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## PREFACE.

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It is an old remark that every book has many authors; it is one that is exceedingly applicable to 'The Zoologist,' and we congratulate our contributors on the volume they have produced for 1897.

Our pages in the record of observations may be said to exhibit the essence of co-operation, for our contributors do not only write about animals, but absolutely seem to live and work with them. This is the aim and ideal of 'The Zoologist.' We do not propose to merely interpret, but really to reveal the secrets and the polity of the animal life that is around us.

The present volume contains much of great interest in British Ornithology. We have recorded the undoubted occurrence of *Hypolais polyglotta* in Sussex; articles have appeared on the capture of Pallas's Willow Warbler, *Phylloscopus proregulus*, in Norfolk towards the end of last year, while from Cambridgeshire was announced the acquisition of an Albatross, *Diomedea melanophrys*, and a recent communication shows that little doubt can be entertained that a specimen of the Mediterranean Herring Gull, *Larus cachinnans*, was shot in Norfolk in 1886. Ornithology has again held the place in our Magazine which it has so long done, and 'The Zoologist' appears to be still considered the recognised and suitable vehicle for avian observations.

The Order Pisces has received increased attention, and in British Zoology the very fact of our sea-girt realm should give

to the study of Fishes a peculiar significance and interest. We trust this study may extend to other marine animals, and that sea-shore naturalists may seek more publicity.

There are still many neglected orders of British Animals which we hope to see receiving more attention in our pages. Earthworms have come to the front in the present volume, and there is a probability of Crustacea affording some material during the ensuing year. The Insecta have their own special Magazines, with which we have no desire to compete, but the *natural history of insects* cannot, and will not, be considered as a foreign subject to the aim and scope of 'The Zoologist.' The annals of Early Man in Britain have been commenced, and will be continued, while we confidently believe that the subject will increase in interest and detail.

We must also refer to the valuable contributions we have received to the Zoology of South Africa, Australia, the West Indies, and British India, and our expectations are that the "Foreign Intelligence" will suffer no diminution in the future.

In conclusion, the Editor, in acknowledging his obligations to the contributors, very heartily offers both them and the readers all the compliments of the season, with the best zoological wishes for the new year.



# CONTENTS.

## ALPHABETICAL LIST OF CONTRIBUTORS.

- ALDERSON, H.**  
Wonderful egg-producing powers of the Wryneck, 511
- APLIN, O. V., F.L.S., M.B.O.U.**  
The autumn song of birds, 410;  
Nesting of the Great Northern and Black-throated Divers in Shetland, 425; Stridulation of Cicadidæ and Orthoptera, 432
- BANKES, A.**  
Egg-producing powers of the common Redshank, 575
- BARRINGTON, R. M., LL.D., F.L.S.**  
Mealy Redpoll off coast of Kerry, 513; Supposed occurrence of a Great Spotted Cuckoo in Co. Kerry, 574
- BARTLETT, EDWARD**  
Obituary notice of Abraham Dee Bartlett, 267
- BAYLIS, E.**  
Honey Buzzard in Staffordshire, 232
- BEAN, TARLETON H., M.D.**  
A gigantic Lobster, 276
- BIRD, Rev. M. C. H., M.A.**  
Ornithological folk-lore, 144
- BONHOPE, J. LEWIS**  
Breeding of Corncrakes in confinement, 35
- BRABROOK, E. W., C.B., F.S.A.**  
Man in Zoology, 13
- BRADSHAW, GEORGE W.**  
Rare birds at Hastings, 86;  
Swallow-tailed Kite in Suffolk, 363; Common Roller in Sussex, 469
- BROWN, J. A. HARVIE, F.R.S.E.**  
The migration of birds, 505
- BURR, MALCOLM, F.Z.S.**  
The stridulation of Orthoptera, 516
- BUTLER, A. G., Ph.D., F.L.S., F.Z.S.**  
Flight of the Swift, 36; Foreign Finches in confinement, 251;  
Inherited instinct in birds, 275;  
Change of Plumage in the American Nonpareil Finch, 335;  
Inherited habit in birds, 367
- BUTLER, Lieut.-Col. E. A.**  
Honey Buzzard in Suffolk, 425
- BUTTERFIELD, W. C. J. RUSKIN**  
The Serotine near Hastings, 141;  
Bank Vole in Jersey, 141;  
Swallow-tailed Kite in Suffolk, 270; Occurrence of the Black-headed Bunting in Sussex, 273;  
"The seasonal changes in the Common Squirrel," 424; *Hypolais polyglotta* in Sussex, 513
- BUTTRESS, BERNARD A. E.**  
A list of birds observed in Shetland, May and June, 1897, 360;  
Black-throated Diver breeding in Shetland, 364; Curlew laying five eggs, 364; Nesting of the Great Northern and Black-throated Divers in Shetland, 509
- CALVERT, R. U.**  
Spotted Flycatcher's nest constructed in nest of Hawfinch, 426; Proximity of Magpie's and Wood Pigeon's nests, 427; Sparrowhawk nesting in Thorn-tree, 508; Nesting of the Great Plover, 511; Do Cuckoos suck eggs? 513
- CHAPMAN, FRANK M.**  
Mammals of Trinidad, 424
- CLARKE, W. J.**  
Little Auks and Little Gulls at Scarborough, 166; Red-legged Partridge migrating, 166; Notes from Scarborough, 578
- CLARKE, W. G.**  
Stone Curlews as observed around Thetford, 248; Curious nests and nesting sites observed near Thetford, 449; The inland breed-

- ing of the Ringed Plover in Norfolk and Suffolk, 502
- COBURN, F.  
Chocolate-coloured variety of *Perdix cinerea*, corrections, 36;  
Red-legged Partridge migrating, 233
- COCKS, A. HENEAGE, M.A., F.Z.S.  
Pine Marten in Ireland, 269
- CONGREVE, F. L.  
Noddy Tern in Cheshire, 510
- COOMBE, PERCY E.  
Common Seal in the River Arun, Sussex, 571
- CORBIN, G. B.  
White eggs of Hedgesparrow, 427;  
Crossbills near Bournemouth, 428; Smooth Snake (*Coronella lævis*) in the New Forest, 431
- CORDEAUX, JOHN, F.R.G.S., M.B.O.U.  
Notes from Norway, 22; Migration at the Spurn lighthouse in 1896, 245; Nesting of the Grey Wagtail in Lincolnshire, 274, 336; Nightingale near Scarborough, 332
- COWARD, T. A.  
Lesser Shrew in Cheshire, 231;  
Habitat of *Ametrida minor*, 326;  
Lesser Shrew in Anglesea, 326
- DAHL, KNUT  
Biological notes on North Australian Mammalia, 189
- DALLAS, C.  
*Dermestes lardarius* eating specimens of moths,—non-poisonous preservatives, 433
- DAVENPORT, H. S.  
Honey Buzzard in Staffordshire, 328; Nesting of the Grey Wagtail in Leicestershire, 336;  
Habits of the Lesser Spotted Woodpecker, 470; Popular ornithological fallacies, 473
- DAVISON, ROBERT ROBINSON  
Yellow Wagtail in Argyllshire, 167
- DISTANT, W. L.  
Editorial Address, 1; Notes on the *Chaema Baboon*, 29; Early Man in Britain, 33; Abundance of Sharks in tropical seas, 36; Breeding of the South African Galago in confinement, 83; A proposed explanation as to the appearance of light- and dark-coloured butterflies during the day, 88; Zoological rambles in and around the Transvaal, 157;
- Carnivora which attack Toads and Frogs, 339; The Scutellated Star-fish, 340; Strange occurrence at Durban, 369; Spider *versus* Wasp, 476; Stridulation and habits of *Cicadidæ*, 520
- DIXON, CHARLES  
The alleged summer appearance of the Shore Lark in Devonshire, 471
- DOBIE, W. HENRY  
Landrail in Chester in December, 86
- DRESSER, H. E., F.L.S., F.Z.S.  
Recent additions to the British Avifauna, 5; Heinrich Gütke, 139; Osprey in Dorset, 508
- ELLIOTT, J. STEELE  
Long-eared Bats and their food, 231; Honey Buzzard in Staffordshire, 271; Daubenton's Bat in Bedfordshire, 326; Black Rat in Bedfordshire, 328; Black Terns in Warwickshire, 330; White Wagtails in Warwickshire, 337
- EVANS, H. W.  
Apparent summer appearance of the Shore Lark in Devonshire, 365, 574
- FARMAN, LAST C.  
Amongst the birds in Norfolk, 168; Twenty years on the Norfolk fens, 351, 428
- FARN, A. B.  
Capture of a Common Bittern at Darent Wood, near Dartford, 86
- FEILDEN, Col. H. W., C.M.Z.S.  
Food of the Knot, 232
- FITCH, EDWARD A., F.L.S.  
Long-eared Owl breeding in Essex, 232; Large Tunny on the Essex coast, 579
- FLEMYNG, Rev. WILLIAM W., M.A.  
Marten in Co. Waterford, 141; Green Sandpiper in Co. Waterford, 143; Pine Marten in Co. Waterford, 327; Nest of the Reed Bunting, 336
- FOX, W. STORRS  
The Question of ornithological fallacies, 514
- FRIEND, Rev. HILDERIC  
The dorsal pores of Earthworms, 149; Earthworm studies, 258, 304, 453; A new British Worm, 349

- FROHAWK, F. W., M.B.O.U.  
Lesser Grey Shrike (*Lanius minor*)  
in Kent, 427
- GROFREY, ROBERT  
Willow Wren singing in autumn,  
513; Hours at which some birds  
sing, 576
- GRABHAM, OXLEY, M.A.  
Vultures and the Tower of Silence,  
143; Birds feeding on the larvæ  
of the Magpie-moth, 236; Black-  
bird stealing eggs, 330; Frog  
attacked by Weasel, and Toad  
by Hedgehog, 369; Taxidermy  
—de omnibus rebus, 412; Eggs  
of the Roseate Tern, 510; Der-  
mestelardarius eating specimens  
of moths, 521; Trapping Shrews  
and Voles, 571; Egg-producing  
powers of the Dipper, 575
- GURNEY, J. H., F.L.S., F.Z.S.  
Ornithological record for Norfolk  
for 1896, 121; Cuckoos sucking  
eggs, 568
- GYNGELL, W.  
Common Swift roosting in tree,  
468
- HAIGH, G. H. CATON  
Grey Seal in Carnarvonshire, 141;  
Common Rorqual on Lincoln-  
shire coast, 142; Alpine Pipit in  
Carnarvonshire, 366
- HAMMOND, W. OXENDEN  
Alleged nesting of Montagu's Har-  
rier in Kent, 363; Note on flight  
of Green Sandpiper, 573
- HARTING, J. E., F.L.S., F.Z.S.  
Dogs of draught in Belgium, 33
- HEADLEY, ALEC GOLDNEY  
Distribution of worm-eating Slugs,  
89
- HORSBRUGH, CHARLES BETHUNE  
Hedgesparrow appropriating a  
Thrush's nest, 427; "Kentish  
Crow," 428; Local name of the  
Sheldrake, 508; Popular fallacy  
concerning the Cuckoo, 512
- KELSALL, Rev. J. E.  
Aquatic Warbler in Hampshire,  
471; Smooth Snake in the New  
Forest, 475
- KERMODE, P. M. C.  
Large Holibut at Isle of Man, 235;  
The Porbeagle in Manx waters,  
579
- LANGDALE, Rev. H. MARMADUKE,  
Hawfinches in West Sussex, 365;  
Quails in Sussex, 366; Strange  
pairing of Butterflies, 521;  
Heron choked by a Frog, 572
- LEWIS, A. L., F.C.A.  
Neolithic life in Devon and Corn-  
wall, 49; Peculiar nesting habit  
of the House Sparrow, 273
- LEWIS, STANLEY  
Black-winged Stilt in Somerset, 511
- LUBBOCK, Sir JOHN, Bart., M.P.,  
F.R.S.  
On the preservation of our indi-  
genous fauna and flora, 264
- MCLACHLAN, R., F.R.S.  
A second brood of Starlings, 334
- MACPHERSON, Rev. H. A., M.A.  
Eared Grebe in Cumberland, 83;  
The Germon in British waters,  
580
- MARSHALL, GUY A. K., F.E.S.  
Stridulation of Cicadidæ in Ma-  
shunuland, 517
- MARTIN, BASIL W.  
Birds seen in the Yukon District of  
Canada, 430
- MASON, PHILIP B., Dr., F.L.S.  
Strange discovery of a Tit's nest,  
167
- MATHEW, Rev. MURRAY A., M.A.  
Icterine Warbler at Lyme Regis,  
332; Garden lists of birds, 417
- MEIKLEJOHN, A. H.  
Toad attacked by a Weasel, 339;  
Summer appearance of Wild  
Geese in Fifeshire, 363
- MORLEY, JOHN  
Golden Eagle in Ross-shire, 425
- MURIE, Dr. JAMES, F.L.S., F.Z.S.  
Our Economic Sea-fishes, 389
- NEWSTEAD, R., F.E.S.  
On the position of the Lesser  
Horse-shoe Bat (*Rhinolophus hip-  
posideros*, Bechst.) during hiber-  
nation, 537
- NICHOLSON, F. G.  
Egg of South African Golden  
Cuckoo in nest of Cape Wagtail,  
142
- NORGATE, FRANK  
Human bones at Bromehill, 164
- NUNN, H.  
Occurrence of a rare Plover (*Cha-  
ratrius dominicus*) on the River  
Thames, 330
- OLDHAM, CHARLES  
Daubenton's Bat on the Derby-  
shire and Staffordshire border,  
326; Bank Vole in Denbighshire,  
328; Scaup inland in Lancashire,  
b 2

- 329; Night Heron in Derbyshire, 329; Black Tern in Anglesea, 329; Black-throated Diver in Derbyshire, 426; Lesser Shrew in Devon, 467
- OVERTON, E. P.  
Little Gull and Red-necked Phalarope in Sussex, 468
- PAGE, W. T.  
The Magpie-moth eaten by birds, 169; Avicultural notes, 338
- PATTERSON ARTHUR  
Occurrence of the Cuckoo Ray at Great Yarmouth, 235; Bull-dog variety of the Sapphirine Gurnard at Great Yarmouth, 275; Notes from Great Yarmouth, 339; Meristic variation in the Edible Crab, 303; The Marine and Fresh-water Fishes of Great Yarmouth, its neighbouring coasts, rivers, and Broads, 539
- PENTLAND, G. H.  
Stock-Dove in Ireland, 88
- PLAYNE, HERBERT C.  
Ornithological notes from Corsica, 254; Memory for locality in a Nightjar, 330; A walk across Lapland, 498
- POCOCK, R. I.  
Trapping Shrews and Voles, 507
- POTTER, E. G.  
Breeding of the Roseate Tern in Britain, 165; The eggs of the Roseate Tern, 467
- QUINTIN, W. H. ST., F.Z.S.  
Unusual sites chosen by birds for their nests, 430
- RALFE, P.  
On Manx bird-names, 71; Ornithological folk-lore, 168
- RAMSBOTHAM, W.  
Wasp, Tipula, and Spider, 475
- READ, ROBERT H.  
Birds nesting in August, 430
- RENDALL, PERCY, M.D., F.Z.S.  
Natural History notes from the West Indies, 341; Field notes on some West Indian birds, 444; Stridulation of Cicadidæ, 520
- RENSHAW, GRAHAM  
Change of plumage in the Nonpareil Finch, 273
- RIVIERE, BERNARD B.  
Arrival of summer migrants in Gloucestershire, 274; Unusual position for the eggs of the Starling, Song Thrush, and Sparrow, 334; Hours at which some birds commence to sing, 472; Roosting of the Swift, 511; Strange nesting habits of Nuthatch and Starling, 514; Egg-producing powers of birds, 575
- ROBERTS, T. VAUGHAN  
Survival of the Kingfisher, 469
- ROPE, G. T.  
Early Snails, 236; Enemies of the Toad, 432
- SALTER, J. H.  
Ornithological notes from the Rhine, 61
- SCHONLAND, S., Ph.D., F.L.S.  
Notes on the Chacma Baboon and the Maanhaar Jackal, &c., 155
- SCHREINER, S. C. CRONWRIGHT  
The Ostrich, 97
- SCLATER, P. L., M.A., Ph.D., F.R.S.  
On the distribution of Marine Mammalia, 217
- SCOTT, Rev. S. G.  
Aquatic Warbler in Hampshire, 471
- SEVERIN, G.  
Musée Royal d'Histoire Naturelle de Belgique, 80
- SICH, H. L.  
Polydactylism in the Horse, 270
- SMITH, G. W.  
Winter notes from Winchester Water-meads, 34; Yellow-billed Cuckoo in the Isle of Wight, 142; The Ostrich, 167; Albino Badger in Hants, 327; Notes from Mid-Hants, spring and summer, 1897, 460; Note on Pied and Grey Wagtails in the Itchen Valley, 513
- SOUTHWELL, THOMAS, F.Z.S.  
On the occurrence of Pallas's Willow Warbler in Norfolk, 8; Notes on the Seal and Whale fishery, 1896, 56, 142; Fen *versus* Marsh, 437; Thresher Shark and Angel-fish at Lowestoft, 475; An unrecorded Norfolk Great Bustard, 572; Occurrence of the Mediterranean Herring Gull (*Larus cachinnans*) in Norfolk, 572
- STEAD, DAVID G.  
The Australian "Rock-Lizard," 233



- STEBBING, Rev. T. R. R., M.A.,  
F.R.S., F.L.S.  
From Buffon to Darwin, 312
- STRICKLAND, T. A. GERALD, F.E.S.  
Frog attacked by a Rat, 169
- SUTTON, JAMES  
Asterias tessellata, or Scutellated  
Star-fish, 170; The Common  
Cockroach, 370
- TEESDALE, JOHN H.  
Montagu's Harrier breeding in  
Ireland, 467
- TICEHURST, A. F.  
Breeding of the Common Snipe  
in Romney Marsh, 271; Rare  
Warblers in Sussex, 333
- TUCK, Rev. JULIAN G., M.A.  
White Wagtail nesting in Suffolk,  
233; Strange occurrence of an  
Albatross in Cambridgeshire,  
363; Cuckoo's egg in nest of  
Song Thrush, 364; Garden lists  
of birds, 474; Fork-tailed Petrel  
in E. Suffolk, 509; Green Wood-  
pecker boring in November,  
573
- WALKER, J. J., R.N., F.L.S.  
A flying visit to Dirk Hartog and  
the Houtman's Abrolhos Islands,  
Western Australia, 293
- WARREN, ROBERT  
Fulmar and Surf Scoter in Cos.  
Sligo and Mayo, 84; Unusually  
large numbers of Pintails in Co.  
Mayo, 143; On the breeding  
range of the Yellow Wagtail in  
Ireland, 346
- WATT, HUGH BOYD  
Local name of the Sheldrake, 571
- WHITAKER, F.  
Little Owl near Newark-on-Trent,  
329; Variety of Grasshopper  
Warbler, 333; Red-backed Shrike  
near Rainworth, 334
- WITLOCK, F. B.  
The breeding habits of the Purple  
Heron, 407
- WILLIAMS, E.  
Hybrids in St. Stephen's Green  
Park, Dublin, 329
- WILSON, WILLIAM  
An unfortunate Cuckoo, 272; Young  
Cuckoo in nest of Twite, 365;  
Appearance of migrants in Aber-  
deenshire during 1896 and 1897,  
366
- WITCHELL, CHARLES A.  
The voices of the Blackbird and  
the Nightingale compared, 331;  
Variations of habit in the Blue  
Titmouse, 333; The song of the  
Greenfinch, 335; The autumn  
song of birds, 358, 471; The Dic-  
tionary of British Bird-song, 578
- WOLLASTON, A.  
A walk across Lapland, 498
- WOOD, Surg.-Capt. HENRY S.  
Description of, and Natural His-  
tory notes on, the Burmese  
Wild Bull, 489
- YOUNG, JOHN  
The Wood-Pigeons in the London  
Parks, 87; Rooks in the West  
End of London, 87

## NEW SPECIES OF BRITISH ANIMALS DESCRIBED IN THIS VOLUME.

## VERMES.

- Enchytræus parvulus*, Friend (Staffordshire) . . . Page 349
- Allolobophora constricta*, Rosa,  
var. *geminata*, Friend (Antrim) . . . . . ,, 459



## ALPHABETICAL LIST OF SUBJECTS.

- Abramis blicca, 561; brama, 561  
 Acanthias vulgaris, 565  
 Acerina vulgaris, 544  
 Acipenser sturio, 564  
 Actitis macularia, 448  
 Address, Editorial, 1  
 African Lake Fauna, 148, 187  
 Agonus cataphractus, 546  
 Agyrtia niveipectus, 446  
 Akodon uriclii, 344  
 Alaska, Natural History notes from, 243  
 Albatross in Cambridgeshire, 363  
 Albino Badger in Hants, 327; Sparrow, 578; Turbot, 339  
 Allobophora arborea, 458; boeckii, 458; chlorotica, 458; constricta, 459, — var. geminata, 459; eiseni, 458; fetida, 458; georgii, 458; hibernica, 458; mammalis, 458; profuga, 457; rosea, 458; subrubicunda, 458; terrestris, 457; trapezoides, 457; turgida, 457  
 Allurus, macrurus, 459; tetradrus, 459, — var. flavus, 459; tetragonurus, 459  
 Alopecias vulpes, 475, 565, 579  
 Amazilia tobaci, 446  
 Ametrida minor, habitat, 326  
 Ammodytes lanceolatus, 555; tobianus, 555  
 Amphibolurus barbatus, 299  
 Anarhichas, lupus, 551  
 Angel-fish at Lowestoft, 475  
 Anguilla latirostris, 563; vulgaris, 562  
 Animal life, deep-sea, in past epochs, 184; pests in British Columbia, 527, — in United States, 530  
 Animals, circular movement in, 146; acclimatization, at Rushmore, 242; and plants, winter life, in United States, 242; influence of darkness on, 488  
 Ant-eater breeding in captivity, 95  
 Aramides cajanea, 447  
 Aretatlantis, the North Atlantic Sea region, 222  
 Arctic expedition, Natural History plans, 291  
 Artirenia, the North Pacific Sea-region, 224  
 Ardea cinerea, 408; purpurea, 407  
 Asterias tessellata, alleged occurrence in Durham, 170, 340  
 Atherina presbyter, 552  
 Atlas Mountains fauna to be investigated, 187  
 Auk, Great, sales of eggs, 241, 382; remains found in Co. Waterford, 383; existing remains, 533; Little, at Scarborough, 166  
 Australia, North, Mammalia of, 189; Western, flying visit to Dirk Hartog and the Houtman's Abrolhos Islands, 293  
 Australian fossils in precious opal, 488  
 Auxis rochei, 547  
 Avicultural Magazine, 385; notes, 338  
 Aviculture, 535  
 Avifauna, British, recent additions, 5  
 Baboon, Chacma, 29; and Maanhaar Jackal, 155; female, menstruation, 32  
 Badger, albino, in Hants, 327  
 Barbel in Great Ouse, 534  
 Bat, Daubenton's, on Derbyshire and Staffordshire border, 326, — in Bedfordshire, 326; Lesser Horse-shoe, position during hibernation, 537; Long-eared, food, 231; Serotine, near Hastings, 141  
 Batrachians and Reptiles of Celebes, 184  
 Bats, Fruit, of Philippine Islands, 44; of Ireland, list and range, 184  
 Bear, Black, breeding in captivity, 185  
 Bedfordshire Vertebrate Fauna, 486  
 Behring Sea Seal Fisheries, 96  
 Bellona ornata, 446  
 Belone vulgaris, 559  
 Bettongia lesueurii, 210  
 Biological stations, fresh-water, 187  
 Bird-names, Manx, 71, 144  
 Birds, rare, at Hastings, 86; extinct, of Chatham Island, 145; amongst the, in Norfolk, 168; eating Magpie-moth, 169, 236; insectivorous, destroyed, in Eastern S. Africa, 243; inherited instinct in, 275, 367; autumn song, 358, 410, 471;

- of Galapagos Islands, 290; observed in Shetland, 360; colour-variation in, 383; garden lists of, 417, 474; unusual sites for nests of, 430; seen in Yukon District of Canada, 430; West Indian, 444; hours at which some commence to sing, 472, 576; migration of, 245, 505; egg-producing powers of, 511, 574, 575; directive coloration in, 531; British, Manual of, 532,—Dictionary of Call-notes, 535, 578
- Birds' tongues in pictures, 533
- Birds nesting in August, 430
- Bittern, Common, in Darenth Wood, near Dartford, 86
- Blackbird stealing eggs, 330; and Nightingale, voices compared, 331
- Bones, human, at Bromehill, 164
- BOOKS NOTICED :—
- Red Deer, by the Rev. H. A. Macpherson Cameron, of Lochiel, Viscount Ebrington, and A. T. Shand, 37
- Oceanic Ichthyology, a Treatise on the Deep Sea and Pelagic Fishes of the World, by G. B. Goode and Tarleton H. Bean, 40
- Coloured Figures of the Eggs of British Birds, with Descriptive Notices, by H. Seebohm, edited by Dr. R. Bowdler Sharpe, 41
- By the Deep Sea, a popular Introduction to the Wild Life of the British Shores, by E. Step, 42
- The Collector's Manual of British Land and Freshwater Shells, by L. E. Adams, 43
- A Handbook to the Game-birds, by W. R. Ogilvie Grant, 90
- Sixteenth Annual Report of the United States Geological Survey. The Dinosaurs of North America, by Prof. O. C. Marsh, 92
- The Fauna of British India, Ceylon and Burma,—Moths, by Sir G. F. Hampson, Bart., 93
- Zoologisches Adressbuch, published by R. Friedlander & Sohn, 94
- Ethnology, by A. H. Keane, 171
- The Present Evolution of Man, by G. Archdall Reid, 173
- Journal of the Right Hon. Sir Joseph Banks, Bart., 175
- A Sketch of the Natural History of Australia, by Frederick G. Aflalo, 176
- The Fishes of North and Middle America,—a Catalogue of the Species of Fish-like Vertebrates found in the waters of North America, north of the Isthmus of Panama, by D. S. Jordan and B. W. Evermann, 178
- The Migration of Birds,—a Consideration of Herr Gütke's Views, by F. B. Whitlock, 179
- Report of Observations on Injurious Insects and Common Farm Pests during the year 1896, by Eleanor A. Ormerod, 180
- Das Tierreich, Aves (Podargidæ, Caprimulgidæ, and Macropterygidæ), by Ernst Hartert, 181
- Man and Woman,—a Study of Human Secondary Characters, by Havelock Ellis, 237
- Society for the Protection of Birds,—Educational Series, edited by H. E. Dresser, 238
- A Handbook to the Order Lepidoptera, by W. F. Kirby, 239
- Problems of Nature,—Researches and Discoveries of Gustav Jaeger, edited and translated by Henry G. Schlichter, 278
- Pheasants,—their Natural History and Practical Management, by W. B. Tegetmeier, 279
- Papers presented to the World's Congress on Ornithology, edited by Mrs. E. Irene Rood, under the direction of Dr. Elliot Coues, 280
- Wild Bird Protection and Nesting Boxes, by John R. B. Masefield, 281
- Birds of our Islands, by F. A. Fulcher, 283
- The Fauna of British India, including Ceylon and Burma,—Hymenoptera, vol. i. by Lieut.-Col. C. T. Bingham, 283
- Investigations into applied Nature, by W. Wilson, Jun., 284
- The Migration of Birds,—an attempt to reduce Avine Season-flight to Law, by Charles Dixon, 371
- Cambridge Natural History, vol. ii. —Worms, Rotifers, and Polyzoa, 373
- L'Année Biologique, Première Année, 1895, 376
- Traité de Zoologie, publié sous la direction de Raphael Blanchard : Fas. xi. Némertiens, par Louis

- Joubin; Fas.xvi., Mollusques, par Paul Pelseener, 377
- Practical Taxidermy,—a Manual of Instruction to the Amateur in Collecting, Preserving, and Setting-up Natural History Specimens of all kinds, by Montagu Browne, 378
- Life in Early Britain, being an Account of the Early Inhabitants of this Island, and the Memorials which they have left behind them, by Bertram C. A. Windle, 477
- The Vivarium, being a Practical Guide to the Construction, Arrangement, and Management of Vivaria, containing full information as to all Reptiles suitable as Pets, &c., by the Rev. Gregory C. Bateman, 478
- A Bibliography of Gilbert White, the Natural Historian and Antiquarian of Selborne, by Edward A. Martin, 480
- Bæveren (Castor fiber) i Norge dens Udbredelse og Levemaade (1896), af R. Collett, 481
- The Concise Knowledge Natural History, by R. Lydekker, R. Bowdler Sharpe, W. F. Kirby, W. Garstang, B. B. Woodward, F. A. Bather, R. Kirkpatrick, R. I. Pockock, and H. M. Bernard, 482
- Citizen Bird,—Scenes from Bird-Life in Plain English for Beginners, by Mabel Osgood Wright and Elliot Coues, 483
- Darwin, and after Darwin, vol. iii., by the late George John Romanes, 522
- A Handbook to the Birds of Great Britain, by R. Bowdler Sharpe, 523
- British Birds, with their Nests and Eggs, illustrated by F. W. Frohawk, vols. i.—iii., 525
- John Hunter, Man of Science and Surgeon, by Stephen Paget, 527
- Bos sondaicus, 489,—skull and horns, figured, 492, 495
- Brabrook, E. W., honours for, 382
- Breeding of Corncrakes in confinement, 35; South African Galago in confinement, 83; Ant-eater in captivity, 95; Roseate Tern in Britain, 165, 467; Caracal or Desert Lynx in captivity, 185; Black Bear in captivity, 185; Cape Hunting Dog in captivity, 186; Long-eared Owl in Essex, 232; Common Snipe in Romney Marsh, 271; Sparrows on a band-stand, 287; Tozenburg Goat in captivity, 291; Wild Sheep in captivity, 291; range of Yellow Wagtail in Ireland, 346; Kingfisher in Norfolk, 354; Black-throated Diver in Shetland, 364, 425, 509; habits of Purple Heron, 407; Montagu's Harrier in Ireland, 467; Ringed Plover inland in Norfolk and Suffolk, 502
- British Museum Report, 1896, 484
- Brown, John Harvie, museum destroyed by fire, 48
- Buffon to Darwin, 312
- Bull, Burmese Wild, description of, and Natural History notes on, 489; skull and horns, figured, 492, 495
- Bunting, Black-headed, in Sussex, 273; Reed, nest in unusual position, 336; Siberian Meadow, 6
- Burma, Upper, Zoology of, 286
- Bustard, Great, old race of Norfolk, 289, 572; Indian Houbara, in Hum-ber District, 47
- Buteo desertorum, 158
- Butterflies, light- and dark-coloured, proposed explanation as to appearance during day, 88; strange pairing, 521
- Buzzard, Honey, in Staffordshire, 232, 271, 328; in Suffolk, 425
- Callionymus lyra, 550
- Call-notes of British birds, Dictionary of, 535, 576
- Campylopterus ensipennis, 446
- Canis dingo, 193
- Capros aper, 548
- Caracal or Desert Lynx breeding in captivity, 185
- Carcharias glaucus, 564
- Carpodacus erythrinus, 6
- Centronotus gunnellus, 551
- Cephalopod, Giant, alleged, reported from Florida, 291
- Ceratorrhina burkei, 161; derbyana, 161
- Certhiola atrata, 447
- Cestode parasites of fishes, 534
- Cetaceans, distribution, 220
- Charadrius dominicus, a rare Plover, on the River Thames, 330
- Check-list of British Earthworms, 453
- Chicago Academy of Sciences, museum, 388



- Chlorestes cærulea*, 445  
*Chlorophanes spiza*, 447  
*Chlorostilbon caribæus*, 445  
*Chrysolampis mosquitus*, 444  
*Chrysophrys aurata*, 544  
 Cicadidæ and Orthoptera, stridulation, 432, 516, 517, 519, 520  
*Clupea alosa*, 562; *finta*, 562; *harengus*, 561; *pilchardus*, 562; *sprat-tus*, 562  
*Coassus nemorivagus*, 345  
 Coccidæ, food-plants of, 486  
*Coccystes glandarius*, supposed occurrence in Ireland, 574  
 Cockroach, Common, changes of colour, 370  
*Cœlogenys paca*, 343  
*Cœreba cærulea*, 447; *cyanea*, 447  
 Coloration, directive, in birds, 531  
*Conger vulgaris*, 563  
*Conilurus boweri*, 197; *hirsutus*, 195; *penicillatus*, 196  
 Cormorants in Lower California, 243; destruction, in Australia, 384  
 Corncrakes breeding in confinement, 35  
 Cornwall and Devon, neolithic life, 49  
*Coronella lævis* in New Forest, 431, 475  
 Corsica, ornithological notes from, 254  
*Cottus bubalis*, 545; *gobio*, 545; *scorpius*, 545,—var. *grœnlandicus*, 545  
 COUNTY RECORDS:—  
*Bedfordshire* — Daubenton's Bat, 326; Black Rat, 328  
*Berkshire* — Frog attacked by a Rat, 169  
*Cambridgeshire* — Albatross, 363; birdsnesting in August, 430  
*Cheshire* — Landrail, 86; Lesser Shrew, 231; Noddy Tern, 510  
*Cornwall*—Neolithic life, 49  
*Cumberland*—Eared Grebe, 83  
*Derbyshire* — Daubenton's Bat, 326; Night Heron, 329; Black-throated Diver, 426  
*Devonshire* — Neolithic life, 49; Shore Lark, 365, 471, 574; Lesser Shrew, 467; Lesser Spotted Woodpecker, 470; Pigmy Shrew, 507  
*Dorsetshire* — Icterine Warbler, 332; Osprey, 508  
*Durham* — *Asterias tessellata*, or Scutellated Star-fish, alleged occurrence, 170, 340; Common Cockroach, 370  
*Essex* — Long-eared Owl, 232; Tunny, 579  
*Gloucestershire* — Summer mi-  
 grants, 274; unusual position for eggs of Starling, Song Thrush and Sparrow, 334  
*Hampshire* — Winter notes, 34; Worm-eating Slugs, 89; Yellow-billed Cuckoo, 142; Red-legged Partridge, 233; Badger, 327; Hedgesparrow, 427; Crossbills, 428; Smooth Snake, 431, 475; notes, 460; Aquatic Warbler, 471; Pied Wagtail, 513; Grey Wagtail, 513; Common Redshank, 575  
*Hertfordshire*—Kingfisher, 469  
*Kent*—Common Bittern, 86; Common Snipe, 271; Blue Titmouse, 333; Starling, 334; American Nonpareil Finch, 335; Montagu's Harrier, 363; Lesser Grey Shrike, 427; Wryneck, 511; Green Sandpiper, 573  
*Lancashire*—Scaup Duck, 329  
*Leicestershire*—Grey Wagtail, 336  
*Lincolnshire* — Greenish Willow Warbler, 5; Common Rorqual, 142; Grey Wagtail, 274, 336; Great Plover, 511.  
*Middlesex* — Wood Pigeons, 87; Rooks in West End of London, 87; Magpie Moth eaten by birds, 169; House Sparrow, 273; avicultural notes, 338; Curlew, 364; Wild Geese, 487  
*Norfolk* — Pallas's Warbler, 5, 8; skulls of early Man, 33; breeding Corncrakes in confinement, 35; ornithological record for 1896, 121; human bones, 164; among the birds, 168; Knot, 232; Cuckoo Ray, 235; Stone Curlew, 248; Sapphirine Gurnard, 275, 339; Nightingale, 332; Lesser Weaver, 339; Turbot, 339; Angler Fish, 340; Common Mackerel, 340; Pilchards, 340; Edible Crab, 340; twenty years in the Fens, 351; "Kentish Crow," 356, 428; Fen *versus* Marsh, 437; nesting sites, 449; Common Swift, 468; Ringed Plover, 502; Barbel in Great Ouse, 534; Marine and Fresh-water Fishes of Great Yarmouth, &c., 539; Cuckoo, 568; Great Bustard, 289, 572; Mediterranean Herring Gull, 572  
*Nottinghamshire*—Little Owl, 329; Grasshopper Warbler, 333; Red-backed Shrike, 334  
*Oxfordshire*—Spotted Flycatcher's

- nest in nest of Hawfinch, 426, 473; proximity of Magpie's and Wood Pigeon's nests, 427; Sparrowhawk, 508; Cuckoo, 426, 513
- Shropshire*—Tit's nest, 167; Long-eared Bats, 231; Wasp, *Tipula*, and Spider, 475
- Somersetshire*—Garden lists of birds, 418, 431; Hedgesparrow, 427; Black-winged Stilt, 511
- Staffordshire*—Honey Buzzard, 232, 271, 328; Daubenton's Bat, 326
- Suffolk*—White Wagtail, 233; Snails, 236; Swallow-tailed Kite, 270, 363; Cuckoo's egg in nest of Song Thrush, 364; Honey Buzzard, 425; garden lists of birds, 474; Thresher Shark, 475; Angel-fish, 475; Ringed Plover, 502; Fork-tailed Petrel, 509; Green Woodpecker, 573
- Sussex*—Rare birds, 86; Serotine Bat, 141; Black-headed Bunting, 273; Rare Warblers, 333; Hawfinches, 365; Quails, 366; Little Gull, 468; Red-necked Phalarope, 468; Common Roller, 469; Hypolais polyglotta, 513; Common Seal, 571
- Warwickshire*—Black Tern, 330; White Wagtail, 337
- Yorkshire*—Little Auks and Little Gulls, 166; Red-legged Partridge, 166; polydactylism in the Horse, 270; Blackbird, 330; trapping Shrews and Voles, 571; Dipper, 575; Notes, 578
- Crab, Edible, meristic variation in, figured, 340
- Crocodiles, "mystic singing," 288, 289
- Crossbills near Bournemouth, 428
- Crow, Kentish, 356, 428
- Cuckoo, South African Golden, egg in nest of Cape Wagtail, 142; Yellow-billed, in Isle of Wight, 142; an unfortunate, 272; egg in nest of Song Thrush, 364; young, in nest of Twite, 365; popular fallacy concerning, 512; does it suck eggs? 513, 568; Great Spotted, supposed occurrence in Co. Kerry, 574
- Curlew laying five eggs, 364; Stone, as observed around Thetford, 248
- Cyclopterus lumpus, 550
- Cyprinus auratus, 559; carpio, 559; carassius, 559
- Darwin, Buffon to, 312
- Dasyprocta aguti, 342; cristata, 342
- Dasyurus hallucatus, 206
- Deep-sea animal life in past epochs, 184
- Dermestes lardarius eating specimens of moths, 433, 521
- Devon & Cornwall, neolithic life, 49
- Didelphis marsupialis, 342
- Dik-Dik in nature and as preserved, 434
- Diomedea melanophrys, 364
- Dipper, egg-producing powers, 575
- Dirk Hartog and the Houtman's Abrolhos Islands, Western Australia, 293
- Diver, Black-throated, nesting in Shetland, 364, 425, 509,—in Derbyshire, 426; Great Northern, nesting in Shetland, 425, 509
- Dog, Cape Hunting, breeding in captivity, 186
- Dogs of draught in Belgium, 33
- Dove, Stock, in Ireland, 88
- Dreschel, Prof., 533
- Duck, Pintail, large number in Co. Mayo, 143; Scaup, inland in Lancashire, 329
- Eagle resting on a balloon, 384; Golden, in Ross-shire, 425
- Earthworm studies: dorsal pores, 149; oviposition and embryology, 258; phosphorescence and luminosity, 304; check-list of British Earthworms, 453
- Egernia (Silubosaurus) stokesii, 301
- Egg of South African Golden Cuckoo in nest of Cape Wagtail, 142; of Cuckoo in nest of Song Thrush, 364; -producing powers of birds, 511, 574, 575
- Eggs of Great Auk, sales, 241, 382; of Starling, Song Thrush, and Sparrow, unusual position for, 334; five, laid by Curlew, 364; white, of Hedgesparrow, 427; of Roseate Tern, 165, 467, 510
- Echidna aculeata, 199
- Echimys trinitatis, 345
- Editorial Address, 1
- Eel, Common, transformations, 287
- Elanus caeruleus, 158
- Elephants in South Africa, destruction of, 532
- Emberiza cioides, 6
- Emu, protection, in Australia, 385
- Enchytræus parvulus, a new British Worm, 349



- Engraulis encrasicolus*, 561  
 Entomology, Economic, in India and United States, 385  
*Esox lucius*, 559  
 Ethnological Bureau of British Empire, 380  
*Eulampis jugularis*, 447; *holosericus*, 447  
 Evolution no longer a word of evil import, 435  
 Fallacies, popular ornithological, 473, 512, 514  
 Fauna, African Lake, 148, 187; of Atlas Mountains to be investigated, 187; and Flora, our indigenous, 264; Vertebrates, of Bedfordshire, 486  
*Fen versus* marsh, 437  
 Finch, Nonpareil, change of plumage, 273, 335  
 Finches, foreign, in confinement, 251  
 Fish, Angler, a large, 340; driven ashore at Durban, 369; oil industry of Japan, 286  
 Fisheries, Behring-Sea Seal, 96  
 Fishery, Seal and Whale, 56, 142  
 Fishes, Marine and Fresh-water, of Great Yarmouth, &c., 539; our Economic Sea, 389  
 Flora and Fauna, our indigenous, 264  
*Florisuga mellivora*, 445  
 Flycatcher, nest constructed in rest of Hawfinch, 426  
 Folk-lore ornithological, 144, 168; among Moki Indians, 183  
 Food of Long-eared Bat, 231; Knot, 232  
 Food-plants of *Coccidæ*, 486  
 Fossils, Australian, in precious opal, 488  
 Foxes, German importation of, 436  
 Fresh-water biological stations, 187; and Marine Fishes of Great Yarmouth, &c., 539  
 Frog attacked by Rat, 169; by Weasel, 369; many enemies among carnivorous mammals, 339  
 Frühstorfer, H., 292  
*Gadus æglefinus*, 553; *luscus*, 553; *merlangus*, 553; *minutus*, 553; *morrhua*, 552; *pollachius*, 553; *virens*, 554  
 Galago, South African, breeding in confinement, 83  
 Galapagos Islands, birds of, 290  
*Galbula ruficauda*, 448  
*Galeus vulgaris*, 564  
 Game, South African, preservation of, 186  
 Garden list of birds, 417, 474  
*Gasterosteus aculeatus*, 543; *pungitius*, 543; *spinachia*, 543  
 Geese, Wild, summer appearance in Fifeshire, 363; over London, 487  
 Germon, or Long-finned Tunny, in British waters, 580  
*Glaucis hirsuta*, 446  
 Goat, Tozenburg, bred in captivity, 291  
*Gobio fluviatilis*, 560  
*Gobius auratus*, 550; *minutus*, 549; *niger*, 550; *ruthensparri*, 549; *unipunctatus*, 549  
*Goliathus albosignatus*, 160  
 Grebe, Eared, in Cumberland, 83  
 Greenfinch, song, 335  
 Grosbeak, Scarlet, 6  
 Grouse, Red and Black, union between, 183  
 Gull, Little, at Scarborough, 166,—in Sussex, 468; Mediterranean Herring, in Norfolk, 572  
 Gurnard, Sapphirine, Bull-dog variety, at Great Yarmouth, 275, 339,—figured, 276  
 Habit, peculiar nesting, of House Sparrow, 273; variations, in Blue Titmouse, 333; inherited, in birds, 275, 367; breeding, of Purple Heron, 407; of Lesser Spotted Woodpecker, 470; strange nesting, of Nuthatch and Starling, 514; of *Cicadidæ*, 520  
*Halmaturus houtmanni*, 297  
 Hants, Mid-, notes from, 460  
 Hare, Common Brown, 95; Irish, 96  
 Harrier, Montagu's, alleged nesting in Kent, 363; breeding in Ireland, 467  
 Harvard College Museum of Comparative Zoology, 387  
 Hawfinch in West Sussex, 365  
 Hedgehog attacking Toad, 369  
 Hedgesparrow appropriating Thrush's nest, 427; white eggs, 427  
 Heron, Night, in Derbyshire, 329; Purple, breeding habits, 407; choked by a Frog, 572  
*Heteromys anomalus*, 344  
*Hippoglossoides limandoides*, 556  
*Hippoglossus vulgaris*, 555  
*Hipposiderus muscinus*, 191

- Hippopotamus, decrease, in the Upper Shire, 380; preservation, in Natal, 381
- Holibut, large, at Isle of Man, 235
- Horns from South Africa, 487
- Horse, critical period in development, 486; polydactylism in, 270
- Hours at which some birds commence to sing, 472, 576
- Hybridity, supposed, between Common Brown and Irish Hares, 96; Red and Black Grouse, 183; colour-variation, &c., in birds and mammals, 383
- Hybrids in St. Stephen's Green Park, Dublin, 329
- Hydromys chrysogaster fulvo-lavatus, 197
- Hymenoptera, Aculeate, 533
- Hypolais polyglotta in Sussex, 513
- Icterus zanthornus, 447
- Indies, West, Natural History notes from, 341
- Indopelagia, the Indian Sea-region, 224
- Influence of darkness on animals, 488
- Insect pests and destruction of birds in Eastern S. Africa, 243; preservatives, non-poisonous, 433
- Insects, protection of, 386
- Instinct, inherited, in birds, 275, 367
- IRELAND.—Fulmar and Surf Scoter in Cos. Sligo and Mayo, 84; Stock Dove in Co. Louth, 88; Marten in Co. Waterford, 141; Pintails in Co. Mayo, 143; Green Sandpiper in Co. Waterford, 143; Pine Marten in Co. Waterford, 269, 327; hybrids, 329; Reed Bunting in Co. Waterford, 336; Yellow Wagtail, 346; Great Auk, 383; Montagu's Harrier in Co. Kerry, 467; strange pairing of butterflies, 521; Heron choked by Frog, 572; supposed occurrence of a Great Spotted Woodpecker in Co. Kerry, 574
- Isle of Man, Holibut at, 235; anthropology of, 435; Porbeagle in Manx waters, 579; Museum for, 579
- Jackal, Maanhaar, 155
- Jefferies, Richard, the late, 46
- Jersey, Bank Vole in, 141
- Kangaroos, protection, in Australia, 385
- Kingfisher, survival of, 354, 469
- Kite, Swallow-tailed, in Suffolk, 270, 363
- Knot, food, 232
- Labrax lupus, 544
- Labrus maculatus, 552
- Lamargus borealis, 565
- Lamna cornubica, 564, 579
- Lampornis violicauda, 444
- Lampris luna, 548
- Landrail in Chester in December, 86
- Lanius minor in Kent, 427
- Lapland, a walk across, 498
- Lark, Shore, 6; supposed summer appearance in Devonshire, 365, 471, 574
- Larus cachinnans in Norfolk, 572
- Latrunculus pellucidus, 550
- Legends, zoological, 46
- Lepus timidus, 96; variabilis, 96
- Leuciscus buggenhagii, 561; cephalus, 560; erythrophthalmus, 560; phoxinus, 560; rutilus, 560; vulgaris, 560
- Leuckart, Prof. Rudolf, honours for, 381
- Liparis montagui, 551; vulgaris, 551
- Lizard, Australian Rock, 233
- Lobster, gigantic, 276
- Local museums, federal staff for, 147
- Locust ravages in South Africa, 45; proposed means of destruction in Rhodesia, 146
- Loncheres guianæ, 344
- Lophius piscatorius, 551
- Lophoceros erythrorynchus, 159; leucomelas, 159
- Lophornis ornatus, 445
- Lota vulgaris, 554
- Lumbricus castaneus, 455; festivus, 455; herculeus, 455; papillosus, 455; rubellus, 455; studeri, 455
- Lynx, Desert, or Caracal, breeding in captivity, 185
- Mackerel, Common, variety, 340
- Macropus agilis, 214; antilopinus, 213; robustus, 212
- Madoqua phillipsi in nature and as preserved, 434
- Magpie-moth eaten by birds, 169
- Magpie's and Wood Pigeon's nests, proximity of, 427
- Mammalia, North Australian, 189; marine, distribution, 217
- Mammals, colour-variation, &c., 383; from Somali-land, 434; of Trinidad, 424

- Man in Zoology, 13; Early, skulls found in Norfolk, 33; Palæolithic, and the glacial epoch, 95; Pre-historic, remains on Rombald's Moor, 145
- Manx bird-names, 71, 144
- Marine and Fresh-water Fishes of Great Yarmouth, &c., 539
- Marmosa murina, 342
- Marsh *versus* fen, 437
- Marten, Pine, in Ireland, 141, 269, 327
- Maurolicus pennantii, 559
- Merlucius vulgaris, 554
- Mesatlantis, the Middle Sea-region, 223
- Mesirenia, the Middle Pacific Sea-region, 225
- Miall, Prof. L. C., on study of zoology, 434
- Migration of Red-legged Partridge, 166, 233; at Spurn lighthouse, in 1896, 245; of birds, 505
- Migrants, summer, in Gloucestershire, 274; in Aberdeenshire, 366
- Mimus gilvus, 448
- Mollusca from Tangier, 244; non-marine, of Essex, 535
- Molva vulgaris, 554
- Momotus swainsoni, 447, 448
- Motella cimbria, 554; mustela, 554; tricirrata, 554
- Mugil capito, 552; chelo, 552
- Mullus surmuletus, 544
- Mus decumanus, 344; musculus, 344; rattus, 198, 344
- MUSEUM REPORTS:—
- Oological collection in Australia, 47
- Harvie Brown Museum destroyed by fire, 48
- Musée Royal d'Histoire Naturelle de Belgique, 80; locality-labels, 81
- Federal staff for local museums, 147
- Albany Museum, Grahamstown, 243
- Museum of Comparative Zoology at Harvard College, 387
- Museum of Chicago Academy of Sciences, 388
- British Museum Report for 1896, 484
- Washington National Museum, 485
- Museum for Isle of Man, 579
- Mustelus vulgaris, 564
- Myiadectes sibilans, 448
- Myrmecophaga jubata breeding in captivity, 95
- 'Naturalists' Directory,' 291
- Naucrates ductor, 548
- Nectomys palmipes, 344
- Neolithic life in Devon and Cornwall, 49
- Nerophis æquoreus, 563
- Nest of Cape Wagtail with egg of South African Golden Cuckoo, 142; of Tit, strange discovery of, 167; of Reed Bunting in unusual position, 336; of Song Thrush with egg of Cuckoo, 364; of Spotted Flycatcher constructed in nest of Hawfinch, 426; of Magpie and of Wood Pigeon, proximity of, 427; of Thrush appropriated by House Sparrow, 427; unusual sites for, chosen by birds, 430
- Nesting of White Wagtail in Suffolk, 233; habit, peculiar, of House Sparrow, 273; of Grey Wagtail in Lincolnshire, 274, 336; of Sparrows on a band-stand, 287; alleged, of Montagu's Harrier, in Kent, 363; of Wood Pigeon in heart of the city, 383; of Great Northern and Black-throated Divers in Shetland, 425, 509; sites, curious, near Thetford, 449; of Sparrowhawk in thorn-tree, 508; of Great Plover, 511; strange, of Nuthatch, 514,—Starling, 514
- Nests and nesting sites, unusual, 430, 449
- Nightingale near Scarborough, 332; and Blackbird, voices compared, 331
- Nightjar, memory for locality in a, 330
- Norfolk, ornithological record for 1896, 121; birds, amongst the, 168; fens, twenty years on, 351; fen *versus* marsh, 437
- Norway, notes from, 22
- Notopelagia, the Southern Polar Sea-region, 225
- Nuthatch, strange nesting habits, 514
- Nyctibius jamaicensis, 447
- Nyctophilus timoriensis, 193
- OBITUARY:—
- Bartlett, Abraham Dee, 267
- Bendire, Major Charles E., 230
- Cope, Edward Drinker, 229
- Dreschel, Professor, 533
- Gätke, Heinrich, 139



- Matthews, Rev. Andrew, 466  
 Müller, Fritz, 268  
 Nevill, Hugh, F.Z.S., 230  
 Newton, Sir Edward, K.C.M.G., 230  
 Steenstrup, Johann Japetus Simon, 325
- Onychogale unguifera*, 209  
 Oological collections in Australia, 47  
*Oreynus germo* in British waters, 580  
*Ortalis ruficauda*, 448  
*Orthogoriscus mola*, 564  
 Orthoptera and Cicadidæ, stridulation in, 432, 516, 517, 519, 520  
*Oryzomys brevicauda*, 344  
*Osmerus eperlanus*, 558  
 'Osprey,' The, 243  
 Osprey in Dorset, 508  
 Ostrich (with Plate), 97, 167  
*Otocorys alpestris*, 6  
 Otter, Irish, differs from Common Otter, 184  
 Owl, Little, near Newark-on-Trent, 329; Long-eared, breeding in Essex, 232
- Pagellus centrodontus*, 544  
 Pairing, strange, of butterflies, 521  
 Partridge, Red-legged, migrating, 166, 233  
*Perameles macrura*, 202; *obesula*, 201  
*Perca fluviatilis*, 543  
*Perdix cinerea*, chocolate-coloured variety, 36  
 Pests, animal, in British Columbia, 529,—in United States, 530; insect, and destruction of birds, in Eastern S. Africa, 243  
*Petaurus breviceps*, 205  
 Petchora River, Siberia, zoological expedition, 287  
 Petrel, Fork-tailed, in East Suffolk, 509; Frigate, on west coast of Scotland, 241; in Cos. Sligo & Mayo, 84  
*Petrogale brachyotis*, 209; *concinna*, 208  
*Petromyzon fluviatilis*, 567; *marinus*, 567  
 Phalarope, Red-necked, in Sussex, 468  
*Phæthornis guyi*, 445; *longuemareus*, 445  
*Phascogale flavipes leucogaster*, 208; *pencillata*, 207  
 Pheasant with upper mandible prolonged, figured, 122  
 Pheasants and earthquakes in Japan, 44  
*Philander trinitatis*, 342  
*Phylloscopus brehmi*, 5; *proregulus* in Norfolk, 5, 8,—figure d, 136; *superciliosus*, 5; *viridans* in Lincolnshire, 5  
 Pigeon, Wood, large flocks, near Croydon, 45; in London Parks, 87; nesting in heart of the city, 383; and Magpie, proximity of nests, 427  
 Pilchards at Great Yarmouth, 340  
 Pinnipeds, distribution, 217  
 Pipit, Alpine, in Carnarvonshire, 366  
*Pipra auricapilla*, 447  
*Pithecanthropus erectus*, 14  
*Pleuronectes flesus*, 557; *cynoglossus*, 557; *limanda*, 556; *microcephalus*, 556; *platessa*, 556  
 Plover, Great, nesting, 511; Little, in Australia, useful qualities of, 385; Ringed, inland breeding, in Norfolk and Suffolk, 502  
 Plumage, change of, in Nonpareil Finch, 273, 335  
 Polar, South, Belgian Expedition, 487  
 Polydactylism in the Horse, 270  
*Pteropus gouldii*, 190; *scapulatus*, 191  
*Pseudochirus dahlii*, 203
- Quails in Sussex, 366
- Raia batis*, 566; *clavata*, 566; *maculata*, 566; *miraletus*, 566; *pastinaca*, 566; *radiata*, 566  
*Raniceps trifureus*, 554  
 Rat attacking Frog, 169; Black, in Bedfordshire, 328  
 Ray, Cuckoo, at Great Yarmouth, 235  
 Redpoll, Mealy, off Kerry coast, 513  
 Redshank, Common, egg-producing powers, 575  
 Rendall, Dr. Percy, 46  
 Reptiles and Batrachians of Celebes, 184  
*Rhamphastos vitellinus*, 447  
 Rhine, ornithological notes from, 61  
*Rhinolphus hipposideros* (with Plate), 537  
*Rhipidomys couesii*, 343  
*Rhombus lævis*, 555; *maximus*, 555  
 Rinderpest in Transvaal, 45; wild animals destroyed by, in South and East Africa, 186  
 Roller, Common, in Sussex, 469  
 Rookery unexpectedly abandoned, 287  
 Rooks in West End of London, 87  
 Roosting of Swift, 511  
 Rorqual, Common, on Lincolnshire coast, 142  
 Salamander, gigantic, 382

- Salmo fario, 558; salar, 557; trutta, 558
- Sandpiper, Green, in Co. Waterford, 143; flight, 573
- Saunders' 'Manual of British Birds,' 532
- Scarborough, notes from, 578
- Sciæna aquila, 547
- Sciurus æstuans, 343
- Sclater, Dr. P. L., bibliography, 188
- Scomber scomber, 547; scriptus, 547; thynnus, 547
- Scomberesox saurus, 559
- Scopus umbretta, 158
- Scorpæna dactyloptera, 544
- Scoter, Surf, in Co. Sligo and Mayo, 84
- SCOTLAND.—Yellow Wagtail in Argyllshire, 167; Cuckoo, 272, 365; Toad attacked by Weasel, 339; Wild Geese in Fifeshire, 363; migrants in Aberdeenshire, 366; Golden Eagle in Ross-shire, 425
- Scotophilus greyii, 193
- Scyllum canicula, 565; stellaris, 565
- Sea-regions of the globe, 221
- Seal, Behring Sea fisheries, 96; Common, in River Arun, Sussex, 571; Grey, in Carnarvonshire, 141; and Whale fishery, 1896, 56, 142
- Selache maxima, 565
- Serpentarius secretarius, 157
- Shagreen made from skins of Rays and Dog-fish, 292
- Shark, Porbeagle, in Manx waters, 579; Thresher, at Lowestoft, 475
- Sharks, abundance in tropical seas, 36; combat at Cocos Islands, 387
- Sheep, Wild, bred in captivity, 291
- Sheldrake, local name, 508, 571
- Shetland, list of birds observed, 360; Black-throated and Great Northern Divers breeding in, 364, 425, 509
- Shrew, Lesser, in Cheshire, 231,—in Anglesea, 326,—in Devon, 467
- Shrews and Voles, trapping, 507, 571
- Shrike, Lesser Grey, in Kent, 427; Red-backed, near Rainworth, 334
- Singing of birds, hours, 472, 576
- Siphonostoma typhle, 563
- Sirenians, distribution, 219
- Slugs, distribution of worm-eating, 89
- Sminthopsis nitela, 208
- Snails, early, 236
- Snake, Smooth, in New Forest, 431, 475
- Snakes found within fifty miles of New York City, 44
- Snipe, Common, breeding in Romney Marsh, 271
- Solea lascaris, 557; vulgaris, 557
- Solway Firth, Germon, or Long-finned Tunny, in, 580
- Somali-land, mammals from, 434
- Song of Greenfinch, 335; autumn, of birds, 358, 410, 471
- Sparrow, unusual position for eggs of, 334; House, peculiar nesting habit, 273,—depredations of, 333; albino, 578
- Sparrowhawk nesting in thorn-tree, 508
- Sparrows nesting on band-stand, 287
- Sparus niger, 548
- Spider, Tipula, and Wasp, 475
- Spurn lighthouse. migration at, in 1896, 245
- Squatina vulgaris, 565
- Squirrel, Common, seasonal changes in, 424
- Star-fish, Scutellated, alleged occurrence in Durham, 170, 340
- Starling, unusual position for eggs of, 334; strange nesting habits, 514
- Starlings, second brood, 334
- Stilt, Black-winged, in Somerset, 511
- Stridulation of Cicadidæ and Orthoptera, 432, 516, 517, 519, 520
- Struthio camelus, 97
- Swift, flight of, 36; night flight, 290; roosting, 468, 511
- Syngnathus acus, 563; hippocampus, 563; lumbriciformis, 563
- Tanagra sclateri, 447
- Taphozous australis, 192
- Tatusia novemcincta, 343
- Taxidermy, 412
- Tern, Black, in Anglesea, 329,—in Warwickshire, 330; Noddy, in Cheshire, 510; Roseate, breeding in Britain, 165, 467,—eggs of, 467, 510
- Terpsiphone cristata, 161
- Thetford, Stone Curlews as observed around, 248
- Thrush, Song, unusual position for eggs of, 334
- Tinea vulgaris, 560
- Tipula, Spider, and Wasp, 475
- Tithoes confinis, 161
- Titmouse, Blue, habit variations, 333
- Tit's nest, strange discovery of, 167
- Toad attacked by Weasel, 339; by Hedgehog, 369; enemies of, 432
- Torpedo vulgaris, 566
- Tortoise, gigantic, from Aldabra Islands, 382





# THE ZOOLOGIST

————— B  
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## EDITORIAL ADDRESS.

A NEW Editor in any phase of journalism—scientific or otherwise—sometimes denotes a fresh departure, often implies a change in method, frequently creates prejudice that some particular subject may be more or less neglected, or another unduly favoured, and doubtless produces some reflex of individuality, as must and should be the case. It may therefore be well to assure our readers that this magazine is still 'The Zoologist,' a monthly journal devoted to Natural History, as founded in 1843; and its aim is still, as stated by Edward Newman in his first Preface, to "combine scientific truths with readable English;" while in its pages "everyone who subscribes a single fact is welcome—nay, more than that—has a direct claim to be admitted as a contributor." To this may be added the words of the recent editor, who has so ably conducted 'The Zoologist' since 1877, that "it must always be remembered that Zoology is one of the most progressive of the sciences." Thus acting on the lines of my predecessors, I trust this magazine—which now enters a new series—will follow the path on which it started, in the advancement of Zoology by recording facts and suggesting conclusions, in maintaining the interest in British Zoology, and in adding to the philosophical standpoint of our insular science by narrating the annals of the larger fauna of which our own forms only a part.

Some changes will take place in our pages. The official reports of the meetings of Natural History Societies will be discontinued. These are fully published in other journals both weekly and monthly, and much of the space now devoted to the same will be utilized for more original matter. The Editor, however, will always be glad to receive and insert notes recording facts and subjects of special interest which have been brought forward at the meetings of our Natural History Societies, and these may prove of a more readable, explanatory, and less technical character than must perforce be the nature of a bald abstract of the whole proceedings of a Society's meeting. Not only is it hoped to fill any lacuna that may thus occur with more general zoological information, but with the support of contributors to even increase the size of the publication.

A Zoology which excludes *Homo* is like 'Hamlet' without the Prince of Denmark. "Early Man in Britain" proclaims his identity to the out-door naturalist who comes across the ancient Barrow as well as the more recent Mound. His flint implements still remain in evidence, and often in conjunction with the *débris* of an extinct fauna which no Zoology can disregard. The fauna of the present cannot altogether be studied without reference to that of the past; and just as the palæontologist must have some zoological training, so the zoologist cannot dismiss and consign to a purely geological standpoint the animals—especially the British animals—of a past era. Prehistoric Man is now at least a reality, and not a theory; he existed with, and was part of, a phase of animal life which is only separated from that of to-day in degree and not in kind. It is therefore hoped that in our pages may be found contributions—so far as these islands are concerned—as to his past history, his physical peculiarities, and his connection with our old British fauna. General treatises on Anthropology are not desiderated, but it is desired to secure records of where his presence can be maintained.

Living in the age—nay, the atmosphere—of Darwin and Wallace, it is impossible to disregard those generalizations which add philosophy to the science and charm to the subject. Not only do we care to know how animals are as we see them, but also to trace the modifications which have so largely influenced their present appearance. Evolution is not only a

subject which, in some form or other, is coeval with thinking man, however crude and wild some early hypotheses may have been, but it is now the established corner-stone of the zoological edifice. There may be much pure guessing, considerable theoretical sack without much bread of fact; but to abstain from all theory is equivalent to discarding the method of Darwin, to ignoring the speculation of a Humboldt. The Editor therefore hopes to receive the thought-out conclusions of contributors on the facts acquired in, and by, their special studies and observations, which may be qualified in the words of Treviranus, who prefaced his speculative opinions in these words:—"The author will give opinion and theory a place in this work, but he is far from those who give their dreams and fancies a reality and permanence, believing that his own theories may perish, and hoping to direct the current of thought in Biology to adapt itself to Nature, and not make Nature adapt itself to the current of thought."

If, however, facts are made more philosophical by generalization, it is clear that all speculation must and should depend on facts, and it is expected that 'The Zoologist' will in the future, as it has done in the past, prove a storehouse of the same, a journal worthy of the observations that immortalized Gilbert White and canonized Richard Jefferies. Its pages are open to record all observations, the only conditions being that such records shall be original, and the species to which they apply accurately determined. With all our knowledge of Natural History it is almost phenomenal how little is still known of the life-histories of many living creatures inhabiting even these islands, while with scarcely an exception there are no animals from which we cannot learn by intelligent observation. The ornithologists have worthily borne the heat and burden of the day in preceding volumes; it is to be hoped that their good example may be followed in other branches of our varied fauna. 'The Zoologist' invites the help of the successors and disciples of Yarrell, Bell, and Ray, of Knapp, "Rusticus," and Buckland.

In our pages a special interest will attach to Museum notes. It is of importance to zoologists to be reminded or informed in what institution or private museum the collections made by travelling and home naturalists are deposited; it is of even



greater importance to tabulate the principal additions made to zoological science by such collections. Our 'Zoological Record' amply narrates the number of new species and forms added to the nomenclature, in fact, constitutes a Zoological Directory; we hope to receive some information as to how these accumulations have enlarged the bounds of zoological conclusions. It is well to remember in what Museum a fauna, or section of a fauna, is best represented. Again, well-known private collections are constantly, through death or other circumstances, either sold in their entirety or disposed of in parts by the auctioneer or natural-history agent; notes as to such removals will be always welcome. These are particularly valuable with regard to British collections. We often hear of the little done in Zoology by the "mere collector," and yet his collection, which in the hands of other naturalists could be made to tell its story, is allowed to be distributed—often virtually destroyed—without a record of its destination being published. No doubt the highest form of patriotism would be shown in bequeathing all such collections to the national or local museum; but human circumstances only too frequently make such a course impossible; or, again, a day may arrive when State or local funds are available to purchase them; but in the mean time it is at least advisable to chronicle the dispersal and migration of what has been achieved with so much labour, and may never in entirety be amassed again. The "mere collector" is not at all unimportant if his material subsequently reaches right hands. The ordinary subscriber to Mudie's is not necessarily a literary man, nor is the average collector always what we understand as a naturalist; but one has as much right to be encouraged as the other if we look to ideal potentialities and not to present fame or notoriety. Even the heads of the Church must have a congregation.

Finally, the present Editor solicits the special assistance of our British naturalists, and trusts that the pages of 'The Zoologist' may still be filled with facts and conclusions, whilst controversy and hyper-criticism may be thus crowded out.



## RECENT ADDITIONS TO THE BRITISH AVIFAUNA.

BY H. E. DRESSER, F.L.S., F.Z.S., &amp;c.

QUITE recently a specimen of Pallas's Willow Warbler, *Phylloscopus proregulus* (Pall.), was forwarded to me for examination by Mr. Thomas Southwell, of Norwich, and I exhibited it on his behalf at the meeting of the Zoological Society held on Tuesday, Dec. 1st. This bird, which was obtained at Cley-next-the-Sea, Norfolk, on Oct. 31st last, affords another instance of the fact that most of the recent additions to our British avifauna are visitants from the East, chiefly from Northern Asia. It is only quite recently that another Asiatic species occurred for the first time on record in our island, *viz.* the Greenish Willow Warbler, *P. viridanus*, Blyth, a specimen of which was obtained at North Cotes, Lincolnshire, on Sept. 5th last; and only a short time ago a specimen of the small race of our Chiffchaff, which I have only hitherto seen from Eastern or South-eastern Europe, and which was obtained at Easington by Mr. Witherby, was sent to me for determination. This form, which is nothing but a diminutive race of our Chiffchaff, was described by Homeyer (Erinn. a. d. Samml. Deutschl. Ornith. 1870, p. 48) as distinct, under the name of *Phylloscopus brehmi*, but I do not consider it worthy of specific rank.

The Yellow-browed Warbler, *P. superciliosus* (L. F. Gmel.), is another Asiatic Warbler which has occurred here on several occasions, and it is worthy of note that Asiatic species which occur on Heligoland generally find their way here sooner or later. Thus the Yellow-browed Warbler has occurred frequently on that island, the Greenish Willow Warbler three times, and Pallas's Willow Warbler once or twice; and we may therefore look for the Siberian Chiffchaff, *P. tristis*, Blyth, Eversmann's Warbler, *P. borealis*, Blasius, the Bright-green Willow Warbler, *P. nitidus*, Blyth, here, as all these Warblers have been obtained on Heligoland. It is very possible that one or more have visited our island and have been overlooked, as at the first glance they

may be passed over as belonging to one of the common species, for it must not be forgotten that the migrants do not have to undergo so close a scrutiny here as is the case on Heligoland, where every man is a birdcatcher, and will at once recognize a new or unrecorded species to that island.

It is somewhat strange that the Siberian Meadow Bunting, *Emberiza cioides*, which is one of the recent additions to our British avifauna, has not yet been recorded from Heligoland. On the other hand, the following species of Asiatic Buntings have occurred on Heligoland, but have not yet been noticed in Great Britain, viz. the Yellow-breasted Bunting, *E. aureola*, Pall.; the Pine Bunting, *E. leucocephala*, Gmel.; Cretzschmar's Bunting, *E. cæsia*, Cretz., any of which may be looked for here; and Strickland's Bunting, *E. cinerea*, Strickl., is stated to have been seen, but not obtained on Heligoland.

There are many instances of the gradual extension westward of Asiatic birds, as, for instance, that of the Shore Lark, *Otocorys alpestris* (Lin.), which a century ago was but an occasional and rare visitant to Europe proper, and was not known to breed in Scandinavia until about 1835; whereas now it breeds commonly in Lapland, and is frequently met with in considerable numbers during the seasons of migration as far west as the British Islands; and, according to Mr. Gätke, hundreds of thousands pass Heligoland each autumn. Again, we have the case of the Scarlet Grosbeak, *Carpodacus erythrinus* (Pall.), which in 1856, when, as a lad, I first visited Finland, was but a rare species; and I well recollect my delight in finding that it had nested in the Botanical Gardens at Helsingfors. Now, however, it is quite a common species in some parts of Finland, and nests regularly near Helsingfors.

To return, however, to Pallas's Willow Warbler. This interesting little bird was first described in 1811 by Pallas (Zoogr. Ross. As. i. p. 499), but Gould figured and redescribed it in 1837 (B. of Europe, ii. pl. 149), and gave it the name of Dalmatian Regulus, *Regulus modestus*. Subsequent writers have to a large extent confused the Yellow-browed Warbler and Pallas's Willow Warbler, and the first specimen of the Yellow-browed Warbler obtained in Great Britain was recorded under the name of *Regulus modestus*, Gould.

