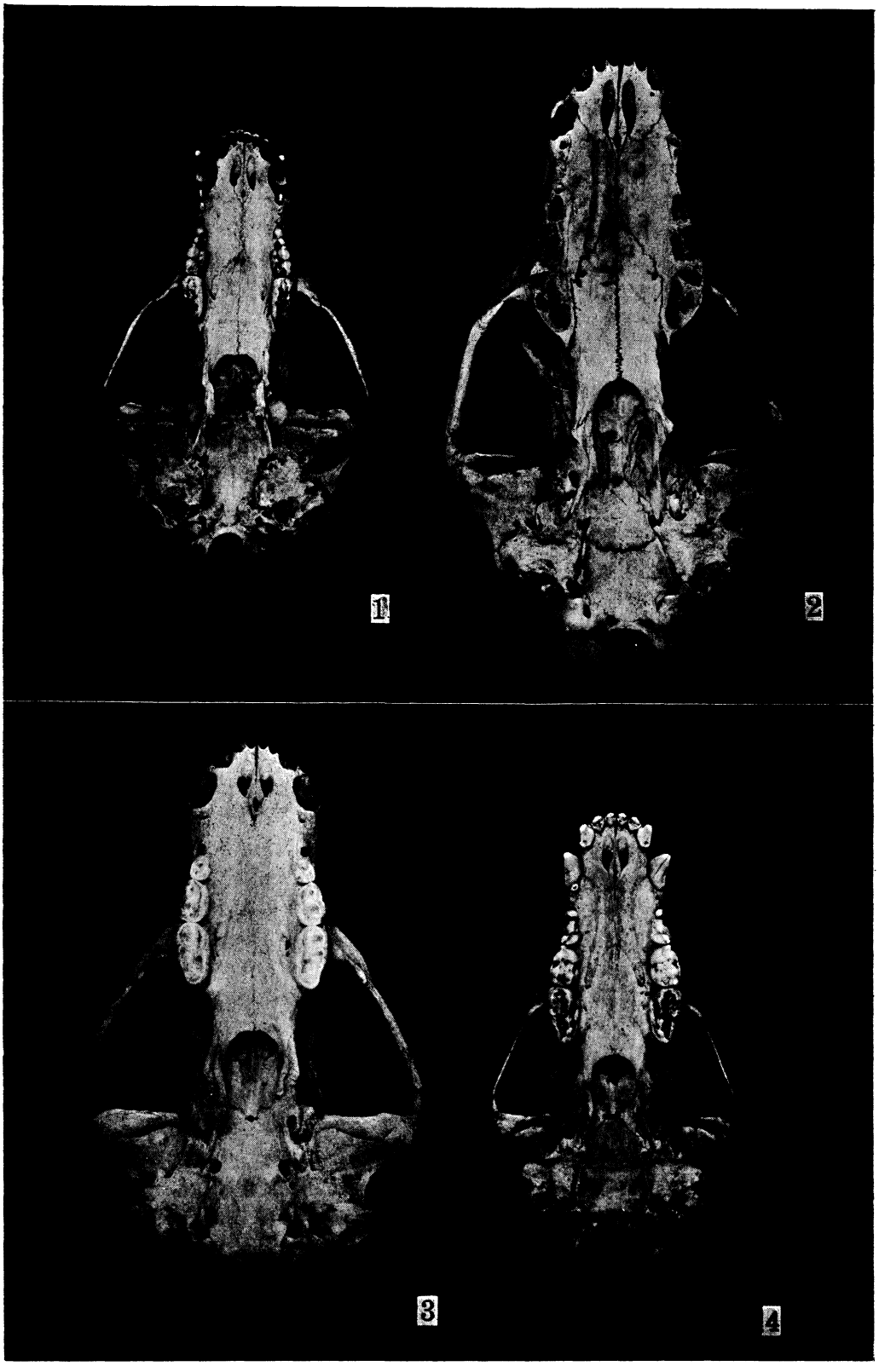
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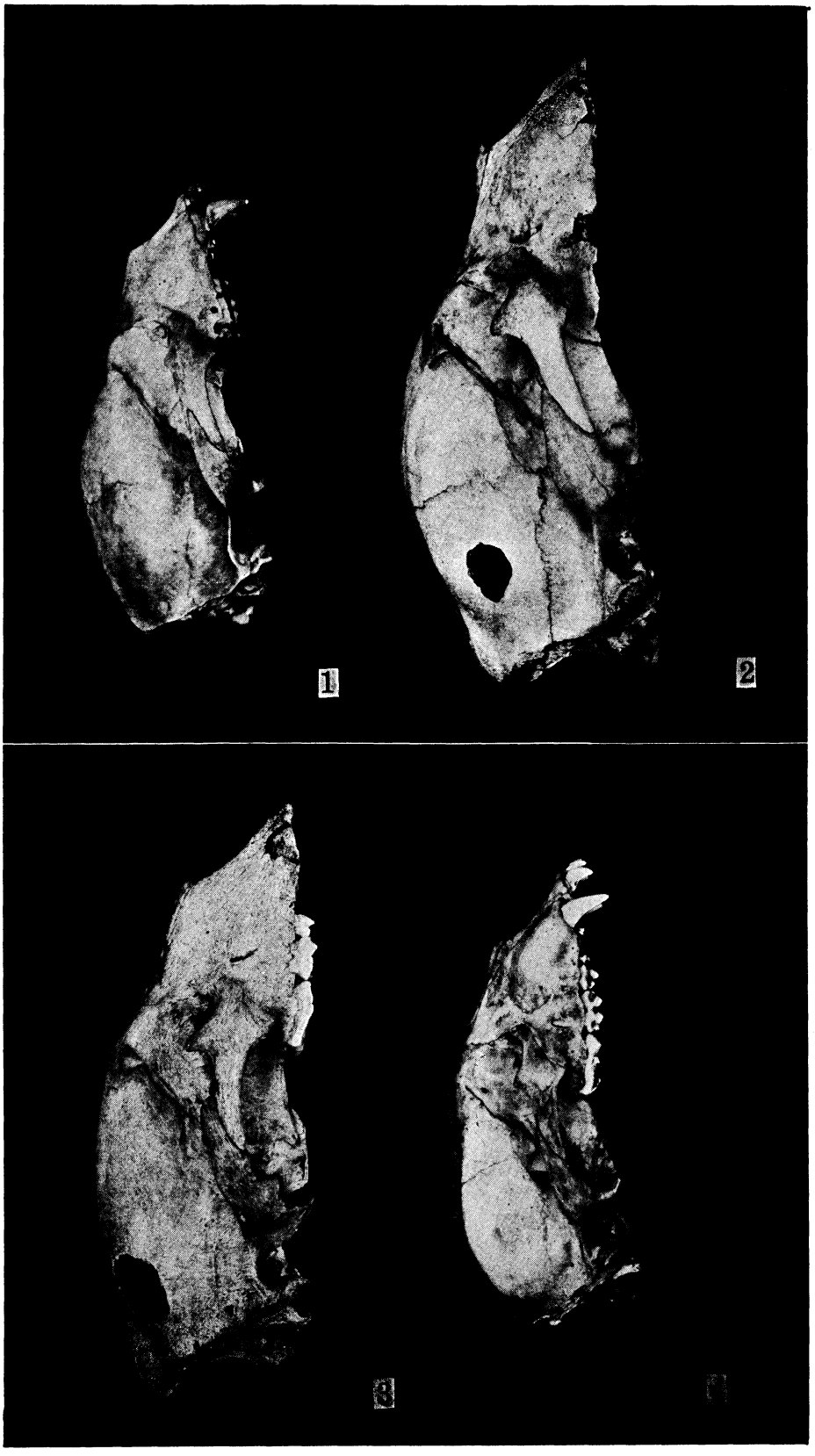
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注　意

本會に對する總ての書信は北海道帝國大學
農學部内札幌博物學會に宛て發送せらるべし。

札幌博物學會報原稿募集

下記事項御含みの上御寄稿願上候

1. 第十五卷第三號原稿
2. 昭和十三年四月末日〆切
3. 昭和十三年六月發行の豫定
4. 原稿は尨大ならざるもの
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キヤツプ	(CAP)	═══
スモールキヤツプ	(SMALL CAP)	═══
イタリツク	*(Italic)*	———
ヘビータイプ	**(Heavy type)**	～～～
ヘビーイタリツク	***(Heavy Italic)***	≈≈≈
ゲスペルト	(Gesperrt)	- - - - -

人名はスモールキヤツプ。學名はイタリツク。

昭和十二年十二月二十五日印刷
昭和十二年十二月三十日發行

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