

formed that this specimen came from Natal; and in the above character it agrees with the two specimens received from Mr. Sargeant; while in all the specimens of *P. subrufa* which I have seen, the shell is more or less rufous brown, often very pale, and the shields are smooth, with only a few distant concentric narrow lines, or they are all over smooth, as if worn and polished.

The three Natal specimens agree also in the under side of the margin being black, with triangular white portions on the inner hinder edge of each shield, and the sternum is black or blackish brown. From this distribution of the colours, I believe that the "*Pentonyx du Cap*," figured by M. Auguste Duméril in the 'Archives du Muséum,' is this species.

I have no doubt of these being distinct species, not only on account of their colour, but also on account of the difference in the scales on the crown, which is very similar to the difference that separates the Natal from the Madagascar *Sternotherus*.

XI.—*Contributions to an Insect Fauna of the Amazon Valley.*
COLEOPTERA : LONGICORNES. By H. W. BATES, Esq.

[Continued from vol. ix. p. 458.]

Subtribe ACANTHOCINITÆ.

Group *Lagocheirina*.

Genus LAGOCHEIRUS (Dej. Cat.), Thomson.

Thomson, Classif. des Cérambyc. p. 9.

Body of large size, broad, oblong, slightly convex. Antennæ stout, half as long again as the body, and of nearly equal length in both sexes; the sixth joint in the males having a tubercle beneath its apex, surmounted by a pencil of stiff hairs; the basal joint is as long as the third, gradually thickened from the base, and in both sexes toothed beneath at the apex. Thorax obtusely tuberculated on its disk, and with large conical lateral tubercles. Elytra very broad at the shoulders, gradually and slightly tapering to the apex, which latter is briefly truncated. Thighs abruptly clavate; basal joint of the tarsi not much longer than the second.

The females have not elongated ovipositors and sheaths; the terminal abdominal segments, however, are much longer in the females than in the males. In one of the two species which I have examined (*L. araneiformis*) both the ventral and dorsal segments have their apical edges excised, whilst in the other (*L. fasciculatus*) they are entire. The males have their anterior tarsi ciliated.

1. *Lagocheirus araneiformis*, Linnæus.

Cerambyx araneiformis, Linn. Syst. Nat. ii. p. 625; Drury, Illustr. ii. t. 35. f. 4.

Acanthoderes araneiformis, Serv. Ann. Soc. Ent. Fr. iv. p. 30.

L. oblongus, postice modice attenuatus: thoracis tuberculis lateralibus acutis: elytris nigro fasciculatis, olivaceo-griseis, macula magna laterali triangulari fusco-nigra lineisque transversis pallidis ornatis: tarsis articulis duobus basalibus griseis, duobus apicalibus nigris nitidis. Long. 7-11 lin. ♂ ♀.

This is a well-known and widely distributed insect. I found it occasionally at most stations on the banks of the Amazons, from Pará to Peru: it is also a native of Guiana, the West Indian Islands, and the Island of Tahiti, where, according to M. Vesco*, it is common, the larva inhabiting the trunks of *Spondias dulcis*. It is not stated whether the Tahitian examples differ from those of America; those of the West Indian Islands form a tolerably distinct local variety. The species, however, has probably been introduced by the agency of man into the distant Polynesian island.

2. *Lagocheirus fasciculatus*, White.

Trypanidius fasciculatus, White, Cat. Long. Col. Brit. Mus. ii. p. 377, pl. 9. f. 9.

L. oblongus, postice valde attenuatus: thoracis tuberculis lateralibus obtusis: elytris nigro fasciculatis, olivaceo-griseis, maculis duabus lateralibus triangularibus (altera magna, altera parva) fasciæque lata pallida ornatis: tarsis ochraceis, articulo ultimo apice nigro. Long. 8-9½ lin. ♂ ♀.

Not uncommon at Ega, Upper Amazons, on dead branches in the forest, in company with *Acrocinus trochlearis* and other wood-eating Coleoptera. The tubercle at the tip of the sixth antennal joint of the males is much larger in this species than in *L. araneiformis*. The figure given in White's Catalogue represents a female.

Genus LEPTOSTYLUS.

Leconte, Journ. Acad. Nat. Sc. Philad. n. s. ii. p. 168.