Pallas's Willow Warbler has recently been found almost every year during migration on the western slopes of the Ural range, but has only once been obtained on Heligoland, and once seen, though not secured; thus it is still an extremely rare straggler in Europe west of the Ural. The British-killed specimen was shot by a son-in-law of Mr. H. N. Pashley, who has obtained so many rarities at Cley-next-the-Sea, where the last one procured was the Aquatic Warbler. Mr. Gätke holds that Pallas's Willow Warbler may be separated into two subspecies, the Siberian form, the true *P. proregulus* of Pallas, being greener and brighter in tinge of colour on the upper parts, the under parts being pure white with a lemon tinge, the second quill being equal to the eighth; whereas in the Himalayan or southern form, which he proposes ('Ibis,' 1889, p. 578) to call *Phylloscopus newtoni*, the second quill is equal to the tenth, the plumage is dull brownish yellow in tone of colour, and the under parts are not so white. I cannot, however, endorse this view, as in a series I have found both the tone of colour and the relative length of the quills very variable; but I may remark that, were it possible to recognize these two subspecies, the British-killed specimen must be referred, as might be expected, to the Siberian and not to the Himalayan form.

With regard to *Phylloscopus viridanus*, this Warbler has been obtained on Heligoland on three occasions. It inhabits Central Asia, but how far north it ranges I have not been able to ascertain. It is common in the Himalayas, and winters in India as far south as Ceylon. That it breeds in Europe there can be no doubt, as I received a young bird barely able to fly from Tjubuk, in the Southern Ural. This specimen I referred to *Phylloscopus plumbeitarsus*, Swinh., when in 1878 I wrote the article in the 'Birds of Europe,' but subsequently discovered and corrected my error.

ON THE OCCURRENCE OF PALLAS'S WILLOW  
WARBLER IN NORFOLK.

BY THOMAS SOUTHWELL.

IN the December number of 'The Zoologist' I had the pleasure briefly to record the occurrence of a specimen of the above rare Warbler, *Phylloscopus proregulus* (Pall.), at Cley-next-the-Sea, Norfolk, on Oct. 31st last. Mr. Ramm, the person who shot the bird, tells me that he found it amongst the long grass on the bank or sea-wall, not far from the sea, at Cley, a locality which has produced many rare migrants, and at first took it for a Goldcrest, but on approaching to within two or three yards, the bird being very tame, he thought he recognized a Yellow-browed Warbler, a species he had seen before, and therefore secured it. Mr. Pashley, of Cley, to whom the bird was sent for preservation, forwarded it to me for determination, as he had some doubt whether it was really a Yellow-browed Warbler; and, with the assistance of Mr. Gurney, we were able to identify it as Pallas's Willow Warbler, *Phylloscopus proregulus*. This Mr. Dresser was good enough to confirm; he also exhibited the specimen, which proved on dissection to be a female, probably adult, at the meeting of the Zoological Society on Dec. 1st, 1896.

Considerable confusion exists in the writings of the ornithologists of the first half of the present century with regard to two nearly allied species of this difficult group. I should therefore be glad if you will allow me to make a few remarks, which I hope may assist in placing in a clearer light the history of the claims of this, and the Yellow-browed Warbler, to be regarded as accidental migrants to the eastern shore of Great Britain.

*Phylloscopus proregulus* seems to have been first described by Pallas in the 'Zoographia Rosso-Asiatica,' which appeared in 1811, but was probably little known (if at all) to British ornithologists till the publication of Gould's 'Birds of Europe' in 1837 (vol. ii. p. 149), where Mr. Gould describes a bird, then new to him, and as he also believed new to science, which he named *Regulus modestus*,



with the trivial name of "Dalmatian *Regulus*," commemorative of the locality of its origin. Mr. Gould's words are as follows:—"A single specimen of this interesting little bird has been sent to us by the Baron de Feldegg, of Frankfort, to whom our acknowledgments are due . . . for this instance of his liberality in consigning to our care . . . a bird probably unique in the collections of Europe." The only history of the bird which Mr. Gould was able to obtain was that written on the label attached to it by De Feldegg, as follows:—"I shot this bird, which on dissection proved to be a male, in Dalmatia in the year 1829' ! Mr. Gould further adds that he named the species *modestus* in allusion to its chaste plumage, as he could not find that it was known to German ornithologists.

The next we hear of the "Dalmatian *Regulus*" is in a communication to the 'Annals of Natural History' (vol. ii., Dec., 1838, p. 310), in which the late John Hancock, of Newcastle-on-Tyne, states that on Sept. 26th, 1838, he shot, on the banks near Hartley, on the coast of Northumberland, a bird which "corresponds exactly with Gould's *Regulus modestus*," and claims the species as British. His observations on the manners and appearance of the bird, which are as follows, are interesting:—"Its manners, as far as I had an opportunity of observing them, were so like those of the Golden-crested Wren that at first I mistook it for that species. It was continually in motion, flitting from place to place in search of insects on umbelliferous plants, and such other herbage as the bleak banks of the Northumberland coast affords. Such a situation could not be at all suited to the habits of this species, and there can be little doubt that it had arrived at the coast previous to or immediately after its autumnal migrations." Thus the "Dalmatian Warbler" came to be regarded prematurely, as will be seen, in the light of a straggler to our shore, and was for a time duly accepted as such.

"Meanwhile," to quote Prof. Newton in Yarrell's 'British Birds' (vol. i. p. 443), "it was shown in 1840, by Count Keyserling and Prof. Blasius (Wirbelth. Eur. p. lv), that Mr. Gould's *Regulus modestus* was no new species at all, but one described many years before by Pallas," as above mentioned; this, however, of course did not remove the species from the European avifauna, but only cancelled Mr. Gould's name in favour of that

conferred by Pallas at an earlier date. As will be seen, however, it had to disappear for a time from the *British* list, as it was further discovered that Mr. Hancock's bird had been wrongly determined, and belonged to a closely allied species, the *Motacilla superciliosa* of Gmelin, the Yellow-browed Warbler. Mr. Swinhoe pointed out the distinctive features of the two birds in the 'Proceedings' of the Zoological Society for 1863 ("Catalogue of the Birds of China"), p. 297, and further stated that Mr. Hancock's specimen was specifically identical with examples of the Yellow-browed Warbler obtained in China. Thus we lost the Dalmatian Warbler as a British bird, and obtained the Yellow-browed Warbler in its place.

In the 'Ibis' (1867, p. 252) Mr. Hancock corrects his previous determination of the bird killed by him in 1838, stating in what respects he found it to differ from Gould's *Regulus modestus*; and Mr. Gould does the same in the second volume of his 'Birds of Great Britain' (1873), when referring to the confusion which had arisen in consequence of Mr. Hancock's bird having been regarded by many authors as specifically identical with that received from Baron Feldegg, and figured by him in the 'Birds of Europe' under the impression that it was a newly discovered species. It may be mentioned here that *Phylloscopus superciliosus* has subsequently been met with in Britain in some eleven instances, one of which was on our own coast at Cley on Oct. 1st, 1894. Having thus disposed of this puzzling subject, we may turn to the bird under immediate consideration.

The next and only other occurrence of Pallas's Willow Warbler (Dalmatian Warbler) in Europe, until the Norfolk specimen, so far as I know, is that mentioned by Herr Gätke in his 'Birds of Heligoland' (p. 293). On Oct. 6th, 1845, Claus Aeuckens, one of his most devoted collectors, then a youth, and not having arrived at the age when he might be trusted with powder and shot, armed only with "a hunting-bag full of rounded pebbles, which he knew how to employ with the most astonishing dexterity," killed a small Warbler with one of his stones "as it was flying round the face of the cliff, and completely crushed it against the rock." Aeuckens noticed that the bird was an unusual one, and brought a wing which had remained undamaged, "with a portion of the lower part of the back with part of the

lemon-yellow plumage still adhering to it," to Mr. Gätke, who at first inclined to the idea that it belonged to a species of *Regulus*, but Aeuckens emphatically insisted that the bird was a Warbler. It was not till the year 1879, when Von Homeyer visited him, bringing a Siberian skin of *P. proregulus*, that he fully satisfied himself his wing belonged to a bird of that species. On Oct. 29th, 1875, Aeuckens, accompanied by his nephew, again saw a bird of this species a few steps in front of him, under the edge of the cliff, in such a position that had he shot it, it would have fallen into the surf below; they had ample leisure to contemplate the bright lemon-yellow plumage of the lower part of its back, but no opportunity offered of securing it. Finally, by the occurrence of the specimen at Cley on Oct. 31st last, after various changes and much confusion, we are able to restore Mr. Gould's so-called Dalmatian Warbler—really Pallas's Willow Warbler—to a place in the list of accidental visitors to Britain; and it may be that, attention having been called to the distinguishing characters of the species, it will be found, as in some other instances, to be of more frequent occurrence than has hitherto been suspected.

The distribution of this species is thus given by Mr. Seebohm in the 'Catalogue of the Birds in the British Museum' (vol. v. p. 72):—"Pallas's Barred Willow Warbler breeds in the sub-alpine districts of South-eastern Siberia, and throughout the alpine districts of the Himalayas from Cashmere to Burma, passes through North China on migration, and winters in South China, Burma, and Bengal"; and, it may be added, occasionally straying as far westward as Heligoland and the east coast of Britain. Mr. Dresser, in part ii. of the Supplement of his 'Birds of Europe' (March, 1895), gives some very interesting particulars with regard to the distribution and breeding habits of this species, in which, however, he exercises considerable discretion, as it has so often been confounded with *Phylloscopus superciliosus*: "In its habits, mode of life, and nidification, although it cannot well be separated generically from the *Phylloscopi*, it shows affinity to the genus *Regulus*, whereas *P. superciliosus* is a true Willow Wren." Mr. Gätke is of opinion that there exists a difference between the Siberian and Indian forms of this bird; but Mr. Dresser, as a result of his examination of

specimens of both the northern and southern forms, finds the differences so slight and the individual variations so frequent that he cannot support Mr. Gätke's views. Should such a difference, however, be found to exist, he informs me that the Norfolk-killed bird would certainly belong to the Siberian form.

"It frequents pine-woods, and those of mixed pine and birch in hilly districts, sometimes ranging in the mountains as high as the border of tree-growth, and it is also met with in the beech-covered valleys." The call-note is said by various authorities to be seldom repeated, and to be rendered as *tsii*, very different from that of *P. superciliosus*; and the song of the male, which is continued for hours without intermission, is described as melodious, varied, and sweet, and "so loud that it rings through the forest, and is astonishing as coming from so small a bird." The nests are placed on the branches of pines or cedars, either near the outer end or where the junction of the bough with the stem takes place; they are neatly constructed of the materials at hand, such as grass-bents, moss, and lichens, partially domed and lined with feathers and hair. The eggs, which are produced from late in May in the southern localities to the middle of June in Eastern Siberia, are five in number, pure white, richly marked with dark brownish-red and deep purple-grey spots, chiefly at the larger end; and the female is said to "commence sitting directly the first egg is laid, so that in the same clutch one finds quite fresh as well as incubated eggs" (Dresser, 'Birds of Europe,' Supplement, ii. p. 76).

In my previous notice of the occurrence of this bird, in the December number of 'The Zoologist,' p. 467, I remarked that this species may be distinguished from *P. superciliosus* by "the pale mesial line on the crown." I should have stated that this "mesial line" in *P. superciliosus* is much paler than in *P. proregulus*, and that in females and young birds, according to Mr. Gätke, there is not even a trace of it. The most conspicuous difference, however, is the pale yellow colour of the rump in the latter species.



## MAN IN ZOOLOGY.

BY E. W. BRABROOK, F.S.A.,  
President of the Anthropological Institute.

I HAVE to thank the Editor of 'The Zoologist' for giving me the privilege of addressing his readers on "Man." He has himself shown, beyond controversy, how fitting the subject of Man is for the pages of this Journal. A zoology which omitted from its purview the highest and most interesting of all animals would indeed be incomplete.

The founder of the Anthropological Society of London, in his opening address to that body thirty years ago, compared his science to the last volume of a work on zoology, "with perhaps an appendix." He accepted the investigation of the relations of Man to the Mammalia as the first great duty of the society he formed. He did not, however, confine this duty within those limits. On the contrary, he defined anthropology as the science of the whole nature of Man, as including in its grasp nearly the whole of the circle of the sciences.

In the years 1846 to 1850 the relation between the study of Man and the study of animals generally was recognized by the British Association in the appointment of an ethnological subsection to the section (D) of Zoology. Dr. Topinard, in his excellent work 'L'Homme dans la Nature,' says, "l'anthropologie vraie est l'histoire de l'Homme considérée au point de vue animal," and refers to the purpose of that work as being to ascertain as to Man "ses rapports avec la zoologie générale, la place qu'il occupe matériellement parmi les animaux, et son origine probable ou descendance." We are entirely of opinion that this is not the whole of anthropology, but the prominence given to this branch of anthropology by a writer of so great authority and distinction certainly justifies the position I am asking for it in the consideration of professed zoologists. There is no line of cleavage between the two sciences.

It is difficult to suggest a physical faculty of Man which is not shared by him with other animals. It is equally difficult to suggest a moral or intellectual faculty of his which is not foreshadowed in them.

Though the present paper is necessarily directed to the early history of Man in the British Islands, I must ask leave to refer by way of preface to the important discovery by Dr. Dubois in Java of remains to which he gave the name *Pithecanthropus erectus*. Whether we regard the controversy which has arisen over this discovery, or the nature of the remains themselves, they form a fitting introduction to the consideration of the question.

In the neighbourhood of Trinil, in 1891-92, Dr. Dubois unearthed a great number of fossil bones, among which he found the upper part of a skull, a thigh-bone, and two teeth, which resembled those of Man. Great care had been taken in removing the layers of rock one by one, so that it was ascertained that these remains were accompanied by those of animals now extinct. The bones were fossilized, harder than marble, very heavy, and of a chocolate-brown colour.

When the skull is compared with that found in 1857, at Neanderthal, in Prussia, it is observed to be less capacious, less lofty, and in other respects of an inferior type. It may be said, in popular language, to stand as far behind the skull of Neanderthal as that skull, with its low capacity, its prominent eyebrow ridges, and its rapidly receding front, stands behind a normally developed skull of the present day.

The thigh-bone shows a number of peculiarities, the most apparent of which is a large diseased excrescence of bony growth along one side of it. In a paper read at the Liverpool meeting of the British Association in 1896, it was shown that these peculiarities may be found, either alone or in some degree of combination, in thigh-bones derived from existing races of mankind. Whether the thigh-bone belonged to the same individual as the skull is not certain, but it appears to be probable that it did. If so, it would seem that the individual was of short stature.

The teeth are large, and appear from their shape to indicate a greater degree of prognathism in the face than is usual in mankind.

The question has been much discussed whether the remains are those of Man, or of an ape resembling the Gibbon. The discoverer took a middle course, as indicated by the name he gave them, and held that they belonged to an animal, as yet unknown, intermediate between the Ape and Man; in other words, one of the long-sought "missing links." In this view he is supported by the distinguished French anthropologist, M. Manouvrier, and some others. The leading authorities in England hold that the bones are human, but admit their remote antiquity and primitive form.

For the zoologist this question will not appear material. Whether we have here evidence of a type just before, or just after, or in the act of, transmission to another, it would seem that we have at least touched the beginnings of human history more closely than ever before. The trilemma is aptly expressed in the impromptu verses of a learned friend on seeing the remains :—

“ Simian skull and human thigh,  
 Why as neighbours are ye found  
 Deep beneath the Javan ground?  
 Grisly comrades, tell me why!

“ Were ye one or were ye twain?  
 Didst thou, monkey, walk upright?  
 Wast thou, bowless, in the fight,  
 By thy straight-thighed cousin slain?

“ What strange antics wast thou at,  
 Ancestor of unknown shape,  
 Ape-like man or human ape,  
 Pithec-anthro-hylobat?”

I refer to this discovery by way of introduction to the question of the evidence of the antiquity of Man in the British Isles, because I wish to urge the necessity of carrying the imagination far back. We seek for that evidence in implements fashioned by human workmanship, and we have also sought, for the most part vainly, for remains of man himself; but even if we should succeed in finding the rudest and most primitive implements that we could assert to be fashioned by Man's hand, we should still be far from the beginnings of Man. For the art of fashioning an implement, however rude it may be, is still an art, and it has to be acquired.

It required no knowledge of that art for Man, as soon as he became "erectus," to fling stones at other animals whom he wished to kill or to frighten. The significance of the erect position of Man was ably shown by Dr. Munro, in his address at Nottingham in 1893. Its mechanical and physical advantages, the differentiation of the limbs into hands and feet, and the relation between the more perfect condition of those organs and the development of the brain, were pointed out. The difference between the semi-erect attitude of the anthropoids and the perfectly upright position of Man represents a wide gap. The chief movement in the act of progression in Man is performed by an enormously developed group of muscles known as the calf of the leg. In the upper limbs the hand has become the most complete and perfect mechanical organ ever produced. From the first moment that Man recognized the advantage of using a club or a stone in attacking his prey or defending himself, the direct incentives to a higher brain-development came into existence. What a memorable event in the history of humanity (continues Dr. Munro, whose argument I have briefly summarized) was the manufacture of the first sharp stone implement!

How long it took Man to make the discovery and acquire the art, who can say? Even now, the human mind works slowly. May it not have worked even more slowly in that time of Man's infancy? It seems not unreasonable to conclude that this great discovery may have come upon him by degrees, and that the first step in it—the ascertaining that a stone with a sharp edge was more effective than a smooth one, and that such a sharp edge might be produced by smartly knocking one stone against another—would give rise to a rude and simple implement, to which a single knock had given all the effect desired. We may therefore expect that, if any remains of Man's work at this stage are found at all, they would be in such a form as to be scarcely distinguishable from stones which had suffered a natural fracture.

When, therefore, the lamented Sir Joseph Prestwich asserted that there are to be found, on the chalk plateau of Kent, a number of flint implements of rude primitive form, in which the trimming is often very slight, made on the edges of rude natural flints, besides others which, though not the result of chance, show no special design, he stated that which is not in itself



improbable. When he told us, further, that the worked edges are commonly rounded off and blunted, and the worked surfaces stained of a deep brown colour, like the natural flint, so that the artificial work is often rendered obscure, he made an admission which is significant of a very great antiquity in the objects, if they be in fact implements worked by Man's hand.

Sir Joseph Prestwich himself, indeed, seemed to shrink from all the conclusions to which his researches into the antiquity of these objects appeared to lead him. If it should prove, he said, that the rude implements have been swept down from Central Wealden uplands forming in pre-glacial times a low mountain range 2000 to 3000 feet in height with the drift which has come from that quarter, they may have to be relegated to a very early period indeed; but that must be a question for the future. We cannot refuse to exercise the same degree of caution, though we run no risk in asserting that it must be exceedingly probable that the industry of fabricating flint implements was a progressive industry, commencing with rudimentary forms, and proceeding by degrees to more elaborate and finished work.

Elsewhere the same enquiry has been pursued, and Mr. Shrubsole has discovered flint implements of the like primitive type at Finchampstead and Old Dean, in Berkshire. Mr. Allen Brown has recognized that these roughly worked flints carry Man back to an earlier period than that called palæolithic, and suggests for it the name "eolithic." Mr. A. M. Bell has also studied the question, and arrived at the conclusion that Sir J. Prestwich was right in his views.

However this may be, there can be no doubt whatever as to the flint implements called palæolithic. One, now in the British Museum, was found in Gray's Inn Road as far back as 1690. Mr. John Frere, who in the year 1797 read a paper before the Society of Antiquaries, on some flint weapons discovered at Hoxne, in Suffolk, remarked that they were evidently weapons of war, fabricated and used by a people who had not the use of metals, and must be considered objects of curiosity from the situation in which they were found, which might tempt us to refer them to a very remote period indeed. A few other similar discoveries were made afterwards, but Mr. Frere's far-seeing suggestion remained unnoticed for sixty years, until M. Boucher

de Perthes found some precisely similar flint implements at Abbeville. Since then the finds have been so numerous that the subject has become one of common and familiar knowledge. In the heart of London, as well as in many parts of the country, palæolithic flint implements have been found in enormous numbers, in association with bones of extinct animals, and in circumstances proving their immense antiquity. These animals include the Hippopotamus, Mammoth, Elephant, Rhinoceros, Lion, Wild Cat, Bear, Hyæna, Bison, and Wild Horse. Mr. Worthington Smith has discovered, at Caddington, thirty miles from London, "an undisturbed living and working place of primeval Man," and has traced there, as he had previously done at Stoke Newington, in the north-east of London, a palæolithic floor, that is, a thin stratum of flint, in some places full of flint implements and flakes, and extending over an area of several miles.

We have thus acquired, from all parts of the British Islands, abundant evidence of Man's workmanship, from which much may be gathered as to his manners and customs. Has there been any discovery of early remains of Man himself? If the answer to the question were a decided negative it would not be surprising; for there are many probabilities against the long preservation of human bones.

This, indeed, is an argument that has been strongly used against the authenticity of certain remains found in the year 1888, at Galley Hill, near Swanscombe, in Kent. I take the following summary of the discovery from the useful work on 'Ethnology,' by Prof. A. H. Keane:—

"Nearly perfect skeleton found by Mr. R. Elliott and Mr. Matthew Heys *in situ* at a depth of 8 feet in the Pleistocene high-level gravels about 90 feet above the Thames, with numerous palæolithic implements and remains of extinct mammals close by; skull hyperdolichocephalic, extremely long, narrow and much depressed, with height and breadth indexes 67 and 64; glabella and brow-ridges prominent; forehead somewhat receding; all chief sutures obliterated; three lower molars and two premolars in place; last lower molar, which in Neolithic skulls is smaller, is in this specimen as large, if not larger than the first; height about 5 ft. 1 in.; altogether most nearly related to the Neanderthal, Spy and Naulette types (Dr. Garson); 'is the best

authenticated record of the occurrence of human remains in the higher river-drift that has yet been brought forward in England.' (J. Allen Brown). From the anatomical characters Prof. Sollas thinks it highly probable that the remains were in a natural position and of the same age as the gravels, and not merely interred in them at a later (Neolithic) period, as suggested by Sir J. Evans and Prof. Boyd Dawkins (E. T. Newton, *Meeting Geolog. Soc.* May 22, 1895)."

It is certainly to be regretted that these remains were not submitted to the scientific examination of Mr. Newton until about seven years after they had been discovered. The very completeness of the skeleton has tended to throw doubts upon it; for it has been urged that, as we do not possess so complete a skeleton of the much stronger and tougher bones of the extinct animals, it is not likely that we should find one in the case of their human contemporaries. The answer to that can only be given by the circumstances of the discovery, and that answer appears to be sufficient, though not so complete as it would have been if the discovery had been made known earlier.

Small fragments of human bone have been found in other circumstances, which may possibly prove to be remains of palæolithic Man, and may tend in time to accumulate a sufficient body of evidence to afford the materials for forming a clear idea of what he was like. One such fragment was found in 1882 at Bury St. Edmunds, by Mr. Henry Prigg; and an ingenious projection of the fragment recently made by Mr. Worthington Smith shows that it coincides in its contour with the Neanderthal and Spy skulls already mentioned. A frontal bone found at Strata Florida, in Wales, in 1888, has also been investigated by Mr. W. Smith, and presents some resemblance to those types, though he is not inclined to claim any great antiquity for it.

The same excellent writer, in his work entitled 'Man, the Primeval Savage,' has essayed to draw a picture of his subject, from which I can only borrow a few touches:—"Man's voice at that time was probably not an articulate voice, but a jabber, a shout, a roar. . . . The human creatures differ in aspect from the generality of men, women, and children of the present day; they are somewhat shorter in stature, bigger in belly, broader in the back, and less upright. . . . They are much more hairy than

human creatures of the present time, especially the old males and the children. . . . The foreheads recede, the large bushy, red eyebrows meet over the nose, the brows are heavy, and deeply overshadow the eyes beneath. . . . Many of the women have whiskers, beards, and moustaches. . . . The teeth project slightly in a muzzle-like fashion; the lower jaws are massive and powerful, and the chins slightly recede. . . . Such ladies as possess lobes to their ears probably have them pierced, and a small feather pushed through the orifice. . . . The savages sat huddled close together round their fires with fruits, bones, and half-putrid flesh. . . . Then, as now, quarrels would sometimes arise over meals. . . . Man at that time was not a degraded animal, for he had never been higher; he was therefore an exalted animal, and represented the highest stage of development of the animal kingdom of his time."

Between this Man and neolithic Man, who polished his stone tools by rubbing them together, but had no knowledge of metals, there is a long lapse of time; but neolithic Man, and we ourselves through him, are lineal descendants of this primeval savage. The gap between them is proposed by some to be bridged over by a mesolithic or intermediate type of Man. The opinion most generally held is that the transition from palæolithic to neolithic Man took place elsewhere than in this country—it is suggested that it might have taken place in Africa—and that in this country there was a long interval of complete depopulation—that the palæolithic peoples all died out, and many centuries passed before the neolithic peoples arrived. It is held by some, however, that here as well as elsewhere there was continuity. Whichever view may be correct, there can be no doubt of the lineal descent, and we may accept it either with pride at having risen so high, or with humiliation at having begun so low, as we please.

The zoologist has therefore an opportunity offered to him of research for the discovery of facts that will throw light on a number of unsolved problems. The missing links leading up to *Pithecanthropus*, and from him to the pre-palæolithic peoples; the rude workmanship of these latter; the remains of palæolithic Man, and the links between him and neolithic Man, are all subjects upon which research may some day be rewarded by im-



portant discoveries. The outdoor naturalist may, if he bear in mind how much there is yet unknown or uncertain as to the real history and belongings of primitive Man, not unreasonably expect to find something that may clear up one or other of these doubtful questions. In any case, the study and training of the zoologist will eminently fit him for such an undertaking, for it is upon zoological principles and by zoological methods that such questions can most properly be determined.

I have still another appeal to make to the zoologist, but it is one which I address to him in common with the thoughtful and scientific observer generally. It is that he should join in the careful and systematic record of the phenomena of the people of our own time and country. For this purpose an ethnographic survey has been organized for the United Kingdom, and facts are being accumulated with regard not only to the physical types of the inhabitants of various places, but also to their current traditions and beliefs and their peculiarities of dialect, as well as to the monuments and remains of ancient culture in their vicinity, and the other historical documents which tend to give evidence as to the continuity of race. If each individual among us is the result not only of the circumstances by which he is surrounded, but of the physical and moral characters which have come to him by the use during countless generations of faculties that have been ever growing and widening, the close observation of the present generation may reveal much of the history of the past, and give guidance to the generations to come.

## NOTES FROM NORWAY.

BY JOHN CORDEAUX.

THESE notes have reference to a tour made in August last from Bergen to Vadsö in the Varanger Fjord, in the Bergen Steamship Company's boat the 'Neptune,' to view the total eclipse of the sun on August 9th. In crossing the North Sea from Newcastle to Stavanger very few sea-birds were seen—some Gulls, Guillemots, and an occasional Skua. When about half-way across, two Dolphins (*Delphinus delphis*) approached the boat and then shot ahead.

We left Bergen on August 1st at 11 p.m., and until we had rounded the North Cape were seldom outside the island belt (Skjærgaard) which fringes the whole length of the mainland. Opportunities were given, both on the out and return journey, for spending several hours on shore at those places where the vessel called—such were Aalesund, lovely Molde, Christianssund, N. Trondhjem, Torghatten, Harstedhavn in the Lofotens, Svartisen glacier, Tromsö, Hammerfest, North Cape (Hornvoek Bay), Vardö, reaching Vadsö at 3 p.m. on August 7th.

The commonest Gulls on the coast are the Lesser Black-backed and the Herring Gull, mixed flights of both following in the wake of the steamer almost continuously on the chance of picking up any scraps thrown overboard. Other Gulls were the Great Black-backed, the Common, and the Kittiwake; the latter, north of the Arctic Circle, being the predominant species and increasing in numbers the farther we go north. A few miles south of the Bird-rock (Hjelmsö), near the North Cape, we passed through an enormous flock of Kittiwakes floating in long extended line, the birds in the rear constantly rising and flying over the heads of those before them to take a front place. All were so eagerly feeding that they took little notice of the passage of our boat, being much too busily engaged picking some small object from the water, probably some of those small crustaceans which form the food of the whales. A large proportion were birds

of the previous year retaining the black markings on the neck. This also was the case at Hjelmsö, where two cannon were fired under the cliff, and instantly on all sides, and across our deck, the air was cut by the passage of countless birds all rushing out to sea; Guillemots, Razorbills, Puffins, Black Guillemots, Cormorants, and thousands of Kittiwakes; high aloft, above the excited throng, floated a large Buzzard, probably *Buteo lagopus*, the only bird of prey I saw in Norway. The sea was covered with the young of Guillemots and Razorbills unable to fly, and our slowly revolving screw I thought must have destroyed several as we steamed at slow speed in front of the black mural precipices on whose ledges the little swimmers first saw the light of the arctic summer. On many of the low flat holms on the coast the Gulls of various species appeared to be nesting by hundreds, with swarms of young grey birds running about the rocks, but none able, as yet, to use their wings. In most cases probably the first eggs from two layings had been taken. The pretty Black Guillemot, in pairs, is one of the commonest sea-birds on the coast. I never saw a Gannet, the Fulmar, Great Skua, or a Shearwater. Several Pomatorhine Skuas, especially north of the Circle and in the Lofotens; Richardson's and Buffon's Skuas were both exceedingly plentiful. Much amusement was afforded on board the 'Neptune' by watching these pirates chasing and bullying their neighbours, descending swiftly and striking the unfortunate victim on the back till he had paid toll by disgorging his honestly-earned meal. I always thought a Gull on the water was safe from their attacks, but this was not the case. Two beautiful adult long-tailed Buffon's Skuas made a most determined attack on a Lesser Black-back on the water. The Gull screamed his best, but the persecutors never desisted till they had gained their point. Both the smaller Skuas were very abundant between the Cape and Vardö in the Arctic Ocean, being constantly in sight on these wilderness waters. Both the Cormorant and Shag are common, the latter especially. I never saw so many Shags in one day as I saw in the Jarfjord east of the Varanger, and touching the Russian frontier. They sat on the rocks in lines and groups, slowly beating their expanded wings, like so many old ladies in dark shot-silk dresses fanning in a hot ball-room.

When running up the coast a few pairs of Grey-lag Geese were seen, also a considerable flock, presumably of this species, on a low grassy holm, before coming to the mountain peaks known as the "Seven Sisters of Alstenö." The Merganser was common in the land-locked sounds and fjords, sometimes with a string of downy mites in close company; the Goosander I failed to identify. Ducks innumerable of many species and with crowds of young. From the deck of a steamer it was impossible to identify them, the males, too, being generally in the "eclipse" plumage. Those I succeeded beyond doubt in making out were the Hareld or Ice Duck, Common Pochard, Goldeneye, and Common Scoter. Eiders in immense numbers about the coast villages and fishing stations, semi-domesticated, and nesting in some cases at the foot of walls of houses. The Eiders are strictly preserved during the nesting season, and the "down-harvest" is a most important source of revenue to many who live on the coast and rent the various islands. I paid twenty shillings a pound (English weight) for eider-down at Bergen.

Red-throated Divers were frequently seen and the Black-throated much less so. Altogether during the three weeks on the coast I may have seen half-a-dozen *Colymbus glacialis*, amongst them it is possible there may have been an example of the western-arctic *C. adamsi*, numerous examples of which now exist in some of the Norwegian museums; regarding this western species on the Norwegian coasts, see Prof. Collett's paper in 'The Ibis,' 1894, pp. 269-83, and plate. Of the Arctic Gulls I saw nothing, except a Glaucous Gull, a bird of the previous year on the wing, off the mouth of one of the northern harbours. When running up the coast and close in to the sides of the islands I often saw various waders on the rocks and shingle—Oystercatchers, Turnstones, Redshanks, Purple Sandpipers, Whimbrel, and Ringed Plover, were all identified. The only Tern was *Sterna macrura*, the Arctic Tern, very numerous in some localities. Magpies are plentiful inland, and very familiar and bold. The Grey Crow everywhere, old and young together; some of the Grey Crows in the north have the grey almost white, and in bright sunlight I thought had a rosy tinge. Ravens were in great force about all the Arctic whaling stations. At Vadsö during the eclipse, and as the gloom thickened, a pair flew to and fro over the harbour,



croaking most dismally. The Oystercatchers also got on wing calling incessantly "peep-peep."

When in the Varanger and Jar fjords I spent some time on the look-out for Steller's Eider, but never came across this duck; perhaps it was too early in the season. It is said to be not uncommon in winter in these waters.

One of the prettiest sights I have seen for many years was a flock of 150 to 200 Ruffs and Reeves in a small wet, recently cut meadow between Vadsö and the moors. A stream ran through the little enclosure fringed with arctic willow and *Comarum palustre* in flower. About one-third were Ruffs; these birds were excessively tame; they were running quickly, with the tibio-tarsal joints much bent, and all eagerly picking out some small object from the grass. Now and then a Ruff would raise himself to the utmost his legs and neck would permit, and look round as much as to say "What is your business here?" When the flock rose they merely circled round close to the ground, and all alighting at once resumed their search within a few yards of where I stood. It was beautiful to watch them, exhibiting as they did not the slightest fear of man. Another interesting sight was the numerous flocks of Phalarope in Vardö and Vadsö harbours; they sat on the water like small butter-bowls, each little head nodding incessantly as they paddled to and fro. They were very tame, keeping the water when only a few yards beyond the sweep of the oars of passing boats, and alighting amongst the shipping. I saw many also on the more open waters of the fjord and in rocky pools on the side of the Jarfjord, swimming very rapidly here and there and snapping at insects.

Of the smaller birds I found on the tundra north of Vadsö and about the whaling station in the Jarfjord, Lapp Buntings, Bluethroats, Red-throated Pipits, White Wagtails, besides the Pipits already noticed by me in 'The Zoologist' (1896), p. 352. I saw the Hedgesparrow on the outskirts of Vadsö, great numbers of House Martins, but have no recollection of seeing any Swallow there, nor the common Sparrow. I never saw a Rook anywhere in Norway north of Bergen. The Willow Wren was common. I watched the Marsh Tit (*Parus borealis*) on some tall plants in the yard of the Marine Barracks at Trondhjem. This seems a very good species, if size and coloration are of any account.

The Wagtails seen were old and young birds of the universal *Motacilla alba*, and once in the north the dark-headed Yellow Wagtail, *M. borealis* of Sundeval, with almost black crown and no eye-streak.

The only notice I have of Fieldfares, besides a few near Voss, was seeing a small flock flying over the birch wood on the hill-side leading up to the foot of the Svartisen glacier in the Holandsfjord. This I think must be the very same wood in which Messrs. Pearson and Bidwell found the Icterine Warbler's nest in June, 1894. It is a charming wilderness of birch, covering rocky ground, on the hill slope, and with a wealth of ferns, meadow-sweet, rose-bay, golden-rod, and aconite, all the flowering plants in full bloom, also the very finest and largest clusters of hair-bells (*Campanula rotundifolia*) I have ever seen in any part of Europe. Through a canopy of golden-green foliage, lighted by a brilliant sunshine, you got upward glimpses of the great glacier, sweeping downwards from an ice-field of over forty miles in extent. The colour of the ice is a pale malachite-green and crossed with gaping crevasses of cobalt. On the terminal moraines of the glacier our party collected a large number of arctic plants. The Trout were rising everywhere along the shore of the fjord, and made one long for a trout-rod and handy boat.

Nothing struck me more in Arctic Norway than the enormous extent of the birch forests, filling the valleys and clothing the sides of the mountains, till they give place to cold grey rock and a sparse vegetation, with long streaks and patches of pallid snow, carrying the eye forward and upward into the interminable ice-plateaux and the grey-blue shadow-lands of the higher ranges. There seems to be everywhere, both inland and on the bleak tundra, on the shore of the Arctic Ocean, room for all the birds in Europe to nest and enjoy the long summer day of those high latitudes. Unfortunately the time allotted to us did not permit much inland exploration.

Some other birds in my list are a flight of about fifty Green-shanks at Vadsö coming down from the tundra to the shore, some Golden Plover in the same place, and a good many Redshanks. At Voss, and between Bergen and Voss (where I was staying from Aug. 15th to 17th), I noted several Herons, quite a large flock of Woodlarks on some firs by the side of the river, and

an Ortolan; Wheatears plentifully. At the Store-Lerfos, near Trondhjem, the Scandinavian Black-bellied Dipper (*Cinclus melanogaster*).

A sharp look-out on board our steamer was kept for cetaceans. At the whaling station on the Jarfjord two Whales were on the slips, and had been partly flensed and cut up. One was the Common Rorqual (*Balænoptera musculus*); the other, so far as I could make out from its long flippers, a Humpback (*Megaptera longimana*). These flippers are wholly white in living or recently captured specimens. On leaving the Jarfjord we were fortunate in seeing a Common Rorqual brought in towed alongside one of the steam whalers. This was about sixty feet in length, and some good photographs were taken of the animal alongside, our own steamer and the whaler stopping for that purpose. In the fjord near Christianssund N. were two species of Dolphin; one of these was dark coloured above and below, and probably referable to *D. tursio*; the other a beautiful black and white one. Two of these latter raced along the side of the ship; they reminded me of a pair of greyhounds in full stretch, now one and now the other making a sudden rush ahead, or diverging from its course to seize some surface-swimming fish (probably mackerel) disturbed by the passage of the steamer. These Dolphins were close to the surface in absolutely clear water; from their markings I have no doubt they were *D. acutus* and not *albirostris*.

On the return voyage to Newcastle, when about fifty miles from the Tyne, we passed through a fleet of Dutch boats, fishing with their masts down. A very large Whale was rolling slowly along, and showing little but his back. Species not determined.

One feature of these northern seas is the enormous abundance of marine invertebrata—*Scyphomedusæ*. They may be seen suspended at all depths in the marvellous transparency of the water. The commonest form has four circular purple rings, like a double eye-glass, at the summit of the disc; others are like parasols—scalped heads, from the colour, somebody called them—with sheaves of long semitransparent tentacles streaming in their wake like the tail of a comet. Progression is a system of contraction and expansion. When the ship was stationary in the harbour, or from some wooden pier, we used to watch them, yawning and gaping their way along in a dilettante manner, much

after the fashion that easy-going people pass through life—in a sort of jelly-fish existence.

There are excellent museums at Tromsø and Trondhjem, and a most interesting one at Bergen; and, from an ornithological point of view, particularly rich in game-birds, hybrids, and various plumages—one a hybrid between the Black Grouse and Capercaillie. I particularly noticed many most beautiful varieties of *Turdus pilaris*; a nest of *Garrulus infaustus*, built of twigs of fir and red hair-like lichens, exactly matching the colour of the sitting bird; a beautiful compact well-built nest and eggs of *Hypolaïs icterina*; a specimen of the Ruddy Sheldrake, labelled "Skudesnæs, 12 x. 92"; the American Surf-scooter, *Ædemia perspicillata*, Hjellefjord, Sept. 23rd, 1893, a fine adult male. There is a good collection also of Viking remains and stone implements, which will well repay inspection.

The Bergen Fish-market is a great feature of the town, the smaller fish being kept alive in wooden tanks with a constant stream of salt water passing through; the fish are ladled out with hand-nets to purchasers. Here I saw examples of the Tadpole-fish or Lesser Fork-beard, about fourteen inches long, and of a deep brown colour; also two richly-coloured Wrasse—the Blue-striped and the Ballan Wrasse—and the brilliant Bergylt, the so-called Norway Haddock.

One, if not the chief, industry of Norway is the fishing trade. The Lofoten fishery employs 8000 boats and 30,000 men; the take in 1895 was thirty-nine millions of Cod, in 1896 about twenty-one millions.

As the ornithologist on board the 'Neptune,' I cannot think our voyage to the Arctic Seas was a very remarkable one, as few except marine and shore birds were observed. Botanically, however, considering the lateness of the season, we did very well, and brought back many interesting plants from the tundra north of Vadsø. Eight of these shrubs and plants of the tundra bear fruit in the greatest profusion; the berries remain sweet and uninjured below the snows of winter, and in the spring supply the migrating birds with an inexhaustible supply of food.



## NOTES ON THE CHACMA BABOON.

BY W. L. DISTANT.

DURING a four years' sojourn in the Transvaal I saw many of these animals (*Cynocephalus porcarius*), heard much about them, had two in my possession as pets for nearly three years, and have still one which I brought home with me.

When travelling up country from the Cape in 1893, a troop of at least fifty crossed the railway track just in front of the train at early morning, evidently returning from some marauding expedition. I was told by an old Africander that Baboons and "other vermin" were becoming more plentiful in the colony, owing to the little shooting now done by the farmers.

I was also informed by a very intelligent Africander whom I frequently met in Pretoria, that Baboons can count up to three, but not higher.\* As proof of this he related the following experience:—In early days he was once on his brother's farm near where Johannesburg now stands, and where Baboons were committing severe depredations on the mealie crop. As usual, there was one of these animals posted as a sentinel to give warning of the approach of the irate and armed farmer, when the raiders would decamp to a rocky eminence in the vicinity. My informant was accompanied by two friends, making with the farmer four in all. Now, he said, we "will do the Baboons," for they cannot count more than three, and we will leave one of our party behind. They accordingly approached the thieves, who immediately fled, the retiring sentinel still watching them. Three of the men then returned, leaving the armed farmer secreted among the mealies. In a short time the word seemed passed among the Baboons that all was right, as the three human visitors had been seen to retire; the animals once more came forth to steal and feed, and the first

\* Mr. Romanes has stated that the Chimpanzee "Sally" was instructed in this art, and that before death her "counting" extended as far as ten. (See 'Darwin and after Darwin,' vol. ii. pp. 31-2, notes.)

thief paid for his limitation in calculating power with his life, as he fell a victim to the farmer's rifle.

Both the specimens I kept were females, one old and the other young, and as time went on our intimacy ripened, and they seemed to become to me more and more like poor relations. The young one I bought from a Boer, who had shot the mother and captured the offspring. It was only after some six months' acquaintance that this animal would be at all friendly, and the explanation I take to be that from wearing a long beard I was not altogether unlike a Boer, and the young Baboon had formed both a distrust and hatred for the murderer of its mother and the capturer of itself. This seemed the more probable, because it always trusted my son, and was friendly with the Kafirs; whilst, though I never punished it in any way, and bribed it continually with sweets and fruits, it still remained a slave to first impressions. This animal used to sleep with a large bull-terrier bitch in its kennel, winding its arms round the body of the dog, which unfortunately died during the Transvaal winter, and the young Baboon contracted a temporary asthma soon after sleeping alone.

I chained this little animal up outside my office window, the length of chain allowing her to sit when she pleased on the window-sill, which she constantly did, only separated from me as I sat at my desk by the glass; but the moment I went outside all good relations were at an end, and she showed terror and dislike if I approached within a distance of three feet. She perfectly understood the separating medium of the glass, which she never attempted to break. Even after six months there was still great distrust, and only the friendship of an armed truce.

Very different was the conduct of the other full-grown matron, who had been long in captivity before I received her as a present. This female, who rejoiced in the name of "Jack," possessed the greatest intelligence I ever met with in any animal not of our own genus. Unlike the younger one, she was friendly to all "whites," but had a perpetual feud with "coloured people," especially Kafirs, who as a rule gave her a wide berth, thus escaping bites, but receiving whenever possible bricks, stones, or other missiles, hurled with no little force and precision. In cold weather—such as winter nights—or when exposed to the full

rays of the summer sun, she invariably covered herself with a sack as protection, using it as a white woman does a cloak, or a Kafir woman a blanket. Her staple food was boiled mealies varied with bread, of which she was particularly fond. Add carrots, an occasional cabbage, fruits such as bananas and oranges, and on high days some pine-apple, nuts, a few sweets, or a handful of tobacco, and her tale of food is completed.

Between us there became an established friendship, incapable of being expressed in articulate speech,\* but more or less communicated by friendly actions, mutual confidence, and a slight recourse to the universal language of gesture. Such a mutual understanding as existed, and between two animals so widely separated in the zoological scale, was a source to me of sincere pleasure, and also a form of compliment. My poor relation, the Baboon, was really anxious for comradeship, was always grateful for favours, and anxious to please. I once asked a clerical friend to study her as an example of original sin. She had, of course, no morals—unnecessary in a Baboon community—and she was cheerfully superior to all shame. She was greedy, passionate, truculent, and revengeful, but as a rule contented, appreciative of good living, highly courageous, and open in expressing her likes and dislikes. Stoical in bad weather, she was epicurean in the sunny fruit season. Decidedly cynical as far as appearances are concerned, she was yet sophisticated, when, with cheeks filled with nuts, she returned an innocent glance to my sceptical deportment before providing more.

This animal would have been useful in a cricket field for her quickness and aptitude in catching. With oranges, I tried her all ways,—with pitches under-hand, and swift straight shots,—but she seldom missed any, and often caught with one hand. She once directed my attention to a flock of vultures soaring overhead, and which I had not noticed. An East Indian vender of pastry frequently visited us, when I usually purchased a tart or bun for the young Baboon and herself. Should this man come

\* Anderson said that his Bushman told him he could understand the Baboon language,—when they are frightened, or hungry, or are to meet together to defend themselves against an enemy, or to meet to play,—and he knew well what they said, and could talk to them. ('Twenty-five Years in a Waggon,' p. 217.)

without my seeing him, I was always notified of the fact by a series of barks, screams, and grunts.

When I first searched for insects in the Transvaal, and in a valley beneath high cliffs, I was intensely surprised to find the stones turned over before my arrival. Being positively certain that no other geodephagous coleopterist was in the neighbourhood, I was somewhat inclined, like the Roman missionaries, who, on their arrival in Thibet, found Catholic ritual among the Buddhists, to ascribe the circumstance to occult influence; but this was before I became acquainted with the insect-searching attributes of my friends the Baboons.

I am not aware of any published records of the menstrual periods of female Baboons. These are not zoologically unimportant, and appear to be somewhat irregular. My observations on one animal during 1894-5 were as follows:—Oct. 15th, Nov. 23rd, Dec. 27th, Jan. 30th, March 8th, April 15th, May 20th, July 4th, Sept. 9th, Oct. 21st.



## NOTES AND QUERIES.

## MAMMALIA.

## HOMINIDÆ.

**Early Man in Britain.**—At Brandon, a village and parish on the borders of Suffolk and Norfolk, there have been recently found, in a field within eighty yards from the Little Ouse or Brandon river, no fewer than sixty-three skulls, which have been examined and described by Mr. Charles S. Myers, B.A., in the ‘Journal of the Anthropological Institute.’ Mr. Myers is inclined to “assign these remains to a people that lived antecedent to the Saxon invasion. Indeed, there is but one skull in this series that presents in any degree the physical characters of Saxon crania.” This prompts the further conclusion that, “if the Brandon skulls date, as there is every reason to believe, from an age prior to the Saxon invasion, the presence of a Saxon in England at this date demonstrates that the Saxon invasion took place more gradually than history would have us conceive, or that Saxons were included in the auxiliary forces introduced by the Romans. Doubtless both these alternatives are true. Even in pre-Roman times the Iceni were a mixed people. Thus the Roman institution of the *Comes Litoris Saxonica* becomes fraught with a new meaning. On some such hypotheses the early Brandon folk may well have received a sprinkling of Saxon settlers along the Ickniel Way from the eastern ports.”—ED.

## CARNIVORA.

**Dogs of Draught in Belgium.**—No visitor to Brussels can fail to be struck with the number of Dogs which are to be seen about the streets employed in drawing small carts and barrows. It has been recently estimated that in the capital alone more than 10,000 Dogs are thus employed, and the number of draught Dogs throughout the country is probably not less than 50,000. Generations of servitude have thus made the Belgian Dog a race *sui generis*. For his size he is said to possess the greatest pulling power of any animal, four times his own weight being considered a load well within his powers. Taking his average weight as 56 lbs., or half a hundredweight, this means that something like 5000 tons are daily dragged about by Dogs in Belgium. The economic importance of the Belgian Dog, and his inability to give expression to his own grievances,

have caused the Royal Society for the Protection of Animals to agitate for the amelioration of his lot.—J. E. HARTING.

#### AVES.

Winter Notes from Winchester Water-meads. — September.—The Peewits are gathering together now into large flocks, and are always flying south by easy stages. On the 29th I came across a company of 500 or so that had settled in a ploughed field, and was feeding in a dense mass and chattering. I noticed in this case that a few individuals had separated from the main body, and appeared to be acting as signals to any stragglers that happened to be in the neighbourhood by flying, apparently aimlessly, at a considerable height, and never straying far from their companions. On this date I disturbed a Green Woodpecker from a small copse on the roadside. We have not been visited yet by any Gulls; the weather has been clear and fine for the most part.

October.—The first Gulls (*Larus canus*) arrived on the 7th, in a violent storm of rain and wind, between 12 and 1 o'clock. They left us the next day. I have noticed that these birds utter their sharp cries only when in the act of arriving or departing, but when they are sailing leisurely over the river here they are quite silent. The Sand Martins are collected in large quantities by the end of October, and leave us, save for a few stragglers, by the first week in November. On the 9th there were some birdcatchers in water-meads, who had committed considerable havoc among the Goldfinches, which are numerous here. A fine cock-bird was ensnared as I passed. They had caught a Sparrowhawk, which had flown down into their nets after the decoy-bird. The place which they had chosen for their unlawful sport was entirely public, but the men were not in the least disconcerted. On this date two solitary Peewits passed over, flying south. On the 13th there were five Herring Gulls wheeling at a great height on the other side of St. Catherine's Hill. On the 28th, during a journey to Oxford, I noticed a large flight of Peewits and numerous Fieldfares in the water-meads on the north side of Winchester. The Gulls have not arrived permanently yet.

November.—On the 1st a solitary Gull passed over College, flying inland (west). The Jackdaws and Starlings, which nest in the loosened stones of the College chapel, can be seen together with numerous Rooks in water-meads. On the 6th the Pied Wagtails arrived in numbers, and one bird frequents the College buildings. On the 17th a flock of thirty Gulls arrived, and these birds have stayed all through the winter, their numbers sometimes being increased by new-comers, and sometimes reduced by absentees. On the 22nd two large flights passed over, and finally took a southward course. A Herring Gull visited his congeners in water-meads,

but left immediately. The Pied Wagtails are collected in numbers in water-meads by this date. A Wild Duck was floating dead in the river. On the 24th it was clear, with a north wind. A flock of eighty or ninety Gulls passed southwards, flying high. A party of six Brent Geese flying inland (west) passed over water-meads in the morning. The Linnets are numerous and gay. Flights of Gulls, numbering fifty, thirty, forty, eighty, sixty, forty, passed southwards between 2 and 4 o'clock, flying high. A congregation of Fieldfares was disturbed by a Sparrowhawk while feeding in the water-meads by St. Cross. On the 29th one solitary Peewit was flying south over Winchester in the morning.

December.—On the 2nd the first Grey Wagtails have arrived in water-meads, looking very bright with their yellow breasts. There are 100 Gulls feeding in a ploughed field on St. Catherine's Hill, with numerous Starlings. Chaffinches swarm on St. Catherine's Hill and in water-meads. By the 6th the Grey Wagtails are more numerous. On the 8th I saw the Reed Buntings in water-meads for the first time this winter. This bird breeds some way further down the river. The cock-birds are very easily distinguished by their black heads, but the females may often be carelessly mistaken for a Sparrow. By the 17th the Grey and Pied Wagtails are still more numerous. On the 22nd I saw six or seven Bullfinches in water-meads for the first time this winter. The Gulls are as numerous as ever, but have to content themselves, unlike their relations in St. James's Park, with what food they can pick up for themselves.—G. W. SMITH (Ivy Bank, Beckenham).

**Breeding of Corncrakes in Confinement.**—In 1895 I reared a pair of these birds from the nest, and they passed the very mild winter (1895-96) in an indoor aviary. About April 24th I turned them into their summer quarters in an outdoor aviary, and the following day the male started craking vigorously. Towards the middle of May a hole was scratched out in the ground, but it was not until June 12th that the first egg was laid, when the male at once ceased to crake. They would not sit, and on the eggs being removed the craking recommenced, and a fresh hole was hollowed out, and lined with bents, dry grass, &c., and a clutch of eight eggs laid. Incubation, which was carried on by the hen, lasted seventeen days. Both sexes look after and feed the young, which, although they leave the nest on being hatched, do not attempt to feed themselves for about four days. The parents hold the food in their beaks, uttering at the same time a soft and almost inaudible sound, while the young, readily responding to the call, run up and take the food. The young were full grown and able to fly at about seven weeks old, their flight-feathers being the last to grow.—J. LEWIS BONHOTE (68, Lexham Gardens).

**The Flight of the Swift.**—With reference to the question asked in the December number of 'The Zoologist,' as to whether this bird is able to rise from the ground, I have found it utterly unable to rise from a perfectly level surface, such as a well-kept road or an oil-cloth-covered or carpeted floor; but from a neglected road, full of ruts and hollow places, it can and does rise, lifting its wings high over its back, and raising itself from a slight elevation by the first downward flap. Its efforts to rise from a carpet are ludicrous, as its long claws enter the texture, and with its first effort it tips forward helplessly. I should expect grass to interfere with its rising, the blades catching in the feet, and thus partly counteracting the lifting effect of the first flap. On a dead level road the tips of the wings strike the surface, and it merely flops along, or that has been the case with those which I have observed.—A. G. BUTLER.

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**Correction.**—In my note "On a chocolate-coloured variety of *Perdix cinerea*" (Zool. 1896, pp. 472-73), some errors have occurred in printing. On p. 472, sixth line from bottom, for "Hinder tail-coverts" read "Under tail-coverts"; p. 473, third line from top, for "Hinder wing-coverts" read "Under wing-coverts"; seventh line from top, for "height 12½ in," read "weight 12½ oz."—F. COBURN (Holloway Head, Birmingham).

#### PISCES.

**Abundance of Sharks in Tropical Seas.**—It is singular how few zoological ideas and facts occur to a naturalist on the most frequented tracks of the ocean; the apparent sameness in the vast wilderness of water seems to oppress and stifle observation. One circumstance, however, has always presented itself to the writer when traversing the ocean in tropical regions, and that is the abundance of Sharks, so easily overlooked. When sitting reading near the rails, a casual glance at the water frequently detects the dorsal fin or even the body of a Shark disturbed by the huge liner. Seldom is a prolonged stay at the bows in tropical regions unrewarded by a sight of one of these monsters. It is obvious that those we accidentally notice can form but a small ratio to the number disturbed by the ship, which again passes only as a mere speck through the regions they inhabit. Probably other readers have had the same experience, and it almost seems that the prodigious number of these fishes is barely estimated.—ED.



## NOTICES OF NEW BOOKS.

*Red Deer*.—Natural History, by the Rev. H. A. MACPHERSON; Deer-Stalking, by CAMERON of Lochiel; Stag-Hunting, by Viscount EBRINGTON; Cookery, by ALEXANDER INNES SHAND. Longmans, Green & Co. 1896.

THE Fur and Feather Series with this volume maintain their standard of excellence in Natural History and Sport. In fact, one great merit of these volumes is to show how sport and natural history should be combined, and not divorced as is so frequently the case. Of course there is no necessity for the naturalist to be a sportsman, though every field naturalist has some of the spirit and ardour that pertain to that pursuit; but there is every reason for the sportsman to be—as he often is—an observant naturalist, and his opportunities are great. To readers of 'The Zoologist' the principal interest will be found in the contribution by Mr. Macpherson, who in delightful phraseology that recalls the scenes among which the Red-deer is found, gives us a local narrative of the life of the animal.

As our author remarks, the history of the wild Red-deer (*Cervus elaphus*) is closely interwoven with our national life, and we may well sigh for the times when "The Weald of Kent was no less the haunt of well-furnished hinds than the waste lands of Lancashire, or the more distant solitudes of central Scotland." Much has been written on the Irish deer, descriptive justice has been done to the English and Scotch deer, but, as we read, "Curiously enough, no one except the writer himself has attempted the life of the stag upon the face of the mist-wrapped hills of the English Lake district. In the forest of Martindale, situated in the very midst of this Lake-land, the deer "which once roamed from the shores of the North Sea to the red sandstone cliffs that break the swell of the Irish Channel, have for many years past found their only northern sanctuary," and as existing in this haven Mr. Macpherson tells the tale of their lives.

These Martindale deer appear to have had no change of blood until thirteen or fourteen years ago, when one stag calf and five hinds were procured "from a well-known forest on the Scottish mainland," which soon mingled freely with the English hinds. "In a forest like Martindale, where there is no other wood than stunted hazel or wind-twisted thorns and alder, the deer are forced to subsist throughout the year on an admixture of short sweet grass and strong wiry bents, besides heather where they can get it. When Martindale was cropped with extensive fields of oats, the deer used to break bounds, and often inflicted considerable injury on the ripening grain before it was carried. At the present time the stags roam in winter in search of fields of turnips, repeating their incursions night after night, in spite of careful watching." But we cannot give more extracts, and must cease our peaceful contemplation of the animal and proceed to "Deer-stalking" under the guidance of Cameron of Lochiel.

Here the scene is changed to the Highlands of Scotland, and though sport is now the main topic there is still much to interest the zoologist. We seem always born too late to have known nature at her best. The name of deer-forest is almost as misleading as that of a Boer farm. Yet at the same time the first is at least a survival, and "seems to confirm the opinion, if confirmation be necessary, that vast regions of the Highlands were in former times covered with indigenous forests of the various species of trees, whose descendants, in sadly diminished numbers, are found at the present day scattered among the valleys and on the hill-sides of most of our northern counties." The owners have altered as well as the forests. There was a time, as our author informs us, when a nobleman was not expected to so far derogate from his position as to go into the forest and shoot deer himself when a forester was kept for that purpose. Now a successful millionaire considers he puts the seal on his social position by purchasing his right to do so. We are therefore not surprised to learn that at the present day it is calculated that about 4000 stags are killed annually. But the rifle is not the only enemy of the deer. "Spring is the ticklish time of year for all animals in the Highlands. If deer are very much reduced during the winter, they are bound to suffer when the grass begins to grow. If they are in good order they proceed to lay on flesh

at once, and thus gain the full advantage of the summer grazing. It is in spring that those cold east winds prevail, often accompanied by hot sun in the day time, which parch the ground and give it a white, desert-like appearance. A well-wintered stag must be better able to stand this particularly trying period of the year than one which has only just been able to pull through the cold north-westerly blasts of wind bringing sleet, snow, or rain, which may not improbably have formed with little interruption the weather of the past four months."

Stag-hunting, by the Viscount Ebrington, transports us to Devon and Somerset, where it "is the only survival in England of a sport which was followed in earlier days in most countries in Europe, and which still has many devotees on the Continent." The total head of deer in this locality is estimated by the author at about four hundred, while the average number killed for the last ten seasons is sixty. Although sport is there again the principal theme, there are scattered notes of the greatest interest to the naturalist. Thus:—"Something is to be learned also from the feeding of the deer. If the bark of a tree or the ivy growing on it is gnawed up and down, it is the work of a hind; but if the bites are across the trunk they are a stag's." Again:—"A stag crosses his legs right and left in walking, while with a hind the prints of the hind foot will be in a direct line with those of the fore foot unless she is heavy in calf; and it is curious, seeing how careful Nature is to protect animals in that condition, that they should in anything resemble the male at that period. The extra weight on the legs is no doubt the reason, and at calving time the stags are defenceless too, having shed their horns." Another query of interest is, "What becomes of the old deer? They are not all killed by the hounds; a few may meet with foul play, but some must die a natural death. Yet it is hardly ever that their bodies are found."

The fourth section of the volume is devoted to "The Cookery of Venison," a subject of importance to every right-thinking naturalist and sportsman, but one outside discussion in these pages.

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*Oceanic Ichthyology: a Treatise on the Deep-Sea and Pelagic Fishes of the World.* By GEORGE BROWN GOODE, Ph.D., LL.D., &c., and TARLETON H. BEAN, M.D., M.S. Washington. 1895.

THE publication of this great work—in which the authors, with the modesty that pertains to excellence, disavow the formation of “any conclusions which are new to science,” though justly claiming that “a great number of new facts are recorded—worthily upholds the best traditions of the Smithsonian Institution. The aim of the authors is best expressed in their own words:—“Our purpose has been to present in *Oceanic Ichthyology* a discussion of all forms of fishes found in the seas of the world, both pelagic species and those occurring at depths greater than 500 feet, especial prominence being given to those species which are found in the Atlantic Ocean, most of which we have had an opportunity to study. All oceanic fishes are included, partly because it is not yet possible to distinguish strictly between the two classes, and partly because the pelagic forms have, in part at least, been mentioned in the discussions by all previous writers on deep-sea fishes.” The publication will therefore find a place with, and also supplement, Prof. Collett’s descriptions of the Fishes of the Norwegian North Sea Expedition, Dr. Günther’s ‘Deep-Sea Fishes of the Challenger Expedition,’ Dr. Vaillant’s Report on the Deep-Sea Fishes of the Travailleur and Talisman Expedition, and Alex. Agassiz’s ‘Contributions to American Thalassography.’

There is a great charm in learning the forms of life that inhabit the gloomy oceanic depths. And we still know little, for, though we are told some 600 different kinds of fishes have been obtained from the depth of 1000 feet and more, there can be little doubt that the tale of the sea is not yet told. “It seems probable that there are many inhabitants of the depths which are too swift, too wary and cunning, or too large to be taken. It cannot be doubted, for example, that somewhere in the sea, at an unknown distance below the surface, there are living certain fish-like animals, unknown to science and of great size, which come occasionally to the surface and give a foundation to such stories as those of the sea serpent.” Here therefore exist



the potentialities of zoological discovery of the most absorbing interest, liable almost to provoke romantic speculation. As the once discredited Herodotus has now been rehabilitated by recent African discovery, so some of the wild traditions of ocean life may come to have an explanation; myths to have some kind of realities, and fables prove to have been at least based on facts. We have, however, some negative data to qualify supposition. "The recent investigations of Mr. Agassiz in the Pacific, with the Tanner net, seem to show pretty conclusively that there are but few living forms below a depth of 1800 or 2000 feet." On those found still deeper the abyssal environment has produced much modification. Thus of *Lionurus filicauda*, Günther, reported as from great depth, its describer refers to the small eye, the soft bones, the lack of firmness in the scales, and the filamentous tail as indicating its abyssal abode.

As one turns over these more than 500 quarto pages devoted to generic and specific descriptions, with the careful details of local habitats, and when the reader may have done something of this monographic and faunistic work himself, he cannot help feeling that apart from all else, the patient labour of zoologists is an established fact. Such authors have few readers, appeal alone to their peers, and did they accept the axiom of Goethe, that he "who does not expect a million of readers should not write a line," works like those under notice would never be produced.

The accompanying Atlas contains 417 figures.

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*Coloured Figures of the Eggs of British Birds, with Descriptive Notices.* By HENRY SEEBOHM. Edited by Dr. R. BOWDLER SHARPE. Sheffield: Pawson & Brailsford. 1896.

THIS beautiful publication may be taken as the last contribution of the late Henry Seebohm to British Ornithology. Other material may yet be printed, but it will not probably wholly pertain to "our rough island story." It is a fitting sequel to the same author's 'History of British Birds,' and though Seebohm did not live to see it published, there can be no doubt that his wish would have been gratified in having it edited by his friend Bowdler Sharpe. The system of classification is as proposed by

the author, and with this we have nothing to do, for we are here concerned with eggs and not systems; in fact, criticism should be a matter between oologists and the work of the lithographers. Whether this is much required seems almost answered in the negative by an examination of the plates, which, belonging to an English work, we rejoice to see were done in England.

The descriptive notes are full and to the point. The geographical area over which the bird is at various times to be found, the place and time of nidification, the structure of the nest, and the shape, size, and colour of the eggs, are alike—where possible—given. A full enumeration of species is contributed, including the Great Auk (*Alca impennis*), two particular eggs of which belonging to the Museum of the Royal College of Surgeons, are now figured for the first time. To conclude a necessarily brief notice, we may surely say that we now possess *the book on British Birds' Eggs*.

The many surviving friends of Henry Seebohm will appreciate the striking portrait given as frontispiece, while in writing the personal memoir Dr. Sharpe has escaped both the Charybdis of panegyric and the Scylla of criticism.

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*By the Deep Sea: a Popular Introduction to the Wild Life of the British Shores.* By EDWARD STEP, F.L.S. Jarrold & Sons. 1896.

IN perusing this book we are reminded of a long ago, when Wood's 'Common Objects of the Seashore' was a well-thumbed companion of our early days, replaced subsequently by Gosse's 'Naturalist's Rambles on the Devonshire Coast.' It sometimes seems that this branch of Zoology is not so popular as it was once; we more seldom see the private marine aquarium, less often meet with the shore collector. We are all aware of the great advance in scientific Zoology made by competent observers at Marine Stations, and may at once cite Plymouth; but our remarks are only intended to apply to the readers for whom the book is written. "In the present volume it is the author's desire to act as a friendly go-between, introducing the unscientific seaside visitor to a large number of the wonderful and interesting creatures of the rocks, the sands, and the shingle beach." As

such it might be difficult to place a better book in the hands of a young enquiring sea-side naturalist. The illustrations are numerous and helpful.

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*The Collector's Manual of British Land and Freshwater Shells.*

By LIONEL ERNEST ADAMS, B.A. Second edition. Taylor Bros., Leeds. 1896.

A SECOND edition of this well-known Manual will be undoubtedly welcomed by those to whom it is addressed. "The object of this little Manual is to enable the novice to collect, identify, and arrange systematically the various shells—both land and freshwater—which abound in almost every part of these islands."

Apart from this modest programme there are some features of general interest to the biologist. Thus Dr. Scharff, in his 'Slugs of Ireland,' is inclined to the opinion that the colours of slugs in that island are at all ages, as a rule, protective. Mr. Adams, however, considers that "the results of his own collecting tend to show that climate may be a factor in the matter." Dealing with inland localities, he finds that he has "taken more brilliant forms, and those more abundantly, in the South of England (*where the climate is warmer*) than in the north." His experience has been the same with coast localities. "All along the south coasts of England and Wales, Cardigan Bay, and the west coast of the Isle of Man and north coast of Ireland (*all of which are noted for a mild climate*), I have taken coloured forms abundantly; while on the coasts of Lancashire and North Wales and the east coast of England from the Thames to the Tees (*where the climate is more bracing*), I have no personal records for anything but the type."

This little book is not only calculated to increase the ardour of the young collector, but, what is more, make him a student of Conchology. Such primers did not exist when we were young, and it would seem—as we hope is the fact—that a taste for Natural History is increasing with the reading public. The lines of the youthful zoologist of to-day are indeed made pleasant.

## EDITORIAL GLEANINGS.

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Mr. L. C. DITMARS has contributed to the 'Proceedings of the Linnæan Society of New York' a descriptive list of "The Snakes found within fifty miles of New York City." These number fifteen species, belonging to thirteen genera. Only two of them, the Copperhead Snake (*Agkistrodon contortrix*) and the Banded Rattlesnake (*Crotalus horridus*), are venomous, and fortunately the first is reported as of not common occurrence near the city, and the second as becoming very rare within fifty miles of the same.

A second species of *Natrix*, *N. leberis*, has been recorded by Holbrook ('North American Herpetology') as being also found in the State, and thus included by Baird in his list of *Ophidia*; but Mr. Ditmars has found no authentic information of its being taken in the area he has defined, and so excludes it from his list.

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IN connection with the recent earthquake shocks in this country, attention has once more been called to the premonitory warnings given by Pheasants in Japan. Lieut. C. W. Baillie, of the Meteorological Office, made some corroborative remarks to a representative of the 'Westminster Gazette' on this subject. He is reported as saying: "Japan is—or was a few years ago—very plentifully provided with Pheasants. And I have heard them many a time in a wood close by my house making a noise that always warned us of the approach of the earthquake; and the warning was always justified within a few minutes."

Readers of this Magazine may remember that in the volume for 1896, p. 78, attention was recalled to the fact that the Pheasant in this country was incited to crow at the sound of thunder or the firing of cannon.

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IN the Zoological Series of the publications of the Field Columbian Museum, Chicago, and in a paper written by Mr. D. G. Elliot on "Sundry Collections of Mammals," are some interesting observations made by Prof. J. B. Steere while collecting in the Philippine Islands. We extract the following:—

"The Fruit Bats of the Philippines prefer small islands for their roosts, but will take up with other isolated localities. I found one roost on Negros occupying one immense hard-wood tree standing by itself far from the forest on the plains of the western side of the island. Where they are not



hunted for food by the natives they sometimes roost near the native houses or villages for protection. Their roosts seem to be permanently occupied. We found the specimens we procured had been feeding upon the palm-juice which the natives were collecting for *squir* (toddy). The bats visit the trees at night and drink the juice from the cups hung on the trees."

Two new species, *Pteropus auri-nuchalis* and *P. lucifer*, are described by Mr. Elliot.

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THE rinderpest, which is devastating South Africa, and has been calculated as liable to destroy ninety-nine per cent. of the domesticated oxen, has prompted the suggestion of more than one remedy. Dr. Stroud, of Pretoria, has now advocated a process of inoculation. He argues that prevention can never be brought about by a system of medication, but, in a specific disease of this terrible nature, can only be effected, either by the wholesale slaughter of the healthy along with the smitten, and so getting rid of all possible contingencies by one radical sweep; or else, by increasing in the sound animal its power of resistance to the invasion of the disease. As the rinderpest is reported to have attacked some of the wild fauna, the difficulties of the course proposed are doubtless increased.

What devastation the rinderpest has created in the Transvaal alone is shown by an extract from the Pretoria 'Press,' November, 1896:—"To quote a single instance, it may be stated that in the ward Boschveld, in the Marico district, there were, before the outbreak, some 30,798 head of oxen. Up to date 4,027 of these have been slaughtered, and 16,808 have died, representing a loss of 20,835 animals; 6,766 are still healthy, 610 are sick; 958 have been salted; 2,229 have been treated by the 'zucht' method; there being thus 9,953 head alive, for those at present sick can hardly be counted."

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LOCUSTS are still ravaging South Africa. We learn from Durban, under date of last November, that on one morning during that month immense swarms stretched without intermission from Bellair to the Congella Valley, and young mealie fields and vegetable patches in many places were utterly spoiled. Part of a swarm passed over, but did not settle. Swarms were seen on the back beach, and although they were keeping pretty close to the ground, a westerly breeze which prevailed was driving them to the sea rapidly. Numbers of dead locusts, which had been washed up by the waves, were piled up in a line along the beach, and as the breeze freshened during the day the work of destruction increased.

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At a December meeting of the Croydon Microscopical and Natural History Society, the President, Mr. W. M. Holmes, stated that he had seen

flocks of Wood Pigeons, numbering many hundreds, in Croham Hurst and the surrounding woods. They are much more numerous this year than usual, and they have evidently been attracted by the abundance of acorns. He was told by a keeper that he had never seen Wood Pigeons in such enormous numbers. They do not appear to do any damage to the crops. In all probability many have come over from the Continent.

