

BULLETIN
OF
ENTOMOLOGICAL RESEARCH

**ISSUED BY THE IMPERIAL
BUREAU OF ENTOMOLOGY.**

EDITOR: THE DIRECTOR.

VOL. VII.

LONDON:

**SOLD BY
DULAU & Co., LTD., 37, SOHO SQUARE, W. 1.
1916-1917.**

IMPERIAL BUREAU OF ENTOMOLOGY.

Honorary Committee of Management.

VISCOUNT HARCOURT, M.P., *Chairman.*

Lieutenant-Colonel A. W. ALCOCK, C.I.E., F.R.S., London School of Tropical Medicine.

Mr. E. E. AUSTEN, Entomological Department, British Museum (Natural History).

Dr. A. G. BAGSHAWE, C.M.G., Director, Tropical Diseases Bureau.

Mr. E. C. BLECH, C.M.G., Foreign Office.

Sir J. ROSE BRADFORD, K.C.M.G., F.R.S., Secretary, Royal Society.

Surgeon-General Sir DAVID BRUCE, C.B., F.R.S., A.M.S.

Mr. J. C. F. FRYER, Entomologist to the Board of Agriculture and Fisheries.

Dr. S. F. HARMER, F.R.S., Keeper of Zoology, British Museum (Natural History).

Professor H. MAXWELL LEFROY, Imperial College of Science and Technology.

The Hon. Sir JOHN MCCALL, M.D., Agent-General for Tasmania.

Dr. R. STEWART MACDOUGALL, Lecturer on Agricultural Entomology, Edinburgh University.

Sir JOHN MCFADYEAN, Principal, Royal Veterinary College, Camden Town.

Sir PATRICK MANSON, G.C.M.G., F.R.S., Late Medical Adviser to the Colonial Office.

Sir DANIEL MORRIS, K.C.M.G., Late Adviser to the Colonial Office in Tropical Agriculture.

Professor R. NEWSTEAD, F.R.S., Dutton Memorial Professor of Medical Entomology, Liverpool University.

Professor G. H. F. NUTTALL, F.R.S., Quick Professor of Protozoology, Cambridge.

Professor E. B. POULTON, F.R.S., Hope Professor of Zoology, Oxford.

Lieutenant-Colonel Sir DAVID PRAIN, C.I.E., C.M.G., F.R.S., Director, Royal Botanic Gardens, Kew.

Mr. H. J. READ, C.B., C.M.G., Colonial Office.

The Honourable N. C. ROTHSCHILD.

Mr. HUGH SCOTT, Curator in Entomology, Museum of Zoology, Cambridge.

Dr. A. E. SHIPLEY, F.R.S., Master of Christ's College, Cambridge.

Sir STEWART STOCKMAN, Chief Veterinary Officer, Board of Agriculture.

Mr. F. V. THEOBALD, Vice-Principal, South-Eastern Agricultural College, Wye.

Mr. C. WARBURTON, Zoologist to the Royal Agricultural Society of England.

The Chief Entomologist in each of the Self-Governing Dominions is an *ex officio* member of the Committee.

General Secretary.

Mr. A. C. C. PARKINSON (Colonial Office).

Director and Editor.

Dr. GUY A. K. MARSHALL.

Assistant Director.

Mr. S. A. NEAVE.

Head Office.—British Museum (Natural History), Cromwell Road, London, S.W. 7.

Publication Office.—89, Queen's Gate, London, S.W. 7.

CONTENTS.

ORIGINAL ARTICLES.

	PAGE.
ADERS, DR. W. M. Insects injurious to man and stock in Zanzibar.....	391
BEZZI, PROF. M. On the fruit-flies of the genus <i>Dacus</i> (s.l.) occurring in India, Burma, and Ceylon.....	99
BODKIN, G. E., and CLEARE, L. D., Jnr. Notes on some animal parasites in British Guiana.....	179
CAMERON, DR. ALFRED E. Some experiments on the breeding of the mangold fly (<i>Pegomyia</i> <i>hyoscyami</i> , Panz.) and the dock fly (<i>P. bicolor</i> , Wied.).....	87
DISTANT, W. L. On some Rhynchota of economic importance from Colombia.....	381
EDWARDS, F. W. Ten new African <i>Haematopota</i> Notes on Culicidae, with descriptions of new species.....	145 201
FISKE, W. F. Insects injurious to vegetation.....	383
GREEN, E. ERNEST. Observations on some recently described Coccidae..... Remarks on Coccidae from Northern Australia..... Notes on Coccidae occurring in the Seychelles Islands, with descrip- tions of new species	51 53 193
JACKSON, MISS A. C., and LEFROY, PROF. H. M. Some fly poisons for outdoor and hospital use..... (C403) Wt P.7/121. 1,000. 11.17. B.&F.Ltd Gp.11/1.	327 ▲