Syn. *Amniscus*, Dej. Cat. (part.).

The chief characters given by Leconte as distinguishing this from the allied genera are the shortness of the basal joint of the posterior tarsi and the tuberculose surface of the thorax, whose sides are simply prominent instead of being armed with a tooth or spine. The genus consists of a number of small-sized species more nearly allied to *Lagocheirus* than to *Leiopus* and *Acanthocinus*, being of compact, oval, convex form, and having short

* Léon Fairmaire, Coléoptères de la Polynésie, p. 88.

legs with thighs abruptly clavate. The basal joint of the posterior (as well as the other) tarsi is scarcely longer than the second; the thorax is very much narrower than the elytra, and its surface is studded with obtuse tubercles, the lateral tubercles in some of the species being scarcely visible, and in none spiniform: the elytra are also tuberculated or uneven, and are not spined at the apex. Most of the species which I have examined have the basal joint of the antennæ much flattened beneath; and in all, the apex of the same joint is produced beneath into a short tooth. The elytra are generally fasciculated, but have not very distinct centrobasal ridges.

Leptostylus appears to be closely related to *Erphæa* of Erichson (Consp. Ins. Peruana, p. 144), differing chiefly in the absence of acute lateral thoracic tubercles.

1. *Leptostylus pleurostictus*, n. sp.

L. oblongo-ovatus, subconvexus, tomento cinereo-brunneo vestitus: thoracis dorso quinetuberculato: elytris multifasciculatis, lateribus macula magna nigro-fusca ornatis. Long. $4\frac{1}{2}$ lin.

Head clothed with tawny-brown pile. Antennæ not much longer than the body, brown; basal joint (except the tip) and base of the remaining joints grey. Thorax with five distinct dorsal tubercles; the lateral tubercles short, conical, obtuse, and accompanied, near the front angle on each side, by a smaller one: greyish or hoary, a lateral spot behind the tubercle dark brown. Elytra ovate, not narrowed before three-fourths of their length; apex very briefly, obtusely, and obliquely truncate: surface coarsely punctured (except near the tip), and furnished with numerous small tubercles arranged in three irregular rows, and surmounted each by a pencil of short bristles pointing towards the apex: the colour is ashy or greyish brown, a large dark brown patch occupying each side from the base to the middle, and an indistinct oblique whitish belt traversing the middle of each elytron. Underneath and legs brownish, varied with grey. The sterna are all plane.

Occurred sparingly at Ega on slender dead branches.

2. *Leptostylus cretatellus*, n. sp.

L. oblongus, subconvexus, tomento canescente vestitus: elytris lineâ laterali nigra, macula apicali fusca: thoracis dorso indistincte tuberculato. Long. $3\frac{1}{2}$ lin.

Head clothed with grey pile. Antennæ grey, spotted with brown. Thorax uneven above; tubercles indistinct, the lateral ones conical, obtuse, placed behind the middle; the colour is hoary white, the fore part of the disk having two small dark brown spots. Elytra oblong, sharply and obliquely truncated at

the apex; surface punctured, and furnished with three faint raised lines, on which rise a few small elevations, surmounted each by a minute pencil of black hairs; the colour is hoary white, except at the apex, which has a large brown spot remounting in an angle on the suture; the sides near the base have also a thick blackish line. Legs and underside greyish, varied with brown.

One example taken at Obydos.

3. *Leptostylus ovalis*, n. sp.

L. curtus, ovatus, convexus, nigrinus: thoracis dorso trituberculato, tuberculis lateralibus obtusis. Long. 3 lin.

Head olive-grey, with minute black spots. Antennæ with the three basal joints dark grey, speckled with black; the remainder grey, with the tips blackish. Thorax with an elevation on the front part of the disk, surmounted by three obtuse tubercles; the lateral tubercles very obtuse: punctured, scantily clothed with dark grey pile irrorated with black. Elytra short, ovate, very briefly truncated at the tip, coarsely punctured, and furnished with rows of small tubercles, each surmounted by a short pencil of black hairs; the colour is sooty black, with scanty dark grey pile, but towards the apex the grey pile forms a patch speckled with black. Beneath iron-grey, slightly shining. Legs grey, speckled with black.

Found at Obydos and Pará, on slender dead twigs.

4. *Leptostylus obscurellus*, n. sp.