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A FEW days ago the father of the late Richard Jefferies passed away at Bath, where he had lived in retirement for some years. To his father the author of 'The Gamekeeper at Home' owed much of his early intimacy with Nature in all her various moods. Mr. Jefferies belonged to the sturdy yeoman class, and formerly farmed Coate Farm, in Swindon, where Richard was born and brought up. Adjoining the farm were the estates of the Dean and Chapter of Westminster, which were full of ground game, and over which the family roamed at pleasure. Stretching a few miles distant stood the Downs, whose outlines and features became so familiar to the author of 'Wild Life in a Southern County'; while in another direction a ten-mile walk brought one to Savernake. Amidst these natural surroundings the father trained his boys' observant faculties in every possible way.

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WE have just heard from our friend and indefatigable collector, Dr. Percy Rendall, whose African collections, made west, south, and east of the Continent, have already borne good fruit, and are expected to produce much more when his material is thoroughly worked out. His last letter was from St. Helena, and he proposes visiting Trinidad, and perhaps St. Lucia and St. Vincent, on his way home. Probably the Tring Museum will be enriched thereby.

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How "legends" in British Zoology are reported abroad may be seen from the following extract from 'The Two Republics,' published in the city of Mexico. As may be noticed, it is again copied from one of the United States journals:—

"A queer story is told of an English naturalist, who died in 1860, and was buried at Blankney, in Lincolnshire. Among his pets was a large grey Bat. This Bat was permitted to enter the tomb, and was sealed up alive along with the corpse of his dead master. In 1866 the vault was opened, and to the surprise of all the Bat was alive and fat. On four different occasions since, the relatives of the dead man have looked after the welfare of his pet, and each time it has been reported that the Bat was still in the land of the living, although occupying quarters with the dead. It was last seen in 1892."—('Cincinnati Enquirer.')

WE have previously remarked on the value of private collections, especially when estimated by their ultimate reception in some public institution. We are glad to see there are collectors in Australia. From the last number of 'The Wombat,' published at Geelong, and just received, we read: "We have much pleasure in offering our congratulations to Mr. A. J. Campbell on the occasion of his collection having entered upon its sixth hundred species of Australian eggs, and upon the success of the entertainment which he gave to brother collectors in celebration of that event."

IN the 'Naturalist' for January, 1897, our old contributor, Mr. John Cordeaux, in his "Bird-Notes from the Humber District: Autumn of 1896," writing on the third recorded appearance, for the British Islands, of the Indian Houbara Bustard (*Otis macqueeni*), remarks:—"Much nonsense was written at the time, in both the London and local press, on the enormity of shooting this Bustard—ignorantly called by the writers the Great Bustard—a former inhabitant of the wolds of Yorkshire. The Indian Houbara Bustard comes from Central Asia, where it is abundant, and there was not the slightest chance of this far wanderer ever finding its way back, or becoming naturalised in this country. No doubt its fate would have been decided by the first prowling Fox that came that way, or by Stoat or Weasel." We are no advocate for the extermination of birds, even for museum purposes; but there can be little doubt that Mr. Cordeaux makes out his case in this instance.

IN the 'Field' for January 9th, 1897, Mr. George Hewlett, Surgeon, H.M.S. 'Barracouta,' gives the following account of an enormous stranding of Whales at Teal Inlet, East Falkland Island:—

"In the end of September, 1896, an enormous school of a species of Whale, called the Caaing Whale, ran ashore in Teal Inlet. Teal Inlet is a small creek, one and a half miles long, opening into Port Salvador, which in turn opens into the South Atlantic by a very narrow opening.

"One morning a whirlwind appeared to be approaching over the water in the bay of San Salvador, and soon this was made out to be an enormous school of Whales, so thick that they seemed to be jostling each other, nothing but fins and tails, and the water in foam all round; this was on a flowing tide, and they came on into the inlet itself, describing a sort of cycloidal curves, until the inshore part of the squadron took on a kelp reef, and then a sudden panic seemed to seize them all, and the unfortunate animals came up the inlet full speed ahead, with the sea boiling in front of them and a great wave coming after them, and they piled up in hundreds on the beach. Then, as there was a rising tide, they got off again, but only to charge the opposite beach, and so on till the falling tide and loss of strength left them high and dry all round the dreary bay; then could be

heard the sort of long-drawn sighs which these mighty beasts made in breathing, and the young ones were said to have been heard to cry with a mewling sound. Some of the cows gave birth in their death agony to poor little calves, and very few, old or young, lived more than a quarter of an hour after their final stranding. Some died quietly, others beat the sand and water with their tails, dyeing the water with blood; the children, not realizing the calamity of the poor monsters, were observed to be putting stones on the blow-holes of such as they could reach, delighted to see the stones blown high into the air at each expiration. The men of the settlement were engaged with ropes in trying to save the boat-pier from destruction by the furious strokes of the tails of a couple of Whales who had got alongside it to die.

“By the evening, after that tide had ebbed, there were five Whales afloat only, out of more than 500 that had been afloat that morning, and by next morning only three were to be seen, and they swam round and round for a while, and then, as if disdainful to live when all their companions were dead, in company they made straight for the beach, and in a few moments they also had passed for ever out of the scheme of existence. Unfortunately for the world at large, all this loss of life benefited nothing but the sea-birds and the pigs of the settlement. Circumstances made it impossible to use the blubber. Some of the bodies have been burnt; they burn like a great oil-shed. The spring tides fortunately floated others up and down and dispersed them, otherwise the stench would have been unbearable.

“As for the cause of this catastrophe among the Whales, my friend Mr. Felton, who manages the estate, thinks that the school got into the bay of San Salvador and lost their way in its ramifications, and could not get suitable food, and became delirious from starvation, thus committing suicide. He dissected some of them, and found both stomach and intestines empty; but, against this theory, they all had about two inches of blubber all over them, and therefore had not wasted very much.

“These Whales were from thirty feet to four feet long. The four-foot ones were just born. They were of all ages and sexes. They had small, sharp-cutting teeth in each jaw, and a very large tongue; the head was not very large, certainly not more than a seventh of the body length.”

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As we go to press news has been received of the burning of the residence of Mr. John Harvie Brown, and the total destruction of his valuable Natural History collection. We desired to record “Museum Notes,” but deeply regret that this should prove to be the first contribution. We not only express our sympathy with Mr. Harvie Brown, on such a more than personal loss, but feel that British zoologists will universally deplore the catastrophe.



# THE ZOOLOGIST

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## NEOLITHIC LIFE IN DEVON AND CORNWALL.

BY A. L. LEWIS, F.C.A.,  
Treasurer of the Anthropological Institute.

DURING the last few years much useful work has been done by certain members of the Devonshire Association and of the Royal Institution of Cornwall in surveying and exploring the prehistoric monuments which, though sadly reduced in number, still abound on Dartmoor and in various parts of Cornwall. Admirably illustrated reports of the work done have been published in the Journals of the two societies, but, as these are not very largely circulated outside the two south-western counties, there may be many readers of 'The Zoologist' to whom a brief account of the results obtained may not be unwelcome.

Visitors to the central parts of Dartmoor will remember the various remains which they have met with there—long "rows" or lines of stones, sometimes single, sometimes double—stones standing or lying in circles, sometimes in connection with the "rows," but more frequently not—single stones or menhirs—and rude enclosures formed by low walls of smaller stones without mortar, sometimes large, sometimes small, sometimes singly, sometimes in groups, with or without a similar wall enclosing the group. The smaller of these are called "hut-circles," the larger ones "pounds"; they are the remains of prehistoric dwellings, and it is in them that the most interesting discoveries have been made.

The most generally known collection of hut-circles, and the first to be explored, is that at "Grimspound," near Moreton Hampstead. "Grimspound" is an irregularly shaped piece of ground, lying between two tors, with a small streamlet running through it, and enclosed by an unmortared stone wall, more than fifteen hundred feet in circumference. This was originally about five feet high and nine or ten thick, but, in some places at least, it seems to have been divided into two walls with a space between them; this space may have been filled up with turf, or it may have been used for dwelling or storage purposes. Inside this enclosure are the foundations of about two dozen roughly circular enclosures, from nine to sixteen feet in diameter, some of which were probably cattle pens, while others were certainly human dwellings. The latter had originally consisted of slabs of granite set up in a ring to a height of about three feet, the spaces between being filled in with smaller stones, and the whole backed up outside with turf; the doors were generally constructed of two upright jambs of granite between two and three feet high, on the top of which lintels of granite were placed; the floors of the huts were of the subsoil of clay and granite grit and rolled pebbles, beaten hard, and occasionally, and in places, paved; the roof is believed to have been formed by poles sloping from the top of the low wall to the centre, and covered with turf, rushes, &c., as there were not sufficient stones found to form a domed roof. Most of the huts, when cleared of the accumulation of vegetable soil with which they were filled, were found to contain a low platform or dais, formed of curbstones with straight edges, all natural, but selected for the purpose, and laid in the soil, cutting off a portion of the circumference, which portion was generally carried out so as to afford additional width and depth to the dais, which was usually paved, and probably served as a seat for the inhabitants by day and as a bed at night. There were generally a flat stone in the middle of the hut, without any indication of fire upon it, which had probably been used as a table, or as a base for a post to support the conical roof, and another flat stone, with considerable marks of fire, which had evidently been a hearthstone; near the latter was usually found a hole in the floor, about nine inches deep, lined with stones set on edge, and full of peat ashes and charcoal, which was doubtless

used as a cooking hole, into which, after it had been thoroughly heated, meat was put with hot pebbles and covered over until it was sufficiently baked. One small piece of pottery, a flint knife, and two flint scrapers, are all the articles of human workmanship found in the twenty circles cleared at Grimspound.

Other collections of circles have, however, been explored in different parts of Dartmoor which, while their general characteristics were very similar, have supplied some further remains of the handiwork of their former occupants. Several flint knives, scrapers and flakes, hones, rubbers, and mullers, one stone with a hole bored nearly through it, a spindle whorl of baked clay (a most important indication of the comparative civilization of the inhabitants), and some very rude pottery, are the produce of later excavations.

At Legis Tor, where a very interesting collection of eleven huts was thoroughly excavated only last year, an urn, ten inches in diameter and twelve deep, was found set in the ground in place of a cooking hole; its bottom had been broken by use, and mended anciently with a lump of china clay, without its being removed; two cooking stones and some earth and ashes were found in it, but there were no ashes round the outside; fragments of urns were also found in the cooking holes of the other huts at this place, several of which were rudely ornamented, but all were of very poor construction.

Up to the end of last season seventy-nine huts which showed signs of human occupancy had been explored in various parts of Dartmoor, of which thirty-seven have yielded tools, flakes, and cores of flint; twenty-six have shown remains of pottery; thirty had cooking holes, some of which contained round-bottomed vessels of coarse pottery, red outside and black within; twelve have produced rubbing stones, and nearly all have contained cooking stones.

The long steep hill of Carnbrê, near Redruth, with its mediæval tower at one end, and the Dunstanville monument at the other end, is well known to all visitors to western Cornwall. Here Dr. Borlase wandered and found various Druidic remains which I entirely failed to identify when I visited the spot in 1869, but both he and I were ignorant of what was really there beneath our feet. It had long been known that there were a few

hut circles, and the remains of walls for the protection of the hill; but, when Mr. Thurstan Peter undertook the excavation of the circles in 1895, it was his young daughter who induced him to extend his researches to the spaces between the naturally placed boulders near the circles, with the result that some of them also were found to have been roofed in and used as dwellings. The circular huts appear to have been of the same type as those at Grimspound, but larger, the diameter of one being as much as twenty-six feet; some of them had hearths and cooking holes like those on Dartmoor, but there were no raised platforms. A few broken spindle whorls, some fragments of pottery of a better kind than that found on Dartmoor, some stone mullers and rubbers, a polished celt, some flint spearheads, knives, flakes, and cores, and about five hundred flint arrowheads of all shapes,—thirty of them in faultless condition and of most beautiful workmanship,—were the reward of the exploration of nearly one hundred hut-circles and inter-boulder dwellings.

The fact that so many arrowheads and several spearheads have been found at Carnbrê, while none have been found at Grimspound, and not many on Dartmoor at all, has been held to indicate that the Cornishmen were a warlike people, either from choice or necessity, while those of Dartmoor were more peaceful and pastoral; and it has also been pointed out that Grimspound is commanded from higher ground on three sides, and is rather a protected village or cattle station than a fortress like Carnbrê. Seeing, however, that arrows are useful for hunting as well as for fighting, it may be questioned whether this difference (should it be sustained by future explorations) may not be due to racial or tribal peculiarities, or may not rather show that Grimspound belongs to a somewhat earlier period than Carnbrê; and this view may be supported by a reference to the great quantity of "stone rows" on Dartmoor, the like of which cannot be found in Cornwall or anywhere else. The existence of flint weapons in Cornwall opens up an interesting question, for there is little, if any, flint in the county suitable for them. In the wildest part of it, between the Cheesewring and Brown Willy, is a piece of water, called Dozmañè Pool, from the peat on the banks of which great numbers of beautiful flakes have been obtained, but the



raw material was brought from a part of Devonshire thirty miles away, to be worked up at this place. Mr. Francis Brent, F.S.A., of Plymouth, has collected much valuable information about flint stations in Cornwall, but has unfortunately not yet published it.

On the slopes of Brown Willy and Rough Tor, which are the highest points of Cornwall, there are numerous hut-circles and enclosures which have not yet been explored; some of these are smaller than those of Dartmoor and Carnbrê, and were covered with roofs of stone and turf built up in the same way as the walls; one of them is still perfect, and at least one other has part of the roof remaining. There also are five circles of standing stones, the diameters of which, as I have pointed out elsewhere,\* seem to have been carefully measured, as indeed do the distances between the circles themselves; their positions also appear to have been carefully selected, so as to bring them into certain lines with the tops of the surrounding hills. All these things point to an observance of the sun and stars for religious or astronomical purposes, or both, and to some amount of communication, casual it may be rather than regular, with the East, which we should hardly expect to find in conjunction with such rude dwellings and appliances of living as the excavations already described show to have belonged to the people by whom the circles were almost certainly erected. But it must be borne in mind that rough ways of living are by no means incompatible with high intellectual capacity, and that the habitations of parts of Ireland and Scotland in which many of our most useful public men have first seen the light have not been very superior to those of Carnbrê or Dartmoor. Another reflection arising from this is that the dwellings in Ireland and elsewhere which strike visitors from England as being so extremely uncivilized, are not the result of degradation of the inhabitants, but rather of their not having advanced in that particular much beyond the fashions of their ancestors of two or three thousand years ago.

There are circles of standing stones on Dartmoor, some of which seem to have been arranged in relation to some of the surrounding hills, or to single stones standing near, and which were almost certainly constructed by the people who lived in the

\* 'Journal of the Anthropological Institute,' August, 1895.

hut circles. Many there are who hold that these circles were places of burial and nothing more; interments have been found in some (just as they may be found in some churches), but not in all of them, and the absence of interments in some shows that burial was not, as a rule, their primary object. Others consider the circles of standing stones to be merely the remains of the circular walls of large stone towers, but that idea hardly requires serious notice. On Dartmoor there are also numerous long rows of small standing stones, which frequently have a small circle, with or without a barrow inside it, at one end of the line, or it may be a barrow without a circle. One of these lines is nearly two miles long, and extends from one of the "sacred" circles to a barrow, which was no doubt a tomb. Nothing really like these stone rows is found anywhere but on Dartmoor, and what the idea underlying their construction was is most uncertain. If, when they were erected, the fogs on Dartmoor were as frequent as they are now, the "rows" might have helped the inhabitants to find their way about; but there was most likely some more occult reason for their construction than that. About forty of these rows are still left on different parts of Dartmoor.

The ancient population of the moors, which was apparently more numerous than that of the present day, must have left considerable quantities of refuse in the shape of bones, which, if they could be found, would enable zoologists to tell us what animals and birds they reared, or hunted, and lived upon; and amongst the bone and shell-heaps might be found further fragments of tools, weapons, and pottery, which would also add to our information about their manners and customs, but their "kitchen-middens" have yet to be discovered and reported upon.

The tombs of the hut-dwellers have for the most part been broken into and their contents scattered long ago, so that we know little about their physical characteristics. They are generally supposed to have been a small dark-haired race, and the size of some of their dwellings, and particularly the dimensions of the entrances to them, seem to favour that view; but, although we are not so well informed upon these points as we could wish, the excavations recently made enable us to form a fair idea of their manner of life. We can imagine the women

spinning, cooking in the holes by the hearths, and preparing the skins of the animals killed in the chase by the men, and making garments from them; while around them the children, who probably wore no clothes at all in hot weather, played at rude games, or imitated the more serious pursuits of their parents. We can picture to ourselves the men hunting, fishing, tending their cattle, and perhaps engaging in some rudimentary agricultural employment, or manufacturing flint tools and weapons from the lumps of flint which in Cornwall were obtained from the north-east, either by parties organized from their own villages, or from caravans of traders from beyond the Tamar. We may even suppose a priesthood supervising the erection of the sacred circles, and carrying on some sort of ceremonies therein, or taking part in funereal rites, and in the construction of barrows with long lines of stones stretching away across the country from them; and we may conclude our brief and imperfect survey of this ancient people and their remains with the reflection that the mere erection of regular circles and long lines of stones, although the stones were much smaller than those of Abury, Stonehenge, or Stanton Drew, demanded an amount of constructive skill, of careful planning, and of organized effort, actuated by some common underlying purpose or idea, which we cannot properly attribute to savages of so low a type as those by whom some other parts of the world are even yet populated; and that, poor as the manner of life of these early inhabitants of Devon and Cornwall may have been, they had yet advanced some distance beyond the first steps of civilization.

## NOTES ON THE SEAL AND WHALE FISHERY, 1896.

BY THOMAS SOUTHWELL, F.Z.S.

MAN is not the only enemy the breeding Seals have to contend with, and I fear that in the past season the smaller number taken by the sealers off Newfoundland is no indication of the total mortality amongst the "whitecoats," rough weather and the consequent disruption of the ice on which they were brought forth, added to the "rafting" caused by pressure, having probably been accountable for the loss of many more young Seals than were saved from the sealers by the impassable nature of the ice. A severe gale from the N.E. about the 5th and 6th of March, before the fishery commenced, broke up a vast extent of the whelping ice, and doubtless killed or drowned a large number of young Seals; the occurrence in some localities, at the same time, of both fairly matured young ones and others newly born, indicated that some such disturbance had taken place. This same gale also drove the ice into Green Bay, and the presence upon it of a few Seals led to the impression that the main body were in that neighbourhood; this, however, did not prove to be the case, and only had the effect of misleading the vessels in their search. About March 10th, the day on which the fleet sailed, the wind changed to the westward, and very few Seals fell to the Green Bay people.

No steamer struck any large body of Seals, and great difficulty was experienced in approaching those they did secure, owing to the unusually heavy nature of the ice. There were level sheets between very heavy ice, and it was on these that the young Seals were deposited; the "patches" might be from fifteen to thirty miles apart, and unless the steamer struck and was able to reach one of these sheets of whelping ice, her success was very small indeed. The 'Newfoundland' got an early start (some say unfairly) and was fortunate in working to the back of the ice, getting a good catch of old and young Hooded Seals and a few young Harps; she struck the patch on March 13th off Cape St. John, and drifted south with them. The body of the young Harps were nearer the



shore than the Hooded Seals, and Capt. Adams, of the 'Esquimaux,' whose gunners made excellent practice, got something like 7600 old Harps and "Bedlamers" off Bonavista Bay.

Mr. Thorburn attributes the comparative failure of the fishery to the combined influence, first, of the gale on March 5th and 6th, which smashed much of the whelping ice (then very thin), drowning many young Seals and driving the heavy ice towards the shore in a compact body; and secondly, to the westerly winds accompanied by severe frost, which prevailed from March 10th to the end of that month, and forced the solid ice again off the shore, forming a barrier through which many of the steamers were unable to make headway until too late in the season for them to do much good.

Three vessels, the 'Iceland,' 'Nimrod,' and the 'Harlaw,' went to the Gulf of St. Lawrence, but did not do very well, the bulk of the northern patch of Harp Seals in that locality having, it is presumed, been driven through the Strait towards Belle Isle by the strong westerly winds; what young Harps were got by the steamers are believed to have been taken from the southern patch, which is generally found inside St. Paul's and other islands in that neighbourhood, and as the large sheets of ice on which the young are whelped do not there, as a rule, break up until late in the season, it frequently happens that they cannot be got at. (See remarks on this subject in last season's notes, p. 42.)

Twenty-two steamers in all went to the Newfoundland sealing this season, but two of them were wrecked, leaving the number twenty, as last year. Of these the most successful was the 'Neptune,' which took 22,946 Seals; followed in succession by the 'Greenland,' with 20,197; the 'Labrador,' 16,973; 'Newfoundland,' 15,900; 'Walrus,' 13,038; 'Vanguard,' 12,593; and the 'Iceland,' 11,666; the remaining thirteen vessels were all under 10,000, the total catch being 187,516 Seals (as compared with 270,058 in the previous season), and the average of the twenty vessels, 9375. In addition to these some 22,000 Seals were taken by the schooners. No second trips were made. The estimated value of the produce landed from the steamers was £55,362 (compared with £74,712 in the previous season, not £77,824 as incorrectly stated).

The result of the fishery, notwithstanding a slight increase in the value of the produce, thus shows a deficiency of £19,350. The

'Hope' had the misfortune to break her shaft, which spoiled her fishing, and the 'Vanguard' and 'Ranger' were badly nipped by the ice; the 'Wolf' was crushed by rafting ice on March 12th eight miles N.N.W. of Fogs Head; and the 'Windsor Lake' met with a similar fate on March 27th; both vessels became total wrecks, but their crews were saved.

None of the Dundee vessels went to the Greenland sealing, as the market value of produce was not sufficiently tempting; there were about seventeen Norwegian steamers out, and they are said to have done very well, but I have no statistics; they nearly all took part in the Bottle-nose fishery also, which proved very successful.

The Whale fishery has now become restricted to the port of Dundee, and the only representative of Peterhead in the Arctic Seas was the brig 'Alert,' which brought home a cargo of produce from the Cumberland Gulf station (this will be referred to further on); but Dundee sent out eight vessels, five of which—the 'Active,' 'Balæna,' 'Diana,' 'Polar Star,' and 'Terra Nova'—went to Greenland; the 'Balæna' returned clean, and the 'Diana,' which broke her shaft on May 28th, only obtained thirty-nine Bears and a few Seals; the 'Eclipse,' 'Esquimaux,' and 'Nova Zembla' went to Davis Strait.

The state of the ice in the Greenland Seas was found to be very unfavourable; it was exceedingly heavy; the weather proved mild and open, accompanied by almost incessant fog, but otherwise it was pleasant. The 'Arctic' killed her first Whale on May 13th, two others in the middle of June, and a fourth in July. The 'Polar Star' and the 'Terra Nova' had one Whale each, and several others were seen by the vessels, but could not be approached.

In Davis Strait the weather is described as the most unfavourable ever experienced by those who took part in the fishery; at the very outset of the voyage strong north-easterly gales prevailed, which blew for several weeks without ceasing, and the record of the voyage is a succession of gales and fogs. The 'Eclipse' encountered the ice very early, off Cape Desolation; and it was not until May 4th that she reached Disco, meeting with no Whales on the east side. Towards the end of May the steamer headed for the middle ice fishing-ground, where she continued to

experience the same adverse weather. After crossing Melville Bay, on June 26th, one of the few days on which the vessel was not enshrouded in fog from morning till night, she saw three Whales, one of which was captured. About this time a fearful gale was experienced from the N.E., lasting four or five days which left the ice in a hopeless condition. Under the circumstances Capt. Milne turned his attention to small game and secured, towards making up a cargo, five Narwhals, twenty-one Walruses, thirty-seven Bears, seventy-four Seals, twenty Reindeer, and three Wolves.

The 'Esquimaux' saw several Whales, but the heavy ice baffled all attempts at their capture, and the only result of her voyage was eighty Seals, twenty-one Walruses, twelve Bears, and two Narwhals.

The 'Nova Zembla' was more successful, securing two small Whales. From the station in Cumberland Gulf the brig 'Alert' brings the produce of three good Whales and 3890 Seals, consisting of 20 tons of seal and 45 tons of whale oil, and 45 cwt. of bone.

The total produce of the Whale Fishery in the past season was 12 Right and 9 White Whales, also 43 Walruses; these yielded 149 tons of oil and  $135\frac{1}{4}$  cwt. of bone. The oil may be valued at £18 per ton, or £2682; and the bone at £2000 per ton, or £13,525; the total being about £16,207, compared with £23,958 in the previous season.

I see it announced in the Newfoundland papers that a company is being formed at St. John's to hunt the Fin Whales in the adjacent seas from that colony, in the same way as has been so successfully practised by the Norwegians off the Finmarken coast.

I cannot close these notes without a passing tribute to the memory of my old friend Capt. David Gray, of Peterhead, of whose career I gave some particulars in my notes for 1892. After retiring from the sea, Capt. Gray was tempted to make one voyage more, and commanded the 'Windward' in 1893, the last voyage she made before her purchase for the use of the Jackson-Harmsworth Expedition. From that time he suffered greatly, bearing with characteristic bravery a painful complication of troubles arising from gout, and finally passed away at his

residence, the Links, Peterhead, on May 16th, 1896, at the age of sixty-seven years. Another well-known whaler, Capt. Alexander Fairweather, also died of brain fever, on May 31st last, off Spitzbergen, on board the 'Balæna,' which he commanded. He was one of the most successful of the Dundee whaling captains, and was chosen by Mr. Leigh Smith, in 1873, to take charge of the 'Diana,' which relieved the Nordenskjold Expedition in Spitzbergen; afterwards he returned to the Whale fishery, and in 1892-3 took the 'Balæna' to the Antarctic Seas.

It is probable that the 'Balæna' and the 'Diana' will be withdrawn from the Whale fishery in the coming season; indeed I am informed that the difficulty of finding capable men to command these costly expeditions is very great, and that there are no young men coming forward. This, in addition to the precarious nature of the enterprise and the seeming exhaustion of the old haunts of the Whales, will probably bring about the extinction of this ancient industry, unless some new resorts of the Whales should be discovered, which seems very unlikely to happen.

As on previous occasions, I have to acknowledge my indebtedness to Mr. David Bruce and Mr. R. Kinnes, of Dundee, and to Mr. Michael Thorburn, of St. John's, Newfoundland, for their kindness in supplying me with information.



## ORNITHOLOGICAL NOTES FROM THE RHINE.

BY J. H. SALTER.

HAVING spent the first nine months of the year 1896 at Bonn, and made numerous notes upon the birds of that neighbourhood, it seemed that some of the facts observed might be worth recording. The chief interest lies in the few species which one does not meet with in an ordinary way in England, and it is easy to understand why they are not more numerous when one reflects that the distance from our own shores is not greater than that from London to Edinburgh. The physical features of this part of the Rhineland are too well known to need description. The river itself, though much disturbed by traffic, affords an occasional sight of Wild Duck or Teal, while Herons come to fish in it at dusk. The Gulls, a few of which may be seen at any time, though they are more numerous in severe weather, are probably of the Black-headed species. The river-plain, with its endless patches of root-crops, potatoes, and rye, yields little of interest. It is hemmed in by the vineyard slopes, above which we reach the general level of the country to find an almost limitless stretch of forest-land, principally Scotch fir, beech, oak, and birch on a gravel soil. Of this nature is the Kotten Forst, which stretches for eight or ten miles behind Bonn; also the wooded hills and dales of the Seven Mountains, and of the neighbourhood of Rolandseck and Remagen. Only in a few spots does the wood become well-grown timber. Roe are everywhere numerous. Forestry is much more of a science than with us; woodmen and keepers abound, and the larger hawks stand no better chance of survival than in this country. Thus, though the Buzzard was common, I never met with the Goshawk; there are local specimens, however, in the Schloss Museum, with eggs and young.

The town itself, with its fine avenues of elm and horse-chestnut, the large walled gardens attached to the older houses, and, above all, the Botanic Garden, offers many attractions to birds.

Nor should one omit to mention the Sieg, which flows into the Rhine on its right side some three miles below Bonn. Its oak woods (English in everything save the absence of bluebells and primroses), its poplar groves, osier-beds, hazel and alder copses, have the characteristic, rare enough abroad, of sheltering as many small birds as one would meet with anywhere under similar conditions in this country.

The woods were lifeless in mid-winter, except for large parties of Tits, in which the Marsh, Great, Blue, and Coal species were generally represented numerically in the order named. The first and last showed the slightly distinctive characters of the continental races. A spirited trill sometimes led to the detection of the Crested Tit in their company, but it was less numerous than any of the others. A small flock of eight or ten Crested Tits, seen on May 24th in a grove of Scotch firs on forest-land near Siegburg, was probably a family party.

At New Year the mountain-ashes which bordered one of the chaussées were thronged with Fieldfares, Chaffinches, Goldfinches, Greenfinches, Bramblings, and Bullfinches, all busily engaged upon the berries. A Grey Shrike watched them, ready to pick up a weakling or a straggler. A few Starlings wintered in the suburbs, but this bird never became numerous, and was much less prevalent and obtrusive than in England. I only once noted a fair-sized flock, to wit, near Siegburg on July 5th. The Nuthatch spent the winter upon the Schloss elms, but left to breed elsewhere.

Every slight frost brought Crested Larks into the suburban streets, singly or in pairs. About the beginning of March they began to sing, often from some rubbish-heap, or from the ground amongst turnips and cabbages. On March 1st the first White Wagtail appeared, shortly followed by others. On the 15th I noted Meadow Pipits, no doubt on passage; Song Thrushes sang well, though much less numerous than in England. The 17th, the first warm spring day, brought the Black Redstart. In a couple of days they were everywhere, singing from the house-tops, and evidently finding the spires, vanes, and turrets, which form such a marked feature of a German suburban street, much to their liking. The Black Redstart is one of the few continental institutions which the Englishman will regard as comparing

favourably with his own. It sings cheerily and industriously from dawn to dark, often commencing, in fact, some time before daybreak. I have heard it at 3.15 a.m. In the Botanic Garden the label-stands formed a favourite perch, and were also much resorted to by Spotted Flycatchers. On May 23rd a pair of Black Redstarts were leading fledglings about the shrubbery with twittered encouragement and anxious scolding at the intruder. So late as July 9th a noisy brood emerged from behind the rain-water pipe on the Schloss. On Aug. 6th I noticed that the males were coming into song again after scarcely three weeks of silence, and from that time onwards they sang constantly till I left on Sept. 11th.

On March 18th, with warm southerly wind, came a "rush" of Chiffchaffs, and there was undoubtedly a large arrival of Robins about this date. In the woods they were to be heard at every turn, while in winter scarcely one was to be seen. Wood Larks began to sing about the open heath-land on the edge of the forest. On the 20th hibernating butterflies, such as Brimstones and Camberwell Beauties (*Vanessa antiopa*) were flying. Woodpeckers were jubilant, and amatory Jays vented their feelings in a variety of uncouth notes. Two days later Stonechats returned, and on March 24th the first Blackcap reached the Botanic Garden; colder weather set in, and there was no further arrival of this species for ten days.

A party of Lesser Redpolls on April 1st, and Redwings a week later, were no doubt working northward. I heard the Willow Wren on the 9th, and the next day the first Swallows were skimming over the Rhine at Königswinter. I found the Grey Wagtail in pairs frequenting the streams of the Seven Mountains and at Rolandseck, and noted Waterhens and Dabchicks haunting the reedy pool at Heisterbach Abbey. April 14th was noteworthy for the arrival of the Serins. I scarcely expected to meet with this species so far north; possibly it is extending its range. In a few days its artless jingle of a song, more suggestive of a Bunting than a Finch, was to be heard everywhere in suburban gardens. In the Botanic Garden I had full opportunity of watching its fussy and energetic ways. Its usual call-note is a sibilant trill. At pairing-time the males have a wavering flight, like that of a Sand Martin, and often sing upon the wing.

One of them constantly sang while perched on the roof of the Schloss. No doubt two broods are raised, as they were in song until Aug. 5th.

Though surrounded by suburban streets, the Botanic Garden was visited by Jays, and occasionally by the Green Woodpecker; while I have heard the Tawny Owl within five minutes' walk of the busiest part of the town. Kestrels frequented the Minster, and I noted a pair nesting in the transept tower of Cologne Cathedral. A Sparrowhawk daily "worked" the Botanic Garden and adjoining streets. The Hawfinches, constantly seen till April, left the Garden to breed elsewhere, returning in August to feed on the hornbeam seeds.

The Tree Pipit arrived on April 14th. On the 19th I heard the Wryneck in the Friesdorf orchards; two days later Cuckoos were calling and chasing in the more open parts of the forest, and Common Redstarts had settled down to breed in numbers in holes in the pollard beeches. The Wheatear was only represented by an odd bird or two seen on passage; none stayed to breed. On the 25th a change from a long spell of cold weather at once brought the Swift and Lesser Whitethroat. Leafing made as much progress in one night as in the previous month, and Nightingales sang in the Botanic Garden and in the grounds of the villas along the Coblenzer Strasse. Next day I noted the arrival of the Blue-headed Yellow Wagtail and of the Common White-throat.

May came in with cold drying winds, so that some of the migrants were late; but the first week of the month brought the Whinchat, Garden Warbler, Spotted Flycatcher, Turtle Dove, and Common Sandpiper. I met with the Sandpiper from time to time during June and July, so that a few pairs probably remained to breed; in the middle of August the return migration took place, and parties of six or eight were common upon the river. On May 7th the Golden Oriole's flute-like call announced its arrival. Next day, in a hazel-copse on the banks of the Sieg, I was in close proximity to at least half a dozen of these bright-plumaged new-comers. It was perhaps a migratory party. Oaks in young leaf were scattered through the copse, and from one or another of them, sometimes from several different directions at once, came the loud clear call, often interrupted by the harsh



grating alarm-note. I made a careful approach, but there was something mysterious about the way in which the birds stole from tree to tree without showing themselves. Finally, however, amongst the yellow of the young oak-leaves, I got a glimpse of brighter gold, as two male birds, hopping and fluttering from branch to branch, came into the field of my pocket-telescope. After this the Oriole soon became common, and was distributed all through the woods wherever oaks occurred. I could hear half a dozen in a short evening walk along the margin of the forest. But they were invariably shy and wary to the last degree. Time after time I have followed up the call, only, as the result of a patient and noiseless stalk, to hear it give place to a harsh rasping alarm-note as the bird went off. When most successful, I got a hasty glimpse of the bird as it changed its whereabouts in the tree; a good leisurely view of it, never. But I learnt during these stalks that the call-note is merely thrown in as an accompaniment to a low chattering song, rather suggestive of the Starling. This song is not heard until one gets close to the performer, who whistles, sings, and squalls by turns. The Oriole was constantly to be heard in the Botanic Garden, and a pair of them doubtless bred there. In the latter half of July I frequently heard a rippling hawk-like call, which I supposed to be the note of the young. The male was in song up to Aug. 6th, on which date I heard all the different notes well.

A noteworthy feature in the forest was the scarcity of Wood Pigeons. In ten square miles of woodland there were fewer than in most English plantations of as many acres. Ants swarmed, and consequently Green Woodpeckers were numerous. Some of them were probably the grey-headed *Gecinus canus*, but I never identified it with certainty. Pied Woodpeckers preferred the more remote part of the forest. I was always on the look-out for *Dendrocopus medius*, but of the few which I saw at close quarters all appeared to be the Greater Spotted, *D. major*. The Wood Wren occurred sparingly in the forest, always where beech timber prevailed.

But birds were far less abundant in the forest than in the low-lying district round the mouth of the Sieg. Here, in poplars, was the only rookery which I met with, for while Carrion Crows were ubiquitous, Rooks were few and unobtrusive. In the woods

bordering upon several weed-grown creeks which communicated with the river, Nightingales, Common Redstarts, and Tree Sparrows abounded. I twice got a sight of a Hobby in the neighbourhood of one of these quiet back-waters of the Sieg. Before entering the Rhine the Sieg flows parallel with that river for about a mile. The narrow strip of land thus formed, together with the adjacent foreshore of the Rhine, was most noticeable of all for the interest and variety of its bird-life. It is a sandy tract liable to be flooded, planted with osier and various other species of willow, amongst which are water-holes, from which the frogs raise an unearthly chorus. Bare enough in winter, it becomes a veritable jungle by the end of May, as with the growth of the willows comes an upgrowth of nettles and tall weeds of every kind, so matted together with hops, bindweed, and the parasitic dodder that by midsummer it is all but impassable. There are stony tracts at the water's edge, and here on May 8th some small waders drew my attention by a note which seemed unfamiliar. There were three of them in company with Common Sandpipers. It was extremely difficult to see them as they ran over the sand, which they nearly matched in colour, but the telescope soon showed me that I had made the acquaintance of the Little Ringed Plover. They once rose with quite a trill, at another time with a note more like that of their larger relative. I saw a Little Ringed Plover again at the same spot on June 10th, so that a pair may possibly have bred there; but on the 27th, owing, I suppose, to the melting of the Swiss snows, the river was high, and these stony tracts were under water.

A good many Blue-headed Yellow Wagtails were nesting amongst the willow-scrub. The males, in spring dress, perched upon the osier-sprays, or rose from the ground with shrill "chit-ip." Reed Buntings chirped and fluttered into cover. Here and there a patch of willow had been left uncut from the previous year, and every such patch seemed to shelter at least one pair of Reed Warblers. Here they skulked and sang, and here, in default of reeds, they made their nests. I noted that incubation lasted fourteen days. A nest at Nonnenwerth, on May 26th, was about six feet from the ground, in the fork of a small poplar; it was evidently intended to pass for one of the many knots of drift which had caught amongst the twigs. I

specially wished to meet with the Marsh Warbler, but it was not till about May 24th, a full fortnight after the Reed Warblers had settled down amongst the willows, that they reached their summer quarters. In a day or two they had taken possession of the fringe of willow-scrub on both banks of the Rhine. I have never before seen a cover so swarming with any one species of Warbler. I found them just as abundant upon similar ground on the island of Grafenwerth, and beside the Moselle at Coblenz. They skulk much less than the Reed Warbler, often singing, in full view, a sweet and charming song with real melody, some notes as liquid as those of a Goldfinch, though delivered in the hurried style of all aquatic warblers. Many pairs settled down to breed in the rye, which was then in the ear. I have found them several miles from the Rhine, on the driest of corn-land, far from sedge or willow cover, and with no water but a small brook in the neighbourhood. Under such circumstances the song often puzzled me for a moment, so little did the locality suggest the *Marsh Warbler*. I found a nest with two eggs on May 31st, two more with three and five respectively on June 10th. All were in nettles, meadow-sweet, or similar undergrowth. Early in July the song gave place to a low scolding note, which I heard from time to time in the jungle till Sept. 8th. Curiously, I could never meet with the Sedge Warbler or the Great Reed Warbler; once only with the Grasshopper Warbler.

One other denizen of the willow-scrub remains to be mentioned. It was on May 10th that an unknown song drew my attention to a bird perched upon a willow-spray. The telescope showed a Bluethroat in all his glory of white-spotted blue gorget, with black and chestnut band below. He sat like a Redstart, but with his ruddy tail half spread. I soon found that the Bluethroat was common along the Rhine and Sieg, wherever the right sort of ground occurred,—sandy wastes, with clumps of reed or with willow and other undergrowth. The two islands of Nonnenwerth and Grafenwerth, which the Rhine tourist sees as soon as the Drachenfels is passed, both run out into long sandy willow-grown spits, which I found to be tenanted by several pairs. There is no need to describe the song after the excellent account of it given by Mr. O. V. Aplin (*Zool.*, Nov., 1896, p. 427). The males perched upon a reed-stem or willow-spray, always in

spirited attitude, never with the listless manner of a Robin, and sang boldly and sweetly, flirting the half-spread tail with a sort of pump-handle movement, till it was sometimes more than vertical, inclined over the back. They constantly drop down into the herbage to pick up an insect, or dart up into the air for a gnat or daddy-longlegs; or one will jerk up into the air almost like a Whitethroat, and come down in Pipit-fashion, but not so stiffly, singing all the while. Towards the end of May they seemed too busy to sing much. On the 27th I saw one with food in its bill. Its white spot seemed smaller than usual, and was only seen as it gave its scolding note. All this time I saw nothing of the females. On May 31st a male bird scolded and sang in much excitement, so I beat about the scrub, and soon put up a young one which had just left the nest. I soon met with another of the same brood, but even in this supreme crisis of the family affairs the female did not put in an appearance. The young appeared to be spotted like young Robins, but were as red about the tail as the adult. Others were later, or probably two broods were reared, as all through June the males were scolding and carrying food. On the 10th I put up another young one, and for once got a view of the female. Her persistent skulking is in strong contrast to the boldness of the male. I heard the song for the last time on June 27th.

There was much to note in the Botanic Garden during May. Nightingales sang fearlessly on all sides, conscious of full security. On June 12th a pair of them, in great excitement, were leading young ones about the Natural Order beds. Others sang, though gradually less fully, all through June, and I heard a few notes so late as July 6th. Blackcaps were equally numerous. Besides their bold rich notes, they improvise at times in an undertone, with wide-gaping bill, the song being then almost unrecognizable. A Spotted Flycatcher placed its nest upon some of the strong thorns against the trunk of a gleditschia. The Wryneck called from the Schloss elms, Turtle Doves cooed, the Golden Oriole whistled, and on May 14th the Icterine Warbler arrived to take its full share in the chorus. About three pairs settled down to breed in the gardens, showing a preference for the neighbourhood of a piece of ornamental water. I listened with peculiar interest to the song of this bird on account of the discussion with refer-



ence to it then proceeding in the pages of 'The Zoologist.' Little need be added. The song is wonderful for its extraordinary variety, energy, and, if I may so term it, tense elasticity of tone. As the bird babbled volubly with puffed-out bearded throat and half-erected crest, showing its red gape, one could hear in fancy the alarm-notes of Swallow, Blackbird, and of every other bird in the gardens. Early in June the Icterines seemed to become much quieter, singing only a part of their notes, and I thought with less intermixture of harsh and uncouth variations. On July 1st one was singing again in the best of form, but I heard nothing of them after the 6th. Is it not possible that in the recent discussion some writers have described the song of the nearly allied *Hypolais polyglotta* in place of that of *H. icterina*?

The Icterine Warbler was not the last of the migrants to arrive. House and Sand Martins did not put in an appearance till the middle of May, and the Red-backed Shrike was still later. Some of the Sand Martins nested in the outlets of small drain-pipes along the Rhine wall.

Some twelve miles up the river from Bonn, and nearly opposite to Remagen, a bold volcanic bluff—the Erpeler Lei—overlooks the Rhine. Its face has been quarried and shows basaltic columns, while in the rocks above, towards the summit, a pair of Falcons breed. As I passed, one or other of them would sail out overhead with angry outcry. At the foot of the cliff were sloping screes, frequented by Stonechats, Black Redstarts, and Linnets. Here I heard a song which completely puzzled me. It was short, but bright and cheerful, of about the same length and compass as a Redstart's. The telescope showed a bird the size of a Yellowhammer, the sides of its head boldly streaked with black on a whitish ground, and with cinnamon-coloured under parts. It was evidently a Bunting, but not the Ortolan which I had long looked for, and it was not till I had the opportunity of consulting a book that I identified it as the Meadow Bunting, *Emberiza cia*. There were probably half a dozen pairs of them about the screes at the foot of the Lei, and they were common about the adjacent vineyard slopes. On June 21st one of them was carrying food in its bill. I watched a male singing for some time as he sat on a rock in *négligé* Bunting attitude, flipping his tail in Bunting fashion, and raising his head each time to sing; but who would

ever have suspected the song, but for its two or three concluding notes, as of Bunting origin? Again, why Meadow Bunting, surely Rock or Vineyard Bunting, if its habits elsewhere are the same as here? Besides its song, it has a Serin-like trill.

The month of August yielded little of interest. On the 2nd the Willow Wren sang its quiet late summer song, and on the 7th I heard a few notes from the Lesser Whitethroat. The Grey Wagtail came to ditches in the suburbs, and Goldfinches in plenty to the weedy field corners. It may have been "insular prejudice," but it certainly gave one a shock to see bunches of Partridges brought in a fortnight or three weeks before "the First." On Aug. 29th the Chiffchaff sang, and on this and following days numbers of House Martins collected on the University front overlooking the Hofgarten.

In conclusion I may express surprise at the number of species which I failed to meet with. I saw nothing of Woodchat Shrike, Ortolan Bunting, Hoopoe, Quail, or Stork. If my time had been less occupied, however, I might possibly have added some of these to my list.

## ON MANX BIRD-NAMES.

BY P. RALFE.

IN the following paper an attempt has been made to collect such Manx names of birds as may still with reasonable certainty be applied. In obtaining the correct Gaelic nomenclature of natural objects there is now a growing difficulty, for of the small and ever-decreasing number who speak the primitive tongue, few are able with precision to identify any but the most common, or in some way conspicuous species. In the impoverished Manx now current, many names have doubtless been lost.

When we turn to the two published dictionaries of the language, we find animal and plant names very numerous in both, but unfortunately their value is impaired by the vagueness and incorrectness of the English equivalents, proving that the compilers had little acquaintance with the English names of the objects signified.

For some birds common here I have been unable to trace any (Gaelic) Manx name, the English or a corruption of it being used in the Gaelic speech. There are, on the other hand, species whose Gaelic names are still frequently or universally used by Manxmen is speaking English.

The Gaelic names are naturally often quite or almost identical with those of Irish and Scotch Highland Gaelic. I am not aware that any trace of the Scandinavian influence for centuries dominant in Man, and which has left so strong an impression on our place-names, can be found among them.

The writer's acknowledgments are due to Mr. J. B. Keig, of Ramsey, and his family, to Messrs. W. Quayle and W. Tupper, of Laxey, and others, whose information and verifications have given this article the greater part of whatever value it may possess.

The following works have also been referred to:—

Cregeen, 'Manx Dictionary,' Douglas, 1835.

Kelly's 'Manx Dictionary' (Manx Soc. vol. xiii., original about 1772, with additions), Douglas, 1866.

O'Reilly and O'Donovan, 'Irish-English Dictionary,' Dublin.

Harvie Brown and Buckley, 'Vertebrate Fauna of Outer Hebrides,' Edinburgh, 1888; from which the references to Scotch Gaelic are mainly taken.

Macpherson, 'Fauna of Lakeland,' Edinburgh, 1892.

Mitchell, 'Birds of Lancashire,' London, 1892.

Rolland, 'Faune Populaire de la France,' tome ii., Paris, 1879.

Moore, 'Surnames and Place-names of the Isle of Man,' London, 1890.

Moore, 'Manx Folk-lore,' Douglas, 1891.

'Manx Note-book,' edited by A. W. Moore, Douglas, 1885-7.

'Yn Lioar Manninagh' (Transactions of Isle of Man Nat. Hist. &c. Soc., 1880 *et seq.*)

'Manx Bible' (Translation made under direction of Bishop Hildesley about 1768), edition 1819.

Kermode, 'Manx Crosses,' Ramsey, 1892.

The initials M. S. D. refer to the Manx Society's or 'Kelly's Dictionary'; Cr. to 'Cregeen's Dictionary.'

Local *English* names in use on the island are added enclosed in brackets.

An asterisk prefixed to a Gaelic name signifies that the name has been verified as in use at the present time. The erratic nature of Manx orthography will be observed in the variant forms of many names.

MISSEL THRUSH, *Turdus viscivorus*. (Wood Thrush; Scotch Thrush.)

SONG THRUSH, *T. musicus*. Treshlen (M. S. D.), evidently a corrupt diminutive of the English.

FIELDFARE, *T. pilaris*. (Snow-bird.) Ushag-ny; Traghtee or Sniaghtee (M. S. D.). \*Ushag-sniaghtey = Snow-bird. These names are probably also often used for the Redwing, *T. iliacus*.

BLACKBIRD, *T. merula*. Lhon, Lhondoo, Lhon-ghoo (M. S. D.); Lhon (Cr.). I think \*Lhondhoo = Black Thrush is now the usual form. The legend of the Lhondoo and Ushag-reaisht is thus given in Mr. Moore's 'Manx Folk-lore,' p. 150:—"It is said that once upon a time the haunts of the Lhondoo were confined to the mountains, and those of the Ushag-reaisht (*Charadrius pluvialis*) to the lowlands. One day, however, the two birds met on the borders of their respective territories, and, after some conversation, it was arranged to change places for a



while, the Ushag-reaisht remaining in the mountains till the Lhondoo should return. The Lhondoo, finding the new quarters much more congenial than the old, conveniently forgot his promise to go back. Consequently the poor Ushag-reaisht was left to bewail his folly in making the exchange, and has ever since been giving expression to his woes in the following plaintive, querulous pipe :—

Lhondoo, vel oo cheet, vel oo cheet ?  
Blackbird, are you coming, are you coming ?

The Blackbird, now plump and flourishing, replies :—

Cha-nel dy bragh, cha-nel dy bragh !  
No, never ! no, never !

The poor Ushag-reaisht, shivering—

T'eh feer feayr, t'eh feer feayr !  
It's very cold, it's very cold !”

For “a quaint fancy derived from the Blackbird's and Thrush's songs,” see p. 151 of the same work ; and in the ‘Manx Notebook,’ No. 2, 55, the song of the former is thus prettily rendered (with a charming illustration) into Manx :—

Kione jiarg.	Kione jiarg.
Apyrn dhoo.	Apyrn dhoo.
Vel oo cheet ?	Vel oo cheet ?
Skee fieau !	Skee fieau !
Lhondoo.	Lhondoo.

Red head.	Red head.
Black apron.	Black apron.
Are you coming ?	Are you coming ?
Tired waiting !	Tired waiting !
Blackbird.	Blackbird.

WHEATEAR, *Saxicola œnanthe*. (Stonechatter.) Claghyn-cloie (Cr.) ; Clachan-ny-gleiee, Clogh-ny-cleigh (M. S. D.) = Stone of the hedge, *cf.* Clochirean, Scotch Gaelic. This is one of the “Shiaght Cadlagyn” or “seven sleepers” of ‘Manx Folk-lore’ (Kermode, ‘Yn Lioar Manninagh,’ I. i. 44).

STONECHAT, *S. rubicola*. (Stonechatter ; Blackcap ; Nick-chick). \*Claghyn-cloie is applied to this species also, and it is probably the Kione-doo-ny-eeigynyn = “Black-head of the gorse” of the M. S. D.

WILLOW WARBLER, *Phylloscopus trochilus*. (White Wren; Tomtit.) \*Drein-vane = White Wren. These names are of vague application, and "White Wren" seems sometimes to denote some fancied variety of the Common Wren. Mitchell gives "White Wren" for the Willow Warbler in Lancashire.

SEDGE WARBLER, *Acrocephalus schoenobaenus*. (Mocking-bird.)

HEDGESPARROW, *Accentor modularis*. (Rough Wren; Little Thrush; Blue Buntie, ? because its eggs are blue.) Drein-mollagh = Rough Wren, rendered "Titmouse" by Cregeen; \*Ushag-keir = Grey-bird; \*Boght-keir; \*Bo'keir = Poor grey (bird).

GREAT TITMOUSE, *Parus major*. (Blackcap.) As in Lancashire (Mitchell).

WREN, *Troglodytes parvulus*. (Jinnie; Jinnie Wren.) \*Drein, Drear (M. S. D. and Cr.); Dreaain (M. S. D.), cf. Ir. Dreathan; Sc. Gael. Dreollan, Drethein. The ceremonies on St. Stephen's Day connected with the Wren are well known. See 'Manx Folk-lore,' p. 133, *et seq.*

PIED WAGTAIL, *Motacilla lugubris*. Ushag-vreck (M. S. D.) = Pied-bird; Skibbag-ny-vultin (M. S. D.); Ushag-voltee (Cr.).

MEADOW and ROCK PIPITS, *Anthus pratensis*, *A. obscurus*. \*Ushag-y-veet; \*Ushag-veet; \*Billy-yn-tweet; \*Tweet; \*Cheet or Chit Veg. Names expressing the note.

SWALLOW, *Hirundo rustica*. \*Gollan-geayee or gheayee (M. S. D. and Cr.) = Fork of the wind. Used in Ps. cxxxiv. 3. Cf. Ir. and Sc. Gael. Gobhlan Gaoithe; Welsh Gwennol; Breton Gwignol, Gwignelenn. One of the "seven sleepers" (Y. L. M. I. i. 44).

GOLDFINCH, *Carduelis elegans*. \*Lossyr-ny-keeyley = Flame of the wood (M. S. D.); Kiark-my-Leydee (Cr.) = My lady's hen. As in Lancashire, "Flinch" is here a common error for "Finch."

SPARROW, *Passer domesticus*, is rendered "Sparroo" in the Manx scriptures, as if even at the date of translation no Gaelic Manx name was known. (Spadger.)

CHAFFINCH, *Fringilla cœlebs*. (Spink) in Lonan.

GREENFINCH, *Ligurinus chloris*. (Green Linnet.)

LINNET, *Linaria cannabina*. (Philip.) Bytermyn (Cr.). \*Fillip-ny-kempey = Philip of the hemp, is in M. S. D. rendered

Bunting. Mitchell says that the Twite (*L. flavirostris*) is called "Manx Linnet" in Lancashire.

COMMON BUNTING, *Emberiza miliaria*. \*Pompee-ny-hoarn (Cr.)=Bunting of the barley. Cregeen translates this merely "a small bird." This species is no doubt also Ushag rouayr (or roayr) ny hoarn=Fat bird of the barley, of both dictionaries.

YELLOW BUNTING, *E. citrinella*. \*Ushag-wee (Cr.); Ushag-vaigh (M. S. D.)=Yellow-bird; *cf.* Sc. Gael. Bhuidheag.

SKYLARK, *Alauda arvensis*. \*Ushag-y-tappee, Ushag-tappagh (M. S. D.) = Crested-bird; Ushag chabbagh (M. S. D.) = Stammering or babbling bird; Ushag happagh (Cr.). *Cf.* Sc. Gael. Uiseag, I. Fuiseog. But Ushag is the common Manse generic term for "bird," as may be seen by many compounds in this list, although Eean (*cf.* Sc. Gael. and I. Eun) is also used. In Lonan, Ushag is usually pronounced Ulliag.

STARLING, *Sturnus vulgaris*. \*Truitlag (M. S. D. and Cr.) *Cf.* Sc. G. Druideag; I. Truid, Truideog; Wel. Drudwy; Bret. Tred.

CHOUGH, *Fregilus graculus*. \*Caaig (Cr.); Caag (M. S. D.); pronounced "Keg," *cf.* Sc. Gael. Cathag. M. S. D. translates "Chough, Daw, or Jay"; Cregeen, "Jay." This is a well-known name as applied to this species; I have not heard it used for the Jackdaw, as in Scotch Gaelic.

MAGPIE, *Pica caudata*. \*Piannad, Pieanat (M. S. D.); Pieanat (Cr.). *Cf.* Sc. Gael. Pitheid, &c.; I. Pighe, Pighead; Eng. Piet, Pie-Annet, of which these are corruptions.

JACKDAW, *Corvus monedula*. Juan-teayst (M. S. D. and Cr.). An attempted translation of the English name read as "John Dough!"

ROOK, *C. frugilegus*. \*Craue-feeagh (M. S. D.).

HOODED CROW, *C. cornix*. (Greyback). Fannag, Trogh, Troghan (M. S. D.); Fannag (Cr.). *Cf.* Sc. Gael. Feannag; I. Feannog. Mitchell gives "Manx Crow" as a Lancashire name.

RAVEN, *C. corax*. \*Feeagh (M. S. D.; Cr., Lev. ii. 15, &c.). *Cf.* S. Gael. Fitheach; I. Fiach, Fitheach. Feeagh-vooar is properly the Raven, Feeagh including also the "Greyback" and Rook. The Raven is commemorated in various place-names, as Edd Feeagh-vooar=Raven's nest; Glion Feeagh=Raven's glen, &c.; and perhaps the Scandinavian Ramsey; and here, as else-

where, Fiach became a family name, now translated into Crowe. On Manx-inscribed crosses of the Norse period (eleventh to thirteenth century) we find in runes the personal name FIAK and its compounds UFAIK and UFAAK (*i. e.* O'Faac) and (?) FEEAK, the former part of the name being in this case defaced and uncertain (MALFEEAK and THURFEEAK suggested). Cur meer da'n feeagh, as hig eh reeisht (Give a piece to the Raven, and he'll come again), and Myr s'doo yn feeagh, yiow eh sheshey (Black as is the Raven, he will find a mate) are Manx proverbs. A bit of Raven-lore, too long for quotation here, is given by Rev. T. E. Brown, in 'Brown's Popular Guide to Isle of Man,' ed. 1877, p. 352.

CUCKOO, *Cuculus canorus*. \*Cooag (M. S. D., Cr., Lev. ii. 16). Cf. Sc. Gael. Coi, Cuach; I. Cubhag. One of "the seven sleepers."

LONG-EARED and SHORT-EARED OWLS, *Asio otus* and *A. accipitrinus*. Hullad, Kione-chayt = Cat's-head (M. S. D.); Hullad (Cr.). \*Hullad-screeah. Hullad is used in various scriptural passages; cf. Eng. Howlet.

EAGLE, *Haliaëtus albicilla*, was probably the Manx species. \*Urley (pr. Urla), (M. S. D., Cr., and in Lev. xi. 18, Deut. xiv. 12, Job. xxxix. 27); but in Lev. xi. 13 and 17, strange to say, the English "Eagle" is inserted. Cf. Sc. Gael. Iolair; I. Iolar; Welsh and Brit. Er. The name Cronk Urleigh, formerly Renurling, probably refers to the Eagle as a device of the Stanleys, lords of Man, the place having been used as a Tynwald.

PEREGRINE FALCON, *Falco peregrinus*. (Falcon Hawk; Royal Falcon).

HAWK (generally). Shawk (M. S. D. and Cr.). Cf. Sc. Gael. Seobhag; I. Seabhac; Welsh Hebog. Shirragh (M. S. D.); Stannair (Cr.). \*Shirragh-ny-Giark (Cr.) = Hen-hawk, refers probably to the Sparrowhawk (*Accipiter nisus*). Shawk in Deut. xiv. 13=Glede, and in Lev. xi. 16, Hawk in the English version; in Lev. xi. 14, Shyrragh=Kite.

CORMORANT, *Phalacrocorax carbo*. (Diver; Jinnie Diver.) SHAG, *P. graculus*. The name \*Shag, given in both Manx dictionaries, applies to both species; and both give also Fannag-varrey=Sea-crow. Feeagh-marrey=Sea-raven appears in Lev. xi. 17. Arrag vooar or Arrag'ooar means *P. carbo*, perhaps only the young



white-breasted birds. Cf. I. Siagaidh, Siogaidh; Sc. Gael. Orag; I. Odharog, "a young Cormorant." Various isolated crags round our coast are well known as "Shag Rock," "apricis statio gratissima mergis."

GANNET, *Sula bassana*. (Johnny Gant). \*Gant, Gaunt (M. S. D.).

COMMON HERON, *Ardea cinerea*. Coayr. \*Coayr-ny-hastan = Eel Crane, Coayr-glass = Grey Crane (M. S. D.); Coar-ny-hastan (Cr.). Cf. Sc. Gael. Corra-ghlas, Corr; I. Corr, Corriasc, Corr-ghlas; Wel. Creyr-glâs; Bret. Kerc'heiz; cognate with Gr. *γέρανος*; Lat. Grus; Eng. Crane, &c. In Deut. xiv. 18, "Heron" is Coar-ny-hastan, and Coar in Lev. xi. 19. As in some other parts of Britain, the Heron is here generally known by the name Crane.

BITTERN, *Botaurus stellaris* (extinct). Ushag-ny-boob (M. S. D.). Cf. Sc. Gael. Bubaire; Welsh Aderyn y Bwn.

GOOSE (gen.), *Anser* sp. \*Guiy (M. S. D., Cr.). Cf. Gael. Giadh; Wel. Gwydd; Bret. Gwas, Gwai, &c.

SWAN, *Cygnus ferus*, &c. \*Ollay (M. S. D., Cr., Lev. xi. 18). Cf. Sc. Gael. Eala; Bret. Alar'ch; Lat. Olor.

DUCK, *Anas boschas*, &c. \*Thunnag (M. S. D., Cr.). Cf. I. Tonnog.

TEAL, *Querquedula crecca*. Laagh, \*Laaghag (M. S. D.). Cf. Sc. Gael. Lach, Lacha = Duck; I. Lacha = Duck.

RING DOVE, *Columba palumbus*. \*Calmane-keeylley (M. S. D.) = Wood-pigeon. Cf. Sc. Gael. Calman coille; I. Colm = Dove; Lat. Columba.

RED GROUSE, *Lagopus scoticus*. Kellagh-ruy = Red cock; Kiark-freoaie = Heath-hen (M. S. D.). Cf. Sc. Gael. Ceare-Fhraoich, Coilleach-Ruadh.

PARTRIDGE, *Perdix cinerea*. \*Kiark-rhennee or rheinnee (M. S. D., Cr., 1 Sam. xxvi. 20) = Fern-hen; Patrag, Eean-patrag (M. S. D.). Cf. Sc. Gael. and I. Ceare Thomain; Sc. Gael. Ceare Chruthach. M. S. D. applies Kiark-rhennee also to the Woodcock (*Scolopax rusticola*).

LANDRAIL, *Crex pratensis*. \*Eean or Yeean-raip, Eean-raip (M. S. D.); Eean-reap (Cr.)—onomatopœtic.

MOORHEN, *Gallinula crex*. \*Kiark-ushtey (M. S. D.) = Waterhen ("a Coot," Cr.). Cf. Sc. Gael. and I. Cearc-uisge.

GOLDEN PLOVER, *Charadrius pluvialis*. \*Ushag reaisht, reeaisht, or reeast (M. S. D. and Cr.)=Bird of the waste. \*Fedjag (pr. Fashag) reeast (Cr. and M. S. D.)=Whistler of the waste; Feddag (M. S. D.). Cf. Sc. Gael. Feadag, Feadag-bhuidhe; I. Feudog. See Blackbird, *supra*. Some Manx people say Ushag-reeast is applied to some smaller bird, perhaps the Redwing or Snow Bunting; but the legend, with its imitation of the Plover's well-known cry, cannot apply to either of these. Mr. Moore says this is also the "little red bird of the black turf-ground" in the ballad on pp. 149, 150 of 'Manx Folk-lore'; but the description seems very inappropriate.

RINGED PLOVER, *Ægialitis hiaticula*. (Miller or Millard; Sand-lark; Sea-lark; this and other small shore-birds.) I do not know the etymology of the first two names; perhaps simply English "Miller" from the bird's colouring. Can it have any connection with Norse "Sandmyla" (Holmgren, 'Skan. Foglar,' ii. 766)?

LAPWING, *Vanellus cristatus*. (Peewit.) \*Eairkan (M. S. D.); Earkan (Cr.). The "Lapwing" of Lev. xi. 19 is also so rendered in the Manx Bible. Derived from Eairk, "a horn." Cf. Sc. Gael. Adhareag-luachrach, Adharean-luachrach; I. Adhairein; Welsh Conchwiglan; Bret. Kernigel. There is a hill-farm in Lezayre called Parknearkin or Park-ny-earkan; and Mr. Moore derives from the bird's name also the appellation of a shore in Maughold, Traie ny Earkan or Earaghyn, which I have heard locally explained in the same way; but a different and perhaps more likely derivation is given in 'Yn Lioar Manninagh,' vol. i. part ii. p. 75.

OYSTERCATCHER, *Hæmatopus ostralegus*. \*Garey-vreck; \*Gareebreck (Cr.); \*Bridgeen. Vreck = Pied. For the meaning of Garey, see 'Fauna of the Outer Hebrides,' p. 117, where the equivalent Gearra is said to be applied to various animals and birds. In the same volume Gearra-breac is given as a name for the Black Guillemot (*Uria grylle*). Cf. Sc. Gael. Bridean, Gillebride; I. Gillebride.

SNIBE, *Gallinago caelestis*. \*Coayr-heddagh (M. S. D.); Coar-chrattagh (Cr.); two attempts at spelling the same sounds. \*Coar-ny-heddagh. Cf. Sc. Gael. Gobhar Athar; I. Gobhar-oidche; German Himmelziege; French Chèvre céleste, &c. Coar (Crane) in the Manx names should doubtless be Goar (Goat).

COMMON CURLEW, *Numenius arquatus*. \*Crottag (M. S. D.), (pr. Crothag). Cf. Sc. Gael. Crotach-mhara, Crotag-mara.

TERN, *Sterna* sp. \*Gibbyn-Gant = Gannet of the Sand-launce (Ammodytes).

BLACK-HEADED GULL, *Larus ridibundus*. \*Pirragh (Cr.). I have heard this given as Perrac, Parrac, and even Parrakeet. Cregeen translates "a species of gull, pinquin" (*sic*), but this is the species to which the name is applied. Cf. Sc. Gael. Tarroch = Kittiwake; Lanc., &c., Turnock.

HERRING GULL, *L. argentatus*; and other species. \*Foillan (M. S. D. and Cr.), (pr. Fölyan). Cf. Sc. Gael. Faoilean, Faoileag; I. Faoilleann, Faoileog; Wel. Gwylan; Bret. Gwelan, Goulen. There is a Traie Foillan (Gull's Shore) in Maughold, and an Ellan-ny-Foillan (Gull's Island) in Lezayre.

LESSER BLACK-BACKED GULL, *L. fuscus*. (Parson, at Peel.)

GREAT BLACK-BACKED GULL, *L. marinus*. Juan-moar (Cr.) = Big John.

SKUA, *Stercorarius* sp. \*Shirragh-varrey = Sea-hawk.

RAZORBILL, *Alca torda*. (Ducker.) Coltrag, Caltrag (M. S. D.); Coltrag (Cr.). The latter translates "a coulter-bill fowl." I have not heard this name used. Does it apply to this species, or the Puffin, or both? Cf. Sc. Gael. Coltrachan = Puffin.

COMMON GUILLEMOT, *Uria troile*. \*Stronnag (not in dictionaries), from Stroin = nose, in allusion to its pointed beak; or its derivative Stron, Stronneraght = Snuffle, from the murmuring cry.

BLACK GUILLEMOT, *U. grylle*. (Sea-pigeon, and, according to Mr. Kermodé, Rock Dove, at Peel.)

PUFFIN, *Fratercula arctica*. (Sea-parrot.) Pibbin (Cr.). The "Manx Puffin," so often mentioned by old writers as taken from holes in the Calf of Man for food, was of course *Puffinus Anglorum*.

The writer believes that this is far from a complete list of the names recoverable, by careful and leisurely investigation, especially in the remoter districts; but it may perhaps serve as a foundation.

## MUSEUM REPORTS.—I.

MUSÉE ROYAL D'HISTOIRE NATURELLE DE BELGIQUE :  
BRUSSELS.

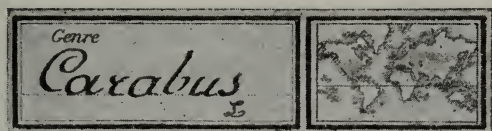
By G. SEVERIN, *Aide-naturaliste au Musée.*

I AM unable to report as to the whole of our zoological collections. At a standstill, except in the palæontological series, our Museum has not advanced for some years, except in Entomology, of which I will gladly speak. My aim on my arrival at the Museum was above all things to have a collection useful to everybody, and it will perhaps be of some interest to state how I worked for that purpose, and with what result.

It must be remembered that I have been at the Museum only six years, but these have proved to me that collections, even the most important, can in a short time be brought to complete order. Above everything I have abandoned all idea of specialising a group or family of insects. I am interested as much in Coleoptera as in Hemiptera, or in Crustacea as in Arachnida. *I determine nothing myself*, except any well-known species of which I know the name, and of which there can be no doubt. All our entomological collections are determined by distinguished specialists, and I prefer to await the offer of assistance rather than to solicit it. When the insects are determined each receives a label with the name of the verifier and the year when verified, and a number is attached to the species repeated with all specimens, corresponding to the name given by the specialist, which name is written in a register-catalogue. If a second specialist should study the same insect his identification is indicated on another label without any change of number if his verification should agree with the former one. A new number below the former number indicates a *divergence of opinion* between the specialists. After a certain time the insects so studied will have a great scientific value and the collection a strikingly typical status. This system is com-

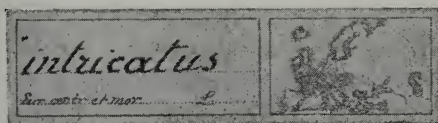
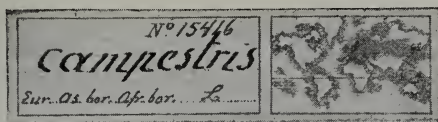


pleted by a locality-label at the bottom of the case, after the following model, which will explain to you our method.



My collections are divided into series:—1st. “The General Collection,” to which the foregoing labels apply, and is arranged so as to exhibit seventy-five per cent. of the species actually described.

2nd. “The Belgian Collection,” which contains the labels of all the species which may be met with in Belgium.



There is also a catalogue, followed by large maps of the country, and containing all the notes and descriptions which we have of our insects. There are about 14,000 cards.

3rd. The Congo Collection, in process of formation, and which I will refer to further on.

All these collections are found under three forms:—1st, The Collection; 2nd, Supplements; 3rd, Duplicates. All which we receive are immediately placed among the “Supplements,” and when a sufficient number are obtained their study is commenced.

It will be seen that the system is simple, and allows a very rapid arrangement of any collection, no matter how important. Thus it has been possible for me to arrange in less than six years about 125,000 species and 700,000 specimens, with further 700,000 duplicates, the whole arranged in 6000 glass cases. These are not all determined, but at least arranged and set in order; for I still await some specialist to occupy himself with some of the genera. It must be pointed out, however, that though I say the arrangement has been carried out in six years, the classification to a great extent was commenced fifteen years before I came to the Museum.

I have suppressed all conventional colour in my collections, the geographical indications employed from the beginning in our Museum being quite sufficient. It remains for me to speak now of our additions during the last few years.

Our collection of Coleoptera has been always very rich. I do not enumerate those obtained in our neighbourhood or the result of small purchases.

CARABIDÆ. Coll. Putzeys.

DYTISCIDÆ. Colls. Chevrolat, Severin.

STAPHYLINIDÆ. Coll. Germain. (European.—These are the insects which have been used by Fauvel in his 'Faune Gallo-rhénane'). Coll. Fairmaire (Exotiques).

COPROPHAGI. Coll. J. Thomson.—Coll. Lafontaine.

MELOLONTHINÆ, ANOMALINÆ, RUTELINÆ. Coll. J. Thomson.—Coll. Lafontaine.

BUPRESTIDÆ. Coll. Weyers.

LYCINÆ, LAMPYRINÆ. Coll. Guerin Méneville.

