

BULLETIN  
OF  
ENTOMOLOGICAL RESEARCH

ISSUED BY THE IMPERIAL  
BUREAU OF ENTOMOLOGY.

EDITOR: THE DIRECTOR.

---

VOL. IV.

---

LONDON:

SOLD BY  
DULAU & Co., LTD., 37, SOHO SQUARE, W.  
1913-1914.

# IMPERIAL BUREAU OF ENTOMOLOGY.

## Honorary Committee of Management.

**THE EARL OF CROMER, G.C.B., O.M., G.C.M.G.,** *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. BAGSHAW, Director, Tropical Diseases Bureau.

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.

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. F. H. 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 Zoology, 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. J. A. C. TILLEY, Foreign Office.

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.

Mr. GUY A. K. MARSHALL.

### Assistant Editor.

Mr. W. NORTH.

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

*Publication Office.*—27, Elvaston Place, London, S.W.

# CONTENTS.

## ORIGINAL ARTICLES.

	PAGE.
AUSTEN, ERNEST E.	
New African Tabanidae.—Part IV. ....	283
BALLARD, E.	
A list of the more important insect pests of crops in the Nyasaland Protectorate .....	347
BALLOU, H. A.	
Notes on Insect Pests in Antigua .....	61
CUMMINGS, BRUCE F.	
On some nondescript Anoplura and Mallophaga .....	35
DISTANT, W. L.	
A Bug attacking <i>Sesamum indicum</i> , L. ....	143
DOANE, R. W.	
Disease-bearing Insects in Samoa .....	265
DUDGEON, GERALD C.	
A proposed method of controlling the ravages of leaf-eating caterpillars ..	243
EDWARDS, F. W.	
Further notes on African Culicidae .....	47
New synonymy in Oriental Culicidae .....	221
On the Oriental Culicid genus <i>Leicesteria</i> , Theobald .....	255
FISKE, WILLIAM F.	
The bionomics of <i>Glossina</i> ; a review with hypothetical conclusions .....	95
GOWDEY, C. C.	
A list of Uganda Coccidae and their food-plants .....	247
The Yellow-headed Coffee-Borer ( <i>Dirphya (Nitocris) princeps</i> , Jord.) .....	279
HIRST, STANLEY.	
On three new species of Gamasid mites found on rats. ....	119

(C33) Wt. P.8/63. 1000. 7.14. B.&F.Ltd. Gp.11/1.

	PAGE.
KERSHAW, J. C.	
A new Froghopper from Tobago .....	148
KING, HAROLD H.	
On the bionomics of the Sandflies ( <i>Phlebotomus</i> ) of Tokar, Anglo- Egyptian Sudan .....	88
Note on an entomological store-box suitable for use in the Tropics .....	85
McCONNELL, DR. ROBERT E.	
Some observations on the larva of <i>Auchmeromyia luteola</i> , F. ....	29
MACFIE, DR. J. W. SCOTT.	
The distribution of <i>Glossina</i> in the Ilorin Province of Northern Nigeria ...	1
On a new African species of Coccidae .....	31
A note on the action of common salt on the larvae of <i>Stegomyia fasciata</i> ...	389
MOISER, DR. BERNARD.	
Notes on a few photographs illustrating the haunts and habits of <i>Glossina</i> <i>tachinoides</i> in Bornu, Northern Nigeria .....	145
NEWSTEAD PROF. R.	
Notes on Scale-Insects (Coccidae).—Part I. ....	67
Notes on Scale-Insects (Coccidae).—Part II. ....	301
PEACOCK, A. D.	
Entomological pests and problems of Southern Nigeria .....	191
ROTHSCHILD, HON. N. CHARLES.	
The Tropical Bed-Bug, <i>Clinocoris hemiptera</i> , Fabr. ....	345
SHIRCORE, DR. J. O.	
On two varieties of <i>Glossina morsitans</i> from Nyasaland .....	89
SIMPSON, DR. JAS. J.	
Entomological research in British West Africa—IV. Sierra Leone .....	151
STANTON, A. T.	
The <i>Anopheles</i> of Malaya.—Part I. ....	129
STRICKLAND, C,	
The <i>Myzorhynchus</i> group of Anopheline mosquitos in Malaya.....	135
THROBALD, FRED. V.	
African Aphididae .....	318
TOWNSEND, CHARLES H. T.	
Progress in the study of <i>Verruga</i> transmission by bloodsuckers .....	125