L. elongato-ovatus, fuliginosus: thorace brevi, dorso inæquali, tuberculis lateralibus prominentibus. Long. 3 lin.

Head clothed with sooty pile; antennæ of the same hue, with the bases of the joints (after the third) pallid. Thorax small compared with the elytra; disk very uneven, the depressed parts coarsely punctured, the lateral tubercles prominent; colour sooty. Elytra elongate-ovate, the broadest part being about two-thirds their length, the tip not perceptibly truncate; their surface is thickly punctured, and is furnished with a few small tubercles or ridges crested with hairs, as in the allied species; the colour is sooty, with a few spots of white pile on the disk, sometimes forming a patch near the apex. Beneath grey; legs sooty, varied with grey; base of the thighs pallid.

Taken on slender dry twigs, in the suburbs of Santarem.

Group *Leiopodinæ*.

Genus AMNISCUS (Dej. Cat.).

Besides the species taken to form the genus *Leptostylus*, the

vague group standing in collections under the yet uncharacterized name of *Amniscus*, Dejean, comprises others which might conveniently bear this title, as they differ in many respects from the types of *Leptostylus*. These have an elongated and sub-depressed form, with the basal joint of the posterior tarsi equal to the two following united. They form a connecting link between *Leptostylus* and *Alcidion*, differing from the latter in having the elytra oblong without prominent shoulders, instead of the triangular form, broad and elevated at the base, which so well distinguishes *Alcidion*. The thorax is tubercular on the disk, as in *Leptostylus*, and its sides are simply prominent in the middle, without acute or spiniform lateral tubercles. The elytra are briefly truncated or rounded at the apex. The thighs are abruptly clavate. In the only species which I have been able to examine closely, the apical segment of the abdomen is conical and somewhat produced in both sexes; but in the male both dorsal and ventral segments are truncated or slightly emarginated at the tip, whilst in the female the dorsal segment is obtusely pointed.

Alcidion polyrhaphoides of White (Cat. Long. Col. Brit. Mus. p. 394, pl. 10. f. 6) may be cited as the type of the genus *Amniscus* as here defined. In this and the species I have to describe the basal joint of the antennæ is abruptly clavate near the tip; but it is doubtful whether this will prove to be a generic character, as some species of *Alcidion* also have the same feature, whilst their nearest allied species have the joint of the same shape as the generality of the Acanthocinitæ. The joint, although abruptly clavate, is of the same relative length as in the rest of the allied genera, and it presents also, near the tip on the underside, the small dentiform process which is characteristic of the subtribe.

Amniscus pictipes, n. sp.

A. oblongus, testaceo-rufus, nigro canoque variegatus: thoracis dorso trituberculato, tuberculis anticis fortiter elevatis: elytris prope basin bifasciculatis. Long. $3\frac{1}{2}$ lin. ♂ ♀.

Head yellowish, spotted with black. Antennæ reddish, joints tipped with black; basal joint swollen beneath near the apex, the latter toothed. Thorax with three tubercles in a triangle on the disk, the two anterior very prominent; lateral tubercles obtuse; the colour is brown testaceous, with two black dorsal stripes. Elytra oblong, gradually narrowed from the middle to the tip, which latter is not truncated; the surface is thickly punctured, especially towards the base, and in the place of the centro-basal ridge there is a large pencil of black hairs; the rest of the surface even; the colour is testaceous brown, with the

base and a few scattered marks blackish, an indistinct whitish line obliquely crossing the disk. Body beneath testaceous, clothed with pile of the same colour. Legs and tarsi reddish, spotted with grey and black.

One example, taken at S. Paulo, Upper Amazons. The species also inhabits South-eastern Brazil, specimens from Rio Janeiro (taken by Mr. Squires) not differing from the Amazonian example except in being rather duller in colour.

Genus *ALCIDION* (Dej. Cat.), Thomson.

Thomson, Classif. des Cérambyc. p. 12.

Char. emend. Thorax free from tubercles on the disk, or at most but slightly uneven, its sides unarmed. Elytra broad and convex at the base, thence narrowing in a nearly straight line to the apex, with the surface sloping equally in that direction; the apex truncated and toothed or spined, and the centrobasal ridges more or less prominent. Apical segments of the abdomen and ovipositor not produced in the female. Thighs abruptly clavate; basal joint of the tarsi generally longer than the two following united.