	PAGE.
JOHNSTON, DR. J. E. L.	
A summary of an entomological survey of Kaduna District, Northern Nigeria	19
LAMBORN, DR. W. A.	
Third report on <i>Glossina</i> investigations in Nyasaland.....	29
LLOYD, LL.	
Report on the investigation into the bionomics of <i>Glossina morsitans</i> in Northern Rhodesia, 1915.....	67
MACDONALD, DR. ANGUS.	
Notes on blood-sucking flies in Grenada.....	259
MACFIE, DR. J. W. SCOTT.	
The limitations of kerosene as a larvicide, with some observations on the cutaneous respiration of mosquito larvae.....	277
Morphological changes observed during the development of the larva of <i>Stegomyia fasciata</i>	297
MACFIE, DR. J. W. SCOTT, and INGRAM, DR. A.	
New Culicine larvae from the Gold Coast.....	1
The domestic mosquitos of Accra.....	161
MACGREGOR, MALCOLM EVAN.	
Resistance of the eggs of <i>Stegomyia fasciata</i> (<i>Aedes calopus</i>) to con- ditions adverse to development.....	81
MARSHALL, DR. GUY A. K.	
A new weevil attacking pine-apples in Jamaica.....	197
MAULIK, S.	
Solubility of the scale of <i>Lepidosaphes ulmi</i> , Linn.	267
NEWSTEAD, PROF. R.	
On the genus <i>Phlebotomus</i> .—Part III.	191
Observations on scale-insects (Coccidae).—III.	343
STANTON, A. T., and HACKER, H. P.	
The <i>Anopheles</i> of Malaya.—III. A new variety of <i>A. albotaeniatus</i> , Theo.....	273
TAYLOR, FRANK H.	
<i>Sarcophaga frogatti</i> , sp. n.—a new sheep-maggot fly	265

CONTENTS.

vii

	PAGE.
THEOBALD, FRED V.	
The Aphid of tea, coffee and cacao (<i>Toxoptera coffeae</i> , Nietner)	337
TURNER, R. E.	
On Mutillidae parasitic on <i>Glossina morsitans</i>	93
TURNER, R. E., and WATERSTON, JAMES.	
A new parasite bred from <i>Glossina morsitans</i> in Nyasaland	133
WATERSTON, JAMES.	
Notes on African Chalcidoidea.—V.	123
Notes on Coccid-infesting Chalcidoidea.—I, II, III.	137, 231, 311
WILLIAMS, C. B.	
Notes on a frog hopper attacking sugar-cane at Marienburg Estate, Surinam	271

MISCELLANEOUS.

Collections received	97, 199, 309, 403
--------------------------------	-------------------

PLATES.

	PAGE.
I. Views in N. Rhodesia, haunts of <i>Glossina morsitans</i>	facing 80
II. Wings of African species of <i>Haematopota</i>	,, 160
III. & IV. Views in Grenada of haunts of blood-sucking flies	,, 264
V. Injurious Rhynchota from Colombia	,, 382
VI. The male of <i>Lecanium hesperidum</i> (Linn.)	,, 380
VII. Pimento trees attacked by scale-insects in Jamaica	,, 380

MAPS.

	PAGE.
I. Map of Accra showing the distribution of mosquitos (1912-1915) in the various blocks into which the town is divided	to face 178
II. Map of Accra showing the samples of mosquito larvae collected in native compounds during the year 1915, distributed according to the various blocks into which the town is divided	,, 178
III. Map of British Guiana revised to 1909	,, 190

ILLUSTRATIONS IN THE TEXT.