CONTENTS.

vii

	PAGE.
TRÄGÅRDH, IVAR.	
On the chemotropism of insects and its significance for Economic Entomology.....	113
WATERHOUSE, CHARLES O.	
On a new species of Mymaridae from Trinidad .....	87
WOOSNAM, R. B.	
Report on a search for <i>Glossina</i> on the Amala (Engabei) River, Southern Masai Reserve, East Africa Protectorate .....	271

---

MISCELLANEOUS.

Collections received .....	91, 147, 251, 353
----------------------------	-------------------

## PLATES.

---

	PAGE.
I. to VI.	Views of N. Nigeria ..... <i>to face</i> 28
VII.	<i>Glossina palpalis</i> , R.D., var. .... ,, 28
VIII. & XII.	Lime trees in Antigua ..... ,, 65
X. to XII.	Haunts of <i>Phlebotomus</i> in the Peruvian Andes .... ,, 128
XIII. to XVII.	Haunts of <i>Glossina tachinoides</i> in Bornu ..... ,, 145
XVIII. to XXII.	Views in Sierra Leone ..... ,, 190
XXIII. to XXVIII.	Insect Pests of S. Nigeria ..... ,, 220
XXIX & XXX.	Breeding places of <i>Stegomyia</i> in Samoa ..... ,, 269
XXXI.	Breeding place of <i>Finlaya kochi</i> in Samoa ..... ,, 269
XXXII.	Breeding places of <i>Stegomyia</i> in S. Nigeria ..... ,, 344

## MAPS.

---

	PAGE.
Sketch-map showing distribution of Tsetse-Flies in Ilorin Province, N. Nigeria .....	<i>to face</i> 28
Map of Sierra Leone showing distribution of <i>Glossina</i> and Sleeping Sickness .....	,, 190
Sketch-map showing distribution of <i>Glossina fusca</i> near Amala River, British E. Africa .....	,, 278

## ILLUSTRATIONS IN THE TEXT.

	PAGE.
Curves showing rainfall in Ilorin Province .. .. .	4
Umoru, a Fulani of Yola, native collector .. .. .	5
Sketch-map of Oyun River showing point at which Tsetse-Flies were taken ..	7
Plan of Offa showing Tsetse-haunt .. .. .	12
Sketch-map showing distribution of Fulani cattle in Ilorin Province .. ..	16
<i>Ceronema africana</i> , Macfie ; females with ovisacs <i>in situ</i> .. .. .	31
"    "    ♀—derm-cells, glands, spines, antenna, tarsus and anal lobes ; ♂ puparium .. .. .	32
"    "    larva—antenna, stigmal spines, spinnerets, anal segment and caudal setae .. .. .	33
<i>Limnognathus limnotraqi</i> , Cummings, ♀ .. .. .	36
" <i>caviae-capensis</i> (Pallas) ♀, 38 ; ♂ .. .. .	39
<i>Trimenopon echinoderma</i> , Cummings, ♀ .. .. .	40
<i>Laemobothrium opisthocomi</i> , Cummings, ♂ ; head, pronotum and terminal segments of ♀ .. .. .	42
<i>Mansonioides uniformis</i> (Theo.), hypopygium .. .. .	51
" <i>africanus</i> (Theo.), hypopygium .. .. .	52
<i>Culex pipiens</i> , L., harpes and harpagones .. .. .	54
" <i>fatigans</i> , Wied., harpes and harpagones .. .. .	55
" <i>pallidocephalus</i> , Theo., hypopygium .. .. .	56
" <i>mirificus</i> , Edw., hypopygium .. .. .	57
<i>Icerya longisetosa</i> , Newst. .. .. .	68
<i>Dactylopius obtusus</i> , Newst., with cephalic portion of adult ♀ .. .. .	69
<i>Stictococcus gowdeyi</i> , Newst., 70 ; spines of ♂ & ♀ larvae .. .. .	71
<i>Ceroplastes coniformis</i> , Newst., 72 ; antenna and leg of adult ♀ .. .. .	73
<i>Lecanium filamentosum</i> , Newst., integument and antenna of ♀ .. .. .	75
<i>Aspidiotus gowdeyi</i> , Newst., pygidium and squamae .. .. .	77
<i>Gymnaspis africana</i> , Newst. ; adult ♀ showing fringe of pygidium .. .. .	78
<i>Chionaspis unilateralis</i> , Newst. ; young adult ♀ showing tubercles, spinnerets, pygidium and rudimentary antenna .. .. .	80
<i>Anagrus flaveolus</i> , Waterh. .. .. .	87
<i>Dermanyssus (Liponyssoides) muris</i> , Hirst ; dorsal view of ♀ .. .. .	120
"    "    "    "    ♂ ; tarsi of third and fourth legs, chelicera .. .. .	121
<i>Laelaps echidninus</i> , Berlese, ♀ ; ventral view .. .. .	123
"    "    "    ♀ ; side view of chelicera .. .. .	124
<i>Anopheles tessellatus</i> , Theo. ; egg and newly hatched larva, 131 ; head and thorax of mature larva, inner anterior clypeal hair, palmate hair of sixth abdominal segment and leaflet of same .. .. .	132