As above defined, the genus *Alcidion* will comprise a considerable number of species distinguished from *Amniscus* by the peculiar shape of the elytra, and from other allied genera by the thorax wanting the lateral spines. It is divisible into two groups, —one of which is distinguished by the species having a raised line along the whole length of the elytra on each side, from the centro-basal ridge to the external apical angle; and the other by the absence of these lines, the centrobasal ridges at the same time being very prominent. The Amazonian species belong wholly to the second group*.

* *A. latum* (Thomson, l. c.), of Mexico, seems to belong to the first group; also *Leiopus emeritus* (Erichson, Conspectus Ins. in Peruana, p. 147) of Eastern Peru. The two following should also be added:—

A. bispinum (Dej. Cat.). Modice elongatum, apud humeros latum, postice declivum et attenuatum, fusco-testaceum griseo olivaceoque variegatum. Caput nigrum. Antennæ fusco-testaceæ, articulo basali subiter clavato, clava infra barbata. Thorax griseo-olivaceus. Elytra apice sinuato-truncata, angulo interno acuto, externo longe mucronato, supra utrinque bicarinata, carinis lævibus, interstitiis punctatis, carina centrobasali nigro penicillata; grisea olivaceo varia, fascia pone basin nigricante. Subtus testaceum, sternis nigricantibus. Pedes testacei, griseo maculati. Long. $3\frac{1}{2}$ lin. Hab. Rio Janeiro.

A. lineatum, n. sp. Elongatum, apud humeros minus latum, olivaceofulvum, olivaceo-fusco varium. Caput olivaceum, vertice fusco bipunctato. Antennæ fusco-testaceæ, articulo basali sensim clavato, infra planato et barbato. Thorax medio fusco bivittatus. Elytra valde elongata, punctata, apice sinuato-truncata, angulo interno acuto, ex-

1. *Alcidion oculatum*, n. sp.

A. oblongum, postice modice attenuatum, tomento cervino subsericeo vestitum: thorace maculis duabus nigro-fuscis, albo marginatis: elytris lateribus acute carinatis, dorso lævibus, utrinque fascia discali interrupta nigro-fusco ornatis. Long. $3\frac{3}{4}$ lin.

Head and thorax tawny brown; disk of the latter with two short blackish lines, narrowly margined with whitish. Antennæ dusky, base of each joint from the fourth pallid; basal joint gradually clavate, the outline waved beneath. Elytra prominent at the shoulders, gradually narrowed to three-fourths of their length, then more quickly so to the apex, which is briefly and very obliquely truncate, without spines: the sides are acutely carinated; the dorsal carina is effaced, but the centro-basal ridge is very prominent, and crested with hairs; the surface is punctured (except near the apex); the colour is tawny or violaceous brown, with a slight silky gloss, having on the disk behind the middle a short blackish-brown fascia, bordered on the basal side with pale ashy; a small linear mark of the same colour is seen also near the suture towards the apex, and the suture, disk, and lateral margins have rows of small dark spots. Beneath tawny ashy. Legs testaceous; thighs varied with ashy; tibiæ black at the base and apex; tarsi with the middle joints black.

Ega; on slender dead branches in the forest.

2. *Alcidion triangulare*, n. sp.

A. breve, postice valde attenuatum, fulvo-griseum: thorace fusco bimaculato: elytris medio irregulariter cinereo fasciatis, apicem versus cinereo strigosis, apice breviter oblique sinuato-truncatis. Long. $3\frac{1}{2}$ lin.

Head dusky; antennæ testaceous brown, apices of the joints from the third black, basal joint waved beneath. Thorax tawny brown; disk with two round blackish spots, sometimes wanting. Elytra gradually narrowed from shoulders to apex, which latter is very obliquely sinuate-truncate; the sides acutely carinated from the shoulder, the carina effaced before the apex; surface even and punctured, the centro-basal ridge extremely prominent and destitute of hairs: the colour is tawny brownish, with a very indistinct, waved, ash-coloured fascia across the middle, the apical part being silky brownish, streaked with ashy. Beneath and legs testaceous brown; base and apex of tibiæ and middle joints of tarsi blackish.

terno obtuse dentato; carina dorsali tenui et acutissima, centrobasali parum prominente, lateribus discoque etiam carinatis, carinis obtusis et abbreviatis. Subtus nigricans; pedibus fuscis. Long. $5\frac{1}{2}$ lin.
Hab. Venezuela.