	PAGE.
Hollow tree in which were larvae of <i>Stegomyia metallica</i>, <i>S. unilineata</i> and	
<i>Culicomyia nebulosa</i>	3
Details of mosquito larvae :—	
<i>Culex ingrami</i> , Edw.	11
,, <i>insignis</i> , Carter	10
,, <i>pruina</i> , Theo.	8,9
<i>Eumelanomyia inconspicua</i> , Theo.	13
<i>Mimomyia hispida</i> , Theo.	14, 15
<i>Ochlerotatus irritans</i> , Theo.	5
,, <i>sudanensis</i> , Theo.	6
<i>Stegomyia fasciata</i>	298-301, 303, 304
,, <i>metallica</i> , Edw.	2
,, <i>luteocephala</i> , Newst.	4
<i>Uranotaenia alboabdominalis</i> , Theo.	17
,, <i>annulata</i> , Theo.	16
Sketch-map of the country round Kaduna Bridge, Nigeria	20, 25
Details of scale-insects :—	
<i>Akermes andersoni</i> , Newst., sp. n., ♀	348
,, <i>quinquepori</i> , Newst., sp. n., ♀	349
<i>Aspidiotus ansei</i> , Green, sp. n., adult ♀ pygidium	193
,, † <i>camelliae</i> , Sign., pygidium	371
,, <i>erythraspidis</i> , Newst., sp. n., ♀ pygidium	372
,, <i>fimbriatus</i> var. <i>capensis</i> , Newst., nov.	373
,, <i>mauritanus</i> , Newst., sp. n., ♀, larva and puparium	374
,, <i>miniatae</i> , Green, sp. n., ♀ pygidium	53
,, <i>pimentae</i> , Newst., sp. n., ♀ and larval antenna	376
,, <i>subcuticularis</i> , Green, sp. n., ♀ pygidium	54
<i>Asterolecanium hilli</i> , Green, sp. n., ♀	63
<i>Chionaspis capensis</i> , Newst., sp. n., ♀	377
,, <i>distorta</i> , Newst., sp. n., ♀	377
,, <i>fici</i> , Newst., sp. n., ♀	379
<i>Fiorinia acaciae</i> , Mask., ♀, pygidium variations	62
,, <i>maskelli</i> , Brittin, ♀ and nymph	52
<i>Gymnaspis grandis</i> , Green, sp. n., ♀, puparia, nymph and larva	194
<i>Hemichionaspis pseudaspidistrae</i> , Green, ♀ pygidium	58
<i>Lecanium acaciae</i> , Newst., sp. n., ♀	356
,, <i>adersi</i> , Newst., sp. n., ♀	357
,, <i>aequale</i> , Newst., sp. n., ♀	354
,, <i>africanum</i> , Newst., ♀	358
,, <i>cajani</i> , Newst., sp. n., ♀	359