HETEROMERA. Coll. J. Thomson.

CURCULIONIDÆ. Coll. Dejean, Lacordaire, Racine, Castelnau, Gobert.

ANTHRIBIDÆ et BRENTHIDÆ. Coll. ditto, ditto.

SCOLYTIDÆ. Coll. Chapuis.

LONGICORNIA. Coll. Lacordaire.

CHRYSOMELIDÆ. Coll. Chapuis, Castelnau, Semper, Duvivier.

HYMENOPTERA. Les coll. Wesmael.

HEMIPTERA. Coll. Van Volxem.

LEPIDOPTERA. Coll. (Palæarctic) Wienmann, Breyer, Degré, Thysebaert.

The principal additions during the last four years have been the insects from the Congo. We have bought the Duvivier Collection, so that our African collection will be the richest, if it is not so already.

## NOTES AND QUERIES.

## MAMMALIA.

## LEMURIDÆ.

Breeding of the S. African Galago in Confinement.—The interesting little animal known to the Boers as the “nagt-apie,” and to zoologists as *Galago maholi*, was generally an inmate of my small menagerie in the Transvaal, and is a common pet both there and elsewhere. It can usually be purchased at Pretoria from the bush-veld Boers who bring their waggons to the market, and the little animals—for they are usually pairs—are simply secured by a light thong round the neck.

The first pair I kept, and in a moderately small cage, bred within the initial twelve months of captivity. One was produced at birth, which evidently died at a very early age, for after death it was thrust outside the sleeping or day-hiding chamber, when I first saw it. I should probably have succeeded in rearing stock from this pair, but for one of those untoward and unforeseen events which dog the steps of the keeper of live animals. The cause of the trouble in this instance was a Meyer's Parrot, *Psittacus meyeri*, between which and the male *Galago* a remarkable antipathy existed; the last would leave his nest, even in the daytime, if the bird was loose and came in front of his cage. One morning, when the Parrot had been loose all night, I found the male *Galago* dead, his snout being lacerated where the bird had bitten him through the wire netting. This proved that he had sought to fight the Parrot, as otherwise he was perfectly safe and protected in his cage. It is an interesting question whether there is a general antipathy between the Parrot and the *Galago*, and if so, why? Dr. Günther informed me that *G. maholi* bred in captivity in England in 1894, and, as the animal is frequently brought home, success in breeding may probably be obtained by those who will take the trouble to secure it. That possibly may be best achieved by interfering as little as possible with the sleeping or day-hiding place of the animals, or, in other words, by leaving them alone.—ED.

## AVES.

Eared Grebe in Cumberland.—An Eared Grebe, apparently an adult bird in winter dress, was shot upon the river Wampool early in December, 1896. It was quite alone, and was resting on the sand at the water-side

when it was shot by one of the professional wildfowlers of the Solway Firth. This species is rare on the N.W. coast of England. — H. A. MACPHERSON (Allonby Vicarage, near Maryport).

**Fulmar and Surf Scoter in Cos. Sligo and Mayo.**—On Oct. 19th, when driving to Ballina, I observed a dead Gull (as I thought) entangled in a small thorn-bush on the side of the road near the village of Castleconnor, Co. Sligo; but to my surprise, on examination, found it to be a very fine fresh specimen of the light-coloured variety of the Fulmar. As we had a continuance of northerly and north-easterly gales for some days before, the poor bird had evidently been driven before the storm and blown into the bush, from which, in its exhausted state, it was unable to extricate itself. The place where I found the bird is at least two miles and a half from Killala Bay, and nearly half a mile from the nearest part of the Moy Estuary. Although I have found dead Fulmars washed ashore by the surf on the Ennicrone Sands, and on one occasion found a pair alive, but too exhausted to move above the edge of the surf, yet I never met one inland before.

When out punt-shooting on Dec. 19th, I was fortunate in obtaining a very fine female specimen of one of our rarest American visitors, the Surf Scoter. A smart frost the night before induced me to launch my punt, and look out for any Mallards driven down by the frost to the estuary, as they usually are when the mercury in the thermometer falls below 26°. On reaching the stony point where the Ducks rest at about 7.30 p.m., owing to the faint light, I was unable to make them out lying amongst the brown seaweed; and, after waiting for some time vainly trying to see them, six fine Ducks rose out of the wrack, going off without a shot. Letting the punt drift down channel with the ebb-tide, I met seven or eight Wigeon near Bannross, and fired, knocking down five out of the bunch, but picking up only four, one cripple escaping by hiding in the seaweed. Loading in a hurry, I hastened on to cross the flats to Moyne Channel before the tide left the banks, and was barely able to do so, having to leave the punt and push her before me in the shallow water for a hundred yards or so, until I got into the channel. I found the sands on either side well covered with Godwits, Curlew, some flocks of Dunlins, and Sanderlings, and on the Bartragh side, a flock of forty Sheldrakes resting after their morning's feed, but well out of shot.

Meeting neither Wigeon nor Ducks, I still kept down channel, till, reaching "Moyne Pool" (an expansion of the channel), I saw a large flock of Godwits at the lower end, nicely placed for a shot. Seeing no chance of Wigeon I sat down to the Godwits, but before coming within shot a pair of heavy black Ducks flew past up channel for a short way, then turning, flew down again, pitching about a quarter of a mile below me. Thinking them to be Common Scoters (of which numbers are always in the bay just out



side the surf), I left the Godwits, and began to paddle down to the Ducks ; but before I had gone fifty yards they rose again, and as they flew past, observing some white showing on the head of one, it suddenly struck me that they were the rare Surf Scoters, birds that I had never seen alive. So, turning the punt, I paddled up to where they had pitched, about a quarter of a mile above me ; they were not at all shy, and, letting me get within fifty yards, I fired my big gun, loaded with an Eley's wire cartridge, but unfortunately at the moment forgetting that at short range the cartridge threw high, I did not depress the muzzle sufficiently, and the consequence was that the body of the charge went over them, a couple of grains only taking effect, one killing the female, the male being only winged. On the smoke clearing away I saw one bird lying dead on the water, the other having disappeared on being struck. However, he soon appeared on the surface about forty yards off, when I saw that he was a beautiful adult male, his orange-red bill and white patches on head and nape of neck contrasting strongly with his jetty-black plumage. Taking up my cripple-stopper, I let him have a charge of No. 6, which had no more effect in stopping him than a charge of sand. This shot sent him under water again, and then began a most exciting chase all about the pool and channel, the bird diving and turning in all directions when under water, and by these manœuvres throwing me off of his line so frequently, that, though always keeping him moving, I could never get closer than thirty or forty yards, and as he always swam under the water, showing only his head and neck stretched out on the surface, offered no mark to fire at from such a distance. Although I fired four times, I do not think a grain touched him, for he used always to duck the flash, the shot striking the water over the place he had been, and just too late. The chase, unfortunately for me always a stern one, lasted for over an hour and a quarter, when, getting into a dark patch of water caused by the shade of the land, he fairly blinked me by darting back and getting down channel when I thought he had gone up, and I lost time searching the upper part. Losing such a prize after being winged was most annoying, but the strength and endurance of the bird was surprising, for at the time I lost sight of him he appeared as fresh as when the chase began.

The Surf Scoter is one of our rarest visitors, W. Thompson recording only one specimen, an adult male, shot at Ballyholme, Belfast Bay, on Sept. 9th, 1846 ('Birds of Ireland,' iii. p. 118); and Sir R. Payne-Gallwey mentions a second as shot in October, 1880, at Clontarf, Co. Dublin ('Fowler in Ireland,' p. 113); while Mr. R. M. Barrington obtained an immature female, shot at Crookhaven, Co. Cork, on Nov. 5th, 1888 (Zool. 1889, p. 32). Mr. Sheridan, of Achill, Co. Mayo, speaks of shooting a female with a rifle-ball in Achill Sound in 1870. So the five above-

mentioned records show what a very rare visitor this Duck is to Ireland, as rare as another American Duck, the Hooded Merganser, which has also occurred only five times.—ROBERT WARREN (Moy View, Ballina).

[With reference to the Surf Scoter whose escape is so graphically described above, Mr. Robert Warren has just informed the Editor that the wounded bird of Dec. 19th was shot by his friend Mr. A. C. Kirkwood, of Bartragh, in the Moyne Channel, near Killala, on Jan. 18th. We feel equally pleased that the specimen has been secured, and that the sufferings of the bird are at an end.]

**Landrail in Chester in December.**—A Landrail, *Crex pratensis*, was shot on the meadow-land bordering the estuary of the Dee on Dec. 23rd, 1896. It was a male bird in good plumage, but weighing only 5¼ ounces. Its failure to migrate in the autumn was probably explained by the fact that one of the wing-bones (the radius) had evidently been fractured somewhat recently, though perfectly united at the time of death. The specimen has been deposited in the Grosvenor Museum, where Mr. Newstead, the curator, examined the stomach, and found it to contain woodlice, dipterous grubs, and other animal matter, besides the usual quantity of small pebbles. W. HENRY DOBIE (Chester).

**Rare Birds at Hastings.**—On Dec. 5th, 1896, a young female Gadwall, *Anas strepera*, was shot at a swampy place called the Fleet, which is just within the boundary of Kent where it joins Sussex; weight, 2 lbs. ½ oz. It was with a young Pintail, which was also secured. Another almost identical specimen was procured at Iden, near Rye, Sussex, on Boxing Day. On Dec. 8th last a young male Cormorant, *Phalacrocorax carbo*, was shot in the Alexandra Park, Hastings, at one of the reservoirs that supply the town; it weighed 6 lbs. 1 oz., and the gizzard contained a roach weighing 1 lb. It has been presented to the local museum. It had probably been blown inland by the gale of the day before, as where it was found is about a mile from the sea, and in the centre of the town.—GEORGE W. BRADSHAW (Hastings).

**Capture of a Common Bittern in Darent Wood, near Dartford.**—On the morning of Jan. 14th a Mr. Nettlingham, having occasion to go about some wood which had been cut, noticed what he at first thought was a hen Pheasant. Closer observation, however, proved that this was not the case. The bird was sitting with drooping wings, neck and head laid along the back, and with the beak pointing straight upwards. Arming himself with a few stones he approached the bird and knocked it down at once. I saw it alive the same evening, but it died the next morning, and is now being preserved by Mr. Davis, of Dartford. This is the second specimen of the species I have seen, and the third I have heard of as

occurring in this neighbourhood within the last few years.—A. B. FARN (Mount Nod, Greenhithe).

**The Wood-Pigeons in the London Parks.**—That birds and other animals accommodate themselves to their surroundings is well known to field naturalists, but a few remarks showing how the habits of the London Wood-Pigeons have been affected may perhaps not be altogether uninteresting. In the first place they have taken to perching freely on the buildings in the vicinity (as is the case with the Brighton Rooks), and on one occasion I saw a pair carrying on a courtship on the top of one of the chimney-pots of St. George's Hospital. I was struck with astonishment at seeing a Wood-Pigeon sitting on its nest in the tracery outside a large window of the Rijks Museum in Amsterdam in 1891, and I subsequently learnt that the nest had been seen in the same situation on a previous occasion; but I was still more surprised to see one of this species gather a twig from a tree in St. James's Park and carry it to a window of the India Office, where it disappeared in a niche, just the sort of place for a House Pigeon. In the wild state I have often found them breeding from April to October; but three or four years ago, on Feb. 8th, during a hard frost, when hundreds of people were skating on the ice in St. James's Park, I saw a Wood Pigeon sitting on a nest within fifty yards of the skaters. The nest was, however, forsaken shortly afterwards. The weather had been previously very mild. This winter, on Dec. 27th and 29th, 1896, I noticed one of these birds preparing a nest in an elm tree opposite to the India Office. The greater number of them, however, leave London in the autumn, returning early in spring. I once witnessed such a return between 4 and 5 p.m. on a February afternoon. A large flock was circling round at a great height, gradually getting lower and lower, till it finally settled in Kensington Gardens. From that date the parks were full of Pigeons. They become very tame, perching on the arms and shoulders of those who are accustomed to feed them. In the early spring they may be seen busily feeding on the tender shoots and flower-buds of the elm and other trees.

Numbers of House-Pigeons have found their way to the lawn on the north of Rotten Row, which is frequented by their wild cousins, and they have learned to perch in a large plane tree in the dell, a favourite resting-place of the wild birds. I have seen as many as fifty tame birds sitting in the tree at the same time.—JOHN YOUNG (64, Hereford Road, Bayswater).

**Rooks in the West End of London.**—With reference to my communication (Zool. 1895, p. 227) recording the nesting of Rooks in Connaught Square and Stanhope Place, I am sorry to have to state that both these sites have been untenanted during the year 1896; so that I fear in all probability the year 1895 will be the last date for the breeding of Rooks in the West

End. Strange to say, there were still a few nesting in Gray's Inn Square.—  
JOHN YOUNG (64, Hereford Road, Bayswater).

The Stock-Dove in Ireland.—I shot a Stock-Dove here on Jan. 6th. It is a level wooded locality about twenty miles from Ravensdale, where Lord Clermont recorded the first Stock-Dove in Ireland (Zool. 1876, p. 4798). I have shot many hundreds of Ring-Doves here, but have never secured a Stock-Dove before.—G. H. PENTLAND (Black Hall, Drogheda).

#### INSECTA.

A Proposed Explanation as to the Appearance of Light- and Dark-coloured Butterflies during the Day.—Dr. Gregory, in his 'Great Rift Valley' (pp. 275-6), has made some original suggestions on the colours of butterflies as observed by him in East-Central Africa. He writes as follows:—"Another point which interested me in reference to insect coloration was the influence of the different capacities for the absorption of heat possessed by different colours. A black object becomes more heated than a white one, when both are exposed under the same conditions. An insect has so much surface in proportion to its bulk that dark-coloured species are heavily handicapped when exposed to the intense sun of the tropics. This is the simple explanation of the fact, which impressed itself upon me as soon as I began to collect butterflies, that the light-coloured species fly in the daytime, and the dark ones in early morning and at dusk. I made considerable collections at Ngatana, at all hours of the day, to test this point. Thus on Jan. 30th I began collecting at 5.45 a.m., and found only species which are mainly of dark brown colour, such as *Hypolimnas misippus* and *Junonia clelia*. At 6.30 a reddish-brown species, *Limnas klugi*, began to appear, and this was the only species caught during the next half-hour, though this was abundant. A little before half-past seven a light brown species, *Acræa cæcilia*, made their appearance, followed immediately by numbers of light-coloured butterflies, such as *Teracolus syrtinus*, which is all white except for a red tip to the wings, and *Catopsilia pyrene*, which is wholly of a light creamy white. The dark brown forms disappeared from the open steppes before seven, and they were followed into obscurity by the light brown *Limnas*, of which not a single specimen could be found during the heat of the day. Then the open 'barra' was tenanted only by white and light coloured species. This rule, however, is not universal, for other factors modify it. Thus in dull cloudy weather the dark-coloured forms fly abroad all day, while some species of rapid flight habitually do so, such as many of the swallow-tail butterflies. *Papilio demoleus*, for example, a common species in the Sabaki and Tana valleys, was met with at all times of day; but it lived mainly under trees, darting out across open places from one shady place to another."



Dr. Gregory is such a good observer that we can only accept the facts he gives, but at the same time I have never *noticed* the correspondence myself when collecting butterflies either in the Malay Peninsula or in South Africa. There is probably here a partial but not absolute rule in the appearance of these insects, and, though I cannot support it from my own experience, it would be most interesting and valuable to obtain the observations and opinions of other tropical field entomologists.

Lord Walsingham in 1885 advocated parallel views on "some probable causes of a tendency to melanic variation in Lepidoptera in high latitudes." In discussing the probable explanation of the white covering of many arctic and alpine mammals and birds, and the dark hue of many lepidopteral species in the same habitats, he accepted the views which were at least enunciated by Craven in 1846 as explanatory of the first phenomenon, which accounts for the same by the well-known fact of white being a bad radiator of solar energy, and white-covered animals thus being able to retain their heat to the greatest advantage. The dark insects, on the contrary, are considered to have their advantage in being better able to absorb the solar radiation.—ED.

#### MOLLUSCA.

**Distribution of Worm-eating Slugs.**—As there appeared in the November number of 'The Zoologist' a note regarding the distribution of worm-eating Slugs (*Testacellæ*), it might be interesting to record that these animals are found here, often in considerable numbers. I might mention that here they are chiefly found in the gardens near the sea.—ALEC GOLDNEY HEADLEY (Portchester, Hants).

## NOTICES OF NEW BOOKS.

*A Handbook to the Game-birds.* By W. R. OGILVIE-GRANT.  
Vol. II. W. H. Allen & Co. Limited. 1897.

WITH this volume Mr. Ogilvie-Grant completes his task, and describes the remaining species of the order Gallinæ or True Game-birds, as well as that curious and aberrant form the Hoatzin, and the Bustard Quails; in fact, as Dr. Bowdler Sharpe, the editor, remarks:—"His volumes contain the names of every species of Game-birds known up to the present date, so that they may be considered in the light of a small monograph of the Gallinæ."

In these days, when so much popular Natural History is written,—so to say,—secondhand, we do not always find the author an admitted specialist on his subject as is the case with the writer of these volumes; nor do we usually obtain such exhaustive treatment as has been devoted to them. Consequently we have in this 'Hand-book to the Game-birds,' not only a complete enumeration and description of the species, but also a nomenclature revised to date, and this, to working naturalists who are not specially ornithologists, is a considerable boon. Another welcome feature is to be found in the copious extracts given from the published writings of field naturalists and observers as to the life-habits of the species, and here we would fain have wished that bibliographical references might have been added to the same. These descriptive narratives give a life and colour to the monograph. We leave the mere skin with the description, and are then transported to bird-life in many climes and under the guidance of competent and accurate observers. In the years to come, when some zoological Gibbon shall devote his life to the composition of an exhaustive history of animal existence, the scattered field-notes now in many languages, often buried in little known or less read books, and frequently published in non-scientific journals, will perhaps be brought together, and such a work may be expected

to inspire the conclusions of another Darwin. We want more recorders before we can anticipate new prophets.

It is impossible, with regard to space, to give many extracts. The author narrates one experience of the destruction of Pheasants' eggs by Crows. In a Scotch plantation, where thousands of Pheasants are annually reared and turned down, and in a slippery path along the sea-coast, "we found several sucked Pheasant's eggs, evidently the work of Crows, nor had we gone far before we came suddenly upon a whole family of Hooded Crows, five young and two old birds. In the course of about a quarter of a mile we counted over a hundred empty shells which had evidently been carried to the path and there devoured. How many more might have been discovered had we searched it is impossible to say, but we saw ample evidence of the wholesale destruction which a family of Crows is capable of committing among Pheasants' eggs."

To those interested in the discussion as to hereditary transmission of ideas and experience, a fact related of the Grey Peacock Pheasant, *Polyplectron chinquis*, a bird inhabiting the Indo-Chinese countries, will not be unacceptable. "We are told that when the young of this species were first hatched in the Zoological Gardens, a Bantam Hen was employed as a foster mother, and that the chicks *would* follow close behind her, never coming in front to take food, so that, in scratching the ground, she frequently struck them with her feet. The reason for the young keeping in her rear was not understood until, on a subsequent occasion, two chicks were reared by a hen *P. chinquis*, when it was observed that they always kept in the same manner close behind the mother, who held her tail widely spread, thus completely covering them, and there they continually remained out of sight, only running forward when called by the hen to pick up some food she had found, and then immediately retreating to their shelter."

A question in nomenclature seems to be raised by the name *Megapodius Layardi*, Tristran, 1879. In 1869 Mr. Sclater had for the same bird proposed the name *M. brazieri*, "*founded on an egg from Banks I.*" Mr. Ogilvie-Grant is probably quite canonical in adopting the later description made from the bird itself. Would the same law apply to the description of a lepidido-

pteron founded on a caterpillar? The answer would almost certainly be in the affirmative now, but posterity might reverse the verdict!

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*Sixteenth Annual Report of the United States Geological Survey.*  
1894-95. By C. D. WALCOTT, Director. Washington. 1896.

THIS bulky volume is another instance of how science is fostered in the United States, and is the first report made by Mr. Walcott, who succeeded Mr. Powell in 1894, after that gentleman had directed the survey for thirteen years. We wish the present editor equal success and increased longevity.

With the geological contents of the volume we have nothing to do in the pages of this magazine, but zoologists may well consult and study an exhaustive memoir, by Prof. O. C. Marsh, on "The Dinosaurs of North America." As the author writes, among the many extinct animals that lived in North America in past ages, "none were more remarkable than the dinosaurian reptiles which were so abundant during Mesozoic times. This group was then represented by many and various forms, including among them the largest land animals known, and some, also, very diminutive. In shape and structure, moreover, they showed great variety, and in many other respects they were among the most wonderful creatures yet discovered."

It is stated that the best authorities now regard the dinosaurs as constituting a distinct subclass of the Reptilia, and Prof. Marsh recognizes three groups, viz. *Theropoda*, carnivorous forms; and *Sauropoda* and *Predentata*, both herbivorous groups. "The first of these suborders contains large dinosaurs more or less protected by a dermal covering of bony plates; the second group includes the huge horned dinosaurs; and the third is made up of the forms that in shape and structure most nearly resemble birds."

While the geological range of the Dinosauria, according to present knowledge, is confined entirely to the Mesozoic period, known so well as the Age of Reptiles, their geographical distribution was extensive. America, Europe, Asia, Africa, and Australia, have all contributed remains of these animals, but "while North America seems to have contained the greatest number of different types, some of the larger species are now known to have



lived in the southern half of the continent. Europe stands next to America in variety and number of these reptiles, large and small."

One interesting point with these animals is their relation to the so-called "bird-tracks" of the Connecticut River sandstone, which have been a "fruitful subject of discussion for half a century or more," and Prof. Marsh considers it now evident "that a dinosaurian reptile like *Anchisaurus* and its near allies must have made footprints very similar to, if not identical with, the 'bird-tracks' of this horizon." No zoologist can fail to find the most absorbing interest in these gigantic and peculiar reptiles, as, for instance, *Atlantosaurus immanis*, of which "the femur is over 6 feet long, and this, with other portions of the skeleton, indicates an animal about 70 or 80 feet in length," or *Laosaurus consors*, estimated as having a height of about 4 feet, with 8 feet in length. It is considered "that the animal was bipedal in its usual locomotion on land," and when walking upright it "seems probable that the animal would touch the ground with its tail; but this is by no means certain."

We have only alluded to matters of general interest in this memoir, which is worthy of study by the zoologist, and is of the greatest importance to the evolutionist. The structural details are fully described, and eighty-five plates are given in illustration of the remains of these vanished creatures.

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*The Fauna of British India, including Ceylon and Burma: Moths.*  
Vol. IV. By Sir G. F. HAMPSON, Bart. Taylor & Francis.  
1896.

"WITH the present volume the first group of Indian Invertebrata included in the present series is completed." The magnitude of the work is shown by the fact that the four volumes of Moths, with the appendix to the last volume, contain descriptions of 5618 species regarded as valid, exclusive of races or subspecies.

These introductory remarks of Mr. W. T. Blanford, the editor of the series, are necessary to appreciate this colossal monograph, of which the volume under notice comprises only a fourth and concluding part. It is but a few years back when

the Moths of India were in the present position of the Moths of Africa, the game of happy hunting grounds for specialists, but a hopeless study for the average lepidopterist. The material was comparatively scanty, with a systematic literature obscure, scattered, and surcharged with synonymy. Without access to a large and well arranged collection, it was hopeless to attempt even much generic subdivision, save in the largest or best known groups of Moths. Hence much work was necessarily of an empirical description, and many of the "difficult" groups remained outside the nomenclature. This is now no longer the case; with these volumes a student of Oriental Heterocera should not find much difficulty in understanding his subject or naming his species. Each genus is illustrated by a typical species, of which one half exhibits the venation, while the other recorded species are also described.

The author has pursued a synthetic method in his work, but on the merits of "splitting," or "lumping," the pages of 'The Zoologist' contain no mention. We merely record the completion of a great and successful undertaking; and when it is remembered that the first volume only appeared in 1892, the industry alone displayed is something phenomenal.

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*Zoologisches Adressbuch.* R. FRIEDLÄNDER & SOHN. Berlin. 1895.

THIS 'International Zoologists' Directory,' edited and published by the well-known Berlin firm whose catalogues are always appreciated by scientific workers, will prove a welcome addition to the bookshelf. In these days when zoological work is carried on by so many widely separated students, it is a boon to readily acquire the address of those with whom we wish to correspond. It is equally important to discover the names of those who in far-away localities are interested in the same studies as ourselves, and may be expected to join in mutual assistance. Taken in conjunction with 'The Scientists' International Directory,' compiled by Cassino and published in Boston in 1892, a mass of information is available which will save much time in these busy days, and serve to increase—where necessary—the number of our correspondents.

## EDITORIAL GLEANINGS.

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WITH the object of clearing up certain doubtful points as to the relation of Palæolithic Man to the glacial epoch, a Committee, under the presidency of Sir John Evans, was appointed at the Ipswich meeting of the British Association in 1895. Its report, drawn up by the Secretary, Mr. Clement Reid, was presented to the Liverpool Meeting of the British Association, 1896.

Work was commenced at Hoxne. A pit was sunk to a depth of 20 feet, and a boring continued 22 feet lower, when the glacial sand (underlying the boulder clay) was reached. This represented a depth of about 51 feet from the surface which existed before the brickyard was worked in which the investigations were made. A chain of borings east and west of this trial pit was also effected.

Mr. T. V. Holmes, in summarising this report in the pages of the 'Essex Naturalist,' writes:—"The explorers think that long after the disappearance of the ice which deposited the chalky boulder clay (the latest glacial deposit of East Anglia) the land was somewhat higher than at present, so that the silted-up channel could be excavated to a depth slightly greater than that of the present channel of the Waveney. Then gradual subsidence turned this channel into a shallow fresh-water lake. After the lake became silted up it was grown over by a temperate flora. Then lacustrine conditions again prevailed, and a colder climate, resulting in the deposition of bed C (black loam with leaves of arctic plants). Then followed the floods, during which the palæolithic beds B (gravel and carbonaceous loam) (no implements at this spot) and A (brick-earth with fresh-water shells, wood, and palæolithic implements) were deposited. The palæolithic deposits at Hoxne are therefore, as Mr. Reid remarks, not only later than the boulder clay of East Anglia, but are separated from it by two climatic waves, with corresponding changes of the flora."

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At the January meeting of the Zoological Society of London, Mr. Slater exhibited a photograph of a young Anteater, *Myrmecophaga jubata*, two days' old, born in the Zoological Garden of Herr Adolf Nill, at Stuttgart. Mr. Slater remarked that this was the first instance, so far as he knew, of this animal having bred in captivity.

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At a meeting of the Linnean Society of London held Dec. 17th, Mr. J. E. Harting exhibited a supposed hybrid between the Common Brown Hare,

*Lepus timidus*, and the Irish Hare, *L. variabilis*, recently obtained in Carnarvonshire, where the latter species had been introduced in 1878. He compared the specimen in question with examples of both the above-named species, and contrasted their distinguishing peculiarities, pointing out the intermediate characters exhibited by the supposed hybrid. His remarks were criticised by the President (Dr. A. Günther), who thought that too much stress should not be laid upon external appearance and colour; that the question of hybridity should rather be determined by comparing the relative measurements of the leg-bones; and that the Irish Hare should be compared in detail with the Hare of Southern Europe, *L. meridionalis* or *mediterraneus*. Prof. Howes drew attention to Natusius's observations upon the Peyer's patches of the Leporines, and pointed to the necessity for examination of the viscera. Mr. Barrett Hamilton, who was present as a visitor, was inclined to regard the supposed hybrid as an example of the ordinary Brown Hare turning white in winter, hitherto unnoticed in this country. Mr. Thomas Christy enquired what position the so-called Belgian Hare or Leporine occupied in relation to the question of hybridity; and was answered that the popular notion of that animal being a hybrid between Hare and Rabbit was fallacious, since it was nothing more than an overgrown tame Rabbit coloured like a Hare.

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The 'Daily News' of Jan. 27th gives a forecast of the Commissioners' Report on the Behring Sea Seal Fisheries, from which we extract the following particulars:—Mr. Gerald Barrett Hamilton, one of the two British Commissioners, returned recently to London, having been preceded by Prof. D'Arcy Thompson. After spending six weeks on the Commander Islands and visiting Robben Island, Mr. Hamilton joined Prof. Thompson on the Pribyloff, and remained until the end of October. The Canadian and United States Commissioners, Messrs. McCoun and Clarke, were also on the Pribyloffs at the time. Owing to the powers given to the American Commissioners by their Government, they were able to do more than had been previously accomplished in the study of the question. Among other things a census—the first ever made—of every Seal on the islands was taken. This showed that there were 143,000 breeding females on the Pribyloffs, and proved that the American estimates of the total number of Seals on the islands were much below the mark. Another important piece of work was the counting of dead pups. The Americans claimed that, owing to the killing at sea of breeding females, vast numbers of pups were left to starve on the islands. They claimed that as many as 30,000 perished in this way. It was therefore highly important to know actually how many dead pups there were. Twenty thousand dead pups were counted, but it was proved that 10,000 of these had been killed by overcrowding before the commencement of pelagic sealing. The remaining 10,000 had died later in the season.







Vicious Ostrich Cock "bromming"—at end of third note of cry (p. 105).



Vicious Ostrich Cock "rolling" (p. 104).

# THE ZOOLOGIST

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No. 669.—March, 1897.

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## THE OSTRICH.

By S. C. CRONWRIGHT SCHREINER.

THE Ostrich, *Struthio camelus*, has been observed with interest from very early times; it has frequently been the subject of remark by African travellers; and it has been domesticated and farmed in the Cape Colony for some thirty years. Yet it is remarkable how little is known about it in scientific circles, and how many misconceptions still prevail as to its nature and habits.\*

\* This article is founded on personal observations made during nine years of uninterrupted Ostrich-farming in the Karroo of the Cape Colony, and during travels about the country generally. The number of Ostriches which were under my care during this period ranged from about 250 to 450. Some of the birds were the progeny of wild birds, brought down as chicks from further up-country. Every year eight special breeding pairs were camped off, each pair in a separate small camp; but the other birds ran in large camps, the extent of the farm being 4600 morgen (about two acres to the morgen). In these large camps, some of which are a couple of miles in diameter, numbers of birds of both sexes run in what is practically a wild state, seldom interfered with in any way, except when rounded up to be plucked or to be fed in a drought. I know, from personal observation when purchasing wild chicks from the nest, and from numerous inquiries, that the habits of birds thus farmed differ in no way from those of native wild birds, except perhaps that monogamy is more difficult. The whole of the Cape Colony is the native habitat of the Ostrich; there are feral Ostriches in many parts, and wild birds in some of the up-country districts.

*How many Species are there ?*

I have not been able to ascertain whether the question as to the number of species of Ostrich has yet been settled. Some writers maintain there are two species; others that there are three. Professor Newton (article "Ostrich," 'Encyclopædia Britannica'), after briefly reviewing the evidence, says the question "has been for some years agitated without leading to a satisfactory solution."

The reasons given for classifying the Ostrich into three species are :—

That in the North African bird, *Struthio camelus*, the skin of the unfeathered parts is flesh-coloured; in the South African, *S. australis*, bluish, except at the angle of the gape, which is flesh-coloured; and in the birds of the Somali country, *S. mybdomphanes*, leaden coloured.

It is further maintained that the eggs of the northern Ostrich are larger than those of the southern, and have a perfectly smooth surface, while those of the southern are punctured or pitted; also that the northern bird is the smaller, and the cock not so jet-black. Mr. Bartlett adds, as another distinguishing character, that in the southern Ostrich the scales of the tarsi and toes, unlike the skin of the other unfeathered parts, are flesh-coloured.

If the question has not been settled, a short description of the South African Ostrich may help towards its solution; if it is decided, the description may nevertheless convey some useful information to such as are interested in it.

*Colour of the Plumage.*

Chicks when first hatched, and for some weeks after, have the wings and upper part of the body covered with a mottled dark-and-white coat of small feathers, ending in solid spiked points, almost like miniature porcupine quills; the lower part with a soft yellow down. The neck is marked longitudinally with wide dark stripes on a lighter ground, and the head with spots of the same colour. Some broods are much darker than others. They soon acquire a plumage varying from ash-colour to brown, the feathers retaining their spiked points for some time. At an age, generally from about twelve to eighteen months,



chicks begin to moult their youthful plumage of narrow pointed feathers, and gradually acquire those of the adult bird, possessing them in their entirety, at the latest, when about four years old. Up to the time when the change begins, the sexes are not distinguishable; but after the moult the cocks acquire a black and the hens a drab plumage, which differs from that of a big chick not so much in colour as in the shape and quality of the feathers. The cocks do not change abruptly from their youthful drab to adult black, but pass through what is generally designated by the Dutch word, the "bont" (variegated) stage. Black, brown, and drab feathers are indiscriminately mingled all over the body, the plumes and tails being black-and-white. The same stage is gone through by the hens, but is not nearly so conspicuous, the difference in the colour of the feathers being less marked. At about four years all have their adult plumage; but both among cocks and hens there is a great diversity in colour in different individuals and in different parts of the country. In all cocks the plumes ("whites") are white, but in hens these feathers ("feminas") vary from white to drab. The "tails" correspond in colour with the "whites" and "feminas," respectively. In both sexes, variations in body-colour are most conspicuous. Some cocks are a glittering jet-black, while others are a rusty-brown; a few have odd white feathers dotted about the body; occasionally the secondary wing-feathers are white, or often fringed with white; and I knew of one which was thickly flecked with white over the whole body. In some cocks all the feathers, "whites" excepted, are beautifully curled, almost as though artificially; while in others they have not the slightest indication of curl. These individual variations are in some cases accentuated by differences of climate. Towards the coast the rusty-brown tint (more pronounced than up-country) is often found, while the glittering jet-black, so characteristic of Karroo birds, is comparatively uncommon. On the authority of an Ostrich farmer of great experience, who has hundreds of birds on both Karroo and coast farms, Karroo birds produce, on the whole, the best "blacks," coast birds the best "whites." The first essentiality of black feathers is that they shall be glittering and glossy, and this condition the dry air of the Karroo seems to favour; a white feather must, other characteristics being equal, be soft, with a limp

quill, and this seems to be most frequently produced by the damp coast breezes. Hens also vary in body-colour to an equal extent, though, in their case, the differences are not very conspicuous, the colours not being so strongly contrasted. They range from a dark rich brown to light brown, grey, or ash. I have had several hens with each feather ("feminas" excepted) barred across with white at about a quarter of its length from the tip, and one which had the perfect black plumage of a cock.

#### *Colour of the Unfeathered Parts.*

The colour of the unfeathered parts of chicks is yellow, which gradually changes to flesh-colour, and, as the adult stage is reached, either remains flesh-coloured, though of not so pronounced a tint, or changes to bluish or leaden—nearly always bluish. Variations not only in colour, but in texture, thickness, and strength of the skin, are both great and frequent. The colour of the neck varies also, in both sexes, from dark—nearly black in the case of the cock and deep brown in the hen—to almost white. The colour of the eye even varies; generally it is brown, but grey is not unknown.

#### *Colour of the Tarsi and Toes.*

Chicks\* may be divided into two lots, of about equal number, by the colour of the scales of the tarsi and toes. Some have light brown scales, the others dark brown. There is no grading from one tint to another; the line of demarcation is clear and unmistakable. The dark-scaled are by some farmers said to be cocks, the light-scaled hens. My attention was only drawn to this peculiarity shortly before retiring from Ostrich-farming; I cannot therefore express a decided opinion, not having had an opportunity of testing whether the statement is correct.

At any rate, the scales of the hens invariably remain brown, but those of the cocks change to flesh-colour, varying from nearly white to brilliant crimson. Cocks' legs do not often lose all trace of the crimson tint, though its intensity varies with the seasons, being brightest in a fat bird in the height of his sexual vigour in the breeding season, and faintest when a bird is in a

\* The term chick is often used for a bird of as much as even three years old.

low condition in the winter. It also varies in individual birds, and with their condition, and becomes pale during the period of sitting. During the non-breeding season the colouration, more or less faded, is nearly always confined to the scales of the tarsi; but in all cocks that "come on" during the breeding season it is seldom, if ever, so confined, the tarsi themselves, the toes, and the beak, to a greater or less extent, also becoming affected. Some cocks are then most brilliantly coloured; not only do the toes and the whole of the tarsi become a brilliant crimson, but the upper part of the leg (called by the Cape Ostrich farmers the "thigh") for half its length, nearly the whole of the head, especially the beak, ears, and around the eyes, are of the same gaudy tint. A vicious cock in full plumage is then a beautiful and imposing creature; the glittering glossy black is strikingly contrasted with the spotless white of his waving plumes, and the bright crimson of his head and legs; and as, with springy steps, he advances to battle, angrily lashing his wings across his raised body, with tail and neck erect, and flashing eyes, he is not only a beautiful, but a grand, and, to many a man, a terrifying object.

No corresponding changes take place in the hen; neither does she become vicious, except when she has chicks.

#### *The Egg; and Size of Ostriches.*

As to the alleged difference in the shell of the eggs of the northern and southern Ostrich, it may be sufficient to remark that the eggs of the southern bird vary frequently and greatly in respect of size, shape, and shell; some are quite a third larger than others; some are almost spherical, others oblong; and the shells vary from being deeply and thickly pitted to smooth and polished.

Differences in the sizes of Ostriches are equally marked; there is no uniformity. Some birds are very much larger than others; they also differ considerably in shape.

#### *Only one Species.*

It will thus be seen that all the differences on which the arguments for classifying the Ostrich into three species are founded, are commonly present among the Ostriches of the Cape Colony—that is, of South Africa generally; for a great many of

the Cape Ostriches are the progeny of birds brought down from "The Interior"—the Kalahari Desert, Damaraland, and beyond. There is, I think, little doubt that all South African Ostriches are of one species; individual variations, accentuated by local differences of food and climate, are quite sufficient to account for all supposed varieties. I do not think that, on the evidence which I have been able to gather, there is any justification for maintaining that there is more than one species of Ostrich.

*The Egg and Flesh of the Ostrich.*

The Ostrich hen lays every other day, and the egg weighs about three pounds; it is a tasty and nutritious food however prepared, very rich, and excellent for making pastry and cakes. It is generally computed to be equal to two dozen fowls' eggs; but this must be on account of its superior richness, for, from personal experiment, the empty shell of a fairly large one exactly held the contents of eighteen fowls' eggs. It takes about forty minutes to boil an Ostrich egg hard. The period of incubation is about six weeks. The flesh of the chick, if well prepared, is excellent, but that of an old bird is tough and insipid. The Ostrich is, however, never killed for food, and is very rarely eaten, except by native servants.

*Its Breast-bone and Powers of Kicking.*

The breast-bone of the Ostrich is of great thickness and strength, and of course keelless. Its lower edge has a hard pad, which must be useful to this heavy, long-legged bird when it bumps down to the recumbent position. It is obvious that the great weight and speed of the Ostrich, and its liability to collide against objects on the ground over which, when frightened, it makes its headlong indiscriminate way, would need that it be protected in front. Its thick convex sternum, almost devoid of flesh, is a most effective safeguard. As an instance of this, I have seen an Ostrich, at great speed, run against and snap a No. 6 fencing-wire, striking it with its breast; in the same way I have seen a sneeze-wood pole (a very tough wood used in wire-fencing), four inches in diameter at its thinnest end, broken just where it emerged from the ground; and a chick about eighteen months old run against a loose badly-built stone wall two feet in



thickness, and break a gap through it;—all these without injury to the birds. The shape and strength of the breast-bone is also a protection to fighting cocks, for the most powerfully delivered kicks nearly always strike there, doing but little harm.

During the breeding season cocks often fight, but, unless they kick at each other through a wire-fence (when a broken leg frequently occurs), seldom with fatal results. The kick is forward with a downward tendency, and the long nail with which the larger toe is armed often cuts and tears severely. The force of the kick is great; a man goes down before it like a nine-pin. I have seen two cocks charge at each other, the larger of the two, at the first kick, being hurled several yards on to the broad of his back, while the kicker recoiled into a sitting posture; and I possessed a cock which kicked a hole through a sheet of corrugated iron, behind which a man had taken refuge. They can kick as high as a man's face; I have had a hole kicked through my riding breeches above the knee, and have known a boy kicked out of the saddle. Deaths from Ostrich kicks are by no means unknown. A really vicious cock seems to fear nothing, unless it be a dog that will attack him. The most striking instance of their fearlessness which I have heard was told me by a railway guard. The goods train he was in charge of was one day rattling at full speed down a steep gradient. A vicious cock saw it coming, and at once got on to the line between the rails, and advanced fearlessly to fight the monster. As the screeching engine approached, he rushed at it from straight in front, hissing angrily, and kicked. He was cut to pieces the next moment.

#### *Leaping and Swimming.*

The old idea that an Ostrich can only leap over a very low fence, or across but the narrowest slit (gully), is incorrect. It is true that perfectly tame birds, grazed within well-defined boundaries, may often be kept there with very insecure fences when the birds are thoroughly accustomed to recognize such as boundaries; but they will, when startled (never deliberately), sometimes go over a six-strand wire fence nearly five feet high, putting one foot on one of the middle wires, and striding over with the other. They will go over a stone wall in the same manner, if too high for them to step upon; and I have seen a

cock take a standing jump on to the top of a wall five feet high, beyond which were his chicks. When accustomed to run in cut-up veld they become very clever at leaping across sluits. They do not stride over, but, coming almost to a standstill at the edge of each sluit, jump with both feet, often alighting on one foot and striding on at once with the other, like a good steeplechaser.

Even as a chick the Ostrich is a powerful swimmer. I have known several birds swim some distance down the Great Fish River when it was running fairly strong, and have heard, on what seems trustworthy evidence, of a cock that was carried a long way down the same river when it was running nearly level with its precipitous banks in the stormy season; he was some hours in the water before he could get out, but emerged unhurt.

#### *Waltzing and Rolling.*

All Ostriches, adults as well as chicks, have a strange habit known as "waltzing." When chicks are let out from a kraal in the early morning they will often start away at a great pace. After running for a few hundred yards they will all stop, and, with raised wings, spin round rapidly for some time, often until quite giddy, when a broken leg occasionally occurs. Adult birds, when running in large camps, will often, if the veld is good, do the same, especially if startled in the fresh of the early morning. A troop of birds waltzing, in full plumage, is a remarkably pretty sight.

Vicious cocks "roll" when challenging to fight, or when wooing the hen. The cock will suddenly bump down on to his "knees" (the ankle-joint), open his wings, making a straight line across his breast, and then swing them alternately backward and forward (keeping the line straight) as if on a pivot, each wing as it comes forward being raised while that going backward is depressed. The neck is lowered until the head is on a level with the back, and the head and neck swing from side to side with the wings, the back of the head striking with a loud click against the ribs, first on the one side and then on the other. The click is produced by the skin of the neck, which then bulges loosely just under the beak, and for some distance downwards. While rolling, every feather over the whole body is on end, and the plumes are open, like a large white fan. At such a time the bird sees very

imperfectly, if at all; in fact, he seems so preoccupied that, if pursued, one may often approach unnoticed. I have walked up to a rolling cock and seized him by the neck, much to his surprise. Just before rolling, a cock, especially if courting the hen, will often run slowly and daintily on the points of his toes, with neck slightly inflated, upright and rigid, the tail half-drooped, and all his body feathers fluffed up; the wings raised and expanded, the inside edges touching the sides of the neck for nearly the whole of its length, and the plumes showing separately, like an open fan, flat to the front, on each side of his head. In no other attitude is the splendid beauty of his plumage displayed to such advantage.

### *The Cry of the Ostrich.*

The cry of the Ostrich is very correctly described as a "boom." (The word in use among all Ostrich farmers at the Cape is the Dutch verb "brom"; in English, an Ostrich "broms," or is "bromming.") This cry is confined to the cock. It is uttered spontaneously sometimes, especially at night; but generally it is a challenge to another cock to fight, or a note of courting to the hen. It can only be uttered while the bird is standing still. It is a peculiar muffled round sound, very difficult to locate exactly, and conveys the impression that, if it had free vent, it would become a loud roar. It is made by the bird calling, without allowing any air to escape. Each cry consists of three "booms," two short followed by one long, the bird just catching its breath after each note. As no air escapes, the neck becomes greatly inflated during each "boom," in the third to a remarkable extent. This cry may be repeatedly uttered. At night it sounds weird and wild. A faint yet close imitation may be produced by a person closing his lips tight, and attempting to utter two rather short "boos" with an interval of about a second after each, and then one long one, allowing the breath to come into the mouth, but not to escape. The cheeks will become distended just as the neck of the Ostrich does.

There are other sounds common to both sexes—an angry hiss, a subdued guttural gurgle (uttered occasionally when much frightened), and a short sharp note, generally an alarm signal. There is also the penetrating plaintive call of chicks of all ages, a liquid, tremulous, treble cry.

*How it Feeds, and what it will Swallow.*

The Ostrich feeds in a peculiar manner. It tosses the food into a sack in the upper part of the neck, and then swallows it. I have seen a bird toss fully a quart of mealies (Indian corn) into this sack before swallowing; and it is no uncommon thing to see two "swallows" travelling down the neck at the same time with a clear interval between them; or to see one of them (if of large and loose food, *e. g.* grain) slide back into the sack after being swallowed, if the bird lowers its head to continue feeding before the food has travelled some considerable distance down the neck. The food travels slowly, and performs a complete circuit of the neck before reaching the crop. Crushed bones are greedily eaten; if too large a piece should stick in the neck, it is a simple matter to cut it out and sew the wound up again. The wound, as a rule, heals quickly, and causes but little inconvenience.

As is well known, Ostriches will swallow almost anything small enough to pass down the neck. I have either known them swallow, or have heard of them swallowing, and on evidence which I believe, such things as oranges, small tortoises, fowl and turkey chickens, and kittens! I found a cock in my dining-room on one occasion rapidly demolishing, one after another, the contents of a box of luscious peaches. Some friends were playing tennis with only one ball. A rather vigorous drive sent it beyond the tennis-ground, close to an Ostrich hen; she at once swallowed it with evident relish, and brought the game to a sudden end! A cock swallowed several yards of fencing-wire in short pieces, and about half a dozen brass cartridges. These were found in his crop, and had killed him. He had followed the fencers, swallowing the ends of the wires as filed off! An Ostrich's crop always contains a large quantity of smooth stones, many of them brightly coloured.

*How the Ostrich runs.*

Considerable misconception prevails as to the manner in which the Ostrich runs. It seems to be still generally held that, when running, it spreads out its wings, and, aided by them, skims lightly over the ground. This is not correct.

When a bird really settles itself to run it holds its head lower than usual, and a little forward, with a deep loop in the



neck. The neck vibrates sinuously, but the head remains steady, thus enabling the bird, even at top speed, to look around with unshaken glance in any direction. The wings lie along the sides about on a level with, or a little higher than, the back, and are held loosely just free of the plunging "thigh." There is no attempt to hold them extended, or to derive any assistance from them as organs of flight. Indeed, I doubt whether the conformation of the wings permits their being held out to any extent with the edge to the front; and the front edge is thickly and heavily covered with long feathers (which are regularly plucked for the market). In fact, it may be said that the wings assume just that position along the sides which the wind would force them into when the Ostrich is running at a great pace; their position is exactly that which offers least resistance to the passing wind.

When Ostriches are startled, as by a dog; when they start away to run; or when not very hard pressed, they will often run, and very rapidly, for some distance with their wings raised nearly upright on each side of the neck; just as, under similar conditions, Springbucks will run with the white fan on their backs raised, frequently "pronking." \* When the Ostrich runs thus, with its wings raised, it generally moves with a high, springy, bounding step, never with the long raking stride of the bird that, hard-pressed, is fleeing for its life. Raised wings are undoubtedly an obstacle to the greatest pace. So the Springbuck, when he stretches himself out to run his fastest, shuts down his fan, as the attitude which enables him to expand it prevents his attaining to his greatest pace. When an Ostrich, after a long run, is very tired, its wings sometimes droop; this is due to exhaustion; they are never, by a running bird exerting itself to the utmost, held out away from the sides to lighten its weight or to increase its pace. But the wings appear to be of great service in turning, enabling the bird to double abruptly even when going at top speed.

\* "Pronking," the (Dutch) word used to denote the habit these Antelopes have of leaping to a great height into the air, the attitude (which expands the white fan) being almost exactly that of a bucking horse.

*Nidification, Sexual Relations, and Parental Habits.*

Greater misconception seems to prevail with regard to the nidification, sexual relations, and parental habits of the Ostrich than upon any other really important points connected with it.

The best comment upon the various authorities will perhaps be a simple statement of what I know to be the facts.

*The Nest.*

As the breeding season approaches, a cock and hen will pair, and, having selected a site congenial to their inclinations, proceed to make a nest. I believe that in all cases, in the first instance, one cock and one hen, having paired, select the site and make the nest.

In a camp, no matter how large, where there are many birds and many nests, choice of position is restricted. As they like to have their nests far apart, it is especially difficult for a pair to select a spot which shall escape the observation of other birds. This probably accounts for the fact that many sites are unwisely chosen. Generally a stony or sandy rise, however slight, is selected, often beside and partly sheltered by a small bush. The sites being selected, each cock is supreme over all other cocks at his nest and in its immediate neighbourhood.

The nest is simply a hollow depression, more or less deep according to the nature of the soil. It is made by the pair together. The cock goes down on to his breast, scraping or kicking the sand out backwards with his feet, cutting the earth with his long and powerful nails. The hen stands by, often fluttering and clicking her wings, and helps by picking up the sand with her beak, and dropping it irregularly near the edge of the growing depression.

*Laying and Sitting.*

When satisfied with their work (and they are easily satisfied, often too easily) the hen begins to lay an egg in the nest, every other day. During the laying period the nest is often unattended, and is not slept on at night. A nest in which only one hen is laying contains on the average about fifteen eggs; but she often begins to sit before she has laid her full complement. Sometimes she will lay four or five after beginning to sit, though not often so many; sometimes only one or two; while sometimes

she will lay her full complement. The hen generally begins the sitting; she will occasionally sit for one or two days and nights before the cock takes his turn. Now and then, however, the cock will be first to sit; but, in such a case, he will probably leave the nest for some hours during the day.

When sitting assumes its regular course, the hen sits from 8 or 9 a.m. to about 4 p.m., and the cock from 4 p.m. to about 8 or 9 a.m. The bird whose turn it is to be on the nest keeps its seat until the other arrives to relieve it, when they at once change places. Soon after beginning to sit, the cock loses his sexual vigour and inclinations, and ceases his attentions to the hen.

It is quite incorrect to say that the cock alone sits, or that during the day the eggs are left to the heat of the sun. The cock and hen sit alternately, regularly and steadily, night and day, during the whole period of incubation. Apart from incubation, it is necessary that the eggs should be covered during the day as a protection, in many parts, against small carnivora and monkeys; against the inclemencies of the weather, such as the frequent and violent hail and rain storms which sweep over the country; and against the great heat, which in the summer is almost tropical. The heat from the direct rays of the sun striking upon unprotected eggs, when, after incubation, development has once set in, is so great that it would kill them. Sand thus exposed becomes so hot that even a hardened hand can scarcely endure it. On an average summer's day I tested the heat of the sand, keeping the thermometer in the shade, and found it to be  $150^{\circ}$  Fahr. The maximum temperature allowed to eggs in an incubator is  $104^{\circ}$  Fahr., though a few degrees more, if not maintained too long, are not greatly injurious; but if the thermometer stands at  $150^{\circ}$  Fahr. for some hours daily, chicks will not incubate. However, argument is quite unnecessary; the hen sits on the eggs every day—of this there is no doubt whatever; they are not left to the heat of the sun; if they were, no chicks would ever result; they are covered by the birds during the whole period of incubation.

*Times of Sitting well Apportioned.*

There are several interesting points connected with the process of sitting. For instance, the time is admirably arranged

to allow each bird to feed. The Ostrich is a peculiar feeder; in the first place he walks rapidly on and on as he feeds, pecking a few leaves here and a few there in his stride, seldom halting unless he finds some plant particularly to his liking, and then only for a minute or two. In the next place, he is not an indiscriminate feeder, but carefully selects what he likes. This, as a rule, consists of plants, which, owing to the nature of the country, are few and far between. He does not, however, go systematically in search of them, but strides straight on, eating those in his way. Thus he travels long distances while feeding, and requires several consecutive hours if he is to obtain a satisfactory meal. The hen has about four or five hours to feed in the early morning before she goes on to the nest; and the cock has seven or eight consecutive hours through the day, after which the hen again has three or four hours in the evening, before she returns to sleep near the nest. Generally, the hen has a somewhat longer time to feed than the cock, but her time is broken into two portions, and she cannot wander so far in search of food as he can, and thus has not the same opportunity of getting on to new ground, where food may be more abundant, from not having been visited so often, for the Ostrich is a destructive feeder, eating out the plants he likes when he has not a sufficiently large run. In compensation, the hen occupies the nest only half as long as the cock, who, however, has his feeding time unbroken, and half his time on the nest at night. It will thus be seen that, not counting the hours at night when both are sleeping (the cock on the nest), the duties of incubation are very evenly divided.

#### *Protective Colouration.*

The colour of each is admirably adapted to the time spent on the nest, and furnish interesting examples of protective colouration. It is scarcely possible to conceive a more effective disguise than the sober brownish grey of the hen for day sitting, and the black of the cock for night. When on the nest, the Ostrich lays its head, neck, and tail flat along the ground; its naked "thighs" are covered by the wings, the plumes lying close together on the earth almost hidden against the bird's body. Thus only the low, long-curved body projects above the surrounding level. The cock, at night, is, of course, almost



perfectly hidden; while the hen, at day-time, closely resembles a stone, bush, ant-heap, or any little inequality of the veld. One is surprised to see how close such a large bird can lie to the ground, and how even an Ostrich-farmer may almost walk over a sitting hen in full daylight without seeing her. The cock is simply indistinguishable at night, except to a practised eye, and then only at a few yards distance. It may be urged that the black of the cock is not a protection in the morning or afternoon during daylight. This is not quite correct. In the very early morning, or in the afternoon towards sundown, it is most difficult to distinguish him; and it is but for two or three hours altogether that he is in the broad daylight, that being the only time in the whole twenty-four hours when the nest is not protected in a singularly effective manner by the colour of the sitting bird. Even then, unless one is close to the nest, his low-lying, long-curved, motionless form blends so closely with the ground and surrounding objects as to be much more difficult to discover than an inexperienced person could believe.

*The little Embankment around the Nest.*

As sitting continues, a little embankment is gradually raised around the nest, where the nature of the soil permits. This is not in the original plan of the nest, but is made during the incubation of the eggs. The sitting bird, while on the nest, sometimes pecks the sand up with its beak nearly as far from the nest as it can reach, and drops it around the body. A little embankment is thus gradually formed, and often, just outside, a shallow irregular trench, from which the soil has been taken. The formation of both is aided by a peculiar habit of the birds. When the bird on the nest is much excited (as by the approach of other birds or people), it snaps up the sand spasmodically without rising from the nest, and without lifting its head more than a few inches from the ground. The bank is raised by such sand as falls inward, and the trench is deepened.

The original nest, as has been pointed out, is merely a shallow depression, the earth scraped out being mostly scattered far and wide by the vigorous kicks of the cock. As sitting continues the depression is very liable to silt up again; this is aided by the bird scraping in sand now and then when working the

outside eggs in under the body, and by the way it seats itself on the nest. It squats at the edge, and then gradually, in a sliding manner, works itself in, until it covers the eggs, dragging in sand during the process, and thus silting up the nest. The Ostrich, being a large, heavy, long-legged bird, when about to squat, bumps with a hard jerk on to its "knees," and then gently lets its body down to the ground. So, when getting on to a nest, it carefully places its feet among the eggs, bumps down with its "knees" outside the nest, clear of the eggs, and then works itself in till the nest is covered. If this method were not pursued the eggs would be broken by the sudden and violent impact with the "knees" as the bird bumped down.

Now the use of the bank, and the reason for its gradual, continuous formation after sitting begins, are apparent; the nest is thus kept hollow. Without it the nest would be liable to silt up and the eggs roll away. That this is its use seems to be clearly shown by the fact that the nest, though hollow, is at times slightly raised above the original level. The embankment, lying close to the bird's body, also serves to carry off some of the rain that falls on the bird, as well as to partly prevent running water entering the nest.

#### *Guarding the Nest.*

The cock is very vicious and pugnacious, and will attack any bird or any person approaching the nest; at times he will chase and kick at bucks, jackals, porcupines, and other animals. If, however, a person gets right up to the nest, especially if he kneels or sits beside it, the cock seldom kicks, but puts his head down to the ground, snaps his beak spasmodically, hissing violently meanwhile, and tremulously flutters his wings (which click loudly at the largest joint) in impotent excitement and distress. But if one is only a few yards off he will kick and fight most determinedly. The reason seems obvious: if he kicks at the nest he will almost certainly break the eggs.

The hen is not vicious, and does not fight, except when she has chicks; then the habits of the cock and hen change to some extent; the cock generally runs away with the chicks (he will fight if necessary), while the hen advances to do battle.

*Eggs outside the Nest.*

Often, during incubation, an egg or two will be found lying outside the nest. Most authorities maintain that the birds put them out designedly, and that such eggs are used as food for the newly-hatched chicks, being broken for this purpose by the parent birds.

There is no truth in either contention. These eggs are rolled out accidentally, and if replaced will not be rejected, as I know from having frequently marked and replaced them by way of experiment. They may be quite fresh, in some stage of incubation, or rotten. There is no truth whatever in the statement that the newly-hatched chicks are fed upon them; but I have seen chicks a few days old greedily eating the dung of their parents, which often, after sitting, is in the form of small pellets. In the earlier days of Ostrich-farming I have seen little incubator-hatched chicks supplied with soft cow-dung and beaten-up Ostrich egg, but nothing of the sort is done now; they are fed with succulent green food, which is enough for all purposes. If left to nature, and allowed to run with their parents, they thrive perhaps better than under any other conditions; only they become very wild, and are liable to be killed by hawks, jackals, and other animals.

*The Hatching of the Chicks.*

If an egg should be broken in the nest, the old birds eat it, shell and all, as they will often do when the first chick or two hatch out. This habit has no doubt given rise to the erroneous belief, expressed by one of the authorities, that the cock breaks the chicks out—cracking the shell with his breast, shaking the chick loose, and then swallowing the membrane. The chicks hatch out unaided, and though no doubt the movements of the parent on the eggs do occasionally help to free a chick which has already pecked through and cracked the shell (as I have seen), there is no design in these movements, and no need for help.

If sitting begins after the hen has laid her full complement of eggs, naturally all fertile eggs will have sufficient time to hatch. Even if she lays one or two after beginning to sit, still all may

hatch, for often one bird will remain on the nest during the day (and of course at night) with such chicks as cannot yet stand or walk, while the other feeds close at hand with the stronger ones. Thus the full time for sitting may be, and often is, exceeded by some days, and all the sound eggs may hatch. But if the hen has laid, say, four or five after beginning to sit, it is probable that several will be left in the nest, containing large living chicks (which die in the shell), for the birds will not continue sitting for more than three or four days after the first chicks appear.

#### *Newly-hatched Chicks.*

As the time for the eggs to hatch out draws near, the birds become much excited, probably from hearing the chicks crying in the shell, or pecking at it to break themselves out (both sounds being very distinct); the excitement increases as the chicks appear.

When first hatched the chicks are perfectly helpless; the back of the head and adjoining portion of the neck are greatly swollen and out of shape, as are the legs, especially the tarsi and toes, which are puffed and jelly-like, and of a transparent-looking pinkish yellow. The eyes have a cloudy expressionless appearance. For some hours they cannot even hold up their heads; they cannot stand until at least twenty-four hours old, nor get about at all until another day older, and then only in a very rickety manner, tumbling over every few steps; nor are they quick and steady on their legs until the swelling has quite subsided. They do not seem to have much consciousness for about the first twenty-four hours, but when once they have found their legs they soon become exceedingly wild unless handled, and rapidly attain to a remarkable speed. For about the first day they eat nothing; after this they may be seen, when the sunshine is warm, sitting on the edge of the nest, just free of the parent, pecking feebly and uncertainly at small objects on the ground, or at anything within their reach. The stronger ones will gradually wander a short distance from the nest with the parent that is not sitting, and eventually all will leave it, being tended by both cock and hen.



*Parents and Chicks.*

When defending the nest the cock carries himself splendidly, with erect straight neck, his attitude being most imposing and defiant. But when the hen (or the cock) is advancing to protect the chicks, she comes with a rapid, shuffling stride, hissing violently, with wings fluttering at right angles to the body, flat to the front, and almost touching the ground. Often both cock and hen will run away with the chicks, but if the enemy is close the chicks, especially when very young, will scatter in all directions, and squat separately. Even when older they will squat, if hard pressed. Sometimes, to mislead the pursuer, the parents will feign injury, gradually leading him away from the little chicks. I have seen a cock fall, as if with a broken leg, several times within a couple of hundred yards.

When startled the parents emit a short sound of one note, which is a signal of alarm. When the danger is past the chicks (which when squatting lie perfectly still, blending closely with the ground, and are most difficult to discover) arise, and run about in all directions, calling with their penetrating tremulous cry. The old birds return to the neighbourhood where the little ones scattered, and gather them together again. They do not call, but their height, and their keen sight and hearing, enable them readily to find the crying, moving specks. The chicks, too, are very quick at seeing and running to their parents.

The parents know their own chicks, except when very small, and will kick and peck at others, often killing them. Adult non-breeding birds also do this, as do large chicks to very small ones.

*Is the Ostrich Polygamous?*

There seems to be no diversity of opinion as to the polygamy of the Ostrich. It is almost entirely on the fact (an incontestable one), that several hens frequently lay in one and the same nest, that the argument for polygamy is based.

Let us examine this fact, and endeavour to ascertain what it implies.

One cock and one hen (not one cock and several hens) having paired, select a spot, and together make the nest. When the spot is well selected, in some secluded place not easily discovered, and

where other birds are not in the habit of coming, I have known many cases, in camps containing from eighty to one hundred birds of both sexes, where the pair have kept the nest exclusively. Such a nest, unless destroyed by rains or wild animals, is almost certain to yield a large proportion of chicks. This cannot, perhaps, be said of a nest under any other conditions. If, during the laying of the eggs, or after the pair have begun to sit, other hens lay in the nest or sit on it, the yield of chicks will not be so great; there will never, as far as my experience goes, be a good yield; often there are no chicks at all. The pair frequently abandon the nest. A good yield of chicks, in proportion to the eggs laid, is seldom obtained from any nest in which more than one hen lays or broods; with two hens, a good yield may be got in proportion to the eggs actually sat upon; when there are more than two hens, a few chicks *may* hatch out, but in the great majority of cases there will be none. The chance of obtaining any yield at all lessens as the number of hens increases; with four or more hens it is almost safe to say that chicks *never* result.

Yet it is undeniable that in a camp where many Ostriches run, nests are generally shared by several hens, usually by more than two. I have known six or eight to share one nest, and have found a nest with one hundred and fifty eggs in and about it, many with from fifty to seventy; but it is very exceptional—in fact, almost unknown—for such nests to yield chicks. If it were natural for several hens to share one nest, chicks should result.

All the hens of one nest keep to that nest, each laying generally about a sitting, and then beginning to brood. If they cannot lay in the nest because it is occupied, they will not often go to another nest, but will deposit their eggs just outside their own. Each nest is owned by one cock; but I do not know, when there are several hens laying in one nest, whether they are all fertilised by the cock of that nest.

#### *Why several Hens often Share one Nest.*

Now, how is it, if the Ostrich is not polygamous, that several hens often share the same nest?

The following considerations may not quite solve the question, but serve, I think, to help towards its solution.

In a troop of young birds the sexes are about evenly balanced, and, presumably, in the wild state this balance is not much disturbed. But there probably is a preponderance of hens, even in the wild state, for, in the breeding season, the cocks fight among themselves, occasionally with fatal results. In domestication, the preponderance of hens is no doubt greater, for cocks are not only killed by kicking at each other through wire fences, thus breaking their legs, but also occasionally by people they attack. In domestication, neither all cocks nor all hens come into season ; but, as the cocks that are killed are among the most vigorous and mettlesome, the proportion also of hens that come into season is greater than that of cocks.

#### *Unattached Hens.*

When a cock is ready to breed, he pairs with one hen, and with her makes the nest. If they escape the intrusion of other hens, this state of monogamy continues, and chicks result ; if they do not, polygamy will probably take place, almost always with disastrous consequences to the nest.

Now, there are other hens in season, and being in excess of the cocks (who have already mated), they are unattached, having no cock to mate with. They surrender to any cock, and are thus fertilised. So excited and overwrought are they, that tame hens will often squat on the approach of a man. Having no nests of their own (only one case of a hen unaided making a nest has come under my observation), they lay their eggs in other hens' nests, each generally keeping to the nest she first selects ; or they drop their eggs at random about the veld, this habit no doubt helping to give rise to the old Biblical belief, persisting to the present day, that the Ostrich leaves her eggs in the sand to hatch by the heat of the sun.

Herein, I think, to a great extent lies the true explanation of the so-called association of several hens with one cock, giving rise to the idea of polygamy. The cock is polygamous, it would seem, not so much from any free choice of his own as because the hens are forced upon him.

*Large Chicks mistaken for Hens.*

I think that travellers have often mistaken large chicks for hens. Thus, when they see a cock and some half-dozen drab Ostriches together, at a nest or on the veld, they at once class them as cock and hens, and say they are polygamous birds, while it is more than likely that the lot consists of one pair with large chicks. I have often seen a large chick mistaken for an adult hen by men of considerable experience as Ostrich farmers. Such chicks are not easily distinguished from hens, except at close quarters by an experienced man. Andersson seems to have made this mistake, and even to have supposed that a large chick was an Ostrich of a different species. It must be remembered that Ostriches are some years reaching maturity, often not attaining their complete adult plumage till four years old. If little chicks (another year's brood) accompanied the pair with large chicks, one would be even more likely to draw a false inference.

*Why no Chicks result.*

When several hens lay in the same nest it frequently happens that two wish to lay at the same time. In this case, as a rule, one will lay in the nest, the other on the bare ground outside. Sometimes, however, two hens may be seen on the nest at once. Presently some of the hens will begin to sit (the cock alone sitting at night). One occupies the nest, the other broody hens lying or standing about close at hand, thus betraying its presence. When she arises, whichever of the other hens is quickest, perhaps a laying hen, takes her place. Under these conditions a great many eggs are broken both before sitting begins and afterwards. The hens do not sit by turns; there is no plan in their proceedings at all.

The laying of eggs goes on from day to day by some of the hens, even after others have ceased. The consequence of this is that *the same lot* of eggs are never in the nest together for more than a few days at a time. (This I have frequently proved by marking the eggs.) Some are rolled out, new ones are laid, or old ones are rolled in, for the nest becomes trampled almost out of shape by the traffic about it. Thus there are no chicks; the eggs become broken or addled, and the nest is eventually abandoned. Under such conditions it not infrequently happens



that the cock (and perhaps some of the hens) abandons the nest in disgust before the full period of incubation is completed. This he never does if he has only one hen and is undisturbed by other birds.

It must also be noted that chicks are attended by one cock and one hen, and that the pair will kick any birds, chicks or adults, that approach them; also that it is a common rule among Ostrich farmers to camp off special breeding birds in pairs.

Every authority that I have consulted holds that the Ostrich is polygamous, but the evidence against polygamy is very strong: a pair make the nest; the hen lays all her eggs (a full sitting) in that nest; the hatching of the eggs and the care of the chicks are shared equally by cock and hen; the cock loses his sexual vigour and ceases his attentions to the hen, soon after beginning to sit; and one hen to a nest yields the best results.

*Evidences for Monogamy stronger than for Polygamy.*

I do not, however, think it can be maintained that the monogamy of the Ostrich is proved absolutely, but I decidedly think that the arguments in its favour are much stronger than those in support of polygamy. That there is a thoroughly organized polygamy I do not believe. It may perhaps be said that the present state of the relation between the sexes is not quite organized; but if monogamy is not yet firmly established, I hold, at least, that the tendency is that way, and am certain that monogamy is the state most suitable to the propagation of the species, though, under certain conditions, polygamy may be resorted to.

*Curious and Exceptional Relations.*

Finally, it must be allowed that, while all the facts at my command point strongly to the conclusion that the Ostrich is not only often monogamous, but that monogamy is the only condition perfectly favourable to the successful hatching and rearing of young; and that all the arguments in favour of polygamy break down on examination: yet the fact remains that there are a large number of curious and exceptional circumstances connected with the nidification, sexual relations, and parental habits of Ostriches that I am not yet exactly able to account

for, either on the supposition of fully organized monogamy or polygamy. It is possible that when a larger number of careful observations have been made, and the Ostrich, both in its wild state and under domesticated conditions, has been scientifically studied, we shall find certain curious and exceptional conditions governing the nidification and sexual relations of these birds. And it is much to be desired that those especially who have opportunities of studying the Ostrich in its wild state, or of obtaining exact information from those who have had these opportunities, should carefully collect all facts, as this matter is one of much scientific interest.

## ORNITHOLOGICAL RECORD FOR NORFOLK FOR 1896.

BY J. H. GURNEY.

(Assisted by Messrs. T. SOUTHWELL, M. BIRD, A. PATTERSON, and H. PASHLEY.)

THE great feature of the year 1896 was the autumn migration, but before allowing myself to dwell on this absorbing topic I have a good account to render of the breeding of Terns, Waterfowl, and Game. For instance, in May three pairs of handsome Shovellers nested in a certain spot, which I will not particularise; and, better still, no less than nine pairs of Sheld-ducks were credibly reported to have brought out their young among the sand-hills. I need not copy notes about common nests, but it is interesting to hear from Mr. T. Southwell of a Cuckoo's egg in a Willow Warbler's nest, and two more were hatched off in Robins' nests. Two pairs of Stock-Doves nested in tubs which I had put up for Owls, and another laid its egg in the same oak-tree as contained a Barn Owl's nest. Young Barn Owls bred in May were still in their hollow tree, in the nest, in August, and on one occasion we found them (but this was earlier) sitting on two dead rats. They undoubtedly prefer the neighbourhood of man and his dwellings, as they are also said to do in America, and it must be solely because there are more mice and small rats there for them. At eight o'clock my Barn Owls generally went out to search for prey, and I do not believe they ever brought back a single head of game. The Rev. Maurice Bird met with a Short-eared Owl's nest containing six young, near the locality of the nest of which the late Henry Seebohm has given such a graphic description; and I am glad to say he reports that Bearded Tits did fairly well in their now limited area on our "Broads." There were two Montagu's Harriers' nests, within a few miles of one another, in the usual district, containing eggs; and four young ones, which may have come from one of these nests, were sent by Mr. Laidlay to the Zoological Gardens, two of which were more rufous than the others, and differed in size. It is doubtful if the Hen Harrier has nested in Norfolk during the last fifty years, the

supposed nests of 1861 and 1870 being in all probability Montagu's; but the latter no doubt breeds every year, or tries to do so. The Marsh Harrier has become very scarce, and there probably has not been a nest anywhere in the eastern counties since about 1885. The birds are persecuted to the death whenever seen, but happily I have not heard of a Marsh Harrier being shot this year.