Var. *Paraëense*, rather more robust; the surface and sides of elytra more thickly punctured, and the apex simply truncated, without sinuation.

This was rather a common insect at Ega, on dead twigs. The variety was found at Pará.

3. *Alcidion latipenne*, n. sp.

A. crassum, postice modice attenuatum, apice transverse sinuato-truncatum: elytris humeris valde productis lateribusque carinatis. Long. 4-6 lin. ♀ ♂.

Head dusky; antennæ testaceous brown; base of all the joints from the third pallid. Thorax much broader than long, surface uneven, tawny brown, silky, with a V-shaped dusky mark behind, joining two dusky spots on the sides of the scutellum. Elytra very broad and convex at the base, gradually narrowed to the apex, which is broadly and transversely sinuate-truncate, with the external angles somewhat produced; the shoulders are very prominent, and from the acute edge of each commences the lateral carina, which extends nearly to the apex; the surface is even and moderately punctured, the colour being reddish or tawny brown, slightly streaked here and there with ashy, especially in the middle, and having rows of small dusky specks, a large violet-brown spot lying on the deflexed margin beneath the shoulders. Beneath and legs testaceous brown.

Ega, and on the banks of the Cuparí, a branch of the Tapajos.

4. *Alcidion interrogationis*, n. sp.

A. valde elongatum, postice parum attenuatum, carneo-griseum sericeum: elytris apice longe mucronatis, litura nigra signum interrogationis simulante ornatis. Long. $5\frac{1}{2}$ lin.

Head brown; antennæ dusky, base of joints from the third pallid, the first joint strongly waved. Thorax tawny, sides black, and disk with a black mark shaped like a horse-shoe. Elytra elongated, quickly narrowed behind the shoulders, then widening slightly, afterwards towards the apex again narrowed, the apex itself being rather broad and sinuate-truncate, the internal angle dentiform, the external one produced into a lengthened spine; the shoulders are acute, and from their edge commences the lateral carina, which is very prominent, but is so placed as to leave the deflexed portion of the elytra beneath it visible from above; the surface is rather thickly punctured in the middle towards the base, sparingly so in other parts; the centro-basal ridges are short, but extremely elevated, hooked posteriorly, and surmounted by a crest of black hairs; the colour is grey, with a rosy tint in some lights, and towards the apex there is on the disk of each a black curved line and spot resem-

bling the note of interrogation. Legs (especially the posterior thighs) elongated; like the under surface of the body, they are of a dusky hue.

This elegantly shaped and curiously marked insect occurred only at Ega, on dead branches in the forest.

5. *Alcidion olivaceum*, n. sp.

A. oblongum, postice modice attenuatum, tomento olivaceo signaturis obscurioribus variegato vestitum: elytris apice breviter oblique truncatis, femoribus crassissimis. Long. $5\frac{1}{2}$ lin.

Head dusky; antennæ dusky reddish, base of joints from the third pallid. Thorax olivaceous grey, with a short black streak in the middle of the hind margin. Elytra rather broad at the shoulders, and narrowed curvilinearly thence to the apex, which is briefly and obliquely truncate; the lateral carina is less pronounced than in the last species, but the centro-basal ridges are very prominent; they are hooked behind, although not crested with hairs; the surface is rather uneven, having two faint and obtuse dorsal carinæ, which, however, are effaced shortly behind the middle; the colour is olivaceous grey, varied with small dusky spots which accompany the carinæ, and two oblique discal streaks placed behind the middle. Beneath and legs dusky, varied with grey; base of thighs and tip of tarsi testaceous; the thighs are short and very thickly clubbed.

Ega, Upper Amazons.

6. *Alcidion minimum*, n. sp.

A. parvum, depressum, postice modice attenuatum, fusco-cinereum, fuliginoso maculatum: elytris apice oblique sinuato-truncatis, angulis obtusis, carina centrobasi modice elevata. Long. 2 lin.