Details of scale-insects:—

	PAGE.
<i>Lecanium chelonoides</i> , Newst., sp. n., ♀, dorsal aspects	370
„ <i>hirsutum</i> , Newst., sp. n., ♀	351
„ <i>hurae</i> , Newst., sp. n., ♀	361
„ <i>pseudotessellatum</i> , Newst., sp. n., ♀	352
„ <i>scutatum</i> , Newst., sp. n., ♀, and larva	365
„ <i>setigerum</i> , Newst., sp. n., ♀	369
„ <i>signatum</i> , Newst., sp. n., ♀	364
„ <i>subhemisphaericum</i> , Newst., sp. n., ♀ antenna	363
„ <i>subhirsutum</i> , Newst., sp. n., ♀	367
„ <i>subpatelliforme</i> , Newst., sp. n., ♀	366
„ <i>wardi</i> , Newst., sp. n., ♀ and larva	353
<i>Lepidosaphes dupontii</i> , Green, sp. n., ♀	195
„ <i>hemichionaspiformis</i> , Green, sp. n., ♂ ♀	60
„ <i>incisor</i> , Green, sp. n., ♀ pygidium	59
<i>Leucaspis japonica</i> var. <i>darwinensis</i> , Green, var. n.	61
<i>Platysissetia carpenteri</i> , Newst., sp. n., ♀	344
„ <i>ferox</i> , Newst., sp. n., ♀	346
<i>Porogymnaspis angulata</i> , Green, sp. n., ♀ and nymph	57
„ <i>rufa</i> , Green, sp. n., ♂ and ♀	56
<i>Sphaerococcus diaspidiformis</i> , Green, sp. n.	64
Early stages of <i>Villa lloydi</i> , Aust.	76
Diagram of section through collapsed eggs of <i>Stegomyia fasciata</i>	81
Eggs of <i>Stegomyia fasciata</i> , collapsed and resistant	84
Breeding cage for the mangold fly	88, 89
<i>Mutilla benefactrix</i> , Turner, sp. n., ♀, 94; ♂	95
<i>Eupelminus tarsatus</i> , wings, ♀, 124; forewing, ♂, 126; thorax	125
<i>Sycophaga cyclostigma</i> , Waterston, sp. n., ♀, hind femur and tibia	128
„ <i>sycomori</i> , L., ♀, hind femur and tibia	128
<i>Colpixys necator</i> , Waterston, sp. n., ♀, metanotum and propodeon	131
<i>Prolaelius glossinae</i> , Turner and Waterston, sp. n., ♀, thorax and head, 133; fore-wing, radius and tarsal claw	134
<i>Diversinervus silvestrii</i> , Waterston, sp. n., ♀, thorax and propodeon, 139; fore-wing	140
<i>Coccophagus acanthosceles</i> , Waterston, sp. n., thorax and abdomen, mandible, mid-leg and radius	141
Heads of:—	
<i>Haematopota crassicus</i> , Edw., sp. n., ♀	150
„ <i>fasciatapex</i> , Edw., sp. n., ♀	147
„ <i>furians</i> , Edw., sp. n., ♀	157
„ <i>mordens</i> , Edw., sp. n., ♀	152
„ <i>nefanda</i> , Edw., sp. n., ♀	153
„ <i>obsoleta</i> , Edw., sp. n., ♀	155
„ <i>palladicornis</i> , Edw., sp. n., ♀	149
„ <i>perturbans</i> , Edw., sp. n., ♀	158
„ <i>pulchella</i> , Edw., sp. n., ♀	146
„ <i>rabida</i> , Edw., sp. n., ♀	156
Chart of rainfall and temperature at Acera during 1915	168
Distribution tables of mosquitos of Acera 163-166, 169, 172, 175-177	
<i>Tabanus desertus</i> , Walk., ♀, pupal aster, 184; imago	187
<i>Diachlorus scutellatus</i> , Mcq., ♀, imago	186
<i>Phlebotomus major</i> var. <i>chinensis</i> , Newst., nov., wings and details	191
<i>Metamasius ritchiei</i> , Mshl., sp. n., ♂, dorsal view and details	197

Male genitalia of:—

	PAGE.
<i>Aedes bulleri</i> , Theo.	222
„ <i>ceylonicus</i> , Edw., sp. n.	222
„ <i>fragilis</i> , Leic.	222
„ <i>leicesteri</i> , Edw., sp. n.	222
„ <i>panayensis</i> , Ludl.	222
„ <i>pseudomediofasciatus</i> , Theo.	222
„ <i>singularis</i> , Leic.	222
„ <i>uncus</i> , Theo.	222
„ <i>varietas</i> , Leic.	222
„ <i>virilis</i> , Leic.	222
„ <i>yerburyi</i> , Edw., sp. n.	222
<i>Aedomyia africana</i> , N.-L.	229
„ <i>catasicta</i> , Knab	229
„ <i>squamipennis</i> , Arr.	229
<i>Armigeres aureolineatus</i> , Leic.	205
„ <i>maiae</i> , Edw., sp. n.	208
„ <i>malayi</i> , Theo.	207
„ <i>obturans</i> , Walk.	206
<i>Skusea amesii</i> , Ludl.	223
„ <i>longirostris</i> , Leic.	223
„ <i>simplex</i> , Theo.	223
<i>Stegomyia albopicta</i> , Skuse	210
„ <i>fraseri</i> , Edw.	210
„ <i>thomsoni</i> , Theo.	210
„ <i>variegata</i> , Dol.	210
<i>Ochlerotatus abnormalis</i> , Theo.	220
„ <i>adersi</i> , Edw., sp. n.	220
„ <i>alboventralis</i> , Theo.	220
„ <i>fryeri</i> , Theo.	220
„ <i>irritans</i> , Theo.	220
„ <i>minutus</i> , Theo.	220
„ <i>nigricephalus</i> , Theo.	220
„ <i>tarsalis</i> , Newst.	220
Scales from comb of the eighth abdominal segment of larvae of <i>Ochlerotatus dorsalis</i> , Mg.; <i>O. nemorosus</i> , Mg.; and <i>O. salinus</i> , Fic.	216
Wings, antennae and mandibles of:—	
<i>Aneristus croconotus</i> , Waterston, sp. n.	235
<i>Cerapterus pattersoni</i> , Waterston, sp. n.	250
<i>Eunotus truncatipennis</i> , Waterston, sp. n.	253
<i>Eusemion cornigerum</i> , Wlk., ♀	315
<i>Coccidozenus coelops</i> , Waterston, sp. n., ♀, head and mandible, 239; wing.	241
„ <i>obscuratus</i> , Waterston, sp. n., ♀, head and mandible, 239; radius of right fore wing	241
<i>Chiloneurus afer</i> , Waterston, sp. n., ♀, head, 244; antenna, 245; right fore wing and left mandible	246
„ <i>cyanonotus</i> , Waterston, sp. n., ♀, head, 244; antenna, 245; radius of right fore wing	246
<i>Eunotus truncatipennis</i> , Wtrst., sp. n., propodeon	257
<i>Lepidosaphes ulmi</i> , L., lower surface	268
Hind legs of <i>Anopheles albotaeniatus</i> , Theo., and <i>A. albotaeniatus</i> var. <i>montanus</i> , Stanton and Hacker, nov.	275
Table of larvicide experiment on <i>Stegomyia fasciata</i>	279