Owing to the dry weather 1896 was a great breeding season for Partridges and Pheasants, but Snipe and Woodcock were very



PHEASANT SHOT AT HARLING.

scarce. Less than half an inch of rain fell in the important month of May, the returns, as taken in an open place on my lawn, being—April, '94 in.; May, '46 in.; June, 2'20 in.; July, '89 in.; August, 1'77 in. At the end of August the year's rainfall was nearly five inches deficient. All this was splendid for the Partridges, which multiplied exceedingly; so that three guns in September obtained 1005 at Hockwold in one day. Even this performance was exceeded at Houghton and Holkham, at the latter place 1117 Partridges being brought to bag by eight guns;



the birds carefully counted, and shot as late as Dec. 8th. In such a year as this the Partridge was numerically the next most abundant species to the House Sparrow in Norfolk and Suffolk; most people would put the Chaffinch third, and I should say the Sky Lark fourth; but after a great wave of Thrushes, Rooks, or Goldcrests, either of these species would be in the ascendant. If Partridges had anything of the Sand Grouse in their nature such a multiplication would cause a migratory exodus. The same causes which contributed to the plenty of Partridges gave us a rare season of Pheasants, and one plump hen was shot at Harling with the upper mandible prolonged to  $3\frac{3}{4}$  in., and twisted like a corkscrew (see fig.). An ordinary Pheasant's bill is an inch, so it is extraordinary how such a growth remained unbroken. Another curious Pheasant, though not shot on the same occasion, was a hen assuming cock's plumage, combined with partial albinism, which produced an altogether motley garb.

Thanks to legislation, our Terns this year had a pretty good time, one reliable witness finding as many as one hundred eggs or small nestlings in a single day at Blakeney; and Mr. E. Ramm believes they were not much molested, except by Rooks, or, it may be, by a pair of Carrion Crows, whose presence I have long suspected there. The close-time ends rather too soon for Norfolk Terns, as on August 1st Mr. T. E. Gunn saw several eggs still lying about, and a good many young birds just leaving the nest; and on the 28th I was given a young one with down on its head. The Lesser Tern seems to leave Norfolk rather earlier than the Common Tern, and very few remain after Sept. 20th. I did not see any on the 28th, but there were several Common Terns left, and one Sandwich Tern. At the close of September, some, following the course of the river, came even as far inland as Norwich. As for the Sandwich Terns, they were again very much in evidence. Mr. H. Pashley was told by reliable fishermen that on one or two days there were actually more Sandwich than Common Terns off Stiffkey and Wells, and beautifully mottled examples were repeatedly seen at the mouth of the Glaven, in pursuit of sand-eels,—an increase which, in such a handsome species, is gratifying.

Arctic Skuas, immature and changing, were comparatively plentiful all through August, September, and October, at or near

Blakeney. Mr. Pashley stuffed one which exhibited a perfect melanism, with just an indication of straw-colour on the acuminate feathers of the neck—an old bird with a nice tail. As far as I know, not a single Pomatorhine turned up, unless a large dark Skua swimming off Cromer Pier was one; but I could not be certain. It is most unusual for a year to pass without a Pomatorhine Skua, and with only one Glaucous Gull; but ten well-identified Little Gulls were seen by different correspondents during the autumn (of which five were observed in October), and this is good as against one in 1895, and three in 1894. We ought to have plenty of Little Gulls, because they are so common in Heligoland. As if to make up for the extraordinary abundance of the Little Auk in 1894–95, the two winters since have scarcely produced any; while the Lapland Bunting, so common in 1892, has been scarcely seen. No Eagles are reported, and only two Rough-legged Buzzards, and but one Fulmar as against ten in 1895.

During the autumn of 1896 the following very rare visitors came in from over the sea:—White-winged Tern, Gull-billed Tern, Sabine's Gull, Greater Shearwater, and Aquatic Warbler, all presumably with a west wind; Icterine Warbler, Pallas's Warbler, and Red-breasted Flycatcher, presumably with an east wind; Barred Warbler, with a south wind; and Greater Spotted Cuckoo, with a north wind. These instances alone show how very much there is still to be learnt as to wind influence, and there is no better post of observation than our rounded seaboard for diligently noticing its bearing on migration. Migratory birds which come to Norfolk in autumn, flying against a west wind, as was the case with three of those here named, were not so numerous in 1896 as they have sometimes been. Such birds are undoubtedly always more in evidence than those which come across the North Sea, flying with an east wind. The reason is evident, because if the wind is with them—*i. e.* east or north-east—they leaving the Naze of Norway, or some more southern place, at one or two o'clock in the morning (or later in the case of the Hooded Crow and Rook), make land at Cromer, Cley, or Yarmouth before any but the earliest fishermen and shore-gunners are abroad. On the other hand, if they come across the North Sea against a west wind, and, unless it be very light indeed, there is a certain amount of labour attending the passage, which accounts for their being seen long

after daybreak, while perhaps the flight goes on all through the day. Ornithological migration on the Norfolk coast is an east to west one in autumn.

I think it may be gathered from Mr. W. E. Clarke's valuable 'Digest of the Observations on the Migrations of Birds' that the feathered pilgrims often cross England, and even go to Ireland, before they turn south. Then the direction of flight of these birds, which may have followed the sun in its course from Russia and Asia, is entirely reversed, though in one or two instances misguided Rooks and Starlings have been seen still flying westwards, even from the western coasts of Ireland.

The number of Rooks, Grey Crows, Jackdaws, and Starlings which arrive in Norfolk every autumn is very large, though nothing like the quantities which pass Heligoland (H. Gätke), and with them come regiments of small birds. Occasionally an old Crow, too hungry to wait until he gets to land, catches a Chaffinch *en route* (cf. Zool. xi. p. 4124), but generally there is harmony. This mixing up of small and great was noticed in our county as long ago as 1660, and is evident still, though there are far fewer Teal and Hawks than there were in Sir T. Browne's day. Of all months there are none for Norfolk, Suffolk, and Lincolnshire like the month of October, which brings not only the largest variety of species, but also the largest number of individuals in any period of the year. More birds pass our eight lightships in that month than in any other. Although I have had nearly seventy species, or at least their wings, from these and other lanterns, there has never been a House Sparrow among them, neither did Mr. Booth or Mr. Cordeaux ever procure one on our coast. As the past autumn was a remarkable one for migration, it was a good thing that Mr. G. Newbegin consented, at my request (stimulated by Mr. Bray's curious observations made in Surrey), to take observations of the sun and full moon at the Norwich Observatory, and he also developed several photographs in the hope of catching birds in the act of passing these luminaries; but none crossed the telescope. This is the only way in which we can establish the altitudes at which migratory birds fly, but at present nothing has passed to confirm H. Gätke's views. Nevertheless I believe them to be perfectly correct, for twenty-five years ago I had exceptional eyesight, and have occasionally, by



looking in the sky, detected large birds on our coast, two miles up, during the migratory period. If migratory birds travel at such heights, and by night, it may fairly be presumed that mountain chains and great rivers have little to do in determining their course; but this does not apply to Crows and Larks, which are seen in great numbers off Norfolk at quite a moderate altitude, and also Kestrels and Starlings. Indeed, Sky Larks may be sometimes seen flying so low over the sea that, as Gätke remarks, they almost adapt their flight to the undulations of the waves.

The past year has accorded Norfolk three novelties—the Aquatic Warbler, the Greater Spotted Cuckoo, and Pallas's Willow Warbler—which, with the Red-banded Crossbill (Supplement to the 'Birds of Europe,' and Zool. 3rd ser. vol. xiii. p. 391), bring the county list to 303. The Red-breasted Flycatcher, Icterine, and Barred Warblers are also very rare birds. The dates of the three Norfolk-killed Icterine Warblers are, in point of season, curiously close, *viz.* Sept. 11th (1884), Sept. 4th (1893), Sept. 7th (1896); and the four Norfolk Barred Warblers, Sept. 4th, Sept. 10th, Sept. 10th, and Aug. 31st. Gätke gives the former as rare in Heligoland, and the Barred Warbler as very rare, and does not mention a September occurrence of either of them. Both are found in Norway and Sweden, so there is nothing remarkable in their touching our east coast on the southward migration. Perhaps next year they will bring the Crested Titmouse with them, which has been identified in Norfolk already by two observers, Mr. Patterson and Mr. Spalding, in the former case on a small Scotch fir on the Caister road, not far from the sea.

Before beginning the diary for the year I wish to allude to another subject. I regret as much as any reader of this Journal can do, the repeated destruction of Spoonbills in the Eastern Counties which it is my lot to chronicle; but it must be conceded that the Breydon Wild Birds' Protection Society has more than justified its existence, as shown by the number of Spoonbills (besides some Avocets) which have visited this tidal broad and escaped since the appointment of our paid watcher nine years ago. In May, June, and July, 1888, thirteen Spoonbills (including six in one flock on June 3rd) came to Breydon. In the spring of 1889 our watcher saw three, and in 1891 two on June 14th, and one on the 20th which remained about, and was seen at intervals until July



31st. In 1893 there were thirteen on the broad, on April 28th, and eleven more in May and June. In 1894 the watcher saw sixteen, on May 13th; and in 1895 a flock of twelve, on May 5th, which remained until the 13th. There have been eight at least during the present year. Thus in ten springs and summers (for they seldom come after August) *eighty-four Spoonbills have visited this one Norfolk broad*, which has long been known—since 1851—to have far more attractions for this species than the mud-flats at Blakeney. Surely if our gunners would be considerate enough to let this grand bird alone, the woods of *Cauntele* (Cantley) and *Castre by Jernemuth* (Caister by Yarmouth) might rejoice in its presence again in breeding time (*cf.* Prof. Newton, *Norf. Norw. tr. vi. p. 158*). It was here probably that in the sixteenth century William Turner, dean of Wells, came to see the Cormorants and Herons building in high trees, but he says nothing about Spoonbills; however, in the seventeenth century they were still nesting at Claxton and Reedham, parishes on the Bure, five miles apart, Cantley lying between them. These places are all within a few miles of Breydon Broad, and it is impossible to resist the conviction that with adequate protection Spoonbills might return to one or other of them.

## JANUARY.

1st.—A beautiful New Year's Day with which to begin the year; weather very mild, and Hawfinch on the lawn.

3rd.—A Grey Shrike caught at Davy Hill, Runton. Placed in a cage, it quickly hung up small birds and pieces of raw meat on thorns supplied it by my brother for that purpose, and then by sheer force of body and beak, for which the shape of the mandible is exactly adapted, wrenched at them, until they were torn in pieces. It lived a long time, but would eat no food at all without first tugging at it with all its might, its whole body working like a lever; it is probably solely for the purpose and facility of tugging that Shrikes impale, and not with any idea of storing up a hoard of food. With closed wings this interesting bird had only one white wing-spot, but with wings unfolded a second spot became visible. Some years ago a Grey Shrike was killed near Cromer, a very pale bird, which showed three fairly distinct white wing-spots, and was perhaps *Lanius leucopterus*,

Sev. Notes were sent me respecting five more in the autumn at Brunstead, Norwich, Shernbourne, and Heacham, probably Pallas's Shrike, which, as in Heligoland, is much the commoner of the two, *i. e.* with one white spot; but as both forms are found in the same brood ('Ibis,' 1886, p. 32), *L. excubitor* and *L. major* cannot be distinct species.

4th.—Red-necked Grebe at Cley, and Little Gull at Cromer (H. Cole).

7th.—White-fronted Goose, Black-throated Diver, and Mealy Redpoll at Blakeney. About Christmas Mr. Pashley states that a number of Mealy Redpolls frequented the sand-hills, but, on the other hand, Shore Larks were just as scarce as they were abundant in 1895.

9th.—A Great Skua shot at Eccles (T. Southwell); a fine dark specimen.

14th.—Shag at Heacham and Grey Shrike at Dersingham (R. Clarke).

17th.—A much pied Moorhen, with white back and breast and curiously dappled wings, its feathers, however, of the ordinary texture, and not hair-like, as is sometimes the case—shot at Morton (E. Roberts).

19th.—Bernicle Goose, always a rare bird with us, brought into Yarmouth (A. Patterson).

22nd.—Shag at Hillington (R. Clarke).

#### FEBRUARY.

10th.—A male Goldeneye shot on the river at Keswick.

11th.—Peregrine Falcon at Holkham (Lord Leicester).

17th.—Mr. A. Patterson forwarded a live Rook with perfectly complete nasal bristles, which it retained up to the time of its death in July, being probably then sixteen months old. Can this bird have been a half-breed? I see nothing wild in the supposition, knowing that Rooks have even paired with Magpies when pinioned.

22nd.—A female (domesticated) Wild Duck, which assumed the male plumage about ten years ago, died, having for several winters past acquired absolutely perfect male attire.

28th.—Three Scandinavian Rock Pipits shot at the mouth of the Glaven, but, though males, they showed very little of the

vinous breast and grey head, it being rather too early for the assumption of much colour; indeed, one of them is scarcely distinguishable from a common Rock Pipit. The last occurred in Norfolk two years ago.

## MARCH.

4th.—Four Pintail on Breydon Broad (S. Chambers).

18th.—One hundred and fifty Wigeon on Breydon (S. Chambers).

24th.—Two Wheatears at Beachamwell (R. C. Nightingale); the first seen.

## APRIL.

2nd.—Drake Garganey at Hickling.

18th.—A poached Shoveller and a Red-necked Grebe in Yarmouth market (Patterson).

23rd.—Shoveller Duck already sitting (M. Bird).

27th.—Several Whimbrel flying over Yarmouth at night during rain (Patterson).

## MAY.

14th.—Puffin at Snettisham, and a pair of Dotterel at Docking (R. Clarke).

16th.—Osprey at Hoveton (Dr. Wheeler), and the same a few days afterwards at Filby.

## JUNE.

2nd.—Spoonbill on Breydon Broad (B. Dye).

6th.                    Do.                    do.                    (Patterson).

7th.                    Do.                    do.                    (Chambers).

8th.                    Do.                    do.                    (Chambers).

14th.—Hawfinch's nest and four young ones at Toft-Trees (R. Drewell); one exasperated owner of green peas shot fifteen of these thieves in his garden this summer.

17th.—Four Garganey Teal on Breydon about this date (Chambers).

19th.—Five Spoonbills seen on Breydon, and two of them shot in spite of the efforts to protect them. (Several correspondents.)

20th.—A pair of Kentish Plovers at Yarmouth, identified but spared (E. Saunders).

22nd.—Six Grey Crows on Yarmouth marshes (H. Bond).

24th.—At 8 a.m., Chambers, being on the Broad, saw a

Spoonbill come in from the south, wheel round once, and then pitch. Though unmolested, and having the whole broad almost to itself, with the exception of one Grey Plover and a few Gulls and Herons, it only remained twelve hours, being last seen feeding by itself about 7.30 p.m. About the same time one, possibly the same, was seen at Cley. On the same day two Roseate Terns, both females, which may possibly have had eggs, as they have nested in Norfolk once, and not many years ago, were shot on Blakeney Bar by a lad whose youth is the only excuse for his having broken the law in killing them. These birds had coal-black heads and orange-vermilion legs, but the evanescent pink of the under parts had almost faded when they were sent to Norwich.

28th.—Grey Crow near Haddiscoe (L. Farman).

29th.—To-day the Scarlet Grosbeak, believed, if there was no miscarriage of justice (see Zool. 1893, p. 150), to have been clap-netted in South Norfolk, died, after living nearly four years. It was always a very tame bird, using its wings very little, and fond of raising the feathers on the crown of the head into an approach to a crest, as it sat sedately on its perch of wood. Gätke particularly remarks on the tameness of this species.

#### JULY.

13th.—Little Bittern heard at Saham Toney, where its grunting note is known.

14th.—A Golden Plover seen on the Bure by Mr. Patterson at this unusual date.

15th.—Spoonbill seen on Breydon (Patterson).

#### AUGUST. (Prevailing wind North).

6th.—Seven Pochards seen at Hickling (M. Bird).

10th.—A Green Sandpiper at Sprowston (R. Gurney), and the next day one in my garden at Keswick, and afterwards some at Potter Heigham and the mouth of the Glaven.

12th.—N.W. in the morning. A White-winged Tern shot on Breydon Broad. This bird, which was exhibited at the Naturalists' meeting, and is now in the collection of Mr. B. Dye, is an old male passing from its summer to its winter plumage, the nape and occiput being mottled with black, and the grey feathers of the back blotched with new black ones. The White-



winged Tern, which one is tempted to think might, like the Spoonbill, establish itself with protection, is not, oddly enough, included in Gütke's 'Birds of Heligoland.'

13th.—W. Some Manx Shearwaters seen off the beach by Mr. E. Ramm. Very few Black Terns have appeared this year.

14th.—W. A Greater Shearwater passed along the shore within eighty yards of Mr. Ramm, who was near enough to see the dark brown of the under parts.

16th.—A small flock of Tree Pipits at Keswick.

18th.—An Eared Grebe at Cley (H. Pashley), which I saw in the flesh; very rare in August.

25th.—Mr. Robert Gurney had a good view of the Greater Shearwater on the Bar, with two Manx Shearwaters. A beautiful white variety of the Sanderling, with a little buff mottling on the back, shot at Heacham, near Hunstanton; female by dissection. Much too conspicuous an object to escape.

27th.—A young Turnstone picked up near Cromer Lighthouse, and about the same time the principal, Mr. Argent, caught a Golden Plover; but little or nothing else visited the light, which revolves too quickly to attract many birds. I have, however, a few notes from lightships, to be given later on.

30th.—Wind S.

31st.—Wind S. A nice arrival of Wheatears and Whinchats on the coast, and with them a Barred Warbler and two other birds, which I think were young Bluethroats. This was within a few hundred yards of the spot where the other Barred Warblers were taken in 1884, 1888, and 1894. The grey tone of its back gave it a Shrike-like aspect, as it skulked in *Chenopodium*, and then doubled back with a somewhat slow and laboured flight. At the same time Mr. Ramm followed a peculiar Bunting, which was probably an Ortolan; so it is clear that the south wind had brought an arrival of foreigners, but I believe it was very light. Three Black-tailed Godwits were seen on Breydon, and about the same time some Spotted Redshanks (E. Saunders), and other Waders.

#### SEPTEMBER.

Prevailing wind S. and W. Gales on four days.

1st.—N.N.E. Mr. Pashley observed Redstarts coming off the sea, and a large arrival of Tit Larks.

2nd.—W. Manx Shearwater at Heacham (R. Clarke).

3rd.—Scarcely any wind. A Bluethroat and some Pied Flycatchers seen, and some 250 Gannets at sea (R. Gurney). Two Quails at Pulham Market (T. Southwell).

4th.—Wind W. [In Lincolnshire E., *cf.* Zool. 1896, p. 436, *Phylloscopus viridanus.*] Going out after dark Mr. Patterson found the weather very unsettled and wet; while from the mingled cries of Grey Plover, Godwits, Knots, and Dunlin overhead, he judged the air to be alive with birds of the wader class, probably attracted by the lights of Yarmouth. When the street-lamps are put out and daylight dawns the spell is broken.

5th.—Wind S., strong. A Gull-billed Tern almost in winter plumage—an adult bird—having the top of the head nearly white, with darker nape and a black forehead, was shot on Breydon Broad, and submitted to Mr. Southwell in the flesh. I imagine that this summer visitor, which doubtless bred in Montagu's time in England, has not been obtained in this garb before; it is certainly less of a sea-loving species than the Sandwich Tern. Mr. R. Gurney met with a Dotterel in the speckled immature plumage, and Mr. Arnold with a Grey Plover (a species which has been rather numerous) still nearly in breeding plumage. Twelve Grey Plovers and four Corncrakes on a stall at Yarmouth (Patterson).

6th.—E. A Bluethroat, a Lesser Whitethroat, and a good many Redstarts, which had probably crossed in the night, noticed by Mr. Gunn in the scrub, a few hundred yards from the sea.

7th.—E. Seven Wagtails and nine Chaffinches passed the 'Dudgeon' light-vessel, intending probably to make the shore at Wells (E. Cole, master). Mr. R. Gurney obtained an Icterine Warbler, which had probably only arrived on the beach a few hours before, as in passing the same small bushes in the morning we had not noticed it there. Length  $5\frac{1}{4}$  in. to tip of beak; weight  $\frac{1}{2}$  oz. Feet and legs greyish lead colour. Upper mandible horn-colour, lower mandible yellow. The bushes contained a good many Garden Warblers, young Whinchats and Whitethroats, and one Bluethroat, which, like the other two, was a young bird with a white gorget encircled with slate colour. This Bluethroat and the Icterine Warbler had come in with the wind, and perhaps crossed the sea together, as they were only about one hundred yards apart.

8th.—*Convolvulus* Hawk Moth caught on 'The Cockle' light-vessel (forwarded). Wind S.S.W. Several Tree Pipits among the sand-hills (Gunn), where an adult Bluethroat in change of plumage was killed. A flock of nine Ruffs seen at 'The Eye' (Pashley), and two more shot at Lynn (R. Clarke). I think it may be considered that with such waders as Ruffs, Dunlins, Plovers, Knots, and Turnstones the proportion of adults to young is about one to nine in September and October at Cley. The young birds lead the way, while the old ones may be the same which, according to Collett, summer at the most southern point of Norway (Journ. für Orn., July 1881), from whence they would soon flit across to Cley; but this is a subject for enquiry, though not an easy one to pursue.

9th.—S.S.W., rather strong. An Aquatic Warbler, *Acrocephalus aquaticus*, Gm., in immature but very good plumage, with the lines on the back more pronounced than the streak of buff on the crown, shot at the foot of Blakeney sand-hills by Mr. Gunn, was a male, and contained the remains of earwigs and a beetle, no doubt foraged in the *Chenopodium* bushes. It is the fifth for England, and is a good deal like one shot by Mr. Edward Hart, at Christchurch in Hampshire. Mr. Gunn saw a few Sedge Warblers at the same time, with which it had probably come from Denmark, where Saunders says it breeds sparingly. Thirteen Chaffinches, a large Hawk, and a Death's-head Moth passed the 'Dudgeon' floating light. The caterpillars of the Death's-head had been more plentiful than for many years, and I see in the 'Field' that they were similarly abundant in Yorkshire.\*

11th.—Honey Buzzard shot at Snettisham (R. Clarke).

14th.—W. A White-headed Honey Buzzard, with chest and under parts of the same colour, and dappled wings, shot at Southrepps. This beautiful albinistic variety has occurred two or three times before in Norfolk, and one of them, just like the present example, is figured in Dresser's 'Birds of Europe.' About this time a sprinkling of Kestrels came in from the sea, going in nearly every case against the wind, some of them taking exactly the same line their predecessors followed in other years.

\* Also elsewhere, and similarly reported from Berks, Brecknock, Cambridge, Cheshire, Devon, Essex, Kent, Lancashire, Lincolnshire, &c. (Ed.)

15th.—Wind W., moderate. Between 7 a.m. and 9 a.m. a good many flocks of Sky Larks, mingled with a few Tit Larks, Wheatears, and Wagtails, were seen coming off the sea at Overstrand, apparently flying due west, *i.e.* against the wind, which direction was changed to north-west when they made land. They then followed the course of the cliff, rounding the highest hills, and frequently resting as if tired. The flocks kept by themselves, and each averaged about thirty-five larks. This movement had probably been going on several days before it was noticed.

16th.—W., moderate. More flocks of Sky Larks passing in the morning along the cliff in a north-westerly direction.

17th.—W. Larks passing as before against the wind. Hoopoe at Caister (B. Dye).

18th.—Grey Phalarope on New Buckenham Common (J. Cole). Hoopoe at Brandon (W. Howlett).

21st.—Hoopoe at Southrepps (H. Cole).

22nd.—Between 7.40 a.m. and 8.15 a.m. at least 1500 House Martins passed Overstrand, going S.S.E., all of them close under the lee of the cliff, where they were sheltered from the wind, which was north. Between 8.15 and 8.30 more than half of them came back again in an almost continuous straggling flock. The wind was very light, but at 12.30 a storm arose, which may have been the cause of these feathered barometers being so extraordinarily restless.

28th.—A walk through the bushes at Cley revealed no birds (wind W.N.W., moderate); but in the course of the day a Red-necked Phalarope and a Red-necked Grebe were brought in to Mr. Pashley's establishment, and a boy on the muds got a Sandwich Tern. Not a single Thrush in the scrub, which, at the end of October, is sometimes packed with them.

#### OCTOBER. (Prevailing wind South-west.)

1st.—Immature female Little Bittern shot on Horsey Broad (E. Daily Press).

5th.—Fork-tailed Petrel on Breydon (Sir S. Crossley).

12th.—N. A Sabine's Gull, in the same state of plumage as those shot in Wales, and possibly a remnant of that flock, killed at Cley (H. Pashley). October is always the month in which it



comes to Norfolk (see Col. Feilden's remarks, Norf. Norw. tr. v. p. 421).

18th.—A Greater Spotted Cuckoo, *Coccyzus glandarius*, immature, with dark crown, rich buff chest, and very little crest, shot between Caister and Yarmouth golf-house. This bird (minus its tail, which was unfortunately scattered to the winds) was bought by Mr. E. C. Saunders, who forwarded the body. It was a male, with single-notched sternum, and with a simple projecting manubrium, very like our Common Cuckoo. The gizzard and œsophagus, which seemed very dilatable, contained fragments of black insects with yellow lines upon them, identified, after some trouble, by Messrs. R. McLachlan and C. O. Waterhouse as the larvæ of *Pygæra bucephala*, the Buff-tip Moth. This Cuckoo had probably come over the day before, when the wind was from the north, and most likely from the same place as the Macqueen's Bustard which was shot at Humber-mouth (also on the 18th), and perhaps from the Don or Volga. Or both of them may have come on the 16th, when there was wind amounting to a gale from the north-east, and this latter supposition is the more probable; while the Courser shot in Jersey on the 19th may have been of the party, in which case it is probably *Cursorius bogolubovi*, subspecies. There was a rush at Flamborough Head lighthouse on the night of the 16th, continuing to 4 a.m. on the 17th ('Naturalist,' 1897, p. 13).

19th.—Sclavonian Grebe at Yarmouth (E. Saunders). Numbers of Robins on the coast (Gunn); about this time there were thousands at Spurn Point (J. Cordeaux).

20th.—Mr. H. Pashley received a Black Redstart.

22nd.—N.W. Wood Lark and Shore Larks seen near Cley. Six Goldcrests on board 'The Cockle' light-vessel (Johnson).

23rd.—Two Velvet Scoters seen at sea by Mr. Gunn.

25th.—Grey Phalarope in a dyke quite in the town of Yarmouth (E. Saunders).

27th.—W. Goldcrests, Starlings, and Sky Larks passed 'The Cockle' light-vessel, going west; fifty Scoters going east (J. H. Johnson).

30th.—N.W. in the early morning, afterwards N. to N.E.

31st.—N.E. Mr. E. Ramm shot a very small bird, as recorded by Mr. Southwell (Zool. p. 8), which, from the exact

description in Gätke's 'Birds of Heligoland,' pp. 294, 295, was soon identified as Pallas's Willow Warbler, *Phylloscopus proregulus*, Pall. For other synonyms see 'Catalogue of Birds in



PALLAS'S WILLOW WARBLER, *Phylloscopus proregulus*.

B. M.' v. p. 71. The Norfolk Pallas's Warbler is a little smaller than the Yellow-browed Warbler, *P. superciliosus*. Its upper parts are a rather purer olive-green, and the yellow markings of the head and neck are considerably richer, especially the eye-streaks, and a rather broad stripe extending across the crown of the head to the nape of the neck. The bands on the wings are a

little broader, but they only reach half-way to the outer edge of the wing, and across the rump there is a band of lemon-yellow. Mr. Pashley jotted down the soft parts while they were fresh as follows:—Upper mandible dark brown, lower orange nearly to the tip; legs brown, feet yellowish. Length,  $3\frac{3}{4}$  in. barely. Sex female. Through Mr. Dresser's kindness I am able to give a representation, the size of life, from a drawing prepared for the 'Birds of Europe,' Supp.

In October a perfectly white Long-tailed Titmouse was sent to Mr. W. Howlett, and about the 31st a yellowish-buff variety of the Woodcock was killed at Northrepps, which had the tips of the primaries white.

#### NOVEMBER. (Prevailing wind N.E.)

1st.—E. As soon as it was light Mr. Johnson, the master of 'The Cockle' lightship, noticed Sky Larks, Thrushes, Starlings, Snow Buntings, Linnets, and Chaffinches going west, the wind being east. From 8 p.m. to midnight, overcast with rain, a quantity of Larks, Linnets, and Chaffinches were flying round the lantern of the vessel; many of them striking it, and falling overboard, were lost.

2nd.—N.E. Larks, Starlings, Rooks, and Crows passing 'The Cockle.'

9th.—A Black-breasted Dipper shot on the river Bure (B. Dye).

11th.—Buzzard at Rollesby (E. Saunders).

12th.—Snow Buntings pretty numerous; seen by Mr. Patterson feeding on the seeds of the Michaelmas daisy.

20th.—Thousands of Lapwings near Haddiscoe, mingled with Golden Plover (L. Farman).

24th.—A Spotted Crake and many Water Rails at Heigham Sounds, as I learn from the Rev. M. C. Bird, who adds that two Coot-shooting parties, one of twelve boats and one of fifteen, on this water and Hickling, obtained 203 Coots on one day and 221 on another.

#### DECEMBER.

3rd.—Two Waxwings at Worstead, and a little later two on a tall thorn-hedge at Cromer (H. Winter). A nearly white Wren at Hickling (Bird).

10th.—W. and S. A young female Red-breasted Flycatcher,

another rarity from the east, and rather unexpected so late in the year, was shot off a tree on the edge of Rollesby Broad by Mr. Connop's keeper. Another was seen in September by a good observer near the sea, which makes four for Norfolk.

Three examples of the chestnut-red variety of the Partridge, *Perdix montana*, Briss.,—one of the most curious varieties in ornithology,—was shot near Dereham, this month, and another seen (fig. 'Field,' Feb. 13th, 1897); its first appearance in Norfolk.



## O B I T U A R Y.

## HEINRICH GÄTKE.

OF those ornithologists who have lately passed away there is none who has done better and truer work than Heinrich Gätke, who died peacefully on the island of Heligoland on January 1st last, at the patriarchal age of nearly eighty-four.

Born at Pritzwalk, Mark Brandenburg, on May 19th, 1813, Mr. Gätke, after getting what little schooling was there available, started in life as an artist, marine painting being the branch in which he took the greatest interest. At the age of twenty-three he visited Heligoland for the purpose of making studies, and, meeting there with a congenial helpmate, he married and settled on the island, and was from then resident until his death.

He was even then deeply interested in ornithology, for he at once commenced collecting specimens and making those careful notes on the migration of birds which he continued with the greatest patience and accuracy during a period of nearly sixty years. Essentially an observer and open-air naturalist, he worked year after year, amassing the rich collection of mounted birds which has of recent years become so widely known, and collecting valuable notes, which were entered in his journal with the greatest regularity. He lived a quiet, retired life, gaining his living by his pencil and brush, not publishing the result of his labours until comparatively recently; for his 'Vogelwarte Helgoland' was not issued until 1890, and then only owing to the assistance of Professor Rudolf Blasius, of Brunswick, whose father, the well-known ornithologist, Professor Johann Heinrich Blasius, visited Mr. Gätke in 1853, and was one of the first to call attention to the extent of his labours and the accuracy of his observations.

Various opinions of the deductions and arguments propounded by Mr. Gätke have been expressed by different ornithologists, but with these we will not deal here. Suffice to say that no one has found any reason to question his extreme accuracy, and there is

no doubt that he has made the island the first ornithological observatory in Europe. Almost every inhabitant was trained by him to observe and note the coming and going of the various species which visit that island during the seasons of passage, and almost every rare or unknown bird was brought to him for identification.

Of very tall and commanding presence, with flowing hair and beard (he reminded one always of what one pictured King Lear to have been), Gätke possessed an extremely genial and pleasant manner, and was a most entertaining companion. Always ready to impart information, he placed his notes most unreservedly at the disposal of any ornithologist who visited the island; and it is well known that the various articles on migration published by the late Mr. Henry Seebohm were based almost entirely on data obtained during his visit to Heligoland from the note-books of Mr. Gätke.

The writer some years ago spent a fortnight on the island with Mr. Gätke, and can testify to his extreme anxiety to render the visit of a fellow-ornithologist as pleasant and instructive as possible; and a more home-like, happy circle than that in his house would be difficult to find. Although of German origin, he spoke and wrote English like an Englishman, and was in some respects even more English than German.

Those who have known and learnt to appreciate his sterling worth will grieve deeply for him; but though he has gone his work remains, and his 'Vogelwarte Helgoland' will stand as a monument of industry and careful observation, carried on during a long and useful life. His intellect remained unimpaired to the last few days, and his end was a most peaceful one, carefully tended as he was by his devoted family.

H. E. DRESSER.

## NOTES AND QUERIES.

## MAMMALIA.

## CHIROPTERA.

The Serotine near Hastings.—On September 3rd an example of the Serotine, *Vesperugo serotinus*, was sent to me. A few days previously I had noticed three bats leave an outhouse belonging to one of the farms on Mr. W. Lucas-Shadwell's estate, and I asked a farm hand to endeavour to capture one and send it to me that I might determine the species. The animal was killed with a hop-pole; the man seems to have been afraid to take it alive as I desired him to do. A figure of the Serotine, from the graceful pencil of Mr. G. E. Lodge, may be seen in 'The Zoologist' for 1891, pl. I., facing page 201.—W. RUSKIN BUTTERFIELD (10, Stanhope Place, St. Leonard's).

## CARNIVORA.

Marten in the County Waterford.—The year before last I chronicled, in these pages (Zool. 1895, p. 301), the occurrence of two specimens, male and female, of *Martes sylvatica* in this neighbourhood. I have again to mention the capture, on December 1st, last year, of a fine male specimen of the same species. It was taken in a rabbit-trap. It measured from tip of snout to end of tail, 26 inches; same measurement to end of tail-hairs, 30 inches; length of body, 17 inches; length of tail, 8½ inches. It weighed 3 lbs. 2¼ oz. Throat yellow, with small brown spot.—WILLIAM W. FLEMING (Coolfin, Portlaw, Co. Waterford).

The Grey Seal in Carnarvonshire. — In July, 1895, I found an example of this species, *Halichærus gryphus*, between seven and eight feet long, on the beach near Afonwen. It had apparently been dead for some time, and much of the carcass had been devoured by crows and gulls.—G. H. CATON HAIGH (Grainsby Hall, Great Grimsby).

## RODENTIA.

Bank Vole in Jersey.—I have pleasure in confirming Mr. Barrett-Hamilton's record of the Bank Vole from Jersey (Zool. 1896, p. 98). Four specimens were trapped on that island by Mr. D. Francis last August, and these have been shown to me. I have not yet had an opportunity of examining and comparing them carefully, but from the impression left on my mind I should hesitate to describe them as "perfectly typical examples," although without comparing them I cannot say wherein the differences (if there be any) lie.—W. RUSKIN BUTTERFIELD (10, Stanhope Place, St. Leonard's).

## CETACEA.

**The Common Rorqual on Lincolnshire Coast.**—An example of the Common Rorqual, *Balænoptera musculus*, came ashore at North Cotes on Nov. 2nd, 1896. It was first seen by a Grimsby fishing-smack in a dead or dying condition floating in the North Sea and towed into the Humber by means of a hawser attached to its tail. Before, however, it reached Great Grimsby the tail came off, with the result that the carcass went ashore as above stated. The animal measured about forty feet in length.—G. H. CATON HAIGH (Grainsby Hall, Great Grimsby).

**Correction.**—Mr. T. Southwell desires to correct a local and a vessel's name in his "Notes on the Seal and Whale Fishery, 1896":—p. 58, line 4, for Fogs Head read Fogo Head; line 14 from foot, for 'Arctic' read 'Active.'

## AVES.

**Yellow-billed Cuckoo in the Isle of Wight.**—In 'The Zoologist' for 1896 (p. 473) I mentioned the reported occurrence of *Coccyzus americanus* at Ventnor in October. I have since, through the kindness of Mr. Smith, at Newport, and Mr. Kent, at Ventnor, been able to verify this report. Mr. Smith writes:—"I beg to say there is no doubt whatever as to the proper identification of the Yellow-billed Cuckoo; it was found dead at a cottage-door by Mr. Kent, of Old Park, Ventnor, who may let you see it if you still have a doubt." Answering my letter asking for particulars, Mr. Kent writes:—"I picked up the bird early in October, 1896. It was lying in the pathway outside my door. The place is in an exposed situation, and about 400 yards from the sea facing west. There had been a storm and strong winds from the west, and most probably the bird was drifted here by the force of the wind coming across the sea. It could not have been dead more than an hour or so, as it was in a perfect state of preservation, and an hour previous was not in the place where I found it. The bird is an adult male." I have not actually heard of the occurrence of this bird in the Isle of Wight before, but several instances of its appearance in Devonshire and other counties on that coast are known.—G. W. SMITH (College, Winchester).

**Egg of South African Golden Cuckoo in Nest of Cape Wagtail.**—For some four years past a pair of Cape Wagtails, *Motacilla capensis*, have nested in the shrubs in my garden, and have generally succeeded in rearing a fairly large family during the season. They are so tame as to come within a couple of yards of the observer when in search of the insects upon which they feed. This season they have nested in a hedge consisting of roses and pomegranates, and have been somewhat seriously imposed upon. A female Golden Cuckoo, *Chrysococcyx cupreus*, has deposited an egg in the



nest of the Wagtails, with the result that a very sturdy young Cuckoo has monopolized the space usually occupied by some four Wagtails, and has secured for himself the nutriment which should have been divided amongst the whole family. The bird in question is so far advanced as to have left its borrowed home, and may daily be seen with gaping mouth awaiting the visits of its foster-parents, whose energy is somewhat severely taxed in supplying the wants of their giant offspring, whom they doubtless regard as a very undesirable boarder.—F. G. NICHOLSON (Pretoria, Transvaal, January, 1897).

[The nest of the Cape Wagtail is usually found in wall-crevices, banks, crannies of rock, or in some creeping vegetation on a wall or tree. Mr. Nicholson now records it as found in garden shrubs, and I have seen it in thorn-bushes on the veld. Mrs. Barber has stated that the Golden Cuckoos lay pure white eggs in the nests of the Cape Bunting, *Fringillaria capensis* (*F. vittata*, Lay.) and all the *Nectariniæ* (Sun-birds). Mr. Jackson found pure white eggs—which have been considered to belong to this Cuckoo—in nests of the Rufous-chested Weaver-bird, *Hyphantornis capitalis*.—ED.]

Unusually large number of Pintails in Co. Mayo.—The unusually large numbers of Pintails visiting the estuary this season is very remarkable, when the mildness of the weather is considered, and except during the hard frost of January, 1881, when the mercury fell to 7° on the night of the 15th, I have never seen their numbers equalled. We usually have a little family party of twelve to fifteen birds regularly visiting the sands in company of Wigeon every winter; but last month a flock of eighty birds was seen by Capt. Kirkwood, of Bartragh, feeding in a sandy bay within sight of his parlour-windows, and I have myself on several occasions counted upwards of fifty feeding together. It would be interesting to learn if there has been an unusually large migration to other parts of the coast this season.—ROBERT WARREN (Moyview, Ballina, Feb. 6th, 1897).

Green Sandpiper in Co. Waterford.—Two specimens of this species were shot in Curraghmore on the 23rd and 25th November last year. They frequented the sides of the pond, and were very wild. Mr. E. Williams, who is mounting them for me, says that the contents of the stomach of both birds were in such a soft and liquid state that it was impossible to know on what they had been feeding. Thompson states, on the authority of the late Dr. R. J. Burkitt, that “the Green Sandpiper is very rarely seen near Waterford.” My friend Mr. Ussher informs me that he has shot it on three occasions in the county.—WILLIAM W. FLEMYNG (Coolfin, Portlaw, Co. Waterford).

Vultures and the Towers of Silence.—In connection with the bubonic plague now decimating certain parts of India, the following facts, communicated

to me by a friend out there, may be of interest, as showing that the supply of Vultures is equal to the demand at these well-known Parsee institutions:—“An unfounded report gained currency some days ago that the Parsee deaths from the pestilence having increased considerably, the Vultures kept at the Towers of Silence were unable to dispose of all the dead bodies exposed there. The secretary of the Parsee Panchayet Funds made personal enquiries into the matter, and has published an authoritative contradiction of the report, from which it appears that in the Tower of Silence known as Kappis Khao's there is ample space for 237 corpses, which are chiefly those of Shenshahi Parsees. In the Banajee Tower of Silence there is space for an equal number of dead bodies, chiefly those of Iranees and Kadmee Parsees, while there is no objection to Shenshahi corpses being laid therein. There is also space enough in the Anjuman and Manockjee Sett's Towers of Silence for 262 and 141 corpses respectively. The Mody Tower of Silence is used only for members of the Mody family. During the last fortnight (first half of January, 1897) about 150 dead bodies were consigned to the towers, most of them in the Kappis Khao Tower, while the corpses of Iranees and Kadmee Parsees were laid in the towers kept apart for them. According to the testimony of the corpse-bearers who enter the towers, the appearances in them were in no way different from their normal state, while the Vultures were sufficiently numerous to respond to the extra demand made upon them. According to an exact calculation made, the Vultures sitting on the walls of one tower were found to number 195, exclusive of the large number of other birds perching on the walls of the several other towers and on the trees. While the former number of Vultures was 250, there are now over 400 waiting daily at the towers.”—OXLEY GRABHAM (Flaxton, York).

**Ornithological Folk-Lore.**—In Mr. P. Ralfe's interesting paper on *Manx Bird-names* (p. 71) mention is made of the Wheatear and Swallow as two of the “Seven Sleepers.” Could he tell us what the other five birds were which indulged in supposed hibernation? On the Dorset coast I was told that the Wheatear was one of the seven sleepers, and was always visible at Portland on the first foggy day in March. Referring to my note-book, I find that the following eleven birds have been given me in various places as representatives of the lethargic heptarchy, the Wheatear always being included, and generally heading the list of every combination, probably in consequence of its early migration and conspicuousness on the coast, where more notice is taken of birds than is the case inland. I have found the first-named seven to be the most frequently mentioned:—Wheatear, Swallow, Sand Martin, Martin, Swift, Cuckoo, Landrail, Spotted Flycatcher, Nightjar, Wryneck, and Nightingale.—M. C. H. BIRD (Brunstead Rectory, Norwich).

## EDITORIAL GLEANINGS.

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At a recent meeting of the Bradford Scientific Society, as reported in the 'Yorkshire Weekly Post,' Mr. W. E. Preston read a paper dealing with the prehistoric remains to be found on Rombald's Moor. After describing generally the various classes of antiquities of prehistoric date to be found on the moors, Mr. Preston alluded to a nearly obliterated circle which he noticed in 1892 on Rivvock Edge, overlooking Keighley. The diameter was about sixty yards, and the wall of the circle was composed of loose stones and earth. In the centre was a large rock covered with peat and heather. On examination of a small portion which was exposed, this rock proved to be inscribed with a number of small and rather indistinct cup and ring marks. This aroused curiosity, and on removing the peat the whole surface of the rock proved to be covered with such markings. This was perhaps the only case in which an inscribed rock had been found enclosed within a circle on the Yorkshire moors. Of this rock Mr. Preston exhibited photographs; and speaking of flint implements, he described the places on the moors in which the searcher after these antiquities was most likely to meet with reward, and showed a very large and valuable collection which had been the result of his own researches.

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DURING a recent scientific excursion made by the 'Princesse-Alice' in the neighbourhood of the Azores, a Sperm Whale was captured, which has proved material for a communication to the 'Bulletin du Muséum d'histoire naturelle,' by S. A. S. Le Prince Albert de Monaco, entitled "Notes sur un Cachalot." This animal, which attained a length of "13 m. 70," afforded considerable information as to the parasites which infest Cetaceans. The author describes its stomach as containing a considerable number of worms resembling Nematoids, in the "tube digestif" many "Helminthes"; in the blubber were found some Cysticerci, whilst *Cyamidæ* were scattered on the epidermis.

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IN vol. iii. of 'Novitates Zoologicæ,' recently completed, Mr. C. W. Andrews, F.G.S., has contributed two parts of a memoir "On the Extinct Birds of the Chatham Islands." This is the result of the examination, in the Rothschild Museum at Tring, of "an immense collection of bird remains from the Chatham Islands," consisting of many thousands of bones, mostly in good condition, and including numerous skulls and other portions

of the skeleton of *Diaphorapteryx*. In addition to the isolated bones, there are one or two more or less complete skeletons which are of great value for purposes of determination. The great bulk of the collection consists of remains of recent sea-birds, such as Albatrosses, Cormorants, and Penguins; but, in addition to *Diaphorapteryx*, there are many other extinct forms, including some large species of *Fulicia*?, *Cabalus dieffenbachii*, *Palæocorax moriorum*, and also a few seal-bones, some human metapodials and phalanges, remains of rats and mice, and of fish; but Mr. Andrews has "not found any reptilian bones whatever."

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WE are glad to see from the 'Bulawayo Chronicle' that the inhabitants of Rhodesia are taking steps to mitigate the Locust scourge in their country. "The Civil Commissioner has made application to the Agricultural Department of the Cape Colony for a supply of the Locust-disease fungus which is supposed to be very effective in destroying the pest. The Principal of the Bacteriological Institute of Grahamstown has been instructed to forward a few tubes when supply is available. On arrival the Civil Commissioner proposes to hand them over to some enterprising farmers for experimenting with." Some time ago a lady in Natal recorded in 'Natural Science' the destructive effect on Locusts of this fungoid growth in her locality. The present Editor also bore witness in the same journal to similar observations made in Pretoria.

In the Transvaal, however, members of the Raad have enunciated the opinion that it is impious to seek to destroy Locusts, which are a scourge sent by the Almighty.

The disease-fungus is not the only natural enemy to the Locust. A correspondent has been recently writing about these insects in 'South Africa.' He describes their most formidable enemies in the Orange Free State as those well-known birds the Black-winged Pratincole, *Glareola melanoptera*, the White Stork, *Ciconia alba*, the Wattled Starling, *Dilophus carunculatus*, and the Lesser Kestrel, *Cerchneis tinnunculoides*. Among parasitic insects which attack the Locusts two have been recorded by Mrs. Barber. One has been described by Mr. Trimen as "a two-winged insect of the genus *Tachina*, which is of the same family (*Muscidæ*) as the common house fly, and not unlike it in appearance."

This correspondent adds:—"It has been discovered lately that salted Locusts form a wholesome and nutritious diet for horses, horned cattle, pigs, poultry, &c."

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IN last month's 'Ann. & Mag. Nat. Hist.,' Mr. E. E. Austen has given a translation of Prof. F. O. Guldberg's lecture before the Biological Society of Christiania, "On movement in a circle as the fundamental form of movement in animals: its cause, manifestation, and significance."



“The majority of those who are accustomed to walk in the fields and woods with open eyes for the observation of animal life have surely been struck by the readiness with which animals belonging to the same family or community find each other again, after having separated voluntarily or under compulsion. Indeed, even newly-hatched or new-born young, which one surely cannot easily suspect of having a fully developed memory for places or any acquaintance with the locality, and as to which it is quite impossible to imagine that they are already in possession of the full use of their senses, nevertheless again discover, apparently with the greatest ease, their parents, brothers and sisters, or companions, even when they have been separated from them for so long a time or by so great a distance that their sensory powers are inadequate to bring them into direct communication one with another.”

The lecturer then alluded to what he provisionally termed *biological circles* or *circular wanderings*, which he traced among vertebrates, including mankind, and among insects, by which *they return to the spot where they were separated*. This, he remarks, must be of *fundamental importance* for the *maintenance of life* and the development of the individuals affected; it is, he remarks, “universally distributed—it is one of the general laws.”

It must be emphasised that Prof. Guldberg distinctly repudiates any connection of his circular movement with the *manège*-movement known in physiology in the case of brain-lesion.

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At the Conference of Delegates of the Corresponding Societies of the British Association, Liverpool, 1896, perhaps the most original paper read was one by Mr. W. M. Flinders Petrie, “On a Federal Staff for Local Museums.”

The author advocated the formation of “a federal staff to circulate for all purposes requiring skilled knowledge, leaving the permanent attention to each place to devolve on a mere caretaker.” By this arrangement “each museum would have a week of attention in the year from a geologist, and the same from a zoologist and an archæologist.”

The duties of such a staff would be to arrange and label the new specimens acquired in the past year, taking sometimes a day, or perhaps a fortnight, at one place; to advise on alterations and improvements; to recommend purchases required to fill up gaps; to note duplicates and promote exchanges between museums; and to deliver a lecture on the principal novelties of their own subject in the past year.

“The effect at the country museums would be that three times in the year a visitant would arrive for one of the three sections, would work everything up to date, stir the local interest by advice and a lecture, stimulate the caretaker, and arrange routine work that could be carried out

before the next year's visit, and yet would not cost more than having down three lecturers for the local institution or society, apart from this work."

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MR. J. E. S. MOORE, of the Royal College of Science, London, has recently been investigating the African Lake Fauna. In a recent number of 'Nature' it was announced that he had made the apparent discovery of dimorphism in the Tanganyika medusa, with active budding in both forms. Further interesting particulars have been extracted from the 'Central African Gazette,' published at Zomba.

"Mr. Moore verified the report, which travellers on Tanganyika have heard from time to time, that there is a large fish in the lake which rushes at the paddles of a canoe passing through the water. He actually saw this take place. He also discovered a large electric fish which gives a severe shock on being touched. Tanganyika, indeed, appears to be full of fish. By trailing a line with an artificial minnow behind the boat, Mr. Moore caught enormous numbers of fish, some of them up to sixty pounds in weight—bright clean fish with silvery scales. The heaviest fish which was seen in the lake weighed over ninety pounds; this was a sort of mud-fish. Sponges were also discovered in Tanganyika, which though of no great size were undoubtedly real sponges. On the east side of the lake, in a bay where the striped leech was very common, Mr. Moore found a small fish about the size of a small minnow, whose back was striped in imitation of the leech, and this seemed to protect it against the raids of the kingfishers, which, while constantly picking up other small fish, avoided this particular one."

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AT A January meeting of the "Caradoc and Severn Valley Field Club," as reported in the 'Shrewsbury Chronicle,' Mr. H. E. Forrest exhibited, on behalf of Mr. Harold Peake, of Ellesmere, three young Vipers, which were taken out of the parent, and remarkable for each having two small legs, These were believed to be unique, and as probably an instance of "reversion to an ancestral type." We are indebted to Mr. R. H. Ramsbotham for the above cutting, and that gentleman writes that he had an opportunity of examining the three young Vipers referred to preserved in spirit—"said to be part of seven taken from a female Viper before birth, and which distinctly exhibited two small feet protruding from the lower portion of the belly."

# THE ZOOLOGIST

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## THE DORSAL PORES OF EARTHWORMS.

BY THE REV. HILDERIC FRIEND,

Author of 'Flowers and Flower-Lore.'

IF a specimen of the Common Earthworm is examined, especially after having been preserved for a time in spirits, it will be found that a number of pores exist on the back. They are most readily seen on the girdle as a rule, and look exactly like the holes which result from the puncture of a pin or needle. These openings have been known for a considerable time as the dorsal pores, a name which serves not only to define their position, but also to differentiate them from the other openings which exist on various portions of the worm's body, such as the male or spermiducal pores, the nephridiopores, and the puberty pores (*tubercula pubertatis*).

It is now many years since these apertures were originally detected. Who first observed them it is impossible to say. Equally difficult would it be to decide who was the first to notice their presence in describing the animals. In 1727 Dr. Derham, Canon of Windsor, wrote a very interesting work entitled 'Physico-Theology,' in which he endeavours to demonstrate "the being and attributes of God from his works of Creation." He says that under the skin of worms "there lies a slimy juice, that they emit, as occasion is, at certain perforations between the annuli, to lubricate the body, and facilitate their passage into the earth." A little later, however, he shows that a certain Dr.

Willis had previously written an account of these "foramina on the top of the back, adjoining to each ring, supplying the place of lungs." Now Willis published his work, 'De Anima Brutorum,' in 1672, so that for upwards of two hundred years the pores have been known to science, to go no further back. It is only in recent years, however, that they have been carefully noted, and the position of the first pore recorded for the different species of worm. It has been thought by some that the first dorsal pore was so uniformly placed in the various species of Earthworms that a specific character might be based thereon. This I am disposed to think is not borne out by facts.

Dr. Benham, one of our few English authorities on the subject, says: "In many Earthworms the cœlom is put into communication with the exterior by means of a series of dorsal pores, placed on the intersegmental grooves. In *Lumbricus* these pores occur in every somite after about segment eight; in *Digaster* and *Perionyx* they commence just behind somite four; in *Plutellus* behind somite six; in *Pleurochæta* and *Typhæus* the pores are present only behind the clitellum. They are present in *Acanthodrilus*, and in many *Perichæta*."\* In *Allurus* they begin behind segment three or four.

As will be inferred from the foregoing, a variety of ideas have prevailed respecting the use to which these apertures were devoted in worm economy. Willis says they supply the place of lungs, and if Derham's remarks apply to the dorsal pores, he regards them simply as the openings through which lubricants were poured. Lloyd Morgan is as cautious on the subject as he is inaccurate. He says: "Every segment of the body *except the first* has a dorsal pore opening into the anterior part of the ring in the mid-dorsal line, and two very minute pores, one on each side of the ventral line, which are the external orifices of the nephridia or segmental organs, whose function is excretory." The dorsal pores are not found in the typical Earthworm on every segment save the first, and if they were, we are not favoured by the Professor with a vestige of an idea as to their use. He says: "There are no specially differentiated respiratory organs, respiration being apparently effected by the surface of the body," so that he does not regard the dorsal pores as lungs.

\* Q. J. Mic. Sc. 1886, p. 247.



The most important contribution to the subject is undoubtedly that which was made a few years ago by Hermann Ude, in a paper which deals chiefly with the structure of the body-wall in Earthworms.\* He points out that "the dorsal pore lies on the anterior edge of the somites in which it occurs, and appears on the intersegmental groove. It is absent in the most anterior somites, but the position of the first pore is constant for a given species." In the Common Earthworm it occurs between eight and nine, and in the Turgid Worm between ten and eleven. We should say between eight and nine and nine and ten respectively. Claparède formerly described the epidermis as being folded inwards at the dorsal pore, just as it is where the setæ are situated, but Ude shows that such is not the case. By stripping off the epidermis I have been able to detect the infolding of the cuticle around the setæ, but not around the dorsal pore, which, as Ude affirms, is a perforation through the epidermis and the muscular layers. The pore is wanting in most Freshwater Worms or *Limicolæ*. Beddard has dealt with the exceptions. In some worms, when the girdle is fully developed, the pores become closed through the growing up of the cuticle around the edge. This is not always the case, however, for the Mucous Worm has been noted by some to be an exception, while I have found that the dorsal pore on the clitellum or girdle of some species is quite as discernible after the organ has attained full development as before.

If a worm is opened laterally, and the internal organs removed so as to leave only the body-wall, it will be possible so to display this portion of the animal as to see the whole series of pores in regular succession. It will be easy then to observe that they are connected with each other by a kind of tube which runs right along the back of the worm. I am a little doubtful whether or not this is what Ude refers to when he says that the epithelium of the body cavity passes across the muscular layers, and meets the cuticle around the edge of the pore. The pore has a special set of muscle-bundles which form its sphincter muscle.

Ude does not think there is the slightest connection between the pores and the nephridia, which are excretory in their function.

\* Zeit. f. Wiss. Zool. xlv. pp. 85-142. Benham, Q. J. Mic. Sc. Aug. 1886, No. cv. pp. 102-4.

Yet in a sense the dorsal pores play their part in the excretory process, since the fluid contained in the cœlom or body-cavity, as well as certain other substances which in some species of Earthworm are coloured, can be caused to exude through them. Sometimes the exudation is in drops, but some foreign species are able to squirt it to a distance of a foot, much as *Peripatus* does. In these cases the process is perhaps protective.

In a memorable article on the Earthworm, published some years ago, Prof. Ray Lankester \* says: "In the cuticle of the Earthworm a system of very minute canals exists, . . . which might either be described in connection with the respiratory mechanism, or here, if we regard these ducts as excretory pores . . . It is undoubtedly through these minute canals, which exist throughout the integument of the Earthworm, that water passes to the perivisceral cavity, and a dense fluid passes out." Ude tried a series of experiments to ascertain whether or not water was admitted through these pores, but he failed to satisfy himself that such was the case, though I have many times observed the denser fluid of which Prof. Lankester speaks issuing from them.

It is to Prof. Busk that we are indebted, through Prof. Lankester, for one of the best accounts of these apertures in English. In a remarkable paper on the Earthworm, published by the latter in 1865, we have an illustration of the integument of a Worm with all the various pores found on the dorsal surface carefully represented. "One of these orifices, situated in the median dorsal line of the segment, appears always to be larger than the others, and penetrates directly to the perivisceral cavity. That these openings form a very ready and frequent means of escape to the colourless fluid may be ascertained by handling a large Earthworm, when some considerable quantity is nearly invariably found to escape from its dorsal surface." † Nor is this all. Prof. Busk says that the fluid expressed from these pores was of a dirty greyish colour, thin and opaque. Examined under the microscope, it contained numerous spherical particles and pyriform granular bodies, besides irregular organic particles. This coloured fluid differs with the species of Worm examined. In some, as the Brandling and Turgid Worm, it is

\* Q. J. Micro. Sc. 1865, pp. 9 and 10, "The Anatomy of the Earthworm."

† Ibid. p. 102.

yellow; in others, as the Mucous Worm, it is white; while the Red Worm yields two-thirds of colouring matter.

Mr. Beddard, in his invaluable 'Monograph of Oligochæta,' unfortunately leaves the subject almost untouched. He says (p. 13): "The cuticle seems undoubtedly to be a formation of the packing cells of the epidermis; the pores upon its surface are the outlets of the gland-cells, and their existence appears to be simply due to the fact that the gland-cells do not secrete a cuticle like the other cells, their secretory activity being taken up in the formation of the granules with which they are laden; hence at the points where they abut upon the cuticle there are gaps—the pores in question." In discussing the question of the cœlom—a subject which has been somewhat fully treated by Mr. Lim Boon Keng, Straits Settlements Scholar, since the 'Monograph' was published—Mr. Beddard again (p. 30) introduces the dorsal pores, and as the paragraph represents the latest results, it will be well to give it almost *in extenso*. "The cœlom," we are told, "is placed in communication with the external medium in a large number of the Oligochæta by a series of pores, one to each segment; in addition to these structures, which are called the dorsal pores, there is, in a certain number—most of the aquatic Oligochæta—a single pore on the prostomium, which is generally spoken of as the head pore" (and is found in the embryo *Lumbricus* (p. 32), though not in the adult). The dorsal pores are never developed upon the first one or two segments of the body, and the point where they commence is characteristic for the species. The dorsal pores were considered at one time to lead into sacs, the function of which was believed to be respiratory; it is now known that the pores are simply perforations of the integumental layers just at the anterior boundary of the segment to which they belong; there is no lining of epithelium, as has been erroneously stated to be the case; there is simply a discontinuity of the muscular and epidermic layers where the pores exist. The structure of these pores has been more particularly studied by Ude. Their structure in *Fridericia* has been studied by Vejdovsky and Michaelsen: "in these Worms the pore is bordered by large round glandular cells on each side; no such cells are visible in the case of the dorsal pores of Earthworms. We are at present completely in

the dark as to the morphological meaning of these pores." No relations are apparent between the dorsal pores and the nephridia. Michaelsen thinks the dorsal pores "have the function of nourishing the body and prevent its becoming unduly dry; it is certain that the cœlomic fluid is pressed out through the pores, and their occlusion is regulated by longitudinal muscles. . . . Perhaps in the Oligochæta the dorsal pores pass out the waste fluids, while the remaining excretory products are elaborated and passed out by the nephridia."

Thus we see that even now, notwithstanding the large amount of attention which has been paid to Earthworms during the past decade, we are very badly informed on many points connected with their economy; and there is great need that some one, with the necessary leisure, means, and scientific training, should investigate some of the details more fully. I have been able to make great progress with my work on the distribution and revision of the British Lumbricidæ, till recently almost totally neglected; and hope by the due publication of the new and interesting results to stimulate further research on the part of others.

Meanwhile, so far as the dorsal pores are concerned, they appear to be for the emission rather than the introduction of fluids; and are apparently lubricative, excretory, and protective. Their homology with certain organs found in other annelids does not seem to have been carefully ascertained; at any rate I know of nothing on the subject in English.



NOTES ON THE CHACMA BABOON, AND THE  
MAANHAAR JACKAL, &c.

BY DR. S. SCHONLAND.

Director of the Albany Museum, Grahamstown, South Africa.

SUPPLEMENTING the editor's article on the Chacma Baboon (*ante*, p. 29), I may state that this animal has now become a regular scourge in some parts of Cape Colony, for a quite unexpected reason. It is perfectly notorious that it has largely taken to killing lambs, for the purpose chiefly of sucking the milk with which they have filled their stomachs. The reason that it has, if anything, increased in the colony during recent years is twofold. Firstly, the alarming spread of the prickly pear (*Opuntia* sp.) in some districts has provided it with almost impenetrable shelter and abundant food, as it is very fond of the fruit and also eats the leaves. Secondly, it has become so cunning that only by means of artful manœuvres can one get a shot at it. A friend of mine, whose wife could approach a troop of Baboons without disturbing them, borrowed one day her cloak and hat and then went out. They let him approach to within very close quarters, and two of them were shot before the remainder got into shelter. Sometimes the farmers of a district combine and during the night surround their sleeping-place. As soon as the day breaks and the Baboons try to escape they are shot down in large numbers; but this method of reducing their ranks is not always practicable.

The Baboon is not the only South African animal which has during recent times changed its habits. Thus, the so-called "Wet-gat Spreouw," *Spreo bicolor*, was formerly never known to touch fruit, its food consisting entirely of insects, but during recent years it has, at all events on some farms with which I am acquainted, become very destructive to fruit. Another case, which possibly comes under the same category, is that of the Maanhaar Jackal, *Proteles cristatus*. The Cape Government was paying a high reward for the destruction of this animal, because it was supposed to be destructive to small stock. I protested

publicly against this, as I had never found anything but insects (especially Termites) in the stomachs of those which I had dissected; and the unanimous testimony of experienced and trustworthy farmers in our district was to the effect that although it does a little damage by breaking Ostrich eggs, it very rarely if ever touches live stock; in fact, only one certain case was cited to me in which the bones of a lamb were found in the hole inhabited by Maanhaar Jackals, who had to provide for a litter of young ones at the time. I need scarcely say that this case does not prove that the Maanhaar Jackal kills lambs, as he is known to devour carrion. To my astonishment I was met by a howl of indignation, proceeding from farmers living in other districts, who were positive that this animal was a dangerous enemy to their flocks; and if they are correct (and I must say that there were intelligent and observant men amongst them) the Maanhaar Jackal must have changed its habits during recent times and in certain districts only, when possibly with the advance of civilization its natural food is failing. However, I cannot admit that the question is definitely settled.

## ZOOLOGICAL RAMBLES IN AND AROUND THE TRANSVAAL.

BY W. L. DISTANT.

IN that very stirring Christmas week of 1895, and quite unconscious that we were projecting a journey that, a few days later, would have almost brought us in contact with Dr. Jameson and his merrie men, my son and self decided to spend the vacation at Rustenburg, there to collect, under the guidance of that good field naturalist, W. Ayres, who has made the sleepy spot his home for a number of years. We started on the afternoon of December 22nd, driving a light cart, attended by our Zulu "boy" John, and armed with necessary apparatus for a successful ornithological and entomological raid. Guns, nets, a taxidermal box of sundries, stifling-bottles, boxes, &c., helped to crowd the already well-filled vehicle, and incited a wish that the "roads" might not prove too heavy.

After leaving Pretoria and passing through Daas Poort—a spot ten days later to mark the nightly vigil of armed Boers—the road crosses a level veld between two ranges of hills. Here one may generally see an occasional Secretary Vulture, *Serpentarius secretarius*, and as there is now not only a heavy penalty for killing one of these birds, but also an inducement offered to the "common informer" by giving him a share of the legal plunder, the "Secretary" is seldom molested. It is, however, an over-rated bird, so far as its snake-destroying propensities are concerned; its usual food—and I have conducted more than one *post-mortem*—consists of small lizards, especially *Agama hispida*, and, in the season, orthopterous insects. To approach one of these birds on the open veld with only a shot-gun is frequently a vain quest. As you walk towards it, so does it walk away; as you quicken your pace the bird does the same. Still there are times and seasons when a casual and nearer acquaintance is made, though a rifle is the best weapon with which to supply a museum.

The Secretary-bird has a peculiar and stately demeanour which any one acquainted with the bird in a state of nature does not easily forget, and nothing seems more inexact than the description given by Brehm, when he writes, it "runs about among the tall grass-stems, or hovers above them."\* An excellent figure of the bird in a state of nature is given by Mr. J. G. Millais, in his 'A Breath from the Veldt.' The weight of a very large specimen, whose skin I possess, was in the flesh only 10 lbs. My son once came across one roosting in a tree, or "thorn-bush," at sundown.

Driving along this road, and when one passes a swampy space, or crosses a sluit, it is not unusual to disturb a Hammerkop, *Scopus umbretta*, when it takes to its slow and heavy flight. A writer in the excellent 'Royal Natural History,' recently completed, states:—"Everywhere these birds are mainly crepuscular, and are but seldom seen in full daylight." This is certainly not my own experience, for, especially in the winter season, these birds are in evidence all day long to one who goes far afield and in their haunts. The Hammerkop is plentiful around Pretoria, wherever sluits, water-holes or marshes are found. It is an unsuspecting bird and easily approached. I once marked one down that had settled in a water-hole not more than six feet broad though moderately deep, and I actually reached its edge before the bird took flight. It is much scarcer near the town in the summer, when it has probably retired to breed.

Along the road, and especially on telegraph-poles, one usually sees Buzzards, especially *Buteo desertorum*. This was the prevalent species near Pretoria when I visited the country before, but seems now—or was during my second sojourn—much scarcer; while, *per contra*, the Black-shouldered Kite, *Elanus caruleus*, which I formerly described as scarce, hovering high in the air, and generally out of reach of the gun, was now plentiful close to the town, and to be seen in trees near dwellings. The real habits of birds are not to be discovered except under prolonged observation.

After crossing the Crocodile river, over which there is now a good bridge, we outspanned at a roadside canteen, kept by the

\* 'From North Pole to Equator,' p. 187



inevitable "Peruvian"\* or Russian Jew, whose *inferior* liquors, with the illustration of drunken Kafirs around the establishment, proved once more that, with few exceptions, these people should never be entrusted with a licence. The best law passed by the Transvaal Government of recent years, and, to their credit be it said, in the face of great opposition by some of their interested and selfish supporters, is one which now prohibits the sale of intoxicants to natives, entirely necessitated by the vile compounds supplied to the Kafirs at the mines. However, by pushing on we reached another roadside house kept by an English Colonial and a Dane, and there we passed the night.

This thickly wooded spot, in the vicinity of a well-known Nek, is an excellent halt for the ornithologist. It was here I first met with the African Grey Hornbill, *Tockus nasutus*, a bird, strange to say, which became rather common in the gardens of Pretoria during the winter months of 1896. Hornbills are not averse to human habitations, and I had brought to me the yellow- and red-billed species, *Lophoceros leucomelas* and *L. erythrorynchus*, both killed in town gardens.

Although the season had been abnormally dry, we now found many boggy and loose sandy tracks, to avoid which loop ways had been made through the trees, though these were often little better than the discarded road. In these sandy tracks I found the Cicindelid beetle, *Manticora tuberculata*, and later on I was able to add to the list of its victims a small member of the Cicadidæ, *Callipsaltria longula*, which I extracted from its closed mandibles. It is often thought and frequently stated that the Cicadas are a highly protected group, owing to their generally assimilative hue, when at rest, to the twigs or boughs which they frequent, and certainly some species are difficult to detect. But any concealment thus acquired is more than negated by the stridulation of the males, and protective resemblance can scarcely be a factor in the insect's existence when by its piercing notes it proclaims the place of its concealment. In collecting I was usually apprised of their whereabouts by their stridulating music, and the difficulty I experienced in finding them among the bush would improbably be felt by birds. As if aware of the danger they incur by

\* S. African corruption of a local European name for these people.

their noise, they become absolutely silent when one approaches the tree lately resonant with the efforts of the cicadan orchestra; but that is too late for protection. They have many enemies in all parts of the world in which they are found, being not only eaten by birds but attacked by such varied insects as Mantidæ, dragonflies and hornets, whilst, as remarked above, the beetle (*Manticora*) can now be added to the recorded list. They also fall a prey to spiders, are attacked in the egg condition by larvæ of ichneumons, and are also sometimes afflicted by a fungoid growth.

Further along the road our way lay across what to S. African travellers is so well known as turf, and after prolonged wet this remains in a terrible condition for vehicular traffic, though in other parts the country may be baked and burnt up, as it was at this time. Our faithful Zulu had to lead our horse, and did so cheerfully and uncomplaining for ten hours at a stretch. I provided him with a bottle of "Cape smoke" as some sort of stimulant under the strain, which he consumed and seemed none the worse for. But when we reached the Hex River, and John led our horse—an animal with a strong dislike for fords—across it, he entered the river on one side sober, and, dreadful and strange to relate, came out the other side in a state of intoxication, the effects probably of the lukewarm and swiftly-flowing water. With a demoralized Zulu fastened to the back of our trap, we made an inglorious entry into Rustenburg about 9 p.m. However, once at the 'Masonic Hotel,' a good supper soon put us to rights, while our faithful servitor speedily became again clothed and in his right mind.

The next morning we were joined by our good friend Ayres, who acted as our guide during the stay, and whose acquaintance with the lives and habits of the living creatures that frequented the country around was equal to the combined knowledge of a field-naturalist and a sportsman.

We had arrived at a bad time. No rain had fallen for some weeks, and the country was parched up. Birds were practically absent, and so we decided to try and find the good things of the place.

Rustenburg is famous for some fine beetles, and we made long excursions in search of a few rare species. In the Cetoniidæ the pride of place centres in *Goliathus albosignatus*. This beetle is

to be netted as it flies among its favourite trees, a species of *Zizyphus*,\* but it is very rare, and only a few are annually secured. The beautiful *Ceratorrhina burkei* and the resplendent *C. derbyana* are found on the twigs or silky leaves of a species of *Combretum*, probably *C. holosericum*; but though the second species can usually at the right time be found, the first is a beetle to be "hoped for." We walked many miles to a nook found by Ayres to be a peculiarly favoured spot in the restricted area of this species. A fine large Prionid *Tithoes confinis* is found under the bark of dead trees, and we procured an example of the large Cicindelid *Ophrydera rufomarginata*; so it will be seen that Rustenburg has some attractions for the coleopterist, but it should be visited early in the summer, and shortly after the rains have commenced.

In the search for these insects we reached the hills and the narrow perpendicular waterfall, which can be often seen a long distance away. Here, enclosed by trees and rising ground, we experienced that peculiar charm of South African scenery that is gradually acquired, never forgotten, and yet is so difficult to analyse or describe. But, as is so frequently the case among these surroundings, animal life was abnormally absent and there were no flowers; it seems a country—to the naturalist—of the past. The water after its long perpendicular drop flows through some rocky pools beneath, and I never drank any that possessed such a tonic and highly stimulating effect. After drinking it we seemed to have left all fatigue behind, and to be invigorated for a fresh march. This was once a fern paradise; a few tree ferns are still left, but unfortunately a market has been found for them, and civilisation has once more ransacked nature.

Among birds the South African Paradise Flycatcher, *Terpsiphone cristata*, is not uncommon at Rustenburg, and I found the nest during my stay. It is well described in Layard's 'Birds of South Africa,' as "composed of fibres and dead leaves, stuck over with bits of bark, cobwebs, and lichens to resemble a knot in the tree." The last sentence, however, is not to be taken as denoting concealment, for the nest is thoroughly exposed. I found this one on a projecting branch on which were very

\* For the botanical determinations I am indebted to my friend Dr. S. Schonland, of the Albany Museum, Grahamstown, to whom I submitted specimens.



few leaves. In the work referred to it is stated to be found "generally in the neighbourhood of water," but this is not invariable, for the nest I found was on a rocky mound in a most arid spot. It contained two eggs, so I presume December is the time of nidification. The internal cavity of my nest is 60 by 50 millim. expanse, and 25 millim. deep. The rarest bird I procured was the Red-headed Weaver Bird, *Malimbus rubriceps*, but this I obtained from W. Ayres, and but one other specimen had ever passed through his hands during a life-time's collecting in the South African bush. I also brought away with me the skin of *Scops capensis*, the Cape Scops Owl, and *Centropus senegalensis*, the Lark-heeled Cuckoo. A flying visit of a few days, after all, gives little opportunity of grasping the real peculiarities of a local fauna, and the short time spent at Rustenburg would have been almost barren in result but for the guidance of the local naturalist. We worked hard during our stay, finishing real work on Christmas Eve, when I smoked the evening pipe with the well-known Anglican Prebendary who has settled in the home of the Doppe Boers, with a small church, a small flock, and no intention of leaving. We had our last insect hunt on Christmas morning, and then after a mid-day banquet—of Rustenburg limitations—shook the hand of our genial guide and companion, and started on the homeward track. We had some good shooting in the afternoon among Crowned Lapwings, *Chettusia coronata*, and Yellow-throated Sand-grouse, *Pterocles guttularis*, as we drove along, but the drought dominated, and little animal life was to be seen. On the banks of a sluit we disturbed a Monitor, *Varanus niloticus*, but this is neither worth shooting nor keeping alive, or rather endeavouring to do so. I once had one in my possession for three months, and during the whole of that time it abstained from food, though I supplied it liberally with small lizards, frogs, eggs, meat, orthoptera, and on one occasion tried to tempt its appetite by the offer of a small harmless water-snake. I kept it in a large tank of water with an artificial rockery in the centre, on which it could rest above the surface, which it usually did; but it refused all food and ultimately died of exhaustion, when, by request, I packed its body off to the Grahamstown Museum.

It was interesting to watch the behaviour of the frogs, most



of which spent the whole time with this *Varanus*. They were at first evidently imbued with the most abject terror when the Monitor approached them, and would huddle together immovable, and with their eyes fixed on their enemy; but in the course of a few weeks, when they found they were not attacked, and familiarity breeding either contempt or friendship, they frequently rested on the reptile's back. The frogs were varied, belonging at least to several genera, so that they could not have been all "distasteful." The frogs rapidly acquired experience, and overcame what may loosely be called an "instinctive" fear.

## NOTES AND QUERIES.

## MAMMALIA.

## HOMINIDÆ.

**Human Bones at Bromehill.**—On both sides of the Little Ouse River, for several miles between Brandon and Thetford, human bones have been at various times found on the surface or unearthed in considerable numbers. I myself have found them exposed on the ground on several spots on the north bank, chiefly near Bromehill Mere, in the parish of Weeting, and at St. Helen's Well (or "Tanner's Pit"), the site of St. Helen's Church, Thetford. The bones at the latter place were doubtless buried there at various dates. In February, 1885, in the meadow a few yards west of Bromehill Mere, I saw, by the mouth of a rabbit-hole, part of a human skull, many human bones, bones of cat, horse, sheep, and rabbit, two flint "scrapers" of neolithic work, three "plague-pipes" (tobacco-pipes of the date of Charles II.), and fragments of pottery ancient and modern, glazed and not glazed. Some of the ancient bits were of a greyish brown (as if they had only been dried, but not burned or baked), and contained in the substance of the clay many small white stones. One small bit of this grey-brown or unburnt ware has the imprint as of wicker-work on its convex side, as if it had once formed a clay lining to a basket, possibly to make the basket water-tight before folk knew how to make pots to stand alone without a basket to hold them together. On enlarging one of the numerous rabbit holes (nearest to the human bones) with my hands and feet and sheath-knife, I grubbed out three more human skeletons, apparently perfect. Whilst taking them out the Weeting gamekeeper came and watched me, and told me of an old man who once ploughed this meadow, and who declared that he turned out men's heads all over the place. I was benighted by the time I had secured three skeletons, but from what I have seen and heard there must be many thousands only just covered, or partly covered. These three skeletons seemed to have been hastily "crowded" in, so that they were somewhat mixed and in different postures. I could not find any sign of east-and-west posture, or any specially recognised posture, nor any trace of violent death, nor of any metal, pottery, ornament, stone implement, or clothing with them. This particular spot is marked on the Ordnance map as the site of Bromehill Priory. The various articles I saw on the

surface are no evidence of date for bones just *beneath* the surface. I fancy these three skeletons, and most of the others ploughed up formerly, and found at intervals between Brandon and Thetford, belong to victims of the Black Death in 1349. The severity of that plague in the eastern counties, and especially in the Thetford neighbourhood, seems to account for the crowded condition, various postures, and absence of ornament, metal, or other possessions.—FRANK NORGATE (Bury St. Edmunds).

## AVES.

**Breeding of the Roseate Tern in Britain.**—I have pleasure in reporting the fact that this elegant and most beautiful of our Sea-swallows, *Sterna dougalli*, is not yet extinct as a British breeding species, and that it still has a regular nesting haunt in the British Isles. Your readers will be aware that eminent and leading ornithologists have for some years been of opinion that the Roseate Tern only visited our coasts as a casual summer migrant, and this has been so stated in all recent works on British birds. Indeed, the late Mr. Henry Seebohm writes, "It is doubtful whether the Roseate Tern nests in any part of the British Islands at the present time." However, for the past few years I have known of a colony of these birds nesting annually in Britain; but of course, for obvious reasons, I must refrain from naming the precise locality. In 1895, I sent Mr. J. T. Proud, of Bishop Auckland, specimens of their eggs, and informed that gentleman of the whereabouts of the locality, and last year he visited the place, saw the birds, and obtained their eggs himself; and I understand he has had the pleasure of supplying the British Museum with such specimens, and has satisfied the British Museum authorities that this Tern is still a British-breeding species.

It is satisfactory to know that these rare birds have selected a portion of our islands for rearing their young where they are not likely to be much molested by man; in fact, as can be supposed, it is far from the path of the ordinary tourist or collector, and it is to be hoped that those gentlemen who are already aware of the habitat in question will keep it secret for the sake of the birds and British ornithology. I may also point out that their eggs are readily distinguishable from those of other and closely allied species.—E. G. POTTER (14, Bootham Crescent, York).

[In our last issue (*ante*, p. 130) Mr. Gurney does not seem to think it improbable that these birds may nest again in Norfolk, as they once were known to do not many years ago. Mr. Ussher, in the March number of the 'Irish Naturalist,' writes:—"The Roseate Tern is recorded by Thompson to have bred in Down, Dublin, and Wexford; but at the present day no breeding place of this species in Ireland is known."—ED.]

**Little Auks and Little Gulls at Scarborough.**—I notice that in Mr. Gurney's interesting notes from Norfolk, he remarks that the last two winters have produced scarcely any Little Auks in his district. My experience during the winter of 1895-6 was similar, as I noted only two occurrences of single birds in each case; but it may be interesting to record that during the past winter this bird has occurred in greater numbers than usual, although the migration has not nearly equalled that of the winter of 1894-5. The following extracts from my note-book will give an idea of the comparative abundance in which they have occurred:—1896, Oct. 29th, two seen in North Bay; 31st, one shot in North Bay; Nov. 1st, one caught alive in South Bay; 5th, ditto; 6th, two washed ashore. After the early part of November they did not occur in numbers regularly, although a few stragglers were noticed; but in January and February of the present year considerable numbers were seen, in small flocks of from three or four, up to a dozen together. On Sunday, Feb. 7th, I picked up five which were washed ashore dead, but all quite fresh, on the beach between Scarborough and Gristhorpe.

I notice also Mr. Gurney mentions that more Little Gulls than usual have occurred. Four were noticed here during January, which is in excess of the usual occurrence of the species in this district. They were all immature birds. The Slavonian Grebe has also been more abundant this winter; I have had four examples brought to me, and have seen several others.—W. J. CLARKE (44, Huntriss Row, Scarborough).

**Red-legged Partridge Migrating.**—As the Red-legged Partridge is not usually considered a migratory species, the following notes may prove of interest to readers of 'The Zoologist.' I must first remark that this bird has not extended its range, as a resident, into the Scarborough district, and we have only three records of its occurrence during the last seven years, which took place under the following circumstances:—On April 4th, 1890, one was seen to come from the direction of the sea and fall exhausted on Filey Road (only a few hundred yards from the beach), when it ran into a doorway and suffered itself to be captured. On April 4th, 1896, another was seen coming over the water from the east; it alighted on the East Pier, where it was picked up, too weary to make any attempt at escape. The third example was seen coming over the sea from the east on March 22nd, 1897, and dropped exhausted in the water a short distance from land. It speedily drifted ashore, and was secured and brought to me. The fact of the only three examples of which I have records having all come in from the east, at the same period of the year, in a very weary and exhausted condition, seems to point to the conclusion that in isolated cases, at all events, this species may be classed amongst our migratory visitors.—W. J. CLARKE (44, Huntriss Row, Scarborough).



**Strange Discovery of a Tit's Nest.**—On Nov. 12th, 1896, the sawyers at the wood-yard of Messrs. S. Allsopp & Sons were engaged in cutting up into planks a very fine broad-leaved elm-tree, the trunk of which was five feet in diameter at the base. The tree had been felled in front of Kiolet Hall, near Highley, Shropshire. Judging from the size, the tree must have been from two to three centuries old. About seventeen feet from the base they found a small cavity containing three nails and also a perfectly-formed bird's nest; on this was a perfect egg, which was unfortunately broken during the manipulations. But on removal of the upper layers another nest was found, containing four eggs in a fair state of preservation. From their size they were probably laid by a Blue Tit, and the markings are quite plain, although somewhat faded. Judging from the disposition of the woody fibres, I think that the original aperture must have been closed by the growth of a large branch which finally coalesced with the main trunk, and so cut off all communication with the outside. I am indebted to the courtesy of Mr. Maxwell Tod, the secretary of the Company, for the opportunity of recording these facts.—PHILIP B. MASON (Burton-on-Trent).

**Yellow Wagtail in Argyllshire.**—I beg to record the occurrence last spring (March and April, 1896) of a solitary specimen of the Yellow Wagtail, *Motacilla raii*, about a mile from Oban, Argyllshire, N.B. It alighted on a stone bridge within a yard of where I was standing, enabling me to quietly and minutely examine and determine the species certainly to my satisfaction. I note Messrs. J. A. Harvie Brown and T. E. Buckley, in their 'Fauna of Argyllshire and the Inner Hebrides,' remark the scarcity of the bird thereabouts, so send you this account of my own personal observation.—ROBERT ROBINSON DAVISON (3, Waterloo Avenue, North Strand, Dublin).

**The Ostrich.**—In an important article of last month's 'Zoologist,' Mr. Schreiner calls attention to a great many fallacies which have hitherto been generally accepted as facts. The German naturalist Brehm, several years ago, in an essay entitled 'The Steppes of Inner Africa,' wrote a description of the habits of the Ostrich which agrees in several points with Mr. Schreiner's views, as, for instance, in the question of polygamy or monogamy; but in a quotation added by the editor to the English edition, which appeared last year, are the following remarks; and I think they are characteristic of the misconceptions existing in scientific circles as to the habits of this bird:—"Ostriches, though sometimes assembling in troops of thirty to fifty, commonly live in companies of four or five—one cock and the rest hens. This is especially true at the breeding season. All the hens lay together; the cock broods during the night; the hens take turns during the day, more it would seem to guard their common treasure from

jackals and small beasts of prey than directly to forward the process of hatching, for that is often left wholly to the sun. Some thirty eggs are laid in the nest, and round it are scattered perhaps as many more, which are said to be used as food for the newly-hatched chicks."

When the zoologist reads corrections of errors which have existed up to the present time with reference to a bird with which man has had direct acquaintance for nearly half a century, he may console himself with the thought that the zoological field has not been entirely explored, and that there is still room and time for fresh discoveries and observations.—G. W. SMITH (Winchester).

**Ornithological Folk-Lore.**—In reply to Mr. Bird's query (p. 144), Mr. Moore ('Folk-lore of the Isle of Man,' p. 151) states:—"Some of the names" (*i. e.* of the "seven sleepers") "vary. Craitnag (the Bat), Cooag (the Cuckoo), Cloghan-ny-cleigh (the Stonechat), and Gollan-geayee (the Swallow), are found in all the lists; the others being Crammag (the Snail), Doallag (the Dormouse), Foillyean (the butterfly), Shellan (the Bee), Jialgheer (the Lizard), and Cadlag (the Sleeper), a mythical animal." Mr. Kermodé ('Manx Note-book,' No. 4, p. 122), says:—"I have always heard that there were seven, though there seems a difference of opinion as to which were the seven. The following list I have received from a Manksman, now nearly ninety years of age, who knows every part of the island, and whose memory is good:—Foillyean (Butterfly), Shellan (Bee), Jialgheer (Lizard), Craitnag (Bat), Cooag (Cuckoo), Clogh-ny-cleigh (Stonechat), Gollan-geayee (Swallow). The Hedgehog is not included, and I fancy has no more claim than the Dormouse, which has been included by some, but which, not being a native of the island, is unlikely to have a place in any Manx tradition." The Stonechat mentioned above is probably, as elsewhere pointed out by Mr. Kermodé, the Wheatear (often so called in the island), as *Saxicola rubicola* does not disappear in winter. It will be observed that our "seven sleepers" are not, like those of Dorset, all birds.—P. RALFE (Laxey, Isle of Man).

**Amongst the Birds in Norfolk.**—Green Sandpipers.—A pair of these birds appeared on the Haddiscoe marshes on Jan. 11th, and allowed me to get within easy shooting distance before they took wing; another of the same species appeared on Feb. 22nd. These birds somewhat frequently appear, more especially during August and September.

**Golden Plover.**—A specimen of this bird attracted my attention on April 4th. During January large flocks of these birds were daily feeding on the marshes, the greatest quantity I have seen during the past ten years; one flock must have numbered about a thousand.

**Redshanks.**—On Feb. 15th I flushed five Redshanks on the verge of

the river Waveney, a rather early arrival. Some thirty couples of these birds annually breed on the ronds by the side of this river, and the adjacent rough marshes between St. Olave's Bridge and Burgh Castle.

Wagtails.—A specimen of the Yellow Wagtail appeared on the marsh on March 29th. A large number of Pied Wagtails are now scattered about the district. Yellow Wagtails breed in quantity on the marshes.

Grey Crow on Haddiscoe marshes, April 9th.

Wryneck.—I have only heard the Wryneck's note once during the past three years; the birds seem to have forsaken the district, though the reason why is not easily understood.—LAST. C. FARMAN (Haddiscoe, Norfolk).

#### AMPHIBIA.

Frog attacked by a Rat.—Is it not unusual for a Rat to attack a Frog? My gardener was walking beside a hedgerow the other day when he heard a commotion and squeaking in the ditch. On investigation he saw a large Rat with a fair-sized Frog in its mouth. He then threw something at the pair, and the Rat allowed the Frog to escape, which hopped quickly away into a place of safety.—T. A. GERALD STRICKLAND (Oakleigh, near Ascot, Berks).

[Frogs killed by Weasels are recorded in 'Zoologist' (1851), p. 3273, and ib. 3rd ser. vol. xii. p. 140. A more remarkable case of a Rat killed by a Frog is described in 'Zoologist,' 1849, p. 2474.—ED.]

#### INSECTA.

The Magpie-moth eaten by Birds.—Last spring my garden was visited with a regular plague of the gooseberry grub and moth; the leaves and fruit-buds were entirely eaten up, and the stems of the bushes were covered with the brightly-coloured grubs; while a little later the moths were all over the place. I caught them by dozens (both grubs and moths), and put them in my aviary, containing Greenfinches, Bramble-finches, Chaffinches, Yellowhammers, Redpolls, and Canaries, by whom they were greedily eaten; the moths were eagerly chased and caught, and so keen were the birds after them that I only remember seeing one escape out of the large numbers that were put in. I am told it is very unusual for birds to so readily devour this species. There is always plenty of food in the aviary, so it was not hunger, but simply choice.—W. T. PAGE (6, Rylett Crescent, Shepherd's Bush).

[This well-known moth, *Abraxas grossulariata*, generally known as the "Currant" or "Magpie" Moth, is usually reported as "protected" from the attacks of birds. Poulton, in his 'Colours of Animals,' speaks of the "slow-flying moth itself, with white wings rendered conspicuous by

yellow markings and black spots," as defended, like its larva and chrysalis, by nauseous qualities.—ED.]

#### ECHINODERMATA.

*Asterias tessellata*, or Scutellated Star-fish.—During the month of January last I received from the Rev. J. Rae, of Lindisfarne, owner and occupier of the property whereon St. Cuthbert lived so many years, a very fine living specimen of *Asterias tessellata*, a species that I have never found on the east or north-east coast. It is also the first that any of the fishermen of Holy Island can remember having seen.

The Brittle Star, *Ophiura granulata*, I have also never seen on this beach, but I have had the species brought from the Farn Islands, where, I am told, it is plentiful. The dimensions of the specimens of *O. granulata* sent me were in thickness 1 in., diameter  $7\frac{1}{2}$  in., circumference 22 in.—JAMES SUTTON (33, Western Hill, Durham).

[*Asterias tessellata* is given by Prof. Jeffrey Bell, in his 'Catalogue of the British Echinoderms,' as a synonym of *Pentagonaster granularis*, Retzius. The same authority gives as its distribution "both sides of North Atlantic; to Arctic Ocean and White Sea on the east." Mr. Percy Sladen, under the synonym of *Pentagonaster balteatus*, has described the species from the south-west coast of Ireland (lat.  $51^{\circ} 1' N.$ , long.  $11^{\circ} 50' W.$ ). Forbes, in his 'History of British Starfishes,' does not mention it.

*Ophiura granulata* is, according to Prof. Bell (*l. c.* p. 129), a synonym of *Ophiocoma nigra*, Abilg., with a distribution as "Scandinavian Seas; Barents Sea." Forbes (*l. c.*), under the name of *Ophiocoma granulata*, records it having been found at Cornwall, Berwick, Strangford Lough, open sea on coasts of Down, Dublin, and Kirkwall Bay, Orkney. Thompson ('Natural History of Ireland') states that it is common on the Dublin coast.—ED.]



## NOTICES OF NEW BOOKS.

*Ethnology.* By A. H. KEANE, F.R.G.S., &c. Second Edition, Revised. Cambridge: University Press. 1896.

THIS is the second and revised edition of a valuable, widely noticed, and in some cases severely criticised book, of which the first edition appeared in 1895; and although the author, a man of the widest reading and acquaintance with his general subject, is not strictly a physical anthropologist, he has still supplied one of the best introductions to the study of Man that even modern zoologists can obtain. This revised edition is without those instances of *lapsus calami* which were pointed out when the work first appeared, references which the author doubtless welcomed, as he himself has written here and there in a freely controversial style.

Man's position in the animal kingdom is sought to be determined from the purely zoological standpoint. "That he is an animal, and as such must be related to other animals; is no discovery of modern science. Then the schoolmen defined him as *animal rationale*, a definition which the ethnologist may accept without hesitation as at least partly true. What modern science has done is to give precision and completeness to this definition, by fixing the place of Man as an animal in the class of mammals, and by separating him, mainly in virtue of his exclusive possession of articulate speech, from other animals to whom the reasoning faculty can scarcely be denied. Man will accordingly here be considered as a rational animal possessing the faculty of articulate speech." These sentences may be taken as Mr. Keane's prolegomena, and evolution is used as the argument throughout.

The book is divided into two Parts, "Fundamental Problems" and "The Primary Ethnical Groups." In the first the evidence for the antiquity of Man is very fully and ably treated, and a feature of great convenience to British zoologists is a descriptive list of the principal areas in Britain which palæolithic Man is

known to have inhabited, with a reference to the animals whose remains are associated with his rude flint implements. Full of suggestion also are the comparisons between the faunas of the periods of palæolithic and neolithic culture.

In the chapters devoted to the "Specific unity" and the "Varietal diversity" of Man, the arguments used on these points by anthropologists are well worthy of consideration by general zoologists; and when we remember the very elastic use of the terms species and variety necessarily made by monographists and descriptive naturalists, we may somewhat incline to the dictum of our author, who writes:—"It is not always easy to draw the line between species and mere variety, more especially as to neither of these terms is any longer attached the idea of finality."

In the second division of his work Mr. Keane discusses the "main divisions of the *Hominidæ*, and, adopting Linné's original fourfold division, divides his subject under the following classification:—"Homo *Æthiopicus*," "Homo *Mongolicus*," "Homo *Americanus*," and "Homo *Caucasius*."\*

In conclusion, we will advise the reader to bear in mind an excellent remark in the author's preface: "In a work of this nature, dealing with a multiplicity of subjects on all of which nobody can be supposed to have personal knowledge, it is not to be expected that the views advocated, or even the mere statements of facts, will be always accepted on the *ipse dixit* of the writer. Hence the necessity of constant reference to received authorities." These are abundantly quoted throughout, so fully indeed that a student who would with an open mind refer to and fully read the references given by Mr. Keane—either with approval or disapproval—could not fail to obtain a somewhat complete grasp of anthropology. And this we consider is the province of a good hand-book, not to dogmatise or inculcate a canon of scientific faith, but to present the whole subject to the enquirer, and not only guide him to the good roads, but mention also the jungle-paths where investigation is not always barren.

\* It is at least worthy of remark, that in two contemporaneous standard works, both bearing the imprimatur of Cambridge, and written by writers so diverse in thought as Mr. Keane and Dr. Sharp, and on animals so widely separated as Man and Insects, a reversion to the system of Linnæus should in each case have been more or less followed.

*The Present Evolution of Man.* By G. ARCHDALL REID.  
Chapman & Hall Limited. 1896.

To adequately notice a book like this—a product of sustained thought and research—within the limits of our pages is impossible; to review such a work with critical examination is beyond the province of our Journal. We can only approach it here from the standpoint of zoology: a somewhat bare proceeding, perhaps as unsatisfactory to the author as irksome to the writer.

In the first section, "Organic Evolution," Dr. Reid clearly defines his standpoint, and enunciates his axioms so that we may readily understand the method of his argument. He adheres to the theory of spontaneous generation, which he remarks "is popularly supposed to be quite exploded. What is exploded is that such highly organized beings as the Infusorians arose spontaneously." And with respect to organic evolution it is stated that, though "many proofs will incidentally be afforded" of its actuality, "it will be assumed that the truth of it is admitted."

A postulate to which considerable importance is attached, and one which bears no little reference to the whole argument, is "that every species must necessarily undergo retrogression, unless that retrogression be checked by selection." On the other hand, "it is possible by means of selection to bring about rapid and extensive, indeed unlimited retrogression." Thus we read: "The domesticated Dog is presumably descended from one or more of the different wild varieties, or from their relatives the Wolves. Now, considering the length of time Dogs have been domesticated, and the severity of the selection to which they have been subjected, our largest Dogs, the St. Bernards, Newfoundlanders, Mastiffs, Boarhounds, do not very greatly exceed Wild Dogs or Wolves in size, nor do our most intelligent Dogs greatly surpass them in intelligence; but our smallest Dogs, some of them little bigger than Rats, are very much smaller, and some of our tame breeds are exceedingly stupid. Clearly, as regards Dogs, we have been able to produce little evolution, but great retrogression."

We still, however, require more experimental facts, repetitions of such experiments, and with different species, before we can

consider many of our conclusions absolutely unassailable. Thus Dr. Reid remarks:—"A young chick, for instance, emerges from the egg the possessor of a large amount of hereditary knowledge," and alludes to the brilliant researches on that matter by the late Douglas Spalding. With Dr. Reid we had all accepted the result of these researches as final; but now Prof. Lloyd Morgan has repeated the experiments, and shown that many of Mr. Spalding's conclusions are erroneous. It is only just to remark, however, that Dr. Reid had evidently no opportunity of consulting the then unpublished observations of Prof. Lloyd Morgan.

The second section is devoted to "The present evolution of Man." It is scarcely necessary to restate the common consensus of opinion that the evolution of Man, so far as general structure is concerned, has ceased, or, in other words, has arrived at an equilibrium with surrounding conditions. This is indeed so prevalent a conception, that by many of our best and most progressive thinkers the human evolution of the future is considered to lie purely in the domain of ethics. There is still, however, a physical arena where the struggle ensues, in which the survivors are not necessarily the strong in limb and mind alone, but "the strong against disease." To use the words of our author: "The present evolution of Man is therefore not mainly an evolution of physical or intellectual strength, as in his remote ancestry, but mainly an evolution against disease, and wherever men are crowded together, and can take disease from one another, or there are other unfavourable circumstances, especially against zymotic disease—that is, disease due to or produced by living micro-organisms."

Such diseases are not confined to Man alone, but are found to ravage other animals, and instances of such devastation will recur to the minds of most zoologists. In calling attention to this important factor, with the authority of personal experience and many gathered facts, Dr. Reid has undoubtedly introduced us to one of the neglected and by no means insignificant byways which intersect the broad road of evolution.

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*Journal of the Right Hon. Sir Joseph Banks, Bart., K.B., F.R.S.*  
Macmillan & Co. 1896.

To once more sail the seas with Capt. Cook, and again discover islands which are now visited weekly by ocean liners; to re-peruse in current literature a description of the manners and customs of native races who are now either improved off the face of the earth, or vulgarized by the veneer of an unreal civilization, we thought impossible. Cook's 'Voyages' are now principally consulted by the ethnologist, or by those readers of light and leisure who still care to study the makings of the Greater Britain. We therefore owe a debt of gratitude to Sir Joseph Hooker for having taken us back to the geographical discoveries of some hundred years ago by publishing the journals of Sir Joseph Banks, written when as naturalist he accompanied Capt. Cook in the 'Endeavour' voyage of 1768-71.

Banks belonged to those select few who combine an ardent love of science with ample pecuniary means, and he proved a true patron of natural history. Thus we are told that when he decided to avail himself of the opportunity of exploring the then unknown Pacific Ocean,—“at his own expense, stated by Ellis to be £10,000, he furnished all the stores needed to make complete collections in every branch of natural science, and engaged Dr. Solander, four draughtsmen or artists, and a staff of servants (or nine in all) to accompany him.”

Most of the zoological observations recorded relate to animals which are very much better known now than then, but they are always interesting and sometimes almost fresh. Thus we learn that the Albatross devours *Physalia*, of which “an Albatross that I had shot discharged a large quantity, incredible as it may appear that an animal should feed upon this blubber, whose innumerable stings give a much more acute pain to a hand which touches them than nettles.”

Although in those days the zoologist experienced the greatest surprises when these expeditions returned with their natural history collections, he had still to be regaled with some “traveler's tales.” Thus, while at New Zealand and while drawing on shore, Mr. Sporing “saw a most strange bird fly over his head. He described it as being about as large as a Kite, and brown like

one; his tail, however, was of so enormous a length, that he at first took it for a flock of small birds flying after him; he, who is a grave-thinking man, and is not at all given to telling wonderful stories, says he judged it to be yards in length."

The ethnological information is most valuable, and supplements the observations of Cook and Forster. It seems inseparable to some expeditions that native life must be sacrificed, but it is not condoned in these pages; in fact, we are inclined to take leave of Banks by quoting some reflections that bespeak the nature of his mind and heart. Some New Zealand natives had been killed, and his journal for that day concludes:—"Thus ended the most disagreeable day my life has yet seen; black be the mark for it, and heaven send that such may never return to embitter future reflection." The portraits of Banks and Solander, in the possession of the Royal and Linnean Societies, are admirably produced by photography in this volume.

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*A Sketch of the Natural History of Australia.* By FREDERICK G. AFLALO, F.R.G.S., F.Z.S., &c. Macmillan & Co. 1896.

IF the ordinary traveller to a foreign land seeks a guide-book, or attempts by reading to obtain some idea of the salient features of the country he is about to visit, how much more necessary is it for the untrained zoologist to obtain at least a little information as to the animal life with which he hopes to become familiar. This, in a condensed form, is not at all common literature, and perhaps Tennent's 'Sketches of the Natural History of Ceylon' is a type of the book to which we refer, an introduction not a monograph; a general sketch of a fauna from which may be gathered its principal peculiarities, and a glimpse obtained of what may be expected to accrue in one's own special studies and pursuits. Such an inception has apparently guided Mr. Aflalo to his task, and he has succeeded in producing a primer to the Zoology of Australia.

And what a wonderful fauna it is! As Wallace has well remarked, "Australia stands alone." It is not more remarkable in the marsupials it so abundantly possesses, than equally distinguished by its complete poverty in many well-known forms.

“Who, for instance, is there but must feel surprise at the absence of Monkeys and Woodpeckers from its vast forests; or at the presence there, and there only, of the Platypus among the lower mammals, the Lories among birds, the double-breathing *Ceratodus* among fish.”

The mammals, which number “not much over one hundred and fifty,” are treated somewhat fully, with a list of species given at the end of each chapter. It is quite exasperating, in these days of vanished animal life, to find that the Platypus may be approaching extinction. Although “it is of the few indigenous animals not eaten by the natives,” its skin has become a commodity with the furriers, though “thirty or forty of the animals must die to make even a small rug.” “The Platypus is thus becoming lamentably scarce, and many a beautiful stream in Victoria and Tasmania, where whilom it rooted up the larvæ or engulfed the floating gnat, knows it no longer.”

The birds have a very strong individuality; of some six or seven hundred species, some five hundred, “in round numbers, are found nowhere else.” Like the Platypus, the Lyre-bird “is indeed doomed to extinction, and is already very scarce in the settled districts.” Not much difficulty is experienced in tracing a cause. “Not long since, for example, two enterprising brothers employed a number of men to shoot the luckless male birds, in which, after some practice, they were unfortunately so successful, that five hundred dozen of the beautiful tails were reported to have reached Sydney in the course of a few weeks.” This much persecuted bird lays but one egg each season.

Reptiles and Batrachians have received shorter treatment, but contribute many interesting records and facts, while the fishes of Australia receive more ample treatment. “The most striking characters of Australian sea-fish are their rainbow hues, projecting teeth, and a tendency to throw out spinous growths that make their safe handling a matter of some difficulty.”

Our author was so fortunate as to witness a combat between the Thresher *Alopias* and a Whale. “The best combat of this nature that I ever witnessed was off Moreton Island. We steamed so near, indeed, as to distinguish, with the aid of the glass, the long upper lobe of the Threshers’ tails, as two of those unflagging belligerents were falling on their ponderous enemy;

so near as to plainly hear (so marvellously are sounds carried over the water) the resounding blows and the feeble and ever feebler snorting of the succumbing Whale, which would have doubtless sounded out of harm's way but for the forbidding blade of some watchful Saw-fish which had made common cause with the assassins. How long the unequal combat had lasted before our arrival I am unable to say; but the end soon came, a commotion around the now motionless leviathan plainly indicating that the victors, assisted, perchance, by other Sharks, were already sampling the blubber."

There are many illustrations, and those of Australian fishes are particularly useful.

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*The Fishes of North and Middle America: a Descriptive Catalogue of the Species of Fish-like Vertebrates found in the Waters of North America, North of the Isthmus of Panama.*  
By D. S. JORDAN, Ph.D., and B. W. EVERMANN, Ph.D.  
Washington: Government Printing Office. 1896.

THIS massive volume of 1240 pages is but Part I. of a colossal undertaking, and we are promised an atlas, containing anatomical figures and illustrations of many of the more important species on the completion of the second volume. In this instalment no less than 522 genera and 1627 species are described, and the publication forms No. 47 of the 'Bulletin of the United States National Museum.'

From the geographical limits of the fauna studied, it will be evident that the work will somewhat anticipate the description and enumeration of Pisces in the 'Biologia Centrali Americana' of Godman and Salvin, though of course it covers a far wider area, and apart from its special value to ichthyologists is a welcome addition to the zoological library, affording a handy and trustworthy book of reference as to the distribution of nearctic and of many neotropical fishes.

The text is naturally of a more or less technical description, though there are some passages which have the charm of narrative. Thus, in dealing with the family *Percidæ*, of which the great majority of the species treated belong to the subfamily



*Etheostomatinae* (the Darters), "all the species of which group are American," and in considering the relation of the Darters to the Perches, the authors have quoted Prof. Stephen A. Forbes. According to this authority:—"Given a supply of certain kinds of food nearly inaccessible to the ordinary fish, it is to be expected that some fishes would become especially fitted for its utilization. Thus the *Etheostomatinae* as a group are explained in a word by the hypothesis of the progressive adaptation of the young of certain *Percidæ* to a peculiar place of refuge and a peculiarly situated food supply. Perhaps we may without violence call these the mountaineers among fishes. Forced from the populous and fertile valleys of the river-beds and lake-bottoms, they have taken refuge from their enemies in the rocky highlands, where the free waters play in ceaseless torrents, and there they have wrested from stubborn nature a meagre living. Although diminished in size by their constant struggle with the elements, they have developed an activity and hardihood, a vigour of life, and a glow of high colour almost unknown among the easier livers of the lower lands. . . . Notwithstanding their trivial size, they do not seem to be dwarfed so much as concentrated fishes."

A pleasant feature in this volume is its dedication "To the memory of those ichthyologists of the past who have studied American fishes in America, in token of the only reward they asked—a grateful remembrance of their work." There follow forty-eight names in this roll-call, commencing with Georg Marcgraf, 1610-1644, and concluding with Marshall McDonald, 1836-1895.

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*The Migration of Birds: a Consideration of Herr Gätke's Views.*  
By F. B. WHITLOCK. London: R. H. Porter. 1897.

THIS brochure pertains to the atmosphere of ornithological polemics. It is "a consideration of Herr Gätke's views," but it is scarcely an approval of any of them. The work criticised is the well-known 'Die Vogelwarte Helgoland,' of which an English translation appeared in 1895, and was, as Mr. Whitlock correctly remarks, "hailed with universal welcome."

However, science is democratic, and though Herr Gätke—

whose death we now deplore—was, from his knowledge and opportunities, an authority of no mean order on his subject, there is no reason why Mr. Whitlock should not hold a brief in opposition. This he has done, and replied in a very trenchant manner to most of the views of Gätke; in fact, he almost traverses in detail the whole of that observer's work. The verdict must of course rest with those ornithologists who study the evidence on both sides, and though some of Mr. Whitlock's contentions seem to carry conviction, they are still so numerous that the old adage involuntarily arises, *quod nimis probat nihil probat*.

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*Report of Observations on Injurious Insects and Common Farm Pests during the year 1896.* By ELEANOR A. ORMEROD, F.R.Met.Soc. Simpkin, Marshall & Co. Limited. 1897.

THE unostentatious and excellent work done by Miss Ormerod in the domain of economic entomology is to be found in that lady's Annual Reports of Observations, of which the twentieth, for the year 1896, is now before us. The *cui bono?* so frequently addressed to entomologists finds a sufficient answer in these Reports, and they bring us back to the well-known, but perhaps now too little read, pages of Kirby and Spence.

“The year 1896, like its predecessor, showed presence of many kinds of agricultural insect infestations, including in these crop, orchard, and forest pests; also infestations to live stock, and to Deer, though not in any instance to the extent of any one special attack being seriously prevalent over the whole of our island.”

We find a good illustration and account of the “Red-bearded Bot Fly, *Cephenomyia rufibarbis*, which infests, in its larval condition, the nostrils and throat and mouth parts of the Red Deer. The authoress, quoting Dr. Brauer, states:—“*The method of attack* is for the flies to lay their small living maggots, in the early or middle part of the summer, at the opening of the nostrils of the Red Deer, up which they work, adhering by their mouth-hooks, until they reach the throat of the Deer, where they may still be found in February.” . . . “The exit of the maggots takes place from early in March until April, through

the nose or mouth of their hosts." That this attack is prejudicial is evident by the fact that "if a Deer is attacked by many flies, soon, one after the other, its nose bleeds, and the mucous skin becomes very much inflamed. When the larval growth is nearly complete,—that is, at the third stage,—the maggots are to be found in the cavity of the mouth, or at the palate, the Eustachian tube, and other localities, as parts of the tongue and gullet." It is doubtful whether this attack is really new in our country, or whether its discovery is now due to the increased attention given to entomological research. Another "Deer Forest Fly," *Lipoptema cervi*, of which males and females are to be found in wingless condition on the Red and the Roe Deer, has been found by Mr. Dugald Campbell (Strathconan Forest, Muir of Ord) "to be very troublesome to those employed in flaying Deer in winter, by reason of their creeping rapidly about the clothes and into the hair of the workers, and being very difficult to dislodge." To the Deer themselves, however, this insect's presence is of no great consequence.

Perhaps to the readers of 'The Zoologist' these extracts may prove most interesting, and we do not refer to the larger portion of the Report devoted to the insect ravages on our vegetable crops. In conclusion, we can not only recommend its perusal to all who are interested in the details of our country life, but also advise them to communicate with Miss Ormerod as to any insect infestations with which they may become specially acquainted.

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*Das Tierreich.*—1. Lieferung: *Aves*. (*Podargidæ*, *Caprimulgidæ* und *Macropterygidæ*). ERNST HARTERT. Berlin: Friedländer & Sohn. 1897.

THE first part of Section *Aves*, in the great descriptive Zoological Encyclopædia, has reached our hands, and is written by Mr. Ernst Hartert, of the Tring Museum. The importance of this work, and the way in which it will be probably consulted, quoted, and followed in the future, must not be underrated. Its proposed aim is nothing less than a synoptical description of the described forms of animal life. It is, perhaps, too much to

expect that the publication will be accepted as a finality in classification, but at least it will rank as a zoological *fin de siècle*.

The work is written wholly in German, and will thus prove a trial to many English zoologists, though the smattering of a language sufficient to read a zoological description is not very difficult to acquire. We English are bad linguists, and prefer translations where possible; but we are not alone, for even Strauss not only praised Schlegel's translations of Shakspeare and Calderon, but wrote: "We Germans can read in translations all that has been produced since nearly three thousand years, from the Ganges to the Tagus." It is possible, however, that some future linguistic latitude may be allowed, as among the list of promised contributors we notice the names of both English and French naturalists.

However, this feature will not remove the necessity of every working zoologist consulting at least the parts which relate to his own special studies.



## EDITORIAL GLEANINGS.

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THOSE of our readers who are interested in primitive and local names of birds and in Ornithological Folk-Lore generally, may well consult an article written by Dr. Edgar A. Mearns in the last (December) number of the 'American Anthropologist,' entitled "Ornithological Vocabulary of the Moki Indians."

"The Mokis inhabit a region of country in longitude 109°, lying just west of the New Mexico-Arizona boundary, north-eastward from the Little Colorado river, and 65 miles south of the Colorado."

The revision of the zoological vocabulary of the Moki language, of which this paper forms the ornithological portion, was made by the author with the aid of an exceedingly intelligent Indian named Ongwischey, so that mistakes should be few and misinterpretations seldom. It will be observed that some of the Moki names are of Spanish origin: "The fact is, the Moki tongue has become impure from contact with Mexicans and half-bloods from some of the new Mexican pueblos, where Indians and Mexicans live together."

The Mokis show an excellent acquaintance with raptorial birds, and Capt. Bourke is quoted for the fact that "Eagles are still raised in cages in Picuris, San Ildefonso, Santa Clara, Zuñi, Acoma, and the villages of the Moquis farthest to the west."

The specific names with Moki equivalents are given for 230 birds, though of course some margin must be allowed for error; for, as the author cautiously remarks:—"Although more attentive to nature than most whites, it must be remembered that the Mokis are not ornithologists, and cannot be expected to name even all birds that have fallen under their observation, much less such as have never attracted their critical attention, or to discriminate between closely related species, or those which resemble one another in colour or form."

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THE Rev. H. A. Macpherson has contributed to the 'Annals of Scottish Natural History' an account of "The Distribution of the Red Grouse, *Lagopus scoticus*, and the Black Grouse, *Lyrurus tetrix*." The author writes:—"The Red and Black Grouse are both so plentiful upon the moors of the border counties of England and Scotland, that I have long expected to come across some additional instances of the well-known but

rare union between *Lagopus scoticus* and *Lyrurus tetrix*. It was therefore with great pleasure that I recently identified no fewer than four birds of this curious cross." These birds were secured at Shalloch, Kirkcudbrightshire—a moor of less than 3000 acres—and included a beautiful female hybrid. Two of these birds, male and female, were exhibited before the British Ornithologists' Club in November of last year, and their identification as hybrids between the Red and Black Grouse was accepted by all the members present.

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At the March meeting of the Zoological Society of London Mr. Sclater called attention to the two specimens of Otters now living in the Society's Gardens, which had been received from Co. Down, Ireland, last year, and pointed out that they differed in several respects from the Common Otter. The Irish Otter had been separated specifically from *Lutra vulgaris* by Ogilby in 1834, under the name of *Lutra roensis*, and Mr. Sclater thought it was worthy of enquiry whether Ogilby was not right in his views.

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At a February meeting of the Zoological Society of London Mr. G. A. Boulenger, F.R.S., read a paper entitled "A Catalogue of the Reptiles and Batrachians of Celebes, with special reference to the collections made by Drs. P. and F. Sarasin in 1893-1896." This memoir gave a *complete list* (with descriptions) of all the Reptiles and Batrachians, with the exception of the marine species, *known to occur in the Celebes*. The number of species of Reptiles enumerated was 83, and of Batrachians 21.

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In the 'Irish Naturalist' for February, Mr. H. Lyster Jameson has written a paper on the "Bats of Ireland," giving as far as possible a complete range of the species.

"Seven species of Bats are known to inhabit Ireland, six of which belong to the family *Vespertilionidæ*, represented by three genera, *Plecotus*, *Vespertilio*, and *Vesperugo*, the seventh to the family *Rhinolophidæ*."

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In the 'Proceedings of the Cotteswold Naturalists' Field Club,' vol. xii. part 1, is an interesting paper, by Mr. E. B. Wethered, on "The Depths of the Sea in Past Epochs." This is not so purely geological as its title might imply, and refers more to the organic life that then ensued and to the remains now found in the then sea bottoms. As the author remarks:—"Generally speaking, geologists have been content with fossils which could be detected without the aid of the microscope." The preliminary summary of results relates to the Silurian, Carboniferous, and Jurassic limestones:—

“The process which went on in the Silurian sea during the formation of the Wenlock limestone was this: the shells and skeletons of the larger marine organisms which existed, collected on the floor of the sea in very small fragments. Whether this condition was due to detrition, or to the fact that the creatures had served as food for large Ganoid fishes,” the author has no knowledge. In Carboniferous days microscopic life must have been quite as abundant “as it was in the sea in which the chalk formation took place and in parts of the ocean of to-day.” Of the Jurassic period Mr. Wethered refers the formation of the oolitic granules (“roestone”) to organic origin.

The microscope has thus fresh fields to conquer; not only the unseen life of the present epoch, but the remains of the minute organisms of a long past.

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THE following note on the breeding of the Caracal or Desert Lynx is taken from our contemporary ‘The Field’:—“About eighteen months ago (August, 1896), I purchased here a pair of ‘Red Cat’ kittens, which must then have been about four or five months old. By ‘Red Cat,’ as we call it out here, I mean the African Lynx, or Caracal. On December 10th last the cat had one kitten, which unfortunately died on the second day after its birth. No one out here seems to have heard of ‘Red Cats’ breeding in captivity, and so it may be of interest to record it. I am told that they have two kittens at a birth; on this occasion only one was born, which may be accounted for, perhaps, by its being the first litter. The mother is now expecting for the second time, and I hope in a few weeks to report the successful rearing of her second family. —J. W. JONES (Vryburg, Bechuanaland, February 1st).”

This note evidently refers to *Felis caracal*—“Rooi Kat” of the Dutch. Nicolls and Eglinton, in their ‘Sportsman in South Africa,’ well observe that “when its size is taken into consideration, it is justly reputed to be, without exception, the most savage and intractable of the *Felidæ*. Even when obtained quite young and brought up by hand, it gradually develops a character, so to speak, of pure ‘cussedness,’ that any attempts to tame it have invariably proved unsuccessful.”

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IN the Report of the Superintendent of the National Zoological Park, Washington (Ann. Rept. Smith. Instit. to July, 1894), published in 1896, and just received, we read that a young Black Bear was “born on Feb. 5, 1894. There are but few opportunities for observing the growth of these animals, as they are rarely born in captivity. The little creature was very small at birth, not larger than a good-sized rat, weighing but nine ounces,

and it was thirty-nine days before it opened its eyes. It has been very vigorous and healthy from the first, and its development was evidently normal."

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IN the Annual Report of the Royal Zoological Society of Ireland for 1896 we read that "the most interesting event which has occurred in the Gardens for many years took place early in the year. On the 6th of January, the female Cape Hunting Dog, *Lycan pictus*, presented the Society with a litter of four cubs. It is very rare for these valuable and interesting animals to breed in captivity, although one or perhaps two litters are known to have been born in the Zoological Gardens in Amsterdam. In no case, however, has the mother reared her offspring. Two or three days after birth they have died through excessive anxiety for their welfare on the part of the mother during the nursing period. The slightest noise alarms her, and, seizing the pups in her mouth, she careers round the cage seeking a place where she can conceal her progeny. Unfortunately the litter born in the Dublin Gardens met the same fate. The puppies stood this treatment for three days and then they succumbed."

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IN the 'Cape Times,' under date of Jan. 20th, a summary of Government Notice, No. 4, of 1897, is given, which relates to the general close or fence season for game in the various divisions of the Colony. The interest to zoologists is found in the list of animals which have been *specially protected*, for here we can read decrease and possible extinction on the wall.

In mammals, as restricted to various districts, and whose slaughter is prohibited for periods expiring in 1897, 1898, 1899, and even 1900, we find enumerated Aardvaark or Ant-eater, Rietbok, Eland, Klipspringer, Klipbok, Duiker, Grysbok, Bushbuck Ewes, Rhebok, Oribi, Steinbuck, Hartebeest, Wildebeest, Gemsbok, Koodoo, Blesbok, Bontebok, Giraffe.

In birds: Paauw, Plovers and Larks, Quail, Knorhaan, "Partridges," "Pheasants," and Guinea Fowls.

Insectivorous and other birds, in Albany and Uitenhage, to Dec. 23rd, 1899; all kinds of birds in Beaufort West Dam, to May 31st, 1898; and in Mossel Bay Municipal Commonage, to June 30th, 1897.

Great and Small Locust Bird, throughout the whole Colony to Jan. 22nd, 1899. This no doubt to increase the destruction of locusts.

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ACCORDING to a Reuter's telegram from Blantyre, dated Jan. 12th, Mr. Poulett Weatherley, said to be the only British sportsman at the time in the interior, and who had circumnavigated Bangweolo and Chifunanti, bears witness to the ravages of the rinderpest among the wild game of South and East Africa:—"The rinderpest has killed off all Antelope



nearly the whole length of my journey. I saw very few Roan, a good many intensely shy Oribi, and a few ditto Senegal Hartebeest. One Buffalo was seen, but not by me. I saw two Zebra; beyond that, *nil*."

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NATURALISTS will be pleased to learn that Mr. Edward Dodson is about to leave, or has left England for Morocco, with the object of investigating the fauna of the country around the Atlas range. This will be Mr. Dodson's third visit to Africa, his previous journeys being in connection with Professor Elliott's expedition to Somaliland and Mr. Donaldson Smith's scientific mission to British East Africa.

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MR. J. E. S. MOORE has reached England on his return from Central Africa, which he visited to investigate the fresh-water fauna of Lake Tanganyika. In conversation with a representative of Reuter's Agency, Mr. Moore said:—"I found the fauna of Tanganyika to be unique—unlike anything else anywhere—and as limited as peculiar. The Jelly-fish and Shrimps were certainly of a marine type, while the geology of the district precluded the possibility of any connection with the sea in recent times. The water, which Livingstone found to be brackish, is now quite drinkable. All this seems to prove that the Tanganyika part of the great Rift Valley running through this part of Africa at one time had access to the sea, while it is perfectly clear that Lake Nyassa—some 246 miles to the south-east—apparently never had any marine connection. It is also a matter of interest that the fauna of Tanganyika is not only marine, but of a very peculiar and primitive type, and it is quite reasonable to suppose that the characteristics of the fauna are connected with the remote geological connection of the lake with the sea."

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PROF. ANTON FRITSCH, of Prague, in the March number of 'Natural Science,' discusses the very important question of "Fresh-water Biological Stations." This investigation has already been commenced in America, Bohemia, Germany, and Russia, and it is quite time England joined that scientific concert. Last summer Prof. Fritsch lectured on more than thirty kinds of life-groups "of Bohemian fresh waters, each with its own special fauna and flora: springs, mountain brooks, mountain rivers, rivers of the plain, backwaters of large rivers, ponds, lakes, bogs, small pools with *Apus*, snow-tarns with *Branchipus*, &c. Each of these kinds of water varies in its own fauna with the season of the year, and also from year to year according as rain and sunshine also vary. Here is work for a century."

This work in Bohemia is done on admirable method, especially in these days of poor endowments. It is open to question whether poverty is not often the handmaid of research, though the crying shame is that it is so

often allowed to be considered as the proper atmosphere in which zoological scientific workers should be reared, and their investigations conducted. Prof. Fritsch's station consists of a movable building, which was presented to the Committee by a friend, and cost £70. "With its internal fittings, it now has a value of £200; yet everything is very humble, and the want of better instruments strongly felt. The annual working expenses of three investigators amount to £40, their work itself being given freely." Nevertheless they have just finished the examination of two lakes in the Böhmerwald, and the station has been transferred to Podiebrad, in the middle of Bohemia, for the investigation of the river Elbe,

It is to be hoped, as the Professor remarks, that it may soon be known that our "wealthy country has done her duty for fresh-water biology."

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A SERIES of bibliographies of representative American naturalists was long ago commenced in the Bulletins of the United States National Museum. The series was naturally limited to the work of naturalists living and working in America, but one exception has been made in favour of Dr. P. L. Sclater, "the Secretary of the Zoological Society of London, who has confined his work for the most part to American ornithology, and whose contributions to the systematic ornithology of the American Continent have far exceeded in extent those of anyone working in this country." Thus writes Mr. G. Brown Goode in the introduction to "The Published Writings of Philip Lutley Sclater, 1844-1896," issued at Washington, 1896. This small volume contains a portrait, biographical sketch, and a chronological catalogue of all papers and notes published. There are 1287 bibliographical references.

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WE have received the Sixty-third Annual Report of the York School Natural History, Literary, and Polytechnic Society for 1896. This institution seems to be in a fairly flourishing condition, and one of the most interesting items in the Report is the following:—"Last spring a number of boys kept fresh-water aquaria in the botanical room. In these the habits of newts, snails, fishes, and minute crustaceans were studied, some of the latter being drawn as viewed through the microscope." This is the training for the naturalists of the next generation—to observe the habits of live animals is as important as dissecting the bodies of dead ones; both studies are necessary, but there seems sometimes a danger of the first being somewhat neglected.

# THE ZOOLOGIST

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## BIOLOGICAL NOTES ON NORTH-AUSTRALIAN MAMMALIA.

BY KNUT DAHL,

Of the Zootomic Instit. University of Christiania.

ENGAGED on a collecting expedition, on behalf of the University Museum of Christiania, to Africa and Australia (from 1893-96), I spent nearly two years travelling in the northern and north-western portions of the latter continent, investigating the little-known fauna of this region. Special interest was devoted to the mammals, and, besides amassing a good collection, my work in this branch was rewarded by the discovery of several species of interest, some of which are new to science. A descriptive list of the mammals, by Professor R. Collett, will shortly be published in the 'Proceedings of the Zoological Society of London.'

The following short notes descriptive of the life and habits of these little-known animals may, I venture to hope, prove of some value to readers who take an interest in the zoology of tropical Australia.

The hardships of travel have undoubtedly put their limitation on my investigations, and no one is more aware than myself how superficial they are, or how little insight they give the reader to the real animal life in the virgin forests of the north. Nevertheless I feel it my duty to commit them to paper, hoping that in course of time I may be able to place a further and more detailed account of my travels before the public.

*Pteropus gouldii.*

This large "Flying Fox" is very plentiful throughout the north, and especially in the neighbourhood of great rivers, where it literally swarms.

It is in the mangroves on the long tidal creeks—so numerous in Northern Australia—or in the bamboo jungles along the great water-courses that the animals spend the day, assembled in flocks numbering several thousands. Hanging on the branches of the trees by their hind legs, and also clinging to each other in the same way, they almost entirely cover the trees in their camping grounds.

Such a "Flying Fox camp" is never perfectly quiet, and even in the middle of the day numbers are flitting about in and around the trees uttering their hoarse shrieks, and the cause of this restlessness may be found in the fact that one individual is not able to settle down in this enormous mass of animals without disturbing others. The buzzing noise issuing from one of these camps when heard at a distance might be compared to that of a gigantic beehive, and the clamour of the colony when disturbed is deafening. Thousands of these animals stack themselves one on top of the other in such masses that the thick limbs of large trees are split and broken by their weight, and when approached by man or any other enemy the individuals in the centre of these hordes of living creatures are prevented from quickly getting away by those hanging outside.

The native hunter of the woods takes advantage of this latter fact, and, on discovering a "Flying Fox camp," runs quickly up, and, bashing away at the struggling bats with a stick or bamboo-rod, easily secures large quantities of this highly esteemed game amongst the aborigines.

Although by no means numerous, at least one of these camps may be found on any large river, and its numbers comprise nearly all the individuals of a considerable district. At sundown the bats commence travelling, sometimes great distances, to reach a patch of the forest where the Eucalypti are in blossom, the flowers of these trees forming their principal food. A constant string of animals is then for hours issuing from the camp, and the observer who posts himself on their roving route may to a certain extent form an idea of their numbers.



I was once sitting on the bank of the Victoria river at sundown not far from a large camping ground. The bats came flying past me along the river, and, watch in hand, I commenced counting them as well as I could. After some time I arrived at the result that, superficially speaking, more than three hundred bats were passing every minute. Faster I could not count, and for more than two hours the living current continued pouring past me. According to this the camp must have numbered at least 32,000 individuals, a figure which may by no means be considered too high.

The *P. gouldii* is not very shy, and falls an easy victim to the gun of the traveller. Its fat flesh is not bad eating, and the natives consider it a great delicacy, the strong smell of eucalyptus peculiar to these animals evidently forming one of its greatest attractions.. Having killed a bat the aborigines will with utter satisfaction smell and even bite the fur of the dead body.

On the Victoria river I observed them breeding in March and April. The two young constantly adhere to their mother's breasts, which, as in most other Chiroptera, are situate in the arm-pits, and they cling to the thick fur of the mother, both when she is on the wing and resting. In this latter position the folded wings of the animal form a secure shelter for the helpless young.

Being of a pugnacious temper and very irritable, a wounded Flying Fox will pluckily attack the legs of the hunter; and, disturbed in their feeding grounds or in the camp, the bats exude their stinking excrements on the intruder.

#### *Pteropus scapulatus.*

This by no means common species was observed on the Daly river occasionally accompanying the mobs of *P. gouldii* on their feeding grounds. As to whether the two species make use of the same camping grounds, I cannot express a definite opinion. I can only state that on examining a number of Flying Foxes shot at night when feeding a few *P. scapulatus* would generally be found. The rest were *P. gouldii*.

#### *Hipposiderus muscinus.*

This rare little species is new to the fauna of the Australian continent, and has hitherto been recorded only from New Guinea.

In Arnhem Land I found it frequenting the locality where the "Wogoit" was first discovered, in the peculiar granitic formation on the western heads of the Mary river.

Crawling through the immense stone heaps characteristic of the region, one could observe these little bats suspended by the hind legs from the rocky roofs of the different chambers. Hanging in this position, their delicate bodies were constantly shaking with a light quivering motion. At a short distance from the observer they would hang perfectly quiet, but the moment I approached them with my hand they would utter a squeak like that of a mouse and flutter away to the next chamber. They seemed to feel the least disturbance of the air surrounding them. None of the specimens killed in the month of May had any young ones attached to the breasts.

At sunset they will commence hunting for insects in the forest around the hills, and are then, as a rule, seen nearly level with the tree-tops. They were numerous, and although the above-mentioned granitic formation was the only locality where I secured specimens, I feel confident of their occurrence in the caves of the central table-land.

*Taphozous australis.*

This insectivorous bat, with its great clumsy head, is considerably larger than the *H. muscinus*, and, contrary to the custom of the latter, it is always hanging by the fore-limbs when at rest. The granitic formation on the western heads of the river Mary was the only place where it was observed during my travels in Arnhem Land, and here it inhabited the same rocky crevices and caves as *H. muscinus*.

As a rule, it chooses slanting rocks for resting, and besides clinging to the rock by the fore limbs, as above mentioned, it also supports the body by the posterior extremities. Upon the sight of man these bats rock forward and backward with an utterly comical motion, then for a moment they sit perfectly quiet, with glistening teeth, and finally with a squeak dart at the intruder. They are only moderately nocturnal in habit. When disturbed they will very often leave the caves, and even in the middle of the day flutter about high in the air, perch in the tall trees, and after some time return to shelter amongst the rocks.

*Nyctophilus timoriensis.*

Of all insectivorous bats this species appeared to be the one most common in Arnhem Land. On Daly river the greatest numbers were observed, especially round the houses of the lonely Jesuits' mission station "Uniya," where they literally swarmed. Just at sunset they commenced flying, and during their flight they never arose to any considerable height, mostly keeping so close to the ground that a short stick would serve as a means for knocking them down. Their flight is feeble and fluttering, with sudden darts upward when catching an insect. Now and then a little squeak is uttered very similar to that of a mouse.

A few specimens occurred around Roebuck Bay. Although the coast of Dampier Land, especially in the rainy season, seemed exceedingly rich in insects, the insectivorous bats, on the whole, were remarkably few in number.

*Scotophilus greyii, Chalinolobus nigrogriseus, Vesperugo tenuis.*

All these little bats were procured in the immediate neighbourhood of Roebuck Bay, and none of the species were numerous. As I have mentioned before, the insectivorous bats were here remarkably few in number. Only now and then a bat would be seen against the golden evening sky, never arising to any considerable height, and during my stay only one or two specimens of each species were obtained. Only once in Arnhem Land did I see a bat which I believe was the *Chalinolobus*, but I failed in securing it.

*Canis dingo.* "Mujinn"; "Damarr."

The dismal howl of the Dingo is one of the characteristic features of a night in tropical Australia. In Arnhem Land, on Victoria River, and around Roebuck Bay, the Wild Dog was common, but mostly occurred singly or in pairs, the large packs described in the tales of bushmen as haunting Central Australia having never been observed by the author.

The hot day is usually spent sleeping in the shade of an ant-hill or in a patch of long grass, and sundown is the signal for the dogs to commence hunting. It is a common belief that the Dingoes literally hunt their prey down in packs, but no such proceeding ever came to my notice. The food of the Dingo in

the vast forests and deserts of the north consists, as a rule, of smaller vertebrates, chiefly various species of lizards, *Coniluridæ* and *Muridæ*, a fact which is strongly indicated by the almost constant presence of their bones in the excrements of the animal. I do not deny that a young Macropod or Emu occasionally forms its diet, perhaps with an additional egg or young bird; but the Dingo chiefly depends on smaller animals for its existence. Its habits are sneaking and cowardly, and I hardly consider it capable of attacking a kangaroo its own size. It will kill goats or sheep, but I am inclined to believe that its tactics are more like the cunning stealthiness of the fox than the ferocious dash of the wolf.

The colonists of the southern parts of the continent are seriously troubled by the depredations of the Dingo on their sheep-farms, and the question has been very much disputed whether these Dingoes belong to the aboriginal species of the continent, or, as commonly believed, are the offspring of various crossings between Dingoes and European dogs. The latter supposition is rendered probable by the fact that Dingoes propagate with European dogs of different breeds, that is, the half-bred Dingoes of the aborigines will breed with the mongrel European dogs also kept by their masters. The question is, will these bastards on their occasional visits in the bush breed with the *wild* Dingoes? It is possible; but even supposing it to be so, I feel inclined to consider it to be the only way in which this interbreeding takes place, and consequently that its effects are very small, far smaller than generally supposed, and so small as in course of time to be almost obliterated. I am led to believe this because the Dingo type is always dominant, and because European dogs never would breed with wild Dingoes. They heartily detest them, may with advantage be employed in their chase, and only by force of circumstances breed with the half-tame individuals in the camps of the aborigines. In the north and north-west, European dogs had been in the country ten and thirty years respectively, and yet in the bush not a single specimen of Dingo was observed or shot which did not have all the specific characters of the species. These characters are very constant, and I have never seen two Dingoes differing more in form and colour than perhaps two foxes, a circumstance which to



my mind indicates that the Dingo is not a breed of domestic dog gone wild—a very common belief—but undoubtedly a distinct canine species peculiar to Australia, a fact which is moreover amply proved by the occurrence of fossil Dingoes in the pleistocene formations of Australia.

The Dingo, as a rule, is shy and very cunning, and a European is seldom able to kill the animal in its lair. The stealthy aborigine, on the contrary, very often succeeds in killing it with a spear when asleep. The flesh is not much esteemed, though some old men eat it.

The traveller will, as a rule, only be able to shoot the dog with a rifle. Occasionally it will, at a respectful distance, follow a man on horseback, apparently from curiosity.

In the month of August some recently-caught pups, hardly a month old, were brought to me by the natives. They were very playful, and soon got used to my company, but were great thieves, and would on the least opportunity break their confinement, and escape to the aborigines or to the bush.

*Conilurus hirsutus*. “Nunjala”; “Dombot”; “Kalambo.”

During my sojourn in Arnhem Land I first met with this species on an expedition to “Hermit Hill,” south of the Daly river. The hollow trunks of the dwarf Eucalypti, which chiefly form the open scrubs of these desert-like sandy plains, were the chief resorts of this animal, whose habits are strictly nocturnal.

Judging from my list of specimens from this locality, the females outnumber the males by far, amongst eleven specimens only two being males. On several other localities the species was met with—in fact it is common nearly everywhere in Arnhem Land; but my series of specimens from these places are too small to admit of any conclusive comparison as to the proportionate numbers of the sexes. Nowhere, at all events, the number of males exceeded that of females, and in the total comparison the scale turns strongly to the female side. From this it may be inferred that the species is polygamous, a theory which I consider strengthened by the fact that the males were always found separately.

The number of young was invariably found to be two. They are suckled by the mother until they reach a considerable size,

and will with great tenacity adhere to her teats when pulled out of the hollow trunk where she is hiding.

At night the animal roams about searching for food, which chiefly consists of the fruits of the Corkscrew Palm, *Pandanus odoratissimus*. Its movements are sudden and jerky, and the animal is a fast and clever runner, as well as a splendid climber. Being smart and well built, and in possession of a very irritable and savage temper, the bite from its strong jaws is by no means insignificant, and a nasty gash in the hand may easily be the result of a clumsy attack on the Nunjala.

Owing to its size and savoury flesh the natives pursue it, and the animal is caught by simply chopping a hole in the hollow tree where it sleeps, and pulling it out by the tail. When colonisation reaches the forest, the Nunjala, like other species of the genus, becomes a domestic parasite, and also a very noxious one.

It is said that the European *Muridæ* in the southern parts of the continent are gradually extirpating and replacing the aboriginal representatives of the *Coniluridæ*, and I shall not contradict the statement. I only feel confident that even *Mus decumanus* would find the "Nunjala" a worthy antagonist.

*Conilurus penicillatus*. "Pelke."

This little species occurred most plentifully in the neighbourhood of "Hermit Hill," and the natives brought me great numbers of it. According to them the animal invariably sleeps in the corners of the stiff leaves of the common Corkscrew Palm, *Pandanus odoratissimus*.

The animal may be seen at night flitting about in the trees, and in Arnhem Land is everywhere common in the vicinity of water. It is extremely savage, and bites viciously. Whenever I kept a number of them together in captivity they would always fight, and very often kill each other. Their gnawing power is very great, and they would in very short time bite their way out of any basket or cage I might put them in.

Wherever a house is built in the forest and people settle, this species, like most other *Coniluridæ*, abandons its original habits, settles in and around the house, and becomes a domestic parasite.

*Conilurus boweri*. "Katkomba."

This beautiful species I only had the opportunity of observing in the vicinity of Roebuck Bay, Western Australia. It does not occur in Arnhem Land. According to the evidence of the natives, like the *C. hirsutus*, it frequents the hollow trees of the Eucalyptus scrubs. I have never seen it myself, except in the houses of settlers. These corrugated iron buildings, with their rafters and framework of Eucalyptus wood, are always tenanted by the "Katkomba," the flour- and rice-bags of the store-rooms being the object of their visit.

On the Hill-station, quite close to Roebuck Bay, a couple of these parasites had their stronghold under the roof of the dilapidated house. Every evening after dark they would commence moving about, and by the flickering light of our lamps I could see the beautiful white-tailed animals rapidly crawl along the rafters overhead, and vanish into the store-room. My attempts to induce them to enter a trap invariably failed. Only by the aid of the natives was I able to secure one nearly adult specimen and two young ones. These latter were brought to me in the month of December, but probably the breeding takes place during the whole year. The number of young ones being two, I venture to propose that this may be regarded as the constant birth-rate of the genus. It will be remembered that the same number is always found with *C. hirsutus*.

*Hydromys chrysogaster fulvolavatus*. "Djinnjokma."

Although this species abounds in nearly all the northern lagoons, rivers, and creeks, the traveller will hardly ever see it, and even the aborigine can only with difficulty procure it.

Everywhere along the water's edge these animals dig numerous channels into the bank, like the European Water-vole, and in the water they seek their food, which chiefly consists of fish and crustaceans. The bleached shells of the latter are generally to be seen along the shore where the animal has devoured its prey.

The mode of life of this animal I had very little opportunity of observing, but I think it may be considered as chiefly nocturnal in its habits. Sometimes it will, according to the natives, come out in the daytime, but hardly without being

noticed. The aboriginal hunter puts a dead fish in the water outside the hole of the "Djinnjokma," and waits with a light spear all day for the animal to come out and feed; but very often he waits in vain, at least, that is my experience.

Only once on the Daly, in the month of August, an aborigine brought me a living adult female specimen with three young ones, and a few juvenile specimens were received later. The *Hydromys* is strong, of a very savage temper, bites hard, and when irritated gives vent to a grunting squeak.

#### *Muridæ.*

The common Black Rat, *Mus rattus*, was observed in Arnhem Land, and frequently found in the dwellings of colonists. Except in these houses and their immediate surroundings, I did not observe it; but I am unwilling to lay any stress on the circumstance that no specimens of this species came to my notice during my travels in the forests. It may easily have escaped my attention, and the animal may, but certainly not to any great extent, inhabit the woods of the north. The species is undoubtedly introduced either by European ships or Malay trepang-fishers, the latter for centuries having every year visited the northern coasts of Australia.

Arnhem Land was inhabited not only by *Mus rattus*, but by a number of small species of the genus *Mus*, the specific determination of which has proved impossible, chiefly owing to the small series of specimens collected. These forms are undoubtedly indigenous to the country, and belong to the original fauna of Australia. They are so numerous and so widely distributed, even to the remotest parts of Arnhem Land, that they can scarcely be considered as introduced. In places where the white man had seldom, if ever before, trod, they seemed to occur in the greatest numbers.

These mice and rats, the size of which generally averages about that of the common *Cricetus frumentarius* of Europe, play a quite important part in the economy of nature. In order that the soil, even in its pristine condition, shall retain its power of nourishing vegetable life, a constant turning and renewal is necessary. Subsoil must in one way or another be conveyed to the surface, and replace that which has become deficient in nourishing



qualities. It is a well-known fact that the termites to a great extent accomplish this work in tropical regions, and in Arnhem Land numerous ant-hills, sometimes of an enormous size, may be everywhere observed; but at the same time I cannot doubt that these small rodents perform a not unimportant part in this task of renewing the soil. The fact is that these rats are living in burrows deeply dug in the sandy ground, the earth being thrown out of the mouth of such retreats and spread outside in great heaps. However, they do not content themselves with this. Every night they continue burrowing, and the ground is perforated in all directions. In Arnhem Land I have travelled through square miles of country where the ground was literally undermined by these rodents to such an extent that the hoofs of my horses at nearly every step would break through and sink deep down in the burrows. The importance of this fact in the economy of nature can easily be understood. Every square mile of land in these localities is covered with heaps of sandy earth, sometimes dug out from a very considerable depth, and when the rainy season sets in and the ground is soaked the burrows collapse, the heaps are levelled, washed out over their surroundings, and the natural ploughing of the year is completed, while the little animals are compelled to recommence their task, and pay their house-rent by throwing earth up to the surface. Not only these *Muridæ*, but nearly every burrowing animal or reptile of this region decidedly perform a certain part—a small share—in the agricultural process of nature.

*Echidna aculeata*. “Melk”; “Guarang.”

The Monotremes are in the north represented by a single form, the *Echidna* or “Porcupine” of the colonist. This species is found nearly all over the continent, and in Arnhem Land seemed to prefer the mountainous regions, especially the wildly broken granite and sandstone formations. In these localities it does not, as a rule, make use of its burrowing properties, but simply rests in some crevice or under the immense boulders, the setting and rising sun respectively being the signal for commencing to feed or retiring to rest.

When thought to be unobserved this clumsy-looking animal will exhibit surprising agility, and sometimes run with considerable swiftness. At the least danger it will immediately roll itself

up in a protective spiky ball. Its usual food consists of termites, but the *Echidna* can for a considerable space of time endure hunger without succumbing. Once I kept a specimen tied up in a bag for more than a fortnight, lacking time to skin it, and during that period it did not obtain the least nutriment; but at the end of the confinement it seemed to be perfectly well, and dissection proved it to be in a fat condition.

The breeding was said by the natives to take place at the commencement of the rainy season, and in a female specimen examined in the drought of the year (May, 1895) there was no sign of the abdominal milk-glands commencing to swell. The ovaries contained eggs, some of which were developed to almost the size of a pea. The natives strongly denied and even ridiculed the idea of an *Echidna* laying an egg and transferring it to the temporary pouch for hatching.

The *Echidna* being dependent on termites for food, and especially well adapted for burrowing, I was surprised at not finding the animal in the low plains, where the termites were very abundant and the soil by no means harder than in the mountainous regions. But it strikes me that there is a circumstance which may have forced the *Echidna* from the plains and restricted it to the broken regions. There is no doubt that an animal burrowing in the soil is more exposed to persecution by the aborigines—the only enemy of the *Echidna*—than one hiding beneath the colossal boulders in the granite and sandstone formations; and I have no hesitation in expressing my opinion that the occurrence of the *Echidna* only in the rocky regions of Arnhem Land is in all probability due to the steady persecution of the natives.

In other portions of Australia, where the natives are less numerous, the *Echidna*, I am informed, may be found not only in the smooth undulating hills, but also in sandy plains. In the north it was, as far as my experience goes, exclusively confined to the broken ranges, large numbers being only found in the most wild and broken formations; and this circumstance, I consider, must be regarded as a very striking example of how the natural dispositions of an animal may be influenced and even altered or modified by human interference.

*Perameles obesula.*

This little bandicoot was very numerous in the coast country around Roebuck Bay, Western Australia. A small grass nest, quite simply built on the ground or in a hollow, forms their place of resort, which, when in danger, they readily quit to hide under another similar cover in the neighbourhood.

Great numbers being brought to me by the natives, I used to keep them in captivity, in order to investigate some of their habits. The adults did not, as a rule, seem to thrive in captivity, nor to attain confidence in the handling of man. The young ones, on the contrary, became perfect pets, and seemed to delight in crawling up one's hand and arm, or to sleep in one's pockets.

Besides being little shy of man, they exhibited great playfulness, and I well remember the amusing ways of a young animal which I placed in the cage with some adults. The moment it was liberated it ran over to one of the others, and, like a kitten, commenced to pat with its fore paws the snout of the old one, licked it, pushed it, and threw itself down on its back. In this position it lay twisting itself and kicking the snout of the old animal in mere playfulness, like a kitten playing with its mother. They lick their fur in the same way as a cat. They walk on the same principle as the *Macropodidæ*, separately moving the fore and hind feet, but their short feeble tail does not, of course, afford them any support.

Sleeping throughout the day, they lie on the side rolled up like a cat, but towards sundown commence moving. Sometimes drowsiness seems to overpower them again, and then they sit with the hind part of the body shut up, the hind legs well tucked in under the body, the chest touching the ground, and the head resting on the fore legs, which are stretched straight forward. The animals in the evening would greedily drink water, which they daintily licked, and rice or crumbs of wheat-bread seemed to give them sufficient nutriment. The species appears to require a great deal of water, and their tracks are always seen by the cattle-wells near Roebuck Bay, the only places where water may be obtained in these deserts. In places where water is absolutely absent, the dew seems sufficient for their wants. A few

drops of dew gathered on the leaves of various plants would quench their thirst, and some of their food undoubtedly contains a certain quantity of moisture.

As regards the breeding of this species, a fact of considerable interest was noticed. In the pouch of the female (which, by the way, has the opening turned towards the anus) as a rule three young are found in the earliest stage of development after birth. When the half-grown post-fœtal stage is reached only two remain; and when development is nearly completed, and the young animal almost fit to leave the pouch, only one is left. This most uncommon phenomenon amongst mammals is very constant in this species, and may admit of the conclusion that the young of *Perameles obesula*, during their post-fœtal stages in the pouch, have greater difficulties to contend with, and are subject to more dangers, than those of most other marsupials.

*Perameles macrura*. "Koppol."

In Arnheim Land this Bandicoot abounded, especially in the neighbourhood of large rivers and creeks. A burrow in the soil lined with soft grass, a little grass nest on the ground or in a hollow log, usually constituted the dwelling of this large *Perameles*, whose savoury flesh forms a considerable part of the animal food so relished by the aborigines; indeed, the "Koppol" is nearly the best game of Australia, and well roasted it does not much differ from a small sucking-pig. The only circumstance which may restrain the hungry traveller from enjoying a "Bandicoot" steak, is, that the animal very often is infested with a large tapeworm. Whether this tapeworm, which reaches an enormous length and very likely at full development causes the death of the animal, is transmissible to man or not, I am unable to express any opinion. The natives never seemed to suffer from a similar complaint.

At sundown the animal will come out, feeding all the night on seeds, herbs, and insects. With rice as a bait it is easily trapped, and occasionally it will visit the pack-bags of the traveller when encamped for the night. It drinks frequently.

More than one young was never found in the pouch of the female.

The animals are very agile, run fast, and when pursued quickly turn with great dexterity and presence of mind.



*Pseudochirus dahlü.* "Wogoit."

Before entering the big central tableland of Arnhem Land, the traveller will in the neighbourhood of the western sources of the river Mary find a very peculiar granitic formation.

From the plain country, the soil of which chiefly consists of a coarse granitic sand, there inwardly rises the huge Eucalyptus forest, hill by hill, with wild torn forms, and on the very hills grows plentifully the cypress of North Australia, *Callitris robusta* (*vulg.* cypress-pine).

These hills, which are only parted by small valleys, never show any primitive rock, but rise from the granite like colossal heaps of stones and *débris*. Granitic boulders in all sizes and forms are heaped up on each other to a height of more than a hundred feet, and through crevasses and passages one may, crawling or walking, penetrate the whole of the dark interior of the mountain. In these surroundings I found, in May, 1895, besides the usual cave-dwellers of the north, *Dasyurus halocatus*, *Petrogale brachyotis*, and the rare *P. concinna*, a *Pseudochirus* new to science.

The natives called it "Wogoit," and in the 'Zool. Anzeiger,' No. 490, 1895, and in the 'Proceedings of the Zoological Society of London,\* Prof. R. Collett, of Christiania, has described it under the name of *Pseudochirus dahlü*, "the Rock Phalanger."

Subsequent expeditions showed me that the species also occurred numerously in the great central tableland; but outside these localities I never discovered the slightest trace of the animal.

The Wogoit is a strictly nocturnal animal, which spends the day sleeping in the caves and crevasses of the granitic heaps, choosing the darkest recesses as a resting-place. After sundown it crawls out from cover, seeking food in the blossoming gum trees, such as *Eucalyptus miniata* and *tetrodonta*. It also commonly frequents a species of *Terminalia*, which carries a fleshy, and even to the human palate, savoury stone-fruit. At the break of day the Wogoit again takes refuge in the dark depths of the caves.

Generally the animals are found in pairs, male and female, sometimes accompanied by a half-grown young one. When at rest the animals very often lie squeezed flat in some crevice, without regard as to its being horizontal, vertical, or slanting, or

\* Shortly to be published.—ED.

coil themselves up in some dark corner. In this latter position they sit rolled up nearly in a ball, the hind legs frequently crossed, like those of a tailor. The right hind leg is, as a rule, stretched out, the left thrown across it, which both fore paws grasp. The tail is curved forward and upward, past the left ear, and the head bends deeply over the fore paws.

Their walk, during which the tail is kept straight out, is firm and sure, and very much approaches the so-termed "amble." They are clever climbers; their run is a kind of quick trot, or perhaps, more correctly, a very fast crawling; and although in the daytime they seem sluggish animals, one is surprised at the wonderful agility which they exhibit at night, or when in danger of life.

The breeding takes place all the year round, and the young remains in the pouch of the mother until it acquires the thick fur characteristic of the adult animal. After this stage of development it follows the parents for a longer space of time, probably until its own sexual propensities are awakened.

The food is grasped first with the mouth, afterwards with the hand, the first and second fingers of which may be put in contraposition to the others. As a rule the left hand is used. They eat sitting on the hind legs, in a very prone position, the back shot up, the head and fore limbs low. Water they lick in the same way as a dog. The meal finished, the face and snout are cleaned with the fore paws, very much on the same principle as that employed by the Cat, but, contrary to the Cat, they use both fore paws at once, one on each side of the face.

Their temperament must be characterized as soft, but attacked they will defend themselves fiercely with teeth and claws. Fights between the males are scarce, or do not perhaps take place at all; but the female sometimes vigorously pulls the ears of her better half, a course of proceeding which may with impunity be adopted, as she is the bigger and stronger of the two.

The muscular power of the animal in proportion to its size must be termed colossal, and a man must strain every nerve and fibre of the hand and arm to master a living individual.

The "Wogoit" is an utterly nocturnal animal, and can only with great difficulty bear the daylight, and except compelled by the utmost necessity never leaves the stone-heap or cave where it lives.

The eye has in the darkness a strong glow like a flashing ruby, and death is accompanied by a strong dilatation of the vertical pupil.

In captivity it very soon becomes familiar with the man who feeds it, but soon dies when removed from its native land, with the loss of its usual food, and the climatic conditions of the country where it was born.

*Trichosurus vulpecula*. "Vie"; "Uia"; "Uidda."

Being strongly pursued by the aborigines and easily caught, this species is not numerous in any portion of Arnhem Land. It is nearly everywhere to be found, but the traveller may search the moonlit woods night after night without seeing a single animal, and in no locality do its numbers in any way approach those of the southern colonised parts of the continent. The brown variety was only found in the jungle around the river Daly, and all the specimens shot or captured in the open Eucalyptus forest were of the common bluish grey colour. In the vicinity of Roebuck Bay, Western Australia, the species was occasionally met with, and in all the specimens I examined the fur was of the latter colour.

The *Trichosurus vulpecula* breeds in the north all the year round, and only one young is found in the pouch of the female.

On leaving the pouch of the mother animal the fur of a juvenile specimen has a strong grassy green tinge, which gradually fades, and after two or three weeks gives place to the general colouring of the adult.

Captured in infancy, it is, like most marsupials, easily tamed, and after a time gets very attached to man.

They eat almost any vegetable, from a grass-root to the fruit of the tallest Eucalyptus, and seem to require a good supply of water. In captivity they will drink at least once a day, generally a little after sundown, and on lagoons and rivers their tracks are generally seen at the water's edge.

*Petaurus breviceps*. "Lambalk."

The Little Flying Squirrel is found all over Arnhem Land, but owing to its small size and mode of hiding in the hollow

branches of large trees, I always found it difficult to obtain. It is nowhere numerous, but more common along the coast than in the interior. I only succeeded in securing specimens on a few occasions.

Like all the other *Phalangistidæ*, it is strictly nocturnal, and using its flying membrane the little animal will swiftly move from tree to tree searching for food. The "flying" only consists in sliding from a higher tree to a lower one, or to the ground, using the large expansion of the skin between the fore and hind legs as a parachute. Curiosity will sometimes induce this little Squirrel to visit one's camp, and on one of the heads of the Mary river I remember one of these little animals appearing every night towards daybreak, examining our camp, until one day we discovered its hiding place in a hollow tree and killed it.

The *Petaurus* having no pouch, the young simply adhere to the teats of the mother. During their most helpless stages I am inclined to believe they are always fixed to the mother in this way, this being also the case with other marsupials destitute of a pouch, such as the *Dasyuridæ*. Later on the young are undoubtedly left behind in the lair, as their size and number would prevent the mother from moving with sufficient ease. They are sucklings until they have reached half the size of an adult individual, and their number is three; at least, that was the number in the only case I had the opportunity of observing.

In the vicinity of Roebuck Bay this species was not uncommon.

*Dasyurus hallucatus*. "Jirian"; "Tjabbo."

This species occurs nearly everywhere in Arnhem Land, but according to my experience never plentifully except in the mountainous parts of the country. Although in the forest-clad plains it resorts to the hollow trees as a hiding-place, the broken rocks and boulders in the mountain ranges seem to have a greater attraction, and in their branching caves and crevasses the little "native Cat" finds a secure resting-place.

Although the habits of the animal are nocturnal, it very often commences hunting a little before sunset, and I once saw it moving about in broad daylight.

Walking or running it carries its tail erect like the *Felis*



*domesticus*. It is not a very fast runner, and on horseback, in open country, is easily overtaken.

The young ones are at birth only the size of a very small pea; and their number is, compared with that of other marsupials, very great, nearly every teat of the mother carrying one.

The crippled trees of the northern forests form the nightly hunting-grounds of the species, and its food consists of insects and small vertebrates. Occasionally it goes down to water to drink. It is a nuisance in meat-stores, will greedily eat fat or tallow, and with this as a bait is easily enticed into a trap. The settlers accuse it of bloodthirstiness, and of wantonly murdering fowls or chickens like the European Weasels, qualities which in my opinion are more attributable to another representative of the *Dasyuridæ*, the *Phascologale penicillata*.

*Phascologale penicillata*. "Wombo."

This pretty little species, commonly termed "Brush-tailed Rat" by the colonists, is one of the most widely ranging of Australian *Dasyuridæ*. It is found nearly all over the continent. In Arnhem Land it appeared to be most common towards the central parts. In the coast country, and around the long tidal river-mouths, I only once saw it, and the "Wombo," as the natives call it, seems to be more adapted to the dry inland scrubs than to the better watered jungles and forests of the coast. In the low broken ranges between Fountain Head and Union Town, and on the railway line, it generally occurred; and also on the rivers Mary and Katherine it was frequently observed. In fact, nearly everywhere inland it was very constant, and on a moonlight walk one would generally expect to see this little marsupial nimbly climbing about amongst the twisting branches of the box tree, or the red gum, whose hollow trunks serve it as a shelter during the daytime.

In the fowl-yards of the settlers it commits serious depredations, and at the store at Fountain Head two dozen fowls were killed in three weeks by these little bloodsuckers, who seem to possess the same devilish thirst for blood as the Weasels of Europe.

The "Wombo" is a smart and clever climber, and moves with great swiftness in a sudden jerky manner, which enables the

traveller easily to detect it in a moonlight night. Very often it will, either from curiosity, or in search of food, approach one's pack-bags in the camp, and most bushmen accuse it of eating the fat of their dried salt beef. Two young ones were once brought to me by the natives. Close to Roebuck Bay, Western Australia, a specimen was shot and preserved, but the species did not seem to be common, as this single specimen was the only one observed during five months' collecting in this locality.

*Sminthopsis nitela.*

This beautiful little species, which Prof. R. Collett, in the 'Proc. Zool. Soc. of London,'\* has described as new to science, was brought to me by the natives on the Daly river, about sixty miles from the coast. According to their evidence, it was found sleeping in holes in the ground. Undoubtedly it is nocturnal in its habits, like the other *Dasyuridæ*.

*Phascogale flavipes leucogaster.*

This occurred in the same locality as the above-mentioned species. Only one specimen came under my notice, and my native collectors brought it to me tied with a string round the hind leg. When placed on the ground it exhibited considerable agility. Presumably its habits are nocturnal.

*Petrogale concinna.* "Bolwak."

This rare little "Rock Wallaby" was met with only in two places in Arnhem Land. Once on the Daly I shot a single specimen on an unknown mountain on the eastern side of the river, about one hundred miles from the river mouth. Subsequently I met the species in the broken granitic country around Mount Gardiner, to the west of the river Mary, and there it occurred in great numbers.

Deep in the caverns and crevices amongst the colossal granite boulders, where the rays of the sun never reach, the little wary "Bolwak" spends the day, sleeping lightly. It is easily disturbed, and will with astonishing agility flee from rock to rock. Their speed and dexterity is simply marvellous, and seeing one of these little wallabies running through the broken country, one might almost imagine it to be the shadow of a bird flying swiftly overhead.

\* Not yet published.—Ed.

The stone seems to afford a better hold for their rough-soled feet than the soil, and they always, when running, keep to the rock, turning and twisting themselves with cat-like cleverness, and running up or down apparently perpendicular cliffs with the same ease as on the level. They will squeeze through nearly any opening, are extremely shy, and I never in my wide wanderings met an animal that puts a man's shooting more to the test. Just at sunset they come out and, perched on the rocks a short time before commencing to feed, they seem to enjoy the cool evening air and the gorgeous tropical sunset. The least noise will then disturb them, even in places where the crack of a gun has never been heard, and, like fitting shadows, their light forms will noiselessly vanish among the broken boulders. Occasionally they will go down to water to drink, but they do not seem to require it as often as many other *Macropodidæ*. They breed all the year round. Only one young is born at a time, and the mother abandons it immediately when in danger.

*Petrogale brachyotis*. "Doria"; "Petpungo."

This handsome "Rock Wallaby" was met with in the same localities as the *P. concinna*, but seems to prefer country with larger features. It has a far wider range, and is found on nearly every large broken hill or mountain. In the torn and rugged sandstone ranges around the mouth of the Victoria river, and in the large central table-land in Arnhem Land, great numbers were observed.

Its mode of life and habits are very much the same as those of *P. concinna*, but, being a heavier animal, it is less graceful, and is without the marvellous agility and swiftness of that animal.

*Onychogale unguifera*. "Karrabbal."

This pretty Wallaby, the tail of which at its extreme point is furnished with a very peculiar horny spike or nail, was only observed in one locality in Arnhem Land.

Around Fountain Head and the Glencoe cattle depôt the country assumes a certain desert-like character; crippled scrub is scattered over vast flats, where innumerable ant-hills tower like churches with domes and minarets, brick-red and baked in the parching sun. In these barren surroundings the little Wallaby

was sometimes found sleeping in a tussock of coarse spear-grass. When disturbed it would utter a quickly repeated guttural u-u-u, and flee with great swiftness. When the animal is running it carries the tail, like other *Macropodidæ*, curved down backward and upward, but in a stronger and more pronounced degree, so as to nearly form a semicircle. The head and fore part of the body is at the same time carried lower, and more stooping than customary with wallabies or kangaroos.

In the vicinity of Roebuck Bay it was frequently found on the edges of the large open coast plains, chiefly choosing the dense *Melaleuca* thickets for resting. Towards sundown the pretty animals might be observed on the open patches amongst the thickets cropping the green grass of the rainy season. In the dry time of the year *Melaleuca* leaves and grass-roots undoubtedly form a greater part of their diet.

As a rule the *Onychogale* is very shy, and in none of the above mentioned localities did it occur in great numbers, more than one or two seldom being seen in a day's march.

*Bettongia lesueurii*. "Jalva."

In the sandy country surrounding Roebuck Bay, Western Australia, the ground was nearly everywhere and in all directions excavated by the burrows of this little Macropod, which by the aborigines of the place is called "Jalva," and by the few Europeans generally termed "Kangaroo-rat." The animals avoid the open plains, but all the scrubs, and especially the slopes of the gently rising and falling sandhills, are inhabited by countless numbers. Several animals, in fact a whole colony, dig their burrows quite close together, and all the different channels communicate with each other, so that each animal does not have a separate dwelling. The burrows have not, like those of the fox or the badger, the opening constantly turned down the slope of the hill, but run in all directions. The animals do not seem to find it more difficult to throw the *débris* up than down the decline of the hill. Digging for their food, which chiefly consists of a small ground-nut called by the natives "nalgoa," they pursue the same course as mentioned in their burrowing, never paying any regard to whether they are digging up or down hill. Not only do the individuals in a colony inhabit the com-



municating burrows in common, but even between different colonies intermigration takes place—in fact, all the animals within a fairly large area seem to form one large family, the members of which are very independent of each other. The “Jalva,” of course, must be termed a gregarious animal, but the gregarious disposition of each individual is not in any remarkable degree pronounced. The fact that the animals are living together in colonies may, I think, be better explained by considering that long experience in the course of time has undoubtedly taught them that it is far easier for ten or perhaps one hundred animals to dig a complicated burrow than for one to do so.

The day is spent sleeping in the channels of the burrow, and just at sunset or immediately after the “Jalvas” commence to appear outside. Nimbly skipping amongst the sand-heaps and the scanty herbage, the agile animals very soon saunter off in search of food. All night they are roaming about feeding, and, according to my experience, they never drink, at least during the dry season. Their tracks were never seen near any well nor on the shore of the ocean, and, although a watering trough for cattle was situated within two hundred yards of one of the places where I used to procure my specimens, I invariably failed in discovering tracks of the animals at the little pool of water which procured its supply from the leaking trough.

However crooked and complicated the burrows of the “Jalva” are, still some of their most dangerous enemies are not prevented from intrusion. The large pythons, for instance, *Python molurus* and *Aspidites melanocephalus*, frequently visit the colonies in search of prey. I have never caught the pythons in the act of devouring the animals, but the unmistakable large tracks of these snakes—the largest in this locality—were often seen leading in and out through the different holes of the “Jalva” colonies; and the natives unanimously affirmed that the snakes came there to eat the “Jalvas.” In the north I have frequently found hair and bones of *Petrogale brachyotis* in the excrements of large snakes.

During the long dry season the aborigine is not a very dangerous enemy to the “Jalva,” but when the rains set in, and, especially in a heavy wet season, perfectly soak the ground, the burrows collapse. The boggy condition of the earth does not

admit of any new digging, and the unfortunate animals are compelled to seek a very unsafe shelter in the grass. Flushed from its place of hiding, and being a poor runner, the "Jalva" is easily overtaken by the native and his dogs, large numbers being often killed in a short time.

One young is born at a time, and the breeding goes on continuously all the year round.

*Macropus robustus*. Male, "Tjikurr"; female, "Tjugeri."

The large black "Wallaroo" of South-eastern Australia was observed only in the sandstone ranges of the central table-land in Arnhem Land. In the wild and broken cliffs or precipices surrounding the large gullies where the South Alligator river flows, and a white man has seldom before wandered, a scanty tribe of the Robust Kangaroo was struggling for life against the steady onslaught of the aboriginal hunter of these lonely mountain valleys. Not long ago, my dark companions affirmed, the "Tjikurr" abounded; but constant hunting had reduced their number to a minimum. The frequent occurrence of old excrements and well-worn paths amongst the rocks amply corroborated the statements of the natives; only now and then a specimen could be seen, and a female with a young one in its pouch was all I obtained (June, 1895).

In the shade of some overhanging rock, in cracks and crevices, and even in the deep dark caves and caverns in the precipices of the table-land, honeycombed by the work of the ocean thousands of years ago, the "Tjikurr" was sleeping during the hot tropical day. The least noise would disturb it. Even the light patter of the naked feet of the aborigine would start the wary sleepers, and cause the black animals to flee with huge bounds through the broken rocky country. Their speed and agility is all the more surprising owing to the considerable size of the animals, and can only be compared to that of the little *Petrogale concinna*. They literally seem to fly through and over the most difficult obstacles. Without hesitation they would precipitate themselves down cliffs of considerable height, and with equally astonishing energy they would rapidly ascend apparently inaccessible mountain walls and heaps of boulders.

*Macropus antilopinus*. Male, "Koppo"; female, "Kondaltburu."

This large species, so rare in the collections of Europe, is exceedingly numerous in Arnhem Land. Although it seems to prefer hilly country, the traveller may often meet it in the plains at a considerable distance from any mountain. There did not seem to be any distinct rule for its occurrence. One would always be sure to find it in any big range, and in the undulating ironstone; in some places it was frequently seen, but not constant, and the only localities where I certainly never observed the slightest trace of it are the large open plains on the lower tidal portion of the river Daly. The large jungles also never seem to offer any attraction. In the sandstone ranges on Victoria river the animal abounded.

The "Red Wallaroo" is nearly always met with in great mobs, consisting of females, young, and young males. "Old men" or adult males are very often found single, or sometimes accompanied by a female, and strong animals of any sex or age may sometimes be observed single; but typically *M. antilopinus* is a gregarious animal.

In some mountain valley, or in the shade of some trees, the animals form what is commonly termed a "camp"; that is, each animal scratches a slight depression in the sandy soil, and there neatly coils itself up to sleep during the hottest part of the day. In the afternoon, or towards sundown, they commence feeding on the green shoots or roots of various grasses, and sometimes at considerable intervals they will make for water. For how long a period they can dispense with water I do not know, but this species, like so many Australian mammals, seems in a considerable degree to be independent of it. In places where water is abundant they do not seem to drink every day, and sometimes one will meet the "Red Wallaroo" in places where water could only be procured by travelling long distances.

All through the night the animals are feeding; even the early morning and forenoon are very often devoted to the same occupation, and only through the hottest part of the day they rest in the camp, to which they constantly return. With such precision do the Kangaroos—and especially the solitary ones—return to their usual camps, that the aboriginal hunter by this circum-

stance is greatly aided in killing them. Covered with mud from head to foot, to retard perspiration, he either stands in wait at the Kangaroos' camp or sneaks upon an already resting animal, and at a short range easily transfixes it with his spear.

The "Koppo" being the largest Kangaroo in the north, and its flesh highly prized by the natives, the animal is subject to a very vigorous persecution, and in consequence thereof is exceedingly shy and wary—so shy as to be almost unapproachable in certain localities to the European hunter.

To observe this large Kangaroo at a close range is a rare occurrence, and one that very seldom befell me; but one of the lay brothers of the Uniya mission-station on the Daly gave me a few facts from his experience. For a long time the missionaries were living to a great extent on Kangaroo flesh, and, being an excellent shot, it usually fell to the lot of this brother to procure the animals. Armed with a rifle, he would quietly invade the Kangaroo camp. The mob would then flee, and my lay brother, hiding himself amongst the stones, waited in perfect quietness. After some time the animals would return, first the young ones, then the adults, and very soon the camp life would go on as usual. The young animals would, according to his statement, exhibit great agility and playfulness, fight and box each others' ears, whereas the old individuals were more lazy and slow in their movements. An old Kangaroo will, with an utterly comical expression in its stupid face, stretch its huge limbs and scratch its ears like a sleepy man. When an "old man" was wounded it would pluckily attack, and my narrator had made a kind of rough cutlass which he employed in slashing down the wounded Kangaroos to save his small store of ammunition.

At any time of the year young animals which recently have left the pouch are seen accompanying their mothers, and I think this may justify the conclusion that the *Macropus antilopinus*, like most other marsupials, breeds all the year round.

*Macropus agilis*. "Ma"; "Bulak."

The Jungle or River Kangaroo, the most common *Macropus* of the north, is found in countless numbers at nearly every large river in Arnhem Land. The day is spent resting in the shade of the jungle, where the animals, singly and in small droves, stretch



themselves in shallow depressions scratched in the soil, sandy patches being preferred. Towards sundown, when the heat of the day is somewhat modified, they commence running about to feed. Every night the Jungle Kangaroo goes to the river to drink; but the time for its visit to water may vary, and is in a remarkable way influenced by the moon at different stages.

When the full moon rises just after sundown, and practically all night throws its bright vertical light over the landscape, the animals at any time, when thirst compels them, make for water. By crescent and decrescent moon, on the contrary, when only the first and last hours of the night are dimly illuminated, sundown is for all Kangaroos the signal to seek water. They must have light; in darkness no Kangaroo dares to approach the river, and that with good reason; because at the drinking-place the hereditary foe of the species, the great *Crocodilus porosus*, is lying in wait, and, notwithstanding all precautions, its strong jaws close on many a young and inexperienced individual. Many are the victims which during lapse of time in this way have succumbed, and the species has in consequence, in especially exposed places, learnt to take its precautions to anticipate the cunning devices of the Crocodile.

Where long flat sand-banks stretch out into the river, *Macropus agilis* chooses its drinking place. Here the animals have a free view, and, what is more important, they do not need to drink at the very shore. For a distance of several yards from the water's edge they dig a hole in the water-soaked sand, patiently wait until this is filled, and thus safely quench their thirst. In places where no Crocodiles are found this course of proceeding becomes unnecessary, and is consequently not employed. These facts may be considered as illustrating to what a considerable degree difficult and strongly exposed conditions of life are capable of improving the intelligence of a species.

All night the Kangaroos are feeding in the open forest or in the plains, and shortly after sunrise they return to the jungles. Besides the Crocodile, the Jungle Kangaroo has only one enemy of importance—the aborigine; but, thanks to its cunning and the imperfect hunting methods of the native, the species is nearly everywhere exceedingly plentiful.

Sometimes this species is also found very numerous in dry

desert-like regions along the coast, and it will be here observed that its need for water is considerably modified according to its surroundings. In the desert-like sandy plains around Roebuck Bay on the coast of West Australia the species was perhaps even more numerous than along the rivers of Arnhem Land. With two exceptions, no surface-water was here to be found, and the animals quenched their thirst either by the moisture obtainable with their food, or by going to the shore of the ocean and drinking the brine.

## ON THE DISTRIBUTION OF MARINE MAMMALIA.\*

BY P. L. SCLATER, M.A., Ph.D., F.R.S.

I. *Introductory Remarks.*

MOST of the recent writers on Geographical Distribution have confined their attention to terrestrial mammals, or at any rate have but casually alluded to the marine groups of that Class. On the present occasion I wish to call your attention to some of the principal facts connected with the distribution over the world's surface of the marine or aquatic members of the Class of Mammals.

Aquatic mammals which pass their lives entirely, or, for the greater part, in the water are, of course, subject to very different laws of distribution from those of the terrestrial forms. As regards aquatic mammals, land is of course an impassable barrier to their extension, and, subject to restrictions in certain cases, water offers them a free passage. Just the opposite is the case with the terrestrial mammals, to which in most cases land offers a free passage, while seas and rivers restrain the extension of their ranges.

The groups of aquatic mammals that are represented on the earth's surface at the present time are three in number, *viz.*:— (1) the suborder of the Carnivora, containing the Seals and their allies, generally called the Pinnipedia, which are semi-aquatic; (2) the Sirenia, which are mainly aquatic; and (3) the Cetacea, which never leave the water, and are wholly aquatic. We will consider briefly the principal representatives of these three groups, following nearly the arrangement of them employed in Flower and Lydekker's 'Mammals Living and Extinct.'

II. *Distribution of Pinnipeds.*

The Pinnipeds, which I will take first, comprise three distinct families—the *Otariidæ*, the *Trichechidæ*, and the *Phocidæ*.

\* By the courtesy of Dr. Sclater we have received an advance proof of this important paper, read before the Zoological Society of London on March 16th.

Beginning with the *Otariidæ* or Eared Seals, commonly known as Sea-lions and Sea-bears, we find the greater number of the species confined to the South Polar Ocean, where they pass most of their time at sea, but, as is well known, resort to the land at certain seasons for breeding purposes. In the Atlantic Ocean, so far as I know, the Eared Seals have never been ascertained to occur further north than the estuary of the La Plata on the American coast, and the vicinity of the Cape on the African coast. But in the Pacific, on the contrary, three distinct species of *Otaria* are found all over the arctic portion of that ocean, and there are well-founded traditions of Eared Seals having been formerly met with in the Galapagos, while they still occur on the coasts of Peru and Chili. I think therefore we may assume that *Otaria* was originally an Antarctic form, but has travelled northwards along the West American coast and is now firmly established in the North Pacific. In a parallel way in the class of birds, the Albatrosses, *Diomedea*, which are essentially a group of the Antarctic Seas, are represented by three distinct species in the North Pacific.

The second family of the marine Carnivora, on the other hand, the Walruses, *Trichechidæ*, are entirely Arctic in their distribution; one species, *Trichechus rosmarus*, being peculiar to the North Atlantic, while a second nearly allied species, *T. obesus*, takes its place in the Northern Pacific.

The third family of Pinnipeds is more numerous and varied, both in genera and species, than the two preceding, and has a more extended range. The Seals, *Phocidæ*, embracing about nine different generic forms, are most numerous in the Arctic and Antarctic seas, but are also feebly represented in some intermediate localities. Beginning with the North Atlantic, we find several species of *Phoca* inhabiting various parts of this area, and the Grey Seal, *Halichoerus*, and the Bladder Seal, *Cystophora*, exclusively confined to it. In the North Pacific all the four true Seals belong to the genus *Phoca*, and three of them are identical with the North Atlantic species, but when we descend as far south as the Gulf of California on the American coast we meet with a species of Sea-elephant, *Macrorhinus*, which, like *Otaria*, has no doubt penetrated up here thus far from its ancestral abode in the Antarctic Ocean.

Returning to the Central Atlantic, we find two species of Seals



inhabiting these waters, both belonging to the same genus *Monachus*. One of these, *M. albiventer*, inhabits the Mediterranean and the adjoining coasts of the Atlantic, while the other, *M. tropicalis*, is in these days restricted to some of the smaller and less known islands of the West Indies.

The *Phocidæ* of the Antarctic Ocean all belong to genera distinct from the Arctic forms and more nearly allied to *Monachus*, the Seal of the Mid-Atlantic. They are of four species, belonging to as many genera: *Ogmorhinus*, *Lobodon*, *Leptonychotes*, and *Ommatophoca*. Besides these the Sea-elephant of the whalers, *Macrorhinus*, is essentially an Antarctic form, though now nearly extinct there, after long persecution by man. But, as already noted, it extends, or has in former days extended, far up the West Coast of America, and is still occasionally found on Santa Barbara Island on the coast of California.

### III. *Distribution of the Sirenians.*

Only two forms of Sirenians are at the present time existing on the earth's surface—the Manatee, *Manatus*, and Dugong, *Halicore*,—each representing a distinct family of the Order. The Manatee is an inhabitant of the coasts and estuaries of both sides of the middle Atlantic Ocean, one species, *Manatus senegalensis*, occurring on the African shores, and another, *M. americanus*, on the South American coast and in the Antilles. A third species, *M. inunguis*, so far as we know at present, is found only in fresh water high up the Amazons.

The Dugong, *Halicore*, is distributed from East Africa, along the shores of the Indian Ocean and its islands, to North Australia. Three species of this genus have been established: *Halicore tabernaculi*, from the Red Sea; *H. dugong*, from the Indian Ocean; and *H. australis*, from Australia; but it is doubtful how far these forms are actually distinguishable.

Besides *Manatus* and *Halicore*, a third quite distinct form of Sirenian was formerly an inhabitant of the North Pacific. This was Steller's Sea-cow, *Rhytina stelleri*, by far the largest animal of the group, which was exterminated by human agency about 1768. Fortunately, recent researches in Behring's Island have been successful in supplying specimens of its skeleton for our principal museums, and Steller, its discoverer, left to posterity a good account of its habits and anatomy.

IV. *Distribution of Cetaceans.*

Adopting the recognized division of the Cetaceans into two Suborders (Mystacoceti and Odontoceti) according as to whether their mouths are furnished with baleen ("whalebone") or teeth, we will first consider the True or Whalebone Whales, which consist of a single family *Balænidæ*, usually divided into five genera—*Balæna*, *Neobalæna*, *Rhachianectes*, *Megaptera*, and *Balænoptera*. Of these, *Balæna*, *Megaptera*, and *Balænoptera* are almost cosmopolitan—species of them, whether distinct or not is at present more or less uncertain, being met with in nearly every part of the ocean. But *Rhachianectes* has as yet been ascertained to occur only in the Northern Pacific, and *Neobalæna* in the South Polar Ocean; so that we have in these cases two well-marked local types to deal with.

The Toothed Whales (Odontoceti) are more diversified than the preceding group, and are usually held to embrace at least four existing families besides several extinct forms. The first family, containing the *Physeteridæ*, or Sperm Whales, consists of at least six genera—*Physeter*, *Cogia*, *Hyperoodon*, *Ziphius*, *Mesoplodon*, and *Berardius*. *Physeter* and *Cogia* are inhabitants of the whole oceanic area between the tropics, extending in certain localities some way beyond them. *Hyperoodon* is confined to the North Atlantic. *Ziphius* has an extensive range, and has been found in nearly every part of the ocean. *Mesoplodon* is also widely distributed, but is apparently more abundant in the Southern Hemisphere. *Berardius*, however, so far as we know at present, is restricted to the South Polar Ocean.

The third family of Toothed Whales contains only the *Platanistidæ*, or Freshwater Dolphins, which although, in some cases, at the present day entirely fluviatile, must necessarily have all descended from what were originally oceanic forms. The three known genera are *Platanista* of the Ganges and Indus, *Inia* of the river Amazons, and *Pontoporia* of the river La Plata; the last form making a connecting link between the two preceding genera and the marine Dolphins.

The fourth family of Toothed Whales, containing the Dolphins, *Delphinidæ*, is very numerous in species, and embraces at least fifteen or sixteen genera. But in spite of the efforts of Mr. True, who has recently given us an excellent summary of our present

knowledge of them,\* both the genera and species of *Delphinidæ* are still so imperfectly understood that I cannot say much about their geographical distribution. Most of the forms appear to be very widely distributed, but it may be said generally that Dolphins are most abundant in the inter-tropical seas, and less plentiful both to the north and south of them.

There are, however, two forms that are exclusively inhabitants of the North Atlantic. These are the very remarkable Narwhal, *Monodon*, in which the male is furnished with a single enormous horn-like tusk, and the Beluga or White Whale, *Delphinapterus*, closely allied to the Narwhal in many points of its general structure. These may be looked upon as quite isolated forms characteristic of the Arctic portion of the Atlantic, but not known in the Pacific.

#### V. Division of the Marine Area of the Globe into Sea-regions.

From what has been already said, it will be evident that, although many of the marine mammals have a wide distribution, others are very definitely localized; and a study of the latter will, I think, enable us to divide the oceanic portion of the globe into six sea-regions, corresponding to a certain extent with the six land-regions into which I proposed to separate the terrestrial portion of the globe in 1874, and which were subsequently adopted by Mr. Wallace in his standard work on the Geographical Distribution of Animals. I propose to call these sea-regions:—

(1) The NORTH ATLANTIC SEA-REGION OR ARCTATLANTIS (*ἄρκτος* and *ἀτλαντίς* = the daughter of Atlas), consisting of the northern portion of the Atlantic down to about 40° N. lat.

(2) The MID-ATLANTIC SEA-REGION OR MESATLANTIS (*μέσος* and *ἀτλαντίς*), consisting of the middle portion of the Atlantic down to about the Tropic of Capricorn.

(3) The INDIAN SEA-REGION OR INDOPELAGIA (*Ἰνδός* and *πέλαγος*), containing the Indian Ocean down to about the same degree of S. lat., and extending from the coast of Africa on the west to Australia and the great Oriental islands on the east.

(4) The NORTH PACIFIC SEA-REGION OR ARCTIRENIA (*ἄρκτος*

\* See "A Review of the Family *Delphinidæ*," by Frederick W. True: Bull. U.S. Nat. Mus. No. 36, Washington, U.S. 1889.

and *εἰρήνη* = *pax*), containing the northern portion of the Pacific Ocean down to about the Tropic of Cancer.

(5) The MID-PACIFIC SEA-REGION OF MESIRENIA (*μέσος* and *εἰρήνη*), containing the inter-tropical portion of the Pacific Ocean; and finally

(6) The SOUTHERN SEA-REGION OF NOTOPELAGIA (*νότος* and *πέλαγος*), containing the whole of the South Polar Ocean all round the globe south of the above-mentioned limits.

We will now proceed to consider shortly the characteristic mammals of these six sea-regions.

### VI. *The North Atlantic Sea-region, or Arctatlantis.*

Amongst the Pinnipeds two well-marked generic forms, the Grey Seal, *Halichoerus*, and the Bladder Seal, *Cystophora*, are exclusively confined to Arctatlantis. The True Seals, *Phoca*, and the Walrus, *Trichechus*, are found in this region and in Arctirenia; and of the former genus three species—*P. vitulina*, *P. grælandica*, and *P. barbata*—are actually common to both these sea-regions, while the Walruses—*Trichechus rosmarus* and *T. obesus*—of the two sea-regions are perhaps somewhat doubtfully distinguishable. It may be easily understood how this has come to pass, because the Seals and Walrus may in the course of time, during unusually mild summers, have extended themselves along the north coast of the American continent into the Northern Pacific. But Arctirenia, as we shall presently show, is markedly distinguishable from Arctatlantis by the presence of Eared Seals, *Otaria*, which are utterly unknown in the whole of the Atlantic area. *Otaria* is, in fact, as regards Arctatlantis, what I have called on previous occasions (see P. Z. S. 1882, p. 311) a “lipotype” of Arctatlantis, but what I now propose to designate a “lipomorph.”\*

\* On former occasions I have used the term “lipotype” for a natural group which characterises a particular locality by its *absence*. It would, however, perhaps be better to change the term to “lipomorph,” because the type and its compounds have been generally employed in reference to the particular specimens of a species upon which original descriptions are based (*cf.* Thomas, P. Z. S. 1893, p. 241). In the same way a natural group which characterises a particular country may be called a “topomorph” (*τόπος*, *locus*, and *μορφή*, *forma*). Thus, in Africa *Giraffa* and *Phacochærus* would be “topomorphs,” and *Cervus* and *Ursus* would be “lipomorphs.”



The Sirenians are entirely absent from the North Atlantic, and constitute another lipomorph of that area.

Coming to the Whales, we find the Mystacoceti well represented in the North Atlantic by *Balæna*, *Megaptera*, and *Balænoptera*, but of these the two latter are almost universally distributed over the ocean, and *Balæna* recurs again in the North Pacific, as well as in more southern latitudes; so that there is no genus of Whalebone Whales peculiar to Arctatlantis, although the great *Balæna mysticetus* has never been found elsewhere.

Proceeding to the Odontoceti, the case is different. Amongst the *Physeteridæ*, *Hyperoodon* is confined to Arctatlantis, and, as already explained, two very well-marked types of the *Delphinidæ*, *Delphinapterus* and *Monodon*, are likewise exclusively denizens of the North Atlantic Ocean. Arctatlantis therefore may be said to be well characterized by the possession of at least five genera of marine mammals not found elsewhere, viz. *Halichærus*, *Cystophora*, *Hyperoodon*, *Delphinapterus*, and *Monodon*.

#### VII. *The Middle Atlantic Sea-region, or Mesatlantis.*

Mesatlantis has certainly not so many forms of marine mammals confined to its area as Arctatlantis, but there seem to be good grounds for its separation. As we descend towards the tropics the True Seals, *Phocinæ*, which are constituted to live in colder water, gradually fall off in number, and in Mesatlantis are no longer met with. But in their place we find the genus *Monachus*, or Monk Seal, restricted to Mesatlantis; one species, *M. albiventer*, occurring in the Mediterranean and on the North African coast; and a second, *M. tropicalis*, being found in the West Indies. Mesatlantis is likewise the true home of the well-marked Sirenian genus *Manatus*, one species of which, *M. americanus*, frequents the coast of America, and another, *M. senegalensis*, that of Africa.

As regards the Cetaceans, we are not able to say that Mesatlantis, although well furnished with many generic types of this order, has any one peculiar to it. We must therefore rest content with assigning two genera of marine mammals, *Monachus* and *Manatus*, as characteristic forms or topomorphs of the sea-mammal-life of Mesatlantis.

VIII. *The Indian Sea-region, or Indopelagia.*

The Marine Carnivora, so far as we know, are entirely foreign to Indopelagia, but the Sirenians are well represented by the Dugong, *Halicore*, which pervades all its northern coasts from North Australia to India and the Red Sea, and down the African coast to Lamu.\* Whether the species of *Halicore* found at different points within this area are the same or different is still a matter of discussion, but there can be no doubt that *Halicore* is an exclusive inhabitant of Indopelagia. As regards the Whales of Indopelagia, we know that *Physeter*, *Cogia*, and *Ziphius*, and numerous forms of *Delphinidæ*, occur there; but I am not aware of any cetacean that is entirely restricted to this sea-region.

IX. *The North Pacific Sea-region, or Arctirenia.*

As was pointed out when speaking of Arctatlantis, Arctirenia has one genus of *Phocidæ* (*Phoca*) in common with the North Atlantic, and three of the species of this genus appear to be actually identical in these two sea-regions, whilst a fourth *Phoca*, *P. fasciata*, is only found in the North Pacific. The Walrus, *Trichechus*, is again a form of marine mammals common to both the great northern sea-regions. But the feature of Pinnipedian life that absolutely distinguishes Arctirenia from Arctatlantis is the presence in the former of three (if not four) well-marked species of the Eared Seals, *Otariidæ*, which are absolutely unknown in the vast extent of the Atlantic down at least to 30° S. lat.

Arctirenia has unfortunately lost its Sirenian, Steller's Seacow, *Rhytina stelleri*, the largest and finest modern representative of this formerly prevalent group, which since the days of the Pleistocene has greatly diminished in numbers; but I think we may still treat *Rhytina* as one of the characteristic forms of the Arctirenian sea-region. The North Pacific is also even at the present day the sole possessor of a remarkable genus of Whalebone Whales which combines the long head and elongate form of *Balænoptera* with the smooth skin of the throat and absence of the dorsal fin of *Balæna*.† This is the Grey Whale, *Rhachia*.

\* A fine specimen of the Dugong from Lamu (on the east coast of Africa, lat. 2° 50' S.), obtained by Mr. J. C. Haggard in 1885, is in the British Museum.

† Flower and Lydekker, 'Mammals,' p. 241.

*nectes glaucus*, of Cope, which in these days is confined to the North Pacific, and does not range farther south than the 20th parallel in that ocean. At the same time it should be stated that indications have been discovered that a nearly allied form existed in the Atlantic in previous geological ages, though this is by no means certain. Besides *Rhachianectes*, *Balæna*, *Megaptera*, and *Balænoptera* are all represented in the North Pacific, and also many species of *Delphinidæ* of which little is at present known. But *Rhytina* and *Rhachianectes* are the only genera of marine mammals absolutely confined to Arctirenia.

#### X. *The Middle Pacific Sea-region, or Mesirenia.*

The Eared Seals, *Otaria*, must have necessarily passed through Mesirenia in their passage from south to north, though the only record of their recent presence in the central part of the Pacific is, so far as I know, the report that they were formerly found in the Galapagos. It should be stated, however, that Tschudi records the occurrence of two species of *Otaria* on the islands of the coast of Peru, and that in 1802 Humboldt met with an Eared Seal on the island of San Lorenzo, in the bay of Callao, which is only some 12° south of the equator.

Like *Otaria*, the Sea-elephant, *Macrorhinus*, has apparently in former ages travelled up the South American shores and established itself as far north on the coast of California as about 34° N. lat. The California Sea-elephant has been discriminated by Gill as a distinct species, *Macrorhinus angustirostris*, but its differences from the southern form, *M. leoninus*, seem to be but trifling.

As regards the Cetaceans of Mesirenia, our information is at present very imperfect, and I have little to say except that species of *Megaptera*, *Balænoptera*, *Physeter*, *Cogia*, and *Ziphius* certainly occur there, besides many representatives of the widely spread *Delphinidæ*.

#### XI. *The Southern Polar Sea-region, or Notopelagia.*

The wide ocean which surrounds the Southern Pole on every side, and extends up to 40° S. lat., seems to present, as regards its marine mammals, a nearly homogeneous fauna, which we will now briefly consider. In the first place it contains represen-

tatives of four genera of true *Phocidæ*: *Ogmorhinus*, *Lobodon*, *Leptonychotes*,\* and *Ommatophoca*, which are peculiar to the southern seas, and are quite distinct from all their northern representatives in the Arctic Ocean. The Sea-elephant, *Macrorhinus*, is also a denizen of Notopelagia, though, as we have already seen, it has wandered north along the South American coast far into Mesirenia.

Like *Macrorhinus*, *Otaria* also, containing the group of Eared Seals, appears to have been originally an Antarctic group, and the greater number of its species, although nowadays very much reduced in numbers, are still found in the Southern Ocean. But the *Otariæ* have travelled still further north than *Macrorhinus*, and three, if not four, species, as already stated, are in these days well established inhabitants of Arctirenia.

The Sirenians are absent from Notopelagia, but Cetaceans of every kind are abundant. Besides one or more representatives of the true Whalebone Whale, *Balæna*, Notopelagia has a smaller representative of the group, *Neobalæna*, entirely restricted to its area. It has also representatives of *Megaptera* and *Balænoptera*, though it is doubtful how far they are even specifically distinct from some of their northern representatives.

Among the Toothed Whales, *Odontoceti*, we find a large Ziphioid form, *Berardius*, restricted to the Notopelagian area, while *Ziphius* and *Mesoplodon* also occur there. The Dolphins, *Delphinidæ*, are likewise numerous, and present some distinct species, but not, so far as our present knowledge extends, any generic forms that do not occur elsewhere.

But Notopelagia is sufficiently distinguished from all the five more northern sea-regions by possessing four genera of Seals and two of Cetaceans entirely restricted to its area.

## XII. Conclusions.

It has therefore, I think, been shown that for the geography of marine mammals, the ocean may be most conveniently divided into six Sea-regions, which are as follows:—

I. REGIO ARCTATLANTICA, characterized by its Seals, *Phocinæ*, of which two genera, *Halichærus* and *Cystophora*, are peculiar,

\* This generic term, established by Gill in 1872, seems to take precedence of *Pacilophoca*, proposed by Flower and Lydekker for the same type, *L. weddelli*, in 1891. Cf. Allen, 'North American Pinnipeds,' p. 418.



whilst *Phoca* is common to it and Arctirenia; by the absence of Sirenians; and by the possession of three peculiar genera of Cetaceans, *Hyperoodon*, *Delphinapterus*, and *Monodon*.

II. REGIO MESATLANTICA, sole possessor of the Monk Seal, *Monachus*, amongst the Pinnipeds, and of the Sirenian genus, *Manatus*.

III. REGIO INDOPELAGICA, characterized by the presence of the Sirenian *Halicore* and by the absence of Pinnipeds.

IV. REGIO ARCTIRENICA, with *Phoca* like the Regio Arctatlantica, but having *Otaria* also; the home of the (now extinct) Sirenian *Rhytina* and of the endemic Cetacean *Rhachianectes*.

V. REGIO MESIRENICA, without true Seals, *Phocinæ*, but having *Otaria* and *Macrorhinus* from the south; no Sirenian known.

VI. REGIO NOTOPELAGICA, characterized by four endemic genera of *Phocidæ*, and by the presence of many *Otariæ*; without Sirenians, but with two endemic forms of Cetaceans, *Neobalæna*, and *Berardius*.

In conclusion I will call attention to some of the more remarkable points in the general distribution of the marine mammals, and to their apparent significance.

In the first place, it is evident that the Pacific has much more in common with the Notopelagian region than the Atlantic. *Otaria* and *Macrorhinus*, quite unknown in the Atlantic, extend themselves to the northern extremity of the Pacific, the former pervading that ocean up to Behring's Straits, and the latter reaching to the Californian coast. It follows that in former ages there must have been some barrier in the Atlantic which did not exist in the Pacific to stop their progress northwards. The only barrier I can imagine that would have effected this must have been a land uniting South America and Africa, across which they could not travel. Adopting this hypothesis, we have at the same time an explanation of the presence of the Manatee on both the American and African coasts. The Manatee could hardly live to cross the Atlantic. It is only found close to the coast, where it browses on sea-weeds and other vegetable food in shallow water. How did it travel from America to Africa (or *vice versa*), unless there were a continuous shore-line between them? The same may be said of the Monk Seal, *Monachus*, of which one species

lives in the Mediterranean and on the African coast and islands and another in the West Indies. We can hardly believe that these creatures could easily traverse the whole Atlantic. The hypothesis of a former barrier of land between Africa and America, which we know is supported by other facts of distribution,\* would alone explain the difficulty.

On the other hand, in the Pacific we find no such break between the north and south. The aquatic mammals of Notopelagia have evidently had free access to the whole Pacific for a long period and have well availed themselves of this facility.

Again, while the great Southern Ocean exhibits a considerable uniformity of marine mammalian life, we see the Northern waters divided into two distinctly recognizable regions by the interposed masses of land. All these facts, with the one exception of the supposed Atlantic Barrier, would tend in favour of the now generally accepted doctrine that the principal masses of land and water are not of modern origin, but have existed mainly in their present shapes throughout all ages.

#### TOPOMORPHS OF THE SIX SEA-REGIONS.

- (1) ARCTIATLANTIS.—*Halichærus*. *Cystophora*.—*Hyperoodon*.  
*Delphinapterus*. *Monodon*.
- (2) MESATLANTIS.—*Monachus*.—*Manatus*.—*Inia*. *Pontoporia*.
- (3) INDOPELAGIA.—*Halicore*.—*Platanista*.
- (4) ARCTIRENIA.—*Otaria*.—*Rhytina*. *Rhāchianectes*.
- (5) MESIRENIA.—*Otaria*. *Macrorhinus*.
- (6) NOTOPELAGIA.—*Ogmorhinus*. *Lobodon*. *Leptonychotes*.  
*Ommatophoca*. *Otaria*.—*Neobalæna*. *Berardius*.

\* Cf. Wallace, Geogr. Distrib. i. 156.

## O B I T U A R Y.

## EDWARD DRINKER COPE.

BY the death of Prof. Cope, of Philadelphia, which took place on April 12th, Biology in America has sustained its greatest loss since the decease of Agassiz, and as zoologist, as well as both geologist and palæontologist, his life work demands recognition wherever zoology is a cultivated science and pursuit.

Prof. Cope was born in Philadelphia on July 28th, 1840, took his degree of Ph.D. at Heidelberg in 1864, and during the remainder of a busy life effected much for the ever-growing knowledge of both living and extinct animal life in his own land. He became successively Professor of Natural Science in Haverford College, a member of many of the well-known United States Geological Expeditions, Vertebrate Palæontologist to the Hayden Survey, Professor of Geology and Mineralogy at Pennsylvania University, and subsequently Professor of Zoology and Comparative Anatomy. He was also a chief editor of our esteemed contemporary the 'American Naturalist,' and in 1895 President of the American Association for the Advancement of Science.

It is impossible here to fully refer to his zoological work, which lay among the vertebrata, and which has formed the subject of very many papers, and also the contents of several handsome volumes. These are sometimes somewhat overlooked by referring only to his philosophical opinions. It is not infrequent to see a popular zoological generaliser considered as possessing the technical knowledge of a zoologist, while as often a specialist who indulges in the philosophical discussion of his subject is looked upon chiefly as a man of views and theories. Prof. Cope combined both qualities. To a most exhaustive and accurate knowledge of his subject, both living and fossil, was added a power of drawing conclusions and advancing opinions which, while always displaying a great intellect, were frequently considered heretical by the holders and promulgators of different views and other theories on organic

evolution. His recent work on 'The Primary Factors of Organic Evolution' is a case in point, and it is well to remember that to really keep abreast of the current biological thought of the day it is necessary to read and study Cope and Eimer as well as Wallace and Weismann.

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We have also to record the deaths of the following zoologists:—

MAJOR CHARLES E. BENDIRE, who died at Jacksonville, Florida, U.S.A., on February 4th, was born in Hesse Darmstadt, on April 27th, 1836, and went to America in 1852, where he undertook considerable military service. As an ornithologist he will be perhaps best remembered by his well-known 'Life Histories of North American Birds,' of which the second volume recently appeared, leaving the whole work, however, less than half completed. We learn from 'The Auk' that his immense collection of birds' eggs, gathered during his military wanderings, long since became the property of the United States National Museum, where their donor had held for some years the position of Honorary Curator of the Department of Oology.

SIR EDWARD NEWTON, K.C.M.G., died at Lowestoft on April 25th, in the sixty-fifth year of his age. He held several important Colonial Government appointments, and he was fortunately a member of the mission sent by the government of Mauritius to congratulate the late King of Madagascar on his accession to the throne, when, according to 'Nature,' being an ardent ornithologist, he seized the opportunity (as he did during a subsequent visit made with that express purpose) to materially increase the knowledge of the very peculiar fauna of that country, which he was almost the first English naturalist to investigate on the spot. He also largely increased our knowledge of the zoology of the Mascarene Islands, and it was mainly due to his exertions that nearly complete skeletons of the "Solitaire" of Rodriguez were recovered from the caves of that island, as described in the 'Philosophical Transactions' of the Royal Society. Sir Edward was also one of the founders of the British Ornithologists' Union.

MR. HUGH NEVILL, F.Z.S., of the Ceylon Civil Service, died at Hyères on April 10th. Mr. Nevill had been an indefatigable collector during twenty-seven years' service, had discovered and described many new species in zoology, and had contributed many specimens to our museums. Quoting from the 'Athenæum,' "his collection of birds passed to the late Marquis of Tweeddale; but a large and very complete collection of certain genera of shells remains."



## NOTES AND QUERIES.

## MAMMALIA.

## CHIROPTERA.

Long-eared Bats and their Food.—Along the valley of the Dowles Brook, in the Wyre Forest, this little Bat is numerous. Whilst watching their movements I found they were working the sallow-trees along the stream-sides, feeding upon the dissipated little *Noctuæ* that can always be found intoxicating themselves upon the bloom in the early spring. One or more Long-eared Bats could frequently be seen circling around the tops of the bushes; and when a moth attracted their attention they would steady themselves in their flight, and with quivering wings (which sometimes gave one an impression of their perching), seize their prey, frequently from off the bloom itself. After thoroughly working one bush they made off to another for the same purpose, when doubtless within a short space of time sufficient food for that night would readily be taken. Whilst watching these little creatures I was surprised at their inquisitiveness and utter fearlessness in my presence; occasionally one would leave the bush and circle around within a few inches of my face and body, its presence often only being recognized by the vibration of the air, which gave one a very uncanny feeling.—J. STEELE ELLIOTT (Dixon's Green, Dudley).

## INSECTIVORA.

Lesser Shrew in Cheshire.—On March 27th I was pleased to find the skull of a Lesser Shrew, *Sorex minutus*, in an owl-pellet obtained in Dunham Park. This is the second example recorded from Dunham Park, and the fourth from the county. Fifty-four pellets, taken from the foot of two trees, showed the following result on analysis:—Eight Sparrows, one Blue Tit, one Rat, fourteen House-mice, twenty-six Long-tailed Field Mice, one Water Vole, sixty Field Voles, three Bank Voles, forty-nine Common Shrews, three Water Shrews, and one Lesser Shrew. Although the Bank Vole is common in Cheshire, it is very much rarer than the Field Vole on the park-land.—T. A. COWARD (Bowdon, Cheshire).

## AVES.

**Honey Buzzard in Staffordshire.**—I have been fortunate enough to save from oblivion a beautiful specimen of *Pernis apivorus*. Acting on information received, I visited the cottage of a keeper, and induced him to sell me the bird for my collection. It was shot by this keeper at Little Aston, Staffordshire (within a few yards of the adjoining county of Warwickshire), on June 16th, 1894. It had been set up and made into one of those idiotic distortions which are so dear to the hearts of the old type of bird-stuffer; but, thanks to the unrivalled taxidermic skill of Mr. F. Coburn, it has now been made into a specimen of rare grace and beauty. Judging by its large size, the specimen was evidently a female, and as there was a large patch on the abdomen denuded of feathers, it was probably breeding. The man said that the bird was on the topmost branch of a tall tree when he shot it, and there were several large nests about, but they might have been Rooks' nests for all he knew. The bird is of the dark form, the whole of the upper and under parts being of a rich dark brown. I can only find one previous record for this bird in Staffordshire, and none for Warwickshire. Garner, in his 'Natural History of the County of Stafford,' page 271, says, "Shot this summer at Trentham," but gives no date; however, as the book was published in 1844, it may have been in 1843 or 1844. E. BAYLIS (Stafford Street, Birmingham).

**Long-eared Owl breeding in Essex.**—While walking through Pheasant-house Wood, Little Baddow, with my boys, on April 15th, I noticed an Owl flit noiselessly out of a large Scotch fir; seeing a squirrel's drey or old crow's nest, one of my sons made an inspection, and soon disturbed the other Owl. The nest contained two eggs. We again saw the Owls in the same tree on April 23rd, so trust they may be successful in bringing off their brood. In Miller Christy's 'Birds of Essex' (p. 155) we read, "I never actually heard of its breeding in the county, except at Harwich, though it has probably done so elsewhere."—EDWARD A. FITCH (Maldon, Essex).

**Food of the Knot.**—In the early autumn the great stretches of sand which extend along the north Norfolk shore from Hunstanton to Blakeney are the resort of innumerable waders. Knots and Dunlins are perhaps the most abundant of these migratory hosts. The chief food of these two species is a little gasteropod, *Paludestrina ulva* (Pennant), which occurs in countless numbers on these sand-flats. I examined the contents of the stomachs of a large number of these birds last September, and in every instance the small mollusc above mentioned composed the principal food of the Knot. In order to render the identification complete of the Mollusca found in the Knots, I submitted the contents of the stomachs of five individuals killed in September to Mr. Edgar A. Smith, F.Z.S., of the British

Museum (Natural History). With his usual kindness he sent me the following reply :—“ The shells contained in the five bottles are *Paludestrina ulvæ* (Pennant), commonly called *Hydrobia ulvæ* in books. As *Hydrobius*, which is practically the same as *Hydrobia*, was preused in insects, I think it advisable to employ D'Orbigny's name *Paludestrina*. It is a common species in most estuaries. Bottle six (contents of stomach of Golden Plover) contains three species, *viz.* the same *Paludestrina*, several specimens of *Littorina rudis*, Maton., and a single example of *Alexia myosotis* (Draparnaud). The *Alexia* is also estuarine, and the *Littorina* may be found both on the coast and in the mouths of rivers.” — H. W. FEILDEN (Wells, Norfolk).

**White Wagtail nesting in Suffolk.**—On April 26th I took a nest with five eggs of the White Wagtail, clearly identifying the hen bird on the nest, and also when she settled on the ground a few yards off. The nest was built in the side of a cattle-shed, and the farm-lad who showed it to me had watched it for some time, and assured me that both birds were alike. We have had more than one instance of the Pied and White Wagtails interbreeding in the Eastern Counties. I refrain from recording the precise locality of this nest, as I do not wish the parent birds to be killed; but it is in West Suffolk, and within an easy walk of this house.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

**Red-legged Partridge Migrating.**—Supplementary to Mr. Clarke's note (*ante*, p. 166), it may be worth while stating that on the 16th March last one of Mr. Edwin Baylis's boatmen found a Red-legged Partridge dead on the beach at Bournemouth, and forwarded it to him here. The bird had been washed in by the tide, and was so exceptionally clear and brilliant in its colours that it has been mounted for Mr. Baylis's collection. This seems to point to the fact that a considerable migration of these birds may have taken place between March 16th and 22nd. I thought the fact that these birds did occasionally migrate was now fairly well established.—F. COBURN (7, Holloway Head, Birmingham).

#### REPTILIA.

**The Australian “Rock-Lizard.”**—This species, *Amphibolurus muricatus*, White, is one of the commonest of Australian Lizards, and abounds principally in rocky situations. Its habits are sharp and active. When watching an object it raises its (comparatively) large head high above the ground and, twisting it on one side, blinks in a comical manner. In shape the head is not unlike that of the Frilled Agama, *Chlamydosaurus kingi*. I have been much struck with the habit this Lizard has (in common with many other animals) of feigning death when caught or wounded.

I once gave one a pretty severe knock with a stick, and, supposing it to be dead, put it in my pocket, from which it escaped half an hour after as I walked along. Once more I struck it, and thought there could be no doubt of its death; but, happening to look about ten minutes after, I noticed it cautiously opening its eyes. On another occasion I experimented with one which had been in my possession for some time. I took it up by the middle, when it directly let its head and tail droop and closed its eyes, simulating death. I then laid it on its back (which was a very uncomfortable posture, considering that its back was bent into a bow-shape), and it remained in that position with its head and long tail quite stiff and not touching the ground. After about fifteen minutes had elapsed it cautiously opened one eye, but otherwise did not move until half an hour had elapsed, when it slowly turned its head round, suddenly jumped up, and ran away. When chasing its prey, or when being pursued, this species darts along with great rapidity, but often takes no notice of an intruder, relying on its colour, which assimilates so readily with the surrounding rock that it is sometimes very difficult (even when quite close) to distinguish it. It is oviparous. The tongue, which is full and rounded at the extremity, is covered with a viscous fluid, by help of which it secures its prey, which consists of spiders, insects, &c. The ordinary length of a full-grown specimen is about fifteen inches, two-thirds of which are taken up by the tail.

I have never met with a more variable species. Specimens taken from each end of the scale of variation would undoubtedly be regarded as distinct species were it not for the connecting links. Some have the dorsal ridge distinctly serrated, while in others it is quite smooth. Again, as regards coloration, many of them have a row of oblong-ovate spots of a light French-grey colour (quite distinct from one another) on each side of the dorsal ridge, while in others these spots are so connected as to form one straight wide band. Another noticeable character is change of colour by heat. The largest specimen I procured, and which was found under a stone on a cold day, was, when caught, a dull slaty colour, almost black; but, on looking at it after a few days, I was surprised to find it changed to a mottled grey colour, with light spots along each side of the median ridge. I have observed since that on cold mornings before the sun shines it is the dark colour, but as the warmth increases it gradually becomes lighter in hue, until it assumes the pale colour before mentioned. This Lizard is sometimes externally infested with a species of tick, and internally with two or more species? (or varieties) of Entozoa.—DAVID G. STEAD (Sydney, N. S. W.).



## PISCES.

Large Holibut at Isle of Man.—A fine Holibut, *Hippoglossus vulgaris*, was brought into Ramsey Market on April 8th, having been taken by the trawl-boat 'Swift' off Bahama Bank. I saw it at the fish-dealer's (Aldritt's), and found it measured 6 ft. 6 in. by 2 ft. 6 in., and 8 in. thick. I asked that it might be weighed, but on my return found that it had been cleaned and packed to be sent across the water. I now hear that it was then weighed at 200 lbs. About 14 lbs. had been removed in the cleaning of it. In its stomach was a whole cod and many fish-bones. I have a note of one taken at the same place in November, 1891 (140 lbs.), in which was a recently swallowed cod. Day, in his 'British Fishes,' quotes Lacépède to the effect that in Greenland these fish "appeared to prefer localities also frequented by the cod, as they probably seek the same food." Evidently it simplifies matters to make one mouthful of the cod and his food together. It appears that in April, 1829, an example, 7½ ft. long and 320 lbs. weight, was taken off the Isle of Man, one of the largest recorded in the British Islands.—P. M. C. KERMODE (Ramsey, Isle of Man).

Occurrence of the Cuckoo Ray at Great Yarmouth.—Couch, in describing this Ray, remarks that "this well-marked species has been overlooked or mistaken by many naturalists." Such appears to have been locally the case, for, until Feb. 4th, it remained unidentified in this neighbourhood, when a message from a fish merchant reached me to the effect that "a queer Skate had turned up." The gentleman referred to (amongst others) keeps an eye open for "strangers." Hence the opportunity afforded of examining what turned out to be a very interesting take. This fish was caught on the hooks of a steam long-liner sailing out of this port, and fishing along the coast as far as Grimsby, returning every two or three days with her catches. The Ray was yet "stiff" and ungutted. It was a 26-inch female, and contained eggs running from the size of snipe-shot to chestnuts. Couch hints that its spawning-time may be December, but leaves a wide margin when remarking he had seen eggs just ready to be shed in July. The fish much resembles a "Honer," *Raia maculata*, in shape and build. Colour yellowish drab, verging on to red at the fin-borders. The surface of the disc (back) is adorned with short spines, a half-circular row of which defend the back of each eye; a triangular group decorate the "shoulders," whilst the tail, which is stout at the origin, tapers off posteriorly, and has two fins near the end. It has a gutter-like depression running its whole length, protected on either side by five rows of spines. The pair of marbled circular blotches, of black and white, each the size of a half-crown, are very distinct. The specimen has been preserved for Yarmouth Museum.

A somewhat smaller male came to hand on Feb. 16th, whilst a third

I secured on April 16th was forwarded to Norwich Museum. Two, which I did not see, were brought in contemporaneously with the last, and were cut up for sale. Thus in a few weeks, and of a species not before locally identified, five specimens have occurred off the coast, and it may undoubtedly lay claim to insertion in the county list.—ARTHUR PATTERSON (Yarmouth, Norfolk).

#### INSECTA.

Birds feeding on the Larvæ of the Magpie-moth.—I was interested in reading the note in connection with this species, *Abraxas grossulariata* (*ante*, p. 169), I see that Mr. Butler, in the work on British Birds and Eggs, with illustrations by Mr. Frohawk, now in course of publication, states "that no bird will touch the larvæ of the Gooseberry Moth," by which, I take it, he means *Abraxas grossulariata*. I can assure him that the Cuckoo will do so readily. Some years ago, in a large orchard of ours, the gooseberry and currant trees were infested with this pest, and at the same time numbers of Cuckoos appeared. We did not connect the two at first, but my father shot one bird, and its stomach was found to be crammed with these obnoxious larvæ.—OXLEY GRABHAM (Heathwold, Goathland).

#### MOLLUSCA.

Early Snails.—On Christmas Day, 1896, at about 10 a.m., I saw a Snail, *Helix nemoralis*, adult, extended at full length, and crawling along the road. A good deal of rain had fallen during the previous night. On March 2nd of the present year I again met with this species abroad. This also was a full-grown specimen, and was found crawling on a wet piece of wood at the edge of a ditch. *Limnaea peregra* is often to be seen here crawling about in numbers as early as February.—G. T. ROPE (Blaxhall, Suffolk).

## NOTICES OF NEW BOOKS.

*Man and Woman: a Study of Human Secondary Sexual Characters.* By HAVELOCK ELLIS. Walter Scott Limtd. 1896.

THIS publication forms a recent addition to the "Contemporary Science Series," of which the first volume, which appeared in 1889, was written by Geddes and Thomson, and devoted to the question of the "Evolution of Sex"—a biological problem of no mean importance, and one which few zoologists have not in some form, or at some time or other, been forced to consider. There is therefore a somewhat natural sequence in Mr. Ellis's more special contribution to a knowledge of the real differences which divide the human sexes—a study of the deepest importance to the anthropologist and of no little interest to the zoologist. Perhaps no fact in nature has been more universally observed, and as well by the ignorant peasant as by men of the highest culture, that in thought and sentiment men and women are diverse. But, as our author observes, though perhaps with some asperity:—"For the most part questions of sexual difference have been left of recent years to magazine essayists—whose lucubrations are generally too slight and too purely literary to deserve mention—and to philosophers; of the latter, Lotze, Schopenhauer, and Herbert Spencer have perhaps touched the matter with most acuteness, though perhaps in an incomplete and one-sided manner." This, however, can scarcely be said of Darwin's masterly exposition of "Sexual Selection in relation to Man," with which the question in recent years was really focussed.