Head sooty brown; antennæ with the basal joint strongly flexuous beneath, sooty brown. Thorax smooth, sides rounded, hinder part punctured. Elytra subtrigonal, depressed, with lateral carinæ; centro-basal ridges moderately elevated, and not abrupt posteriorly; apex obliquely sinuate-truncate, angles not produced; the surface (except towards the apex) has a number of large punctures, and is of an ashy-brown colour, with a number of oblong dusky spots on the apical portion. Body beneath and legs dusky; base of thighs and of the first tarsal joint and a ring on the tibiæ pale testaceous.

Taken flying in the evening, banks of the river, S. Paulo, Upper Amazons.

The species, from its small size and general appearance, would consort well with those I have placed in the genus *Ozines*; but

the absence of lateral thoracic spines compels us to treat it as a member of the *Alcidion* group*.

[To be continued.]

XII.—On the *Leaf-Cells* of the *British Species* of *Hymenophyllum*. By GEORGE GULLIVER, F.R.S., Professor of Anatomy and Physiology to the Royal College of Surgeons.

A COMPARATIVE examination of the leaf-cells of this genus seems to be a desideratum, which I can only attempt to supply, at present, as far as regards the British plants.

There is nothing satisfactory on the subject in the works of Sir James Edward Smith and Mr. Sowerby. In the 'English Botany' no mention occurs of the cells; and the figure given of those of *H. Wilsoni* (t. 2686) incorrectly represents the inter-cellular spaces nearly or quite as large as the cells, though the oval form is truly depicted, but without the slightest indication of any difference in this respect between the two species. The same remark is applicable to the descriptions and plate in the

* The following species also belong to the second section of *Alcidion* :—

A. bicristatum. Elongatum, postice sensim attenuatum, olivaceo-griseum, fusco varium. Caput olivaceum. Antennæ infra parce setosæ, articulo basali angulo inferiore apicali producto, olivaceo-brunneæ, articulis basi pallidis. Thorax dorso obtuse tuberculatus, antice et postice punctatus, olivaceo-griseus, subsericeus. Elytra elongata, depressa, postice sensim attenuata, apice oblique sinuato-truncata, angulis externis productis; lateribus et disco obtuse carinatis; carinis centrobasalibus parum prominentibus, singulis cristis duabus pilorum nigrorum ornatis; elytris utrinque penicillis minutis atris in duplici serie (altera suturali, altera obliqua discoidali) notatis: olivaceo-grisea, tertia parte posteriore saturatiore griseo lineata, marginibus nigro punctatis. Corpus subtus griseum, pedibus olivaceo-griseis nigro punctatis, femoribus basi testaceis. Abdomen foeminæ segmento ultimo dorsali apice attenuato producto, maris rotundato medio emarginato. Long. 5 lin. ♂ ♀. *Hab.* Rio Janeiro. (Coll. Squires.)

A. trivittatum. Elongatum, depressum, postice sensim attenuatum, brunneo-sericeum, vittis et maculis fusco-atris ornatum. Caput fuscum. Antennæ rufescentes, articulis basi pallidis, articulo basali æqualiter clavato. Thorax rotundatus, dorso æqualis, olivaceo-brunneus, sericeus, vittis latis tribus atro-fuscis velutinis (una centrali, alteris lateralibus) marginem anticum haud attingentibus ornatus. Elytra elongata, depressa, apice sinuato-truncata, angulis internis acutis, externis valde productis, humeris parum prominentibus, lateribus utrinque acute flexuoso-carinatis; disco æqualia; carina centrobasali valde prominente, brevi, nuda; rufescenti-brunnea, certo visu carnea nitentia, passim punctata et fusco maculata; lateribus prope basin fuliginosis; disco pone medium plaga atro-fusca antice utrinque linea obliqua grisea marginata ornato. Corpus subtus nigricanti-sericeum. Pedes nigricantes, tibiis et tarsorum articulo primo cano annulatis. Long. 5 lin. *Hab.* Venezuela.



Bates, Henry Walter. 1863. "XI. Contributions to an Insect Fauna of the Amazon Valley. Coleoptera : Longicornes." *The Annals and magazine of natural history; zoology, botany, and geology* 12, 100–109.

View This Item Online: <https://www.biodiversitylibrary.org/item/88262>

Permalink: <https://www.biodiversitylibrary.org/partpdf/65129>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Smithsonian

Copyright & Reuse

Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.