	PAGE.
Diagram of apparatus used in larvicide experiment	290
Larva of <i>Stegomyia fasciata</i> , head, in four stages, 298; labial plate in four stages, 299; four stages of ventral thoracic hook and second abdominal segment, 300; four stages of scales from comb and from pecten, 301; posterior end in first three stages, 303; end in fourth stage	304
<i>Coccidozenus distinguendus</i> , Waterston, sp. n., mandible and details of neuration	311
<i>Aethognathus afer</i> , Silv., var. <i>cavilabris</i> nov., ♀ labrum	313
<i>Eusemion italicum</i> , Masi, ♀, basal half of fore wing	316
<i>Habrolepis apicalis</i> , Waterston, sp. n., ♂, antenna, mandibles, and hind femur	319
<i>Aspidiotiphagus citrinus</i> , Craw, ♀ mandible	320
<i>Eriaporus laticeps</i> , Waterston, sp. n., ♀, mandible, right fore wing and mesonotum	323
<i>Toxoptera coffeae</i> , Nietn., details of ♀, alate and apterous, 329; wings, 340; ornamentation of cuticle	341
Diagrams of relations between plants and insects	388
Chart showing seasonal incidence of Tabanidae in Zanzibar	398

ERRATA.

Page 51, line 11, for	" p. 74 "	read	" p. 721."
" 88, ,, 25, ,,	" <i>Empis tessellata</i> "	"	" <i>Empis tessellata.</i> "
" 97, ,, 24, ,,	" Mr. M. H. Dawe "	"	" Mr. M. T. Dawe."
" 120, ,, 29, ,,	" Prof. Buguion "	"	" Prof. Bugnion."
" 158, ,, 23, ,,	" Dr. J. O. Murphy "	"	" Dr. J. C. Murphy."
" 171, ,, 22, ,,	" <i>O. nigrocephalus</i> "	"	" <i>O. nigricephalus.</i> "
" 182, ,, 36, ,,	" <i>Dicorcelium</i> "	"	" <i>Dicrocoelium.</i> "
" 183, ,, 2, ,,	" <i>Echinorhynchus</i> "	"	" <i>Echinorhynchus.</i> "
" 189, ,, 37, ,,	" <i>domestica</i> "	"	" <i>domesticus.</i> "
" 189, ,, 39, ,,	" <i>Crux</i> "	"	" <i>Crax.</i> "
" 234, ,, 13, ,,	" <i>tosPentelicus</i> "	"	" <i>to Pentelicus.</i> "
" 238, ,, 29, ,,	" <i>Tephrosia vogelii</i> "	"	" <i>Tephrosia vogelii.</i> "
" 262, ,, 36, ,,	" <i>Haemogogus</i> "	"	" <i>Haemagogus.</i> "
" 355, ,, 28, ,,	" <i>Coupida</i> "	"	" <i>Courida.</i> "
" 363, ,, 4, ,,	" <i>silvestrii</i> "	"	" <i>silvestrii.</i> "
" 366, ,, 17, ,,	" <i>Mimusops globosa</i> "	"	" <i>Couroupita guianensis.</i> "
" 400, ,, 16, ,,	" <i>Xenopsylla cheopsi</i> "	"	" <i>Xenopsylla cheopis.</i> "