One of the main contentions of Mr. Ellis is that woman is not "undeveloped man," but rather that "women remain somewhat nearer to children than do men." To understand the gist and real tendency of this argument it is necessary to remember that in animal life there is much deterioration, or departure from the evolutionary ideal in the adult stage. "The infant ape is very much nearer to man than the adult ape." "The ape starts in life

with a considerable human endowment, but in the course of life falls far away from it; man starts in life with a still greater portion of human or ultra-human endowment, and to a less extent falls from it in adult life, approaching more and more to the ape." Woman is therefore on these lines not degraded by the comparison of an infantile diathesis.

Whether, however, the reader who peruses the wonderful array of facts marshalled in this book—and there is not a dull page—will come to the same conclusion as the author is a very open question, but assent or dissent on this point is unnecessary to the real value of the volume, which may be called a monograph of human sexual variation. In conclusion, we heartily concur with Mr. Ellis in the view that "To arrive at any reliable knowledge of mental sexual differences it is no longer enough to formulate suggestive impressions or brilliant theories. These have a certain interest and value, it is true, but they have no part in any knowledge that can be called science. It is along the lines of precise experiments that we may reasonably hope to obtain a more definite and objective knowledge of mental differences."

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*Society for the Protection of Birds.* — "Educational Series."

Edited by H. E. DRESSER, F.L.S., F.Z.S. Part I., containing Nos. 1 to 11 inclusive. 'Knowledge' Office. 1897.

THERE sometimes seems an impression abroad that ornithologists are a body of enthusiasts who seek to destroy birds in order that they may study them afterwards; and it is not long since that the present Editor was told that 'The Zoologist' was a magazine devoted to chronicling the details of bird slaughter. At all events the "Society for the Protection of Birds" receives the support of some of the ornithologists well known to our readers, for these "Educational Series" are not only edited by Mr. H. E. Dresser, but include among the contributors the names of Thomas Southwell, O. V. Aplin, and J. A. Harvie-Brown.

It is to be hoped that this little publication may be circulated broadcast over the country; in fact, we should be glad to see it made the occupation for a few ornithological colporteurs. We are not among the fanatics who decry the necessary process of addition to the ornithological cabinets, which has afforded us



delight and instruction in the past, and is still anticipated as a cherished hope of the future, but there are birds in this country—to go no further afield—to which only organised protection can prevent ultimate extermination, for ignorance of their habits is a principal cause of their destruction. In this first instalment of the series, the birds described are Owls, Woodpeckers, Starlings, Swallows, Kingfisher, Osprey, Dippers, Nightjar, Titmice, Kestrel, and Plovers, and a woodcut is given of each, so that he who reads can clearly understand. Not only are their food and habits enumerated, but the penalties for their destruction are clearly detailed, a perusal of which will certainly surprise many a bird-nesting boy and amateur bird-catcher.

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*A Hand-Book to the Order Lepidoptera.* Vol. IV. Moths, Part II.  
By W. F. KIRBY, F.L.S., F.E.S., &c. W. H. Allen & Co.,  
Limtd. 1897.

THIS is another volume of "Allen's Naturalists' Library," and forms part of the section devoted to Entomology, a subject entrusted to Mr. W. F. Kirby. The present volume refers to thirteen families of moths, of which the Sphingidæ, Bombycidæ, Saturniidæ, and Lasiocampidæ are perhaps the most generally known to most readers. Many of the more important genera and species are described from all parts of the world—a special and fuller treatment being accorded to our British species—and the coloured plates, of which there are no fewer than thirty-one, contain representations of some species not before figured, and others of great rarity. But useful and interesting as these features are, this book will be more often consulted for an excellent essay "On the Systems of Classification of Moths," and a still more important "Sketch of the Literature of Lepidoptera." Mr. Kirby is well known as one of the best entomological bibliographers of the day, and therefore in these articles we find a most accurate condensation of literary information which an amateur will find instructive, and a specialist interesting reading.

The first essay, devoted to a retrospect of the principal systems proposed for the classification of moths, commences with that of Linnæus in 1758, and terminates with that of Dr. Packard in 1895. A survey, or rather a study, of these propositions, made in a

fairly eclectic spirit, cannot fail to be advantageous to the method of a cabinet arrangement, even if leading to no higher biological conception.

In the sketch of the literature of Lepidoptera we are somewhat appalled by being reminded that "eighteen languages at least are employed in entomological works at the present day." *Class A*, of which a knowledge is considered necessary, includes English, French, Latin, and German. *Class B*, important but less necessary, comprises Dutch, Swedish, and Russian. *Class C*, valuable, but still less necessary, contains Italian, Spanish, Portuguese, Danish, and its near ally Norwegian. *Class D*, sometimes wanted, as Polish, Czech, and Magyar. *Class E*, probably unimportant, in which is enumerated Croatian, modern Greek, and Japanese. We are consoled by the reflection that though we know many entomologists, we are unacquainted with any possessing such polyglot accomplishments.

The faunistic bibliography given by Mr. Kirby is an excellent compilation, containing all that must be consulted for a primary knowledge of the Lepidoptera of the various regions detailed. There is also to be found a good list of the principal "books on Lepidoptera in general."

## EDITORIAL GLEANINGS.

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A CONSIDERABLE amount of interest attached to the sale by auction, on April 13th, at Messrs. J. C. Stevens's Rooms, in King Street, Covent Garden, of a very fine and perfect specimen of an egg of the Great Auk. There was a large attendance, and after a spirited competition, the bidding starting at 100 guineas, quickly rose by five and ten-guinea bids until the sum of 280 guineas was reached, at which price it was knocked down to Mr. T. G. Middlebrook. During the last twenty years the pages of this Journal have recorded the sales of several of these high-priced eggs, in the same well-known sale-rooms:—

‘Zoologist,’ vol. iv. p. 365 ...	July 2nd, 1880 ...	2 eggs ...	£100 and £105 2s.
,, ,, xii. p. 28 ...	Dec. 13th, 1887 ...	1 egg ...	£168.
,, ,, ,, p. 143 ...	Mar. 12th, 1888 ...	1 ,,	£225.
,, ,, xviii. p. 108 ...	Feb. 22nd, 1894 ...	1 ,,	£315.
,, ,, xix. p. 193 ...	April 23rd, 1895 ...	1 ,,	£189.
,, ,, ,, p. 269 ...	June 25th, 1895 ...	1 ,,	£173 5s.
,, ,, xx. p. 192 ...	April 20th, 1896 ...	1 ,,	£168.

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MR. THOMAS THOMPSON writes (‘Newcastle Daily Journal,’ April 28th), that “on the 20th March he noticed a Thrush’s nest in a yew tree in his orchard at Winlaton, and on the 27th it contained Black-bird’s eggs, the old female Blackbird flying off. He also saw the male Thrush at different dates sitting very close in the nest on the young birds, but on Friday, the 23rd inst., on examining the nest, he was grieved to see that it had been interfered with by some small animal, most likely a Mouse, as a hole had been made through the side. This work must have alarmed the parent birds. The nest contained one young bird only, and though warm it was dead. Mr. Duncan, of Newcastle, received it the same day for preservation. Mr. Thompson adds that in over fifty years’ experience he never came across a like instance or yet ever heard of such.”

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IN the ‘Annals of Scottish Natural History’ for April, Mr. William Eagle Clarke records the occurrence of the Frigate Petrel, *Pelagodroma marina*, on the west coast of Scotland. It was captured alive on the margin of a stream on the west side of the island of Colonsay, on Jan. 1st of the

present year. The weather immediately preceding this bird's visit to the west coast of Scotland was characterized by severe gales from the south-west, and these may, perhaps, have been instrumental in driving it from its accustomed haunts, the nearest of which are in the vicinity of the Canary Islands; but it is a wide ranging species in the Southern Seas. The only other visit of this Petrel to Europe was also to the west coast of Britain, a specimen having been washed up dead on the sands of Walney Island, Morecambe Bay, in November, 1890, as recorded by the Rev. H. A. Macpherson.

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WE are indebted to Lt.-Gen. Pitt-Rivers for a copy of 'A Short Guide to the Larmer Grounds, Rushmore; King John's House, and the Museum at Farnham, Dorset.' The acclimatization of animals in the park and paddocks at Rushmore is a very pronounced feature. "The Fallow Deer has been crossed with the Mesopotamian Deer, the Japanese Deer with the Red Deer, and these again with the Formosan Deer. The Yak has been crossed with the Pembroke, the Highland cattle, the Kerry, and the Jersey. The Zebu (Indian humped cattle) with the Jersey, producing a very fine animal, and these again with the Jersey. The park and small menagerie contain Llamas, Emus, Rheas, and Kangaroos; also a small brown breed of Sheep from St. Kilda, which resembles the Roman Sheep found in the Romano-British villages here; a breed of black four-horned Sheep, piebald Assyrian Sheep, and Aden Sheep. The Prairie Dogs have bred, but are now dead. Australian Parrots stand the climate fairly well, whilst those from South America are difficult to rear. The White Peacocks do not breed true, but reproduce their like occasionally, The Impeyan Pheasant has been found difficult to rear. Piebald Peacocks and Javanese Peacocks have also been bred here. The Australian Bower-bird has built its bower in the bird-sheds, but it is now dead. The animals in the menagerie vary from time to time. Reindeer have been let loose in the park, but have succumbed to the heat of the summer months."

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IN the February number of 'Appleton's Popular Science Monthly,' published in New York, is an interesting article by W. S. Blatchley, the State Geologist of Indiana, on "How Plants and Animals spend the Winter." Amongst the many forms of animal life to which reference is made are Myriapoda. "Full forty kinds of myriapods occur in any area comprising 100 square miles in the eastern United States. . . . All those found in the Northern States are perfectly harmless, the true Centiped, whose bite is reputed much more venomous than it really is, only being found in the South. . . . In winter three or four species can usually be found within



or beneath any decaying log or stump. One species, with very long legs, is often found in damp houses or in cellars. It is sometimes called the 'wall-sweeper,' on account of its rapid ungainly gait, and it is even reputed to prey upon Cockroaches and other household pests."

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MR. A. W. ANTHONY, of San Diego, California, has recently examined a very large colony of Farallone Cormorants, nesting on San Martin Island, Lower California, to ascertain, if possible, at what age the nostril becomes closed. "This colony had been so often disturbed by the guano schooners, that even at this late date (July 16th) many nests contained fresh eggs; while young birds, ranging from those but just hatched to nearly full grown, were found by thousands." In the newly hatched young, which were blind, the nostril was a mere slit, scarcely noticeable, but those a few days old showed a well developed orifice, which exhibited no sign of closing in the largest young I could find, nearly as large as their parents, but not half fledged." ('The Auk,' April, 1897.)

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WE are glad to see that our American contemporary, 'The Osprey,' has come to stay, and that the veteran ornithologist, Dr. Elliott Coues, has become associated with the magazine as a consulting editor. From its pages we extract the following report from a collector in Howkan, Jackson, Alaska, which makes that somewhat generally considered inhospitable region to appear as a naturalist's paradise:—

"Have been here now a month and am having a 'great time.' Am nicely located in a cabin on the beach, with a good canoe and enough to eat. Deer are plentiful, and I have four hanging in the shed. A fine Clam bed is in front of the house, a Salmon stream up the beach, a Holibut bank in the channel, and Ducks, Geese and waterfowl everywhere. Bald Eagles are numerous, and I have over a dozen nests located. . . . I have been so busy with various odd jobs and away on prospecting trips that I have not really settled down to collecting as yet, but I have taken some nice birds—Kowak, Chickadee, Aleutian Song Sparrow, Alaska Winter Wren, Alaska Three-toed Woodpecker, and others. A few Harlequin Ducks are about, but hard to shoot. Ptarmigan are plentiful, but I have not obtained any yet, and do not know of what species they are. Cormorants are abundant; they 'line up' on a rock just opposite the house, and one shot will generally kill as many specimens as can be put up in a day. They are mostly violet-green and white-crested, but there is another kind that I have not been able to capture as yet. Marbled and another species of Murrelet are very common on the open water, in company with the larger Guillemots"

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WE learn from the last 'Report of the Albany Museum, Grahamstown, South Africa,' that "the alarming spread of insect pests in the Eastern

Province has occupied the attention of the committee for some time past, and it was thought that it is largely due to the wholesale destruction of insectivorous birds. As under the provisions of the game-laws of this country, divisional councils and municipalities have, subject to the approval of Government and his Excellency the Governor, the power of protecting any birds for a period of several years, a circular was addressed by the committee to the municipalities and divisional councils of the Eastern Province, recommending (1) that certain birds and their eggs should be protected; (2) that saloon rifles, air-guns and catapults be classed as weapons, and placed under the same restrictions as firearms." It is hoped that "by strictly enforcing these regulations we may see within a short time a considerable increase in the number of our feathered friends."

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WE have received the fifth volume of the 'Journal of Malacology,' with its excellent bibliography of current literature on its special subject. A paper by Mr. G. W. Chaster, on "Some New Marine Mollusca from Tangier," is noteworthy, if only by the description of the material from which the specimens were obtained, *viz.* "heaps of anchor-mud and dredgings" obtained during a Mediterranean cruise. "The material from Tangier consisted of a bag of dredgings (weighing but a few pounds) from about seven fathoms, and a quantity of shore-sand brought on board for the purpose of deck-scrubbing." This produced five new species, and a new genus of Mollusca.

# THE ZOOLOGIST

No. 672.—June, 1897.

MIGRATION AT THE SPURN LIGHTHOUSE IN 1896.

BY JOHN CORDEAUX, F.R.G.S., M.B.O.U.

THE new lighthouse on the Spurn, which was lighted for the first time on the night of September 12th and 13th, 1895, throws a beam equal to 80,000 candles in fine, and 100,000 in stormy weather. The light is visible twenty to thirty miles at sea under favourable conditions of the atmosphere. I am indebted, through Dr. Hewetson, of Leeds, to Mr. W. Y. Counter, one of the light-keepers, for the following record of birds which struck the lantern in 1896.

## JANUARY.

3rd.—A large number of small birds flying round the lantern; three or four Larks caught. Weather foggy with southerly light airs.

14th.—One Golden Plover and several Knots struck the lantern and killed between two and six o'clock a.m. The weather very clear but dark with a drizzling rain and a moderate breeze from S. and S.E.

## FEBRUARY.

7th.—One Knot killed. Weather foggy; wind W.S.W.

13th.—Caught a Snow Bunting against lantern. Overcast and dark; wind light W.

15th.—One cock Blackbird and twelve Starlings. Overcast, but clear; wind E.

## MARCH.

7th.—Many Starlings flying round the light, two caught. Wind S., fog and drizzle.

8th.—Many small birds about lantern. One Starling and a Lark caught. Cloudy, but clear; wind N.W.

9th.—Between one to five a.m. several Starlings flying about lantern, one caught. Misty; wind N.W.

10th.—An immense number of Starlings around the light all night, also a flock of Lapwings, Golden Plovers, and Stints. Six dozen Starlings, two Lapwings, two Stints, and one Blackbird captured against lantern, and about four dozen Starlings found in the morning, at the base of the tower, dead. Wind S.W., dark, with showers. I have noticed we always get more birds when the wind is off the Lincolnshire coast, than when it blows in any other direction.

11th.—A few Starlings round lantern; one Blackbird caught.

16th.—Several birds striking the lantern between one and four a.m. Wind S.W., dark night. Caught four Starlings, two Blackbirds, and one Fieldfare.

18th.—Several birds struck between one and four a.m. Wind N.W. and dark night. Six Starlings and one Fieldfare caught.

#### APRIL.

1st.—3.45 a.m., Water Rail struck and was killed, breaking its leg. Wind W.N.W., slightly overcast, with drizzling rain.

#### JULY.

29th.—A Swift roosting in one of the tower windows.

#### AUGUST.

9th.—A Lesser Tern killed against lantern at two a.m. Wind N.E., overcast and clear.

13th.—Carrier Pigeon caught and released at daylight. A Snipe roosting on the gallery.

#### SEPTEMBER.

2nd.—Oystercatcher killed against light, many flying round; also many small birds. S.W. wind and a dark night.

4th.—During the small hours of the morning two Wheatears and a Tern killed against lantern, and one Wheatear caught. Wind E., rain, very dark.

#### OCTOBER.

7th.—Large flocks of Knots to the south; one killed against lantern.



10th.—Flocks of Knots to the south.

11th.—Ring Ouzel and two Redwings caught against lantern.

13th.—Several Starlings, Chaffinches, and Snow Buntings. Five Starlings and three Larks captured.

15th.—First appearance of the Woodcock. Snipe killed against light.

17th.—Hundreds of birds around lantern from one to five a.m. Wind N.E. and drizzling rain. Nine dozen captured, including Lapwings, Ring Ouzels, Fieldfares, Starlings, Blackbirds, Redwings, and Chaffinches. Several Woodcocks shot on dunes in the morning. At 10.45 p.m. a Golden-crested Wren flew against lantern.

#### NOVEMBER.

7th.—Large numbers of birds about lantern from seven to nine p.m.—Curlews, Golden Plovers, Oystercatchers, and Larks. Seven Larks and one Golden Plover caught. Wind W., thick, rain.

13th.—4 a.m., two Blackbirds, two Starlings, and one Knot killed against lantern.

19th.—A large number of birds were flying about the light from dark to dawn of the 20th. Wind S.E., strong (6), overcast, misty and drizzling rain (O.M.R.). Caught four Lapwings, one Golden Plover, ten Starlings, and two Stints; a great number also were picked up at foot of tower, killed after striking lantern.

20th.—Flock of Lapwings flying round lantern, but none struck. Weather overcast; S.E., moderate gale (7).

29th.—A Golden Plover killed at 2 a.m. Wind S.E. fresh (5), overcast, misty and rain.

#### DECEMBER.

11th.—A large number of Knots flying round all night to daylight of the 12th. Wind S.W., gentle breeze (3), overcast, misty and rain, fog at times. Caught two Knots; one Dunlin killed against lantern.

12th.—At 4.30 a.m. a large bird struck the lantern and fell with a heavy thud to the ground; it was found dead in the morning some distance from the tower, and proved to be a Coot. Wind S.W., gentle breeze (3), fog. A female Wigeon was also picked up at foot of tower.

18th.—4 a.m. Titlark caught against lantern. Wind E. light (2), overcast but clear.

STONE CURLEWS AS OBSERVED AROUND  
THETFORD.

BY W. G. CLARKE.

THE first Stone Curlew graphically described to British ornithologists was a specimen killed near Thetford in 1674, a drawing of which was forwarded to Ray by Sir Thomas Browne of Norwich. Since that time the "breck" district of Norfolk and Suffolk, of which Thetford is the centre, has been known as the great stronghold of this bird in Britain. Although the number of Stone Curlews breeding in the district has doubtless greatly diminished since that period, it still seems probable that the numerical loss has been little since the time of Salmon in the early thirties. This year they are certainly far more plentiful than they have been during the last ten years. A belt of heath-land from four to eight miles wide surrounds Thetford—which for this reason has been designated "the town on the heath"—and hereon the Stone Curlews nest yearly.

J. D. Salmon, F.L.S., recorded the first arrivals of the bird in the district as on March 27th, 1834; March 15th, 1835; and March 28th, 1836. My own dates are April 2nd, 1892; March 31st, 1893; March 28th, 1894; March 31st, 1895; and March 24th, 1897. This year, however, they were noted by a very accurate observer at Great Fakenham, Suffolk, during the last week of February. The main body has generally departed by the middle of October, but Salmon started one on December 9th, 1834, and on December 12th, 1894, I distinctly heard one whistling almost incessantly for fifteen minutes from Barnham Cross Common, a mile from Thetford. A pair were also observed here in March, 1853, during deep snow.

On March 25th last, the day after their arrival in the district, these birds seemed to be extremely plentiful upon the heaths and upland "brecks" north and west of Thetford. Their whistling was almost continuous, albeit blurred, as it always is

for a few weeks after their arrival. During this period, too, they seem to frequent the uplands by night in preference to the river-side marshland, their querulous notes sounding from all quarters. After this period, when the duties of nidification are in full swing, these birds may be seen following their accustomed lines of flight from the heaths to the river side, generally about two hours after sunset. Stevenson was unable to determine what amount of truth there was in this nocturnal "flying" to the alluvium, but it is an undoubted habit in this district. Although the Stone Curlew is a bird of extreme wariness, it is possible on Thetford Warren to get within ten yards of flocks numbering from twelve to twenty in the months of May and June. In the 'Fauna of Norfolk,' Lubbock says that they were sometimes observed in flocks of from eighty to a hundred prior to their autumnal migration, but personally I have never seen a flock containing more than twenty-five. This may possibly be accounted for by the fact that, whereas in Lubbock's time the country was practically bare, and formed one vast heath, now, by the extensive planting of quick-growing trees, numerous plantations divide the heathland into sections, and it may be that only the birds of these smaller sections at present collect together, where of yore their area was much more extended. These flocks may be seen and heard together in the daytime, but after dark one never hears more than a pair calling together from any one quarter. A commonly accepted idea is that the Stone Curlew is disinclined to utter its note during the day, but is with regard to whistling essentially a bird of the night. In this district they always when disturbed,—whatever the hour of the day,—fly off whistling. Another curious fact may be noticed during a shower of rain in summer. A few minutes after the commencement of the downfall the majority of the Curlews fly down from the upland heaths to the nearest water, where I presume the rain has the effect of driving their food out of its haunts, thus enabling them to more easily capture it. From Knettishall and Stonehouse Heaths, and Thetford Warren and Abbey Heath, these birds fly down to the Little Ouse river, but on the heaths north of Thetford—Roudham, Bridgham, Wretham and Croxton—the Curlews invariably fly towards the meres, which are small sheets of water situated in the wildest portion of the Norfolk heathland. This, however, is more noticeable late in the season, in August and September, when they may find greater difficulty in always

obtaining a sufficient food-supply by night. Each individual seems to whistle its loudest during this day-time flight to the feeding-grounds.

Their whistle has several variations soon after their arrival. Until May it is blurred, and often consists merely of a hoarse chuckle incessantly repeated for a short time. But about the first week in May their note is "curlew"; first short and indistinct, and then shrill and continued, the first short note being gradually dropped until only the full note remains. It has been suggested that their whistling by night is a call to inform one another of their whereabouts during cloudy weather. My own experience is that they are incomparably more noisy on moonlight nights than when the sky is overcast, and that therefore this reason is not the correct one. In this district the brood is generally hatched off by the commencement of June; but so well do the colourings of the young birds harmonise with those of the heathland that it is a matter of extreme difficulty to detect them. The eggs are usually laid in a slight hollow, sometimes on the open heath, but more generally on the upland "brecks." There is no material for the nest save a few of the previous year's dried bracken fronds, and search how one will, it is practically only by accident that the two eggs can be found. After the young ones are hatched it seems to be their rule to take care of themselves on the approach of danger; their parents doing likewise. It is at this time that one or other of the parent birds may occasionally be seen with head and neck extended, as in the beautiful life-group in the British Museum of Natural History. A remarkable fact of the authenticity of this nest and its surroundings struck me as a prehistoric archæologist. On the slab of heathland turf is a prehistoric flint flake, such as one may find on any of the local heaths. Locally the Stone Curlew is generally called the "Cullew," but is occasionally termed the "Sandpiper" or "Willie Reeve."

What effect the planting previously mentioned may have upon the Stone Curlew cannot yet be determined; but certainly the more heathland there is covered with trees the more circumscribed must their haunts be in future. One cannot but hope that this characteristic breckland bird, with its once-heard but never-forgotten whistle, will long continue to occupy the haunts of its extinct companion, the Great Bustard.



## FOREIGN FINCHES IN CONFINEMENT,

WITH HINTS AS TO THE DIFFICULTIES ARISING FROM THE ASSOCIATION OF VARIOUS SPECIES IN THE SAME AVIARY.

BY ARTHUR G. BUTLER, Ph. D., F.L.S., F.Z.S., &c.

FOR many years before I ventured to arrange for the publication of my 'Foreign Finches in Captivity,' I had kept and studied a considerable number of species of both the *Fringillidæ* and *Ploceidæ*; but thoroughly to comprehend the peculiar dispositions of these birds is the work of a lifetime, perhaps of several generations of lifetimes.

The first aim of the aviculturist is so to group the species that they may dwell harmoniously together, but with certain birds this is practically impossible, as I shall now proceed to explain.

The genus *Spermophila* was considered by my friend Herr August Wiener to consist of uninteresting but perfectly harmless birds which were content to pass an uneventful existence in munching millet-seed. I find the species of this genus very interesting, the whole of them fair, and some excellent, songsters. Most of them are innocent enough, but one—the White-throated Finch, *Spermophila albigularis*—is a perfect little demon. I have kept the White-throated Finch for nine or ten years. For the first year, in a large aviary, he is on his good behaviour, and sings his pretty see-saw song almost incessantly; the aviculturist is charmed, and buys two or three more males, and perhaps a female or two. From that day there is incessant war in the aviary; the males fight from dawn to twilight. If only two equally powerful males are together the fighting does little harm, but when there are three the weakest goes to the wall, is literally scalped, and unless promptly removed is certain to be torn to shreds.

When I had got as far as this in my study of *S. albigularis*, I thought I had plumbed the depth of its iniquity; so, never having seen it attack anything but a *Spermophila*, I purchased a

pair, and turned them out in a large cool aviary with about fifty small birds of various kinds. During the whole of 1896 *S. albigularis*, with the exception of occasional wordy disputes with *S. gutturalis*, was a pattern of amiability; but from the beginning of April, 1897, he began to show his true character, disputing incessantly with my Goldfinches, one of which he would have murdered had I not fortunately come upon the scene just as he commenced to tear at the feathers on its forehead, making it scream with fright and pain. Within a fortnight from that date it had killed two Amaduvade Waxbills, *Sporæginthus amandava*; one Green Amaduvade, *Stictospiza formosa*; and four Zebra-finches, *Taniopygia castanotis*, one of these being a young bird only two days out of the nest, the other three adults which were breeding. The last victim had the skull entirely bared, the eyes pecked out, the neck reduced to a mere thread, the base of the wing cleared of coverts and quite raw, and the whole of one side of the breast raw and bare of skin. I have removed that White-throated Finch to an aviary where he will have the society of birds twice his own size, chiefly African Weavers (*Pyromelana*, *Quelea*, &c.).

The history of the Green Singing-finch, *Serinus icterus*, is similar, only it is rarely aggressive excepting in the breeding season, when it fiercely attacks other Serins, Goldfinches, &c. Canaries have no chance against it; they are hunted down, and the skin almost instantly torn back from the base of the beak.

Of course many of the true *Fringillidæ*, such as the species of *Sycalis* and *Paroaria*, are well known to be dangerous associates for smaller and weaker birds; but, until 1896, I was not aware that *Sycalis flaveola*, savage and pugnacious as it always is towards males of its species, was capable of murdering its own mate. However, after breeding from a pair in a large flight-cage for several years, the hen refused to continue to accept her husband's attentions; whereupon he knocked her down, grasped her firmly, tore off her scalp, and temporarily blinded her. Hearing the screams of the wounded bird, I took her out, applied vaseline to her wounds, and caged her separately; in a fortnight she recovered her sight, but at the end of a month I found her dead.

Among the smaller *Ploceidæ* there are a few very spiteful birds,

notably the Parson-finch, *Poephila fasciata*, and the Ribbon-finch, *Amadina fasciata*, the former being more than a match for the latter; for I had a hen Ribbon-finch killed by a cock Parson-finch two or three years ago. Yet individual males of *P. fasciata* have lived with other small finches for many years on amicable terms, only proving dangerous from the fact that they will pair with any of the tiny Grass-finches, not a few of which consequently die through egg-binding.

With nine good-sized aviaries at my disposal, I find no little difficulty in so sorting out my many birds as to avoid risk to life and limb, and I find the best plan is to mix the various Orders as much as possible. Thus in one aviary I keep the larger Doves, some Chinese Quails, a Yellow Wagtail, a Stonechat, a Paradise Whydah, a Canary or two, and a pair of Parson-finches; the Doves quarrel a little, but otherwise everything goes on smoothly. In another aviary I keep many small finches, both British and foreign, two pairs of Diamond Doves, a Redstart, and a Garden Warbler; and so on.

It has been stated that insectivorous birds and seed-eaters should not be kept together; but, when we consider that most finches are insectivorous, and most of our British insectivorous birds thrive on a partial seed diet, the objection ceases to have any weight. I have seen the American Blue-bird, the English Starling, the Robin, Redstart, and many other insectivorous birds swallow quantities of seed, and benefit greatly in consequence. When finches are breeding, soft food in the aviary becomes a necessity for most of them, and the pan put in for the insectivorous birds is largely resorted to. I have reared many broods of Java Sparrows, Saffron-finches, Zebra-finches, Ribbon-finches, and even a Rosa's Parrakeet, all of which were fed by their parents upon regurgitated food put into the aviaries for my insectivorous birds.

## ORNITHOLOGICAL NOTES FROM CORSICA.

BY HERBERT C. PLAYNE (Clifton College).

THE days from the 10th to the 21st of April I spent in Corsica, walking from Ajaccio across the island over some high mountains to the east coast, where there is a tract of flat country, and then back again into the mountains to Corte. In some parts birds were very abundant, and the following is a list of the species I was able to identify. The birds were not so forward with their nesting as I had expected, and I found no nests at all containing eggs, though there were a good many nearly ready for them.

It is a land of Goldfinches and Serins, and Cirl Buntings too are very numerous.

MISSEL THRUSH, *Turdus viscivorus*.—A few fairly high up in the mountains.

BLACKBIRD, *T. merula*.—Fairly common.

BLUE ROCK THRUSH, *Monticola cyanus*.—I saw a few among the mountains. The cock sings from the top of a rock, and then flies up in the air and descends, still singing, to another rock. I saw one descend in this way some distance down the mountain side.

WHEATEAR, *Saxicola œnanthe*.—One near the top of the mountains by Corte, and others by the sea-shore near Ajaccio.

WHINCHAT, *Pratincola rubetra*.—I saw one near Corte on April 20th.

STONECHAT, *P. rubicola*.—Abundant.

REDSTART, *Ruticilla phœnicurus*.—I saw a few only.

REDBREAST, *Erithacus rubecula*.—Fairly common.

NIGHTINGALE, *Daulias luscinia*.—There were a few near the east coast, and near Ajaccio.

SARDINIAN WARBLER, *Sylvia melanocephala*.—Abundant on the lower mountain slopes. His song seems to vary a good deal, and he has a rattling alarm-note. I found two nests, much like those of the Blackcap, not quite ready for eggs.



BLACKCAP, *S. atricapilla*.—Numerous.

MARMORA'S WARBLER, *Melizophilus sardus*.—Very abundant on the mountain slopes; I tried for some time to find a nest, but unsuccessfully.

FIRE-CRESTED WREN, *Regulus ignicapillus*.—I saw several among the ilex trees on the mountains.

WILLOW WREN, *Phylloscopus trochilus*.—I found only one at Corte, and a few at Ajaccio.

WOOD WREN, *P. sibilatrix*.—There were a few among the olive trees at Ajaccio.

CETTI'S WARBLER, *Cettia cettii*.—Abundant among the thick bushes on the lower ground. The cock frequently sings a few loud notes, and can be seen without much difficulty as he moves restlessly about the undergrowth. The hen keeps very quiet, and is not easy to find, but now and then she utters a rapid rattling call to the cock. After watching for some time I found a nest nearly ready for eggs on April 15th. It was placed about three feet from the ground among the dead stalks of a bramble-bush, and was substantially built of dry grass of the same colour, so that it was not easy to see at first. It was well lined with bits of wool and feathers.

DIPPER, *Cinclus aquaticus*.—To be seen by the mountain streams.

LONG-TAILED TIT, *Acredula caudata*.—Fairly abundant.

GREAT TIT, *Parus major*.—Common.

COAL TIT, *P. ater*.—I only found it among the pines in the mountains.

BLUE TIT, *P. cæruleus*.—Common.

WREN, *Troglodytes parvulus*.—Fairly abundant.

WHITE WAGTAIL, *Motacilla alba*.—I only saw very few.

GREY WAGTAIL, *M. melanope*.—I saw several by the mountain streams.

MEADOW PIPIT, *Anthus pratensis*.—Fairly common in suitable places.

WOODCHAT SHRIKE, *Lanius pomeranus*.—I came upon a party of cock birds on April 15th near the east coast. They were flying about together and singing often, and were probably, I think, on migration. I saw several more after this day in other parts of the island.

PIED FLYCATCHER, *Muscicapa atricapilla*.—I saw two among the olive trees near Ajaccio.

SWALLOW, *Hirundo rustica*; HOUSE MARTIN, *Chelidon urbica*.—Common.

CRAIG MARTIN, *Cotile rupestris*.—On two occasions, when high up in the mountains, I had glimpses of birds which I feel sure must have been of this species.

GOLDFINCH, *Carduelis elegans*.—Very common in the lower parts of the island. They were in flocks, as though they had not paired. I one day saw more than twelve bathing together in a stream—a most beautiful sight.

SERIN FINCH, *Serinus hortulanus*.—These birds were as abundant in the higher ground as the Goldfinches were in the lower. They too were in flocks, singing and calling to each other all over the mountain slopes. The yellow rump is conspicuous when the bird is flying.

GREENFINCH, *Ligurinus chloris*.—Common.

HAWFINCH, *Coccothraustes vulgaris*.—I saw a small boy sitting in a village street plucking a dead Hawfinch, but did not meet with the bird alive.

HOUSE SPARROW, *Passer domesticus*.—I only saw a few.

ITALIAN SPARROW, *P. italicæ*.—Abundant.

CHAFFINCH, *Fringilla cœlebs*.—Common; their songs seemed to me much more varied than they are in this country.

LINNET, *Linota cannabina*.—Common.

COMMON BUNTING, *Emberiza miliaria*.—Common about the lower ground.

CIRL BUNTING, *E. cirrus*.—Very common indeed on the mountain slopes; I have never seen them so numerous elsewhere.

CRESTED LARK, *Alauda cristata*.—Common.

SARDINIAN STARLING, *Sturnus unicolor*.—I saw one flock near the east coast.

JAY, *Garrulus glandarius*.—Fairly common.

HOODED CROW, *Corvus cornix*.—Common, especially by the sea-coast.

RAVEN, *C. corax*.—Common.

SWIFT, *Cypselus apus*.—Seen first on April 19th.

WHITE-BELLIED SWIFT, *C. melba*.—Seen on April 10th, but not again.

GREAT SPOTTED WOODPECKER, *Picus major*.—Seen several times.

HOOPOE, *Upupa epops*.—I saw the first on April 15th, and several others after that day.

CUCKOO, *Cuculus canorus*.—Common, but I did not meet with it till April 15th.

COMMON BUZZARD, *Buteo vulgaris*.—Common.

EAGLE.—I saw one Eagle, but at too great a distance to be able to identify it.

SPARROWHAWK, *Accipiter nisus*.—I only saw one.

COMMON KITE, *Milvus ictinus*.—Very common. One day I sat on a mountain side while four of these birds kept sailing about quite close to my head.

PEREGRINE FALCON, *Falco peregrinus*.—Seen on a few occasions.

KESTREL, *F. tinnunculus*.—Common.

DUCK.—I saw a pair flying one day, but could not determine their species.

ROCK DOVE, *Columba livia*.—I found a colony of them inhabiting a curiously honeycombed rock high up in the mountains.

PARTRIDGE.—One evening on the mountains I put up a pair of Partridges, but could not be sure of their species.

QUAIL, *Coturnix communis*—There were plenty to be heard in the low-lying country by the east coast.

## EARTHWORM STUDIES.

BY THE REV. HILDERIC FRIEND,

Author of 'Flowers and Flower-Lore.'

## II. OVIPOSITION AND EMBRYOLOGY.

OUR egg is not to be found in any of the famous collections on which oologists have spent fortunes, and for the acquisition of which museums have set apart large sums. Though no one ever lavished upon it such amounts as have been paid for an egg of the Great Auk or the extinct Dodo, it is practically as seldom seen, and as little known, as any of the rare eggs which collectors covet so ardently and prize so highly.

We usually think of eggs as consisting of a yolk surrounded by albumen, and enclosed in a hard shell made of lime or some form of calcium. The eggs of birds and fowls are our types, but the egg of the Earthworm has no chalk-like shell. Most eggs, together with their shells, are formed within the body of the egg-bearing animal, but this egg differs from the majority in this respect. It is true that the egg itself is formed as usual in the ovary, and passed through a tube known as the oviduct, but the shell or case is fabricated by the animal externally, and is slipped over the egg as it passes out of the oviduct and is about to be deposited. Eggs are very commonly laid in a nest, more or less elaborately constructed, and it is a rare thing for only one egg to be laid during the season by each individual. It has been correctly surmised that the number of eggs laid by a bird or other animal bears a close relation to the exigencies and dangers which the young will be likely to encounter. Hence a Pigeon lays only a single pair of eggs for each brood, while the Thrush deposits some half-dozen in its nest; and Partridges, Pheasants, Tits, and other birds lay from a dozen to a score. Then we find that Herrings and other fish lay enormous quantities of eggs as compared with many fresh-water species.



The egg of the Earthworm is never deposited in a well-formed nest. As a rule each specimen is found at a greater or lesser distance from its neighbour. As it is not laid in the open air, on the branches of trees (as the eggs of many insects are), or on the surface of the soil, like the eggs of the Ostrich or Peewit, but in damp places under the bark of trees, under stones by streams and ponds, or deep down in the moist soil, special provision has to be made for its development amid such peculiar surroundings. Or perhaps it would be more correct to say, that as the conditions differ so does the provision for meeting them.

If the eggs of a bird or fowl be varnished so as to exclude the air, or if they are enclosed in vessels, or buried in soil at a considerable depth, the young will never be hatched; yet here is an egg which can only be hatched when it is kept moist and cool, and one which may be buried at a depth of some inches, or even feet, in earth or under water, and yet retain its vitality.

The egg of the Earthworm is seldom more than a quarter of an inch in length, and, as it is usually oval, the shortest diameter is only about half that length. It was long ago pointed out that eggs almost invariably remain during the hatching period the same size as they were when first extruded, but here is a curious exception to the rule. We should look with amazement on a Pigeon's egg which increased in size till it became as large as a hen's egg during the time when the mother bird was sitting upon it, but this is exactly what happens in the egg before us during the hatching period. It both lengthens and widens, and we shall have to enquire how this is possible.

The naturalist is already well aware of the fact that when an animal regularly lays a large quantity of eggs of minute dimensions, the offspring is almost invariably unlike its parent, and has to undergo sundry transformations, changes, and developments before arriving at any degree of perfect resemblance to the adult form. Conversely, as in the case of birds, when a few relatively large eggs are laid the young usually emerges with a strong resemblance to its progenitor. The reason is obvious. A good deal of material is needed within the egg in order that a perfectly developed brood may emerge, and when the parent is compelled, through the struggle for existence, to launch a bevy of young on the sea of life, it cannot possibly fill the pockets of each (to speak

metaphorically) with the almighty dollar, or provide that its offspring shall be started in life as are the progeny of individuals whose dangers are fewer and whose resources are more abundant. If we apply this argument to the egg in question we may conclude that its enemies are comparatively few. The colour of the horny egg-capsule is usually either a delicate olive-green or a light brown, and well harmonizes with its surroundings. The egg is, relatively to the size of the parent, large, and the number deposited comparatively small; while the young on emergence are found to be an exact copy of the original, an almost perfect reproduction of the parent.

It seems somewhat curious that an egg possessing so many peculiarities should have been almost absolutely ignored by scientific men and naturalists generally, the more so as it is easily obtained and readily examined. So far as I have been able to find during a long and extensive period of study, Swammerdam, who wrote the 'Book of Nature,' is almost the only observer who has devoted any attention to the systematic study of these eggs; but the result of his researches was such that he writes:—"Among all the eggs of insects, of which I have various species in my collection, I know none worthy of greater attention."

The case which contains the fluid matter out of which the future worm is to be evolved is of a horny, not of a calcareous, substance. It reminds us of the egg-capsules of the dog-fish, found everywhere on the sea-coast. Here we have a hint too of the aquatic origin of Earthworms. Chemically it corresponds almost exactly with our nails, and with the hoofs and horns of animals. It is cuticular in origin, that is, the skin, and not the blood, the spleen, or any other internal organ or substance, is the agent in its formation.

Everyone knows that the finger-nails are most easily trimmed after the hands have been washed in warm water. The reason is plain. Horny substances absorb moisture, and swell in proportion to the amount taken up, at the same time becoming soft and pliable. It may here be observed that several species of Earthworm, besides the semiaquatic *Allurus*, go through the process of oviposition under water. I have not seen this fact recorded by other observers, but have often myself discovered worms

submerged on the margins of Derwentwater and elsewhere at this period. Slight chemical changes produce greater or lesser degrees of hardness in the substance. Hence horny substances are not all alike hard, and the horny capsule of the worm is tolerably elastic; so that when kept in a moist condition it can be slightly expanded by the internal pressure exerted by the growing worm. But how can the worm grow? The chick can become no larger than the shell-surrounded yolk and albumen will permit, but when the young worm is hatched it will very probably be an inch in length. Let us see how this contingency is provided for. The following illustration will help to make the matter plain. If we took a small tube of gelatine, and placed within its cavity a tiny globule, we could secure the contents of the tube by drawing the two ends to a point. If now the globule could expand on the application of moisture, it must either burst its case, cause it to expand in the direction of its shortest diameter, or force open the ends of the tube. Now the egg-capsule of the worm can expand slightly, but not to a sufficient extent to allow the worm to reach full dimensions. Consequently the embryo gradually forces open the sealed extremities of the case, and thus paves the way for its ultimate escape, at the same time that it loosens its swaddling bands, and develops little by little into a perfect worm. While the beak of the embryo bird develops and hardens within the shell sufficiently to enable it to peck its way out of the calcareous covering, the worm has no such tool for opening its prison-house, and so these other means must be provided for its escape.

It may occur to some observant reader that a condition analogous to this is found in the case of the dung-flies' eggs, which are deposited with their horn-like projections upwards. In both instances, if the eggs are removed from their moist lodging-place, they shrivel and become lifeless. Worms again are not quite alone in the possession of the power to extend the egg-case during incubation. Huber long ago observed the same fact in relation to the eggs of ants, and those of certain sawflies can similarly expand to meet the requirements of the growing grub within.

The question now arises—How does the worm lay its eggs? Although many careful observations have been made for the



purpose of deciding this question, I believe I had the good fortune to be the first to observe and record the actual process. If the different books which have been written on the subject of Annelids be examined, it will be found that they either pass over this question in silence, or give a very vague and unsatisfactory account of the process.\* Some time ago, however, a pleasant surprise was granted me. I was trimming up my flower-beds ready for Christmas. The soil was inhabited by a large number of Earthworms of various species. When I first began the study of these creatures only about ten British species were known. I have now raised the number to a quarter of a hundred. As I was examining the different species on the day in question, I presently detected a happy pair in the very act of manufacturing their cocoon. It was the first time in all my experience as a naturalist that such a treat had fallen to my lot, but I have since repeated the observation more than once on other species of Annelids. The process is as follows:—

When two worms are about to form an egg-case it is necessary that they should work in unison. One worm cannot do the work alone, though each worm is at the same time both male and female or hermaphrodite. A pair therefore approach each other from opposite directions, each having its head towards the other's tail. Near the middle of each adult worm is a swollen portion called the girdle or clitellum. This peculiar organ yields the horny substance of which the egg-case is formed, but it is at first soft and pliable, hardening after exposure to the air and cold. When the worms are ready for the process of oviposition the chitine is formed into a girdle around their two bodies, so that for the time being they are tied together. When the case is complete the necessary contents are poured into it from the two animals, after which they withdraw from each other backwards, and so allow the capsule or egg-case and its precious freight to slip over their heads and fall to the ground; the ends are then drawn together, and the cocoon left to its fate.

\* Since this article was forwarded to the printer I have received from Dr. Ed. de Ribaucourt an extract from the 'Bulletin Scientifique,' vol. xxx. pp. 168-176, containing a "Notice Physiologique sur les Lumbricides d'Europe," in which reference is made to the act of copulation, but no allusion to the construction of the egg-case.



Should all the conditions be satisfactory, the egg soon begins to show signs of life. It is left to nature to hatch, and the time occupied in the process varies greatly. If an egg-case be opened after some time, a tiny embryo worm, or sometimes a pair, will be found inside, surrounded by a glutinous fluid. The young worm as it grows expands its case, and ultimately emerges—not as a caterpillar or larva, for it goes through no metamorphoses as does the butterfly or frog, the sawfly or even the fish, but as a worm; and now it has only to hasten development and become adult. The adult stage is reached when a girdle has been assumed, just as is sometimes the case among human beings.

It sometimes happens, however, that things do not go well. I have often observed that the eggs of worms are liable to be rendered abortive by the invasion of a smaller worm. It is another illustration of the amusing rhyme about the big fleas and little fleas. Into the life-history of these parasites, however, I must not now enter, as the subject requires a chapter to itself.

It would occupy too much space if I were to detail the wonderful process which goes on within the egg-case. The embryology of the worm has been fully studied, and is replete with marvels. If an egg is examined when the young embryo is almost ready to emerge, it will be possible, through the semi-transparent and greatly dilated case, to watch the movements of the worm, trace the current of blood along the elaborate system of vessels, and eventually observe the emergence of the baby Annelid into the world.

For the further study of this intricate subject, I may refer the reader to Mr. Beddard's valuable Monograph, and the works which are there enumerated.

## ON THE PRESERVATION OF OUR INDIGENOUS FAUNA AND FLORA.

BY SIR JOHN LUBBOCK, BART., M.P., F.R.S., &c.

[We are indebted to Sir John Lubbock for the following Report of his Address to the Selborne Society on May 20th.—ED.]

THE Selborne Society is especially necessary in a populous country like our own. Our rarer animals and plants are gradually disappearing. Parliament has done what it could in passing wise laws, and County Councils are doing their best to carry them into effect. They can, however, effect comparatively little, unless they have the general support of the community.

We hear a good deal about the love of Nature, but it often takes an unfortunate form. It was said of King William Rufus that he “loved the tall deer like a father”; but what he loved was killing them, and I am afraid that the love of animals shown by many people is of that description.

Again, many show their love of flowers by gathering them; sometimes getting very soon tired of them and throwing them away. I have often been asked why I do not gather flowers when I am so fond of them; but I always say that is the very reason why I prefer to leave them where they are growing.

The use of the word sport is I think unfortunate. A great deal more interest is to be got out of animals by keeping them alive than by putting them to death.

Only recently a friend of mine saw seventeen Nightingales stuck upon a gamekeeper’s cottage, and when he asked the gamekeeper why in the world he killed these charming little birds, the man said that they made such a noise at night that they kept his young Pheasants awake.

At the same time it must be confessed that the strict protecting which is necessary for the preservation of game does also

to some extent protect other birds, and has therefore, at any rate, that advantage.

It is very remarkable, considering how long we have lived on this globe with other animals and plants, how little we know about them ; and yet there is intense interest in unravelling the secrets of nature.

I do not allude to difficult problems which require physical laboratories and observatories, nor to those which can only be solved by technical study. The formation of the blood, for instance, is still a mystery ; and it is certainly an extraordinary thing, considering the great importance of blood in the animal system, that we do not yet know how or where it is produced. There are many other questions of the same kind which might be mentioned, but which, though of great importance, hardly came within the range of such a Society as our own.

Even, however, as regards the habits and life of our commonest animals and plants, there are still an immense number of interesting problems remaining to be explained and solved.

Perhaps the commonest of all English plants is *Pleurococcus vulgaris*, the little alga or seaweed which covers the stems of trees, palings, and other woodwork of a similar character with a coating of green. It consists of small rounded cells, sometimes quite separate, sometimes grouped together in little packets of two, four, or eight. These divide and subdivide, and multiply in this manner. But obviously this is only a part of the life-history of the plant. Like the rest of its family it probably, at certain times and under certain conditions, produces spores ; but all this part of its life-history is quite unknown. In the case of the common mushroom, again, the spores are of course enormously abundant, and yet nothing is known about their germination.

Peas, beans and other leguminous plants almost invariably have swellings or tubercles on their roots. These are supposed to be produced by bacteria, and when such tubercles are present great quantities of nitrogen are accumulated. An important result of this is that leguminous crops are supposed actually to enrich the soil. In Germany, in many places, the yellow lupine is especially grown for no other purpose but to be ploughed in and thus improve the soil for other crops. These bacteria are

therefore of great importance and abundance; but the rest of their life-history is quite unknown. The relation of these bacteria to the lupines, and their whole action, is still very little understood.

As regards the animal kingdom, many of the most interesting recent discoveries have been made with reference to the commonest species. Until within the last few years the male of the Gallfly, which produces the common King Charles Oak-apple, was unknown. It is now found that the species goes through a sort of alternation of generations, the autumn brood being quite different from that of the spring.

In Bees and some allied insects it has recently been discovered on what the sex of the young depends. They are almost the only animals of which this can be said.

So again in the case of Eels. It was long ago mentioned by Aristotle that nobody knew how or where Eels bred, and certainly no one had ever seen until in the last few years the egg of the Eel, or the young Eel just emerged from the egg. It has now been shown, mainly by the researches of Grassi, that the history of the Eel is in fact the reverse of that of the Salmon. The Salmon comes up into our rivers to breed; the Eel goes down into the sea and breeds in water of great depth.

All our ponds are rich in different species of Rotatoria, the Common Rotifer itself being very abundant; and yet I believe up to the present time no male of the genera *Philodina*, *Rotifer*, *Calledina*, or *Admeta* has yet been discovered.

Many other similar instances might be mentioned. These few, however, suffice to show how many interesting problems in Natural History remain to be solved.



## O B I T U A R Y.

ABRAHAM DEE BARTLETT.

MR. A. D. BARTLETT, late Superintendent of the Zoological Gardens, was born in London on October 27th, 1812, and died on May 7th last. He received a humble education in London, and at a very early age evinced a great delight in all matters connected with Natural History, and commenced business as a taxidermist in a house in Little Russell Street. In those early days scientific men and collectors of rare birds, and especially birds' eggs, made his shop a perfect resort, and his extraordinary art in taxidermy became so widespread that he was obliged to remove into larger premises; and there are few, if any, of those early zoologists and collectors left to remember that he started again in a large house in Great College Street, Camden Town. In that place his circle of admirers increased, and his first connection with the Zoological Society of London commenced. His first communication to that learned Society occurred in 1839, and from that time he worked not only for the Society, but for nearly all the scientific men and established museums, including the Queen and the late Prince Consort. It was in that house that he prepared all his exhibits for the 1851 Exhibition, and among them were, by permission, several of the Queen's specimens which are now believed to be at Windsor Castle. After the close of the Exhibition of 1851 the Crystal Palace Company started, and, not being able to find a more proficient taxidermist, engaged him as Superintendent to form the Natural History department in the South Transept; afterwards adding to his charge the aviaries and aquarium in the North Transept, besides which he attended to endless matters of a similar character in other places.

After working laboriously for the Crystal Palace up to 1859, on the death of Mr. John Thompson, then Superintendent of the Zoological Society, Dr. P. L. Sclater, the newly appointed Secretary, in course of conversation with Mr. Henry Walter, of

'The Times,' remarked that they were seeking a new man for the post. Mr. Walter at once recommended Mr. Bartlett, and he was immediately communicated with, and accepted the post, which he held to the end of his life.

It would be difficult, and beyond the limits of this Journal, to give a detailed insight into the vast amount of work carried out during the years from 1859 to the present day, which, we are given to understand, will be compiled before long in a more collected and chronological form.

Mr. Bartlett was awarded the medal for taxidermy at the 1851 Exhibition, the bronze and silver medals of the Zoological Society, and a very large series of the highest testimonials from different societies and exhibitions. He also received the bronze medal, conjointly with his eldest son Edward, at the 1872 Exhibition, and testimonials, with his sons Edward and Clarence, at the Colonial Exhibition.

During the years he passed in the Zoological Gardens he became more closely connected with the scientific world, and devoted his whole time and energy to the study of animal life, which all those who knew him can testify. He was a man of vast resource and quick perception, in many difficult cases was always ready to help those around him out of their almost hopeless position, kind to all classes of society, and at the same time of a retiring nature, never wishing to force himself upon society. —(*Edward Bartlett*).

#### FRITZ MÜLLER.

The death of this well-known biologist is announced as having taken place at Blumenau, Santa Catarina, Brazil, on May 21st. Dr. Fritz Müller was an observant and philosophical naturalist, of whom frequent mention is made by Darwin in the 'Origin' and 'Descent,' and who is also to be remembered by his volume entitled 'Facts and Arguments for Darwin' (English transl.). He also contributed some original observations and suggestions on the subjects of Mimicry in Butterflies and Coloration of Caterpillars, and was elected an Honorary Fellow of the Entomological Society of London in 1884.

## NOTES AND QUERIES.

## MAMMALIA.

## CARNIVORA.

Pine Marten in Ireland.—It will perhaps be of interest to your correspondent, Mr. W. W. Flemyng (p. 141), and to other Irish naturalists, to learn that I have five living adult Pine Martens from Ireland. The species is decidedly less rare there than in the three other divisions of the British Isles, but Irish naturalists and the Martens at large will thank me not to indicate the precise localities whence my specimens come. One of them I obtained so recently as the end of February, and in the early morning of the last day of March she gave birth to a litter of young, apparently two in number. Young Martens are, as I discovered in 1882,\* pure white at birth, beginning to get grizzled within a week, and becoming brown within four weeks; but in the present instance, with a freshly-caught mother, inspection was quite out of the question. Assuming, from the date of her capture, that she might be in young, I prepared a suitable cage for her; but not anticipating the increase would take place so early had not shifted her from the small cage in which I had originally placed her. It was impossible then to move her, and hopeless to expect her not to eat the cubs in a small cage containing merely a little bed-box; so I prepared a large box, and adjusted it without noise, so as to fit against one of the narrow openings through which the cage is cleaned, as we could not, of course, block the only door. This opening is little more than two inches high, but she very soon moved the cubs through it into the more spacious and secluded bedroom. Since the first two days, however, I have been unable to certainly distinguish more than a single voice, so it is not unlikely that one cub has come to grief.

Those who are acquainted with Martens (and those only) will appreciate their gnawing powers; and during the night of Easter Tuesday (April 20th–21st) this Marten ripped out a strip from the front edge of the flooring of the bed-box, the width of which was only  $1\frac{1}{2}$  in. at the widest point,

\* See 'Zoologist,' 1883, p. 203. The same pair of Martens bred again in 1884 and 1885, and both eventually died well on in their seventeenth year (at least).

through which she got out! She found herself not absolutely at liberty, but inside a large cage, from which, however, she could have escaped almost anywhere. It would seem as if an inspection brought her to the conclusion that it would be very difficult, perhaps hopeless, to get the young away in safety, so she actually squeezed her way again through the  $1\frac{1}{2}$  in. opening back into the box, where she still remains. Sundry scraps of iron and zinc wedged in prevent her again using this hole, but, as before, I did not venture to drive nails, or otherwise make a noise. An unusual display on April 29th of the cub's vocal powers, followed, to the moment of writing (May 3rd), by unwonted silence, may mark the opening of its eyes; for young Martens are blind for a little over four weeks. One of my other Irish Martens (a male) is remarkable for having only scattered flecks of white in place of the normal yellowish-white "shirt-front." — ALFRED HENEAGE COCKS (Thames Bank, Great Marlow, Bucks).

#### UNGULATA.

**Polydactylism in the Horse.**—A colt was produced from a cart-horse early this month at a farm near here. Three of its feet have each two quite divided toes. The left hind foot is normal, and it can walk on the hoof of the right one. The two front feet are rather distorted. Otherwise it is a perfect animal. As this peculiarity seems to point to more than ordinary monstrosity, it may interest some readers of 'The Zoologist.' It appears to be rather improbable that it is a high-bred animal.—H. L. SICH (c/o Rev. J. P. Smith, Whixley Vicarage, York).

[With reference to the above interesting record, it may be remembered, as Bateson observes, "Variation in the number of digits in the Horse has been repeatedly observed from the earliest times." The whole subject is treated in that author's 'Materials for the Study of Variation' (pp. 360-73), and many instances given which are grouped and analysed.—ED.]

#### AVES.

**Swallow-tailed Kite in Suffolk.**—Through the kindness of Dr. Otho Travers, of this town, I was lately afforded an opportunity of examining an example of *Elanoides furcatus*. It passed into the possession of this gentleman from his father, the late Mr. O. W. Travers, by whom it was shot in Suffolk. I am afraid it is now impossible to state either the exact locality in that county or the year, but, so far as Mr. Travers is able to judge, it was shot by his father near the village of Mildenhall between the years 1830-1840; there can, however, be no doubt as to the county. The specimen in question is in excellent preservation, and is the only one killed in Britain known to be in existence. I have carefully sought for indications that the bird had been in confinement, and of this I cannot entertain the



least suspicion. In the opinion of Prof. Alfred Newton this beautiful bird has unquestionably occurred twice in Great Britain, and as it is a very vagrant species, it seems unreasonable to disallow its claim to be considered a wanderer to our shores. The species is a native of Tropical America, and the occurrence of individuals with us is perhaps mainly interesting as showing that "Transatlantic stragglers" are not wholly confined to natives of the northern half of that continent, though whether those stragglers cross by a different route, or in a different way, it is impossible to say. For a description of the species the reader may be referred to Dr. Coues's 'Key,' or to Mr. Ridgway's 'Manual.'—W. RUSKIN BUTTERFIELD (St. Leonards-on-Sea).

Honey Buzzard in Staffordshire.—Mr. E. Baylis's record of this occurrence (p. 232) contains some errors which are well to be corrected. The date given (1894) is incorrect. I examined the bird some years since, and was informed by the gardener who killed it (not the keeper, as stated) that it was obtained June 16th, 1891; and the record has long since been saved from oblivion, having been recorded fully in the 'Journal' of the Birmingham Natural History Society. Moreover, if Mr. Baylis had referred to McAlldowie's 'Birds of Staffordshire,' he would have found several other recorded occurrences; and again an additional specimen recorded by myself in Zool. 1888 (p. 394). As regards Warwickshire, several have occurred within the county.—J. STEELE ELLIOTT (Dixon's Green, Dudley).

Breeding of the Common Snipe in Romney Marsh.—Towards the end of April, some three or four years ago, I flushed a Snipe in Romney Marsh; the question immediately occurred to me, does the Snipe breed here? There are many very suitable places, though none of large extent like there are in the fens. Being well acquainted with the bird during the nesting season in the fen country, I at once began to look for the nest, but could not find it. Every year since I have put up three or four in different parts of the marsh, in the month of April; but they always seemed to be only feeding, as the places were generally very wet, and no nest was to be found. On April 24th last, however, while hunting a small piece of rough sedge and rushes with my brother, I saw a Snipe get up right at his feet, and as usual, when there is a nest, fly away slowly and close to the ground. The nest was easily found, situated on the top of a tussock, and contained four typical eggs. We subsequently put up several more Snipe, but they were obviously only feeding, and we were unable to find a second nest. So far as I can make out, this is the first recorded instance of the breeding of this species in Kent; I can find records for all the other southern counties from Cornwall to Essex, and Borrer, in his 'Birds of Sussex,' mentions it as nesting on the Pevensy Levels, only some twenty-five miles from where I found

the above nest. Being now at work during my spare time in preparing a History of the Birds of Kent, I should like to hear from any reader of 'The Zoologist' who knows of a previous instance, or would be kind enough to furnish me with any information regarding the occurrence of rare birds, the distribution of local species during the breeding season, winter visitors, or the whereabouts of private collections; all such information will be gratefully acknowledged.—N. F. TICEHURST (Guy's Hospital, London, S.E.).

**An Unfortunate Cuckoo.**—My attention has recently been directed to a dead Cuckoo found on a moor near here, which must have met its end under somewhat peculiar circumstances—I might say melancholy circumstances—when we consider the long flight which this bird must have taken a short time before it was destroyed. The enemies which may have attacked it in an unwary moment—as it was found beside a small water-course, where it may have been either drinking, bathing, or otherwise occupying its time—are Stoats, Weasels, Dogs, and Cats; or, among birds, the Merlin, Kestrel, Sparrowhawk, and Hooded Crow, of which the first is rare in this neighbourhood. But there were no signs of picked-out eyes, blood-sucking about the neck, or anything that would indicate an attack by any of the above-mentioned animals. The parts eaten away when I saw it were indicative of Rooks, who had fallen upon it after death; and we may suppose from other appearances that it had been perhaps killed in battle, either between one or more of its own kind or with some other bird, as there were feathers, apparently plucked, lying at three places in the vicinity where the dead bird was found, while its neck was practically cleared of feathers in some parts, without indication of cuts. I have seen these birds somewhat pugnacious about the time they arrive, as well as during their stay here, and it is possible that there may have been a fight, ending in the death of one of them. In the vicinity there was a Ring Ouzel's nest, and it is a question whether it would be possible for a Cuckoo to tamper with one of these Thrushes with the view of depositing an egg in its nest. The other birds in the neighbourhood which could have fought would consist of Lapwings, Golden Plovers, Curlews, Grouse, Partridges, Wood-Pigeons, or Rooks. The last mentioned sometimes have great fights with Hawks, and if the Cuckoo possesses the boldness of the Hawk it might enter into a disadvantageous conflict with one or other of these birds.—WM. WILSON (Alford, Aberdeen, N.B.).

[I found a dead Cuckoo several years ago among some trees near Purley, Surrey, and ascribed its death to contact with some tall wire-fencing (?). It was in such perfect condition that it was set up, and is still in my possession. Good authorities—Bowdler Sharpe, Jefferies, amongst

others—have recorded that small birds will mob a Cuckoo from its similarity in appearance to a hawk.—ED.]

**Peculiar Nesting Habit of the House Sparrow.**—We have a colony of Sparrows which build nests in a creeper on the front of our house. This year the creeper was very slow in coming out, and the nests were therefore very visible to the naked eye; so the Sparrows took a great number of leaves from a tree in front of the house and stuck them about the creeper, with the view apparently of covering up its deficiencies. Of course they dropped four for every one they fixed in the creeper, and those they did get there were soon blown down; but they nearly stripped the side of the tree next the house.—A. L. LEWIS (54, Highbury Hill, N.).

**Change of Plumage in the Nonpareil Finch.**—Last summer I purchased a Nonpareil Finch, *Cyanospiza ciris*, from a local dealer. When I first had the bird its breast-feathers were scarlet, but since its last moult they have become orange. I should be glad if any readers of 'The Zoologist' could inform me if there is any method of restoring the scarlet colour of the feathers at the next moult. The bird itself is in the best of health, and sings well, and I may say the blue of the head and the green feathers on the back leave nothing to be desired. It is kept in a roomy cage, has plenty of exercise, and in addition to ordinary seed diet has abundance of insect food. I am aware that Nonpareils in captivity are very liable to lose colour, and should be glad of any suggestion as to feeding, &c, which might enable me to remedy this. — GRAHAM RENSHAW (Sale Bridge House, Sale, Cheshire).

**Occurrence of the Black-headed Bunting in Sussex.**—Early in January of the present year, while looking over some birds in the possession of Mr. Daniel Francis, I recognized an example, in adult female plumage, of the Black-headed Bunting, *Euspiza*, or, as it is more generally called, *Emberiza melanocephala*. It was given to Mr. Francis on the morning of Nov. 3rd, 1894—the day on which, as Gould supposed, the first British example was killed twenty-six years before—by one of the men of the coastguard service, who had just picked it up in an exhausted condition close to the metals on the South Coast line of railway near Bexhill. The bird had a shattered wing, and had probably been shot at while perched on the telegraph-wires. Through my friend's kindness the specimen is now in my possession. The original British specimen was shot in this county in November, 1868, and is in the choice collection of Sussex birds formed by Mr. Monk, of Lewes. Since that year it has occurred twice in other parts of Britain, so that the present makes the fourth record. During the breeding season the species is "abundant in Asia Minor, all through the Caucasus" mountains, but it rarely extends westward or northward of the

peninsula of Italy; while during the autumnal migration its flight is directed eastward to India, which forms its winter quarters. It is enough to excite one's wonder that individuals should be found in this country (and the same may be said of Heligoland) in November, separated as they then are from their rightful home by almost the whole length of Europe and half that of Asia. A short notice of this occurrence may be seen in the second volume of Dr. Butler's 'British Birds,' p. 192 (Addenda).—W. RUSKIN BUTTERFIELD (St. Leonards-on-Sea).

**Nesting of the Grey Wagtail in Lincolnshire.**—I have been delighted in watching a pair of Grey Wagtails, *Motacilla melanope*, Pallas, which, *mirabile dictu*, have actually brought off a brood within three feet of my library window. The nest, the exterior of which is composed of fine grasses and roots, and lined with cow-hair, is five feet from the ground, in the wall-ivy. It was commenced the second week in March; I dare not look too closely to ascertain when the first egg was laid. The female commenced sitting about April 25th. The young were hatched on May 9th, on which day both the parents commenced feeding them with insects and their larvæ. These Wagtails were first seen on Nov. 10th, and have kept about the premises ever since. There are several spring-heads and water-courses which they haunt, but none very near the house. It has been a daily pleasure to watch these elegant and chastely coloured little creatures, so suggestive of a north-country beck, running here and there on the lawn, sometimes on the window-sill, or perched on a window-box or the scraper of the side door. When I found they really intended nesting precautions were taken to prevent them being disturbed, and since the female commenced to sit six worthless stray cats have disappeared without subsequent enquiries as to their whereabouts. I was pleased (May 22nd) when the young birds (I think four of them) left the nest, and strong enough to fly to the house-roof and into an old beech-tree on the lawn. The old birds used alternately to bring insects to the nest almost regularly every five minutes, commencing, to my knowledge, at 4 a.m. and to 7.30 p.m. This is the first occasion on which the Grey Wagtail has been recorded nesting in Lincolnshire, and, as far as I am aware, in Eastern England south of the Humber. It is, however, a most regular winter visitant.—JOHN CORDEAUX (Great Cotes House, R.S.O., Lincoln).

**Arrival of Summer Migrants in Gloucestershire.**—The following is a list of some of our summer migrants, with the dates upon which I first observed them in Gloucestershire (near Cheltenham):—Chiffchaff, March 25th; Willow Wren, April 11th; Redstart, April 14th; Whitethroat, April 13th; Swallow, April 13th; House Martin, April 14th; Blackcap, April 16th; Lesser Whitethroat, April 18th; Cuckoo, April 19th; Sand



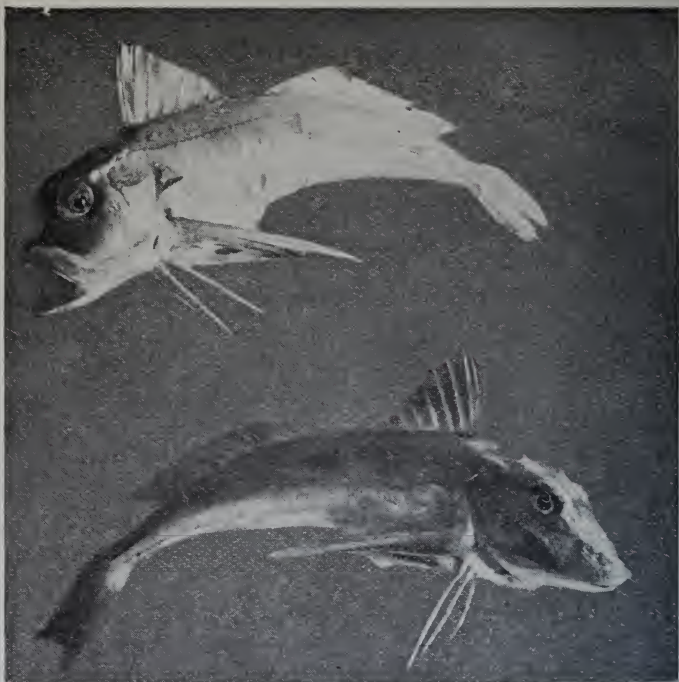
Martin, two seen on April 4th.—BERNARD RIVIÈRE (Flaxley, 82, Finchley Road, N.W.).

**Inherited Instinct in Birds.**—It has been asserted, without a shadow of real evidence to support the statement, that birds build their nests by imitation, and that the reason why many of them at the commencement of the season trifle with building material for some time before they produce a satisfactory structure is that they are unable at once to remember exactly what the character of the nest was in which they first saw the light of day. In 'British Birds, with their Nests and Eggs,' now in course of publication, I pointed out that young birds never really see the more complex part of the nest, inasmuch as their vision is mainly confined to the lining (which is moulded into form in the most primitive fashion); and in direct proof of the fact that birds do not build by imitation, I recorded the fact that in 1895 and 1896 different hen Canaries, reared in the usual square box of a London breeding-cage, were turned loose in aviaries in which no typical finch-like nest existed, and, after the lapse of about three hundred years, reproduced nests nearly resembling those of their wild ancestors. This year a still more convincing proof of the instinctive building habit in birds has been given. I turned loose a Canary, also cage-bred, in one of my aviaries, late in April. The bird, without my knowledge, took possession of a square box hung high up on the wirework, and had almost completed a nest therein, when I lifted the box down to see whether any bird had made use of it. Although I hung up the box again, the Canary deserted it, and commenced at once to build an elaborate cup-shaped nest in a dead bush. In three days this nest was completed; the following day she began to lay, and deposited five eggs, upon which (as I write) she is sitting steadily. On the other hand, Goldfinches and other birds reared out-of-doors take possession of cages and boxes in which to nest when in captivity.—ARTHUR G. BUTLER (124, Beckenham Road, Beckenham, Kent).

#### PISCES.

**Bull-dog Variety of the Sapphirine Gurnard at Great Yarmouth.**—During the middle of May an unusual number of Gurnards were brought to the fish-wharf by local trawlers. The Sapphirine Gurnard, or Tub-fish, *Trigla hirundo* (local, *Latchet*), was exceptionally plentiful, and ran to a very large size. In one instance I saw a specimen very prettily mottled with a fine bluish network of markings. The pectoral fins were barred very like those of *Trigla lineata*. On May 18th a sixteen-inch example was brought to me, exhibiting the peculiar characteristics which have been noticed in several species, and which have gained for that abnormality the title of "bull-dog variety." The "latchet" had a head-piece that had the appearance of

having been, in nautical language, "stove in." I have on two or three occasions found this feature displayed in the *Gadida*, in which the deformity amounts to positive ugliness. I am indebted to my friend Mr. C. Rumbold, an amateur photographer living in this town, for the photograph from which



the accompanying illustration has been taken. A normal specimen has been introduced to show the contrast. The fish is now in the Cambridge Museum.—ARTHUR PATTERSON (