	PAGE.
Sketch-map of S. Nigeria, showing itinerary .. .. .	191
Net for collecting Red Cotton Stainers .. .. .	195
Male genitalia of :—	
<i>Leicesteria flava</i> .. .. .	258
,, <i>magna</i> .. .. .	259
,, <i>cingulata</i> .. .. .	260
,, <i>longipalpis</i> .. .. .	260
,, <i>pendula</i> .. .. .	261
,, <i>digitata</i> .. .. .	262
,, <i>pectinata</i> .. .. .	263
<i>Dirphya princeps</i> , Jord. .. .. .	279
<i>Chrysops pallidula</i> , Austen, ♀ .. .. .	284
<i>Haematopota hastata</i> , Aust., ♀ .. .. .	286
,, <i>maculosifacies</i> , Aust., ♀ .. .. .	292
,, <i>ingluviosa</i> , Aust., ♀ .. .. .	294
,, <i>nigripennis</i> , Aust., ♀ .. .. .	298
<i>Icerya maxima</i> , Newst., ♀♀ .. .. .	301
,, ,, antennae and spinneret .. .. .	302
<i>Aspidoproctus giganteus</i> , Newst., ♀ antenna, mentum, glands and spine .. .. .	303
<i>Pulvinaria jacksoni</i> , Newst., ♀♀ and puparia of ♂♂ .. .. .	303
<i>Aspidiotus (Pseudaonidia) baïkeae</i> , Newst., adult ♀; fringe of pygidium of ♀; parasitised ♀ .. .. .	308
Pygidium of adult ♀ of: <i>Aspidiotus (Pseudaonidia) fossor</i> , Newst.;	
<i>A. tesseratus</i> , de Charmoy .. .. .	309
<i>Chionaspis funtumiae</i> , Newst., pygidium of adult ♀ .. .. .	311
Head and antenna, cornicle, cauda, hairs &c. of :—	
<i>Macrosiphum lophospermum</i> , Theo. .. .. .	314
,, <i>lycopersicella</i> , Theo. .. .. .	316
,, <i>neavei</i> , Theo. .. .. .	317
<i>Macrosiphoniella bedfordi</i> , Theo. . . . .	319
<i>Aphis gossypii</i> , Glov. .. .. .	322
,, <i>tavaresi</i> , Del Guercio .. .. .	323
,, <i>solanella</i> , Theo., 325; abdomen of a late ♀ .. .. .	326
,, <i>ligustriella</i> , Theo. .. .. .	327
,, <i>nigripes</i> , Theo. .. .. .	328
,, <i>africana</i> , Theo. .. .. .	330
<i>Toxoptera theobromae</i> , Schout. .. .. .	332
,, <i>aurantii</i> , Boyer .. .. .	332 & 333
,, <i>graminum</i> , Rond. .. .. .	333
<i>Dryaphis persicae</i> , Chol. .. .. .	335
<i>Lachniella thujafolia</i> , Theo. .. .. .	336
Fore wing of <i>Toxoptera theobromae</i> , <i>Aphis tavaresi</i> , and <i>Dryaphis persicae</i> .. .. .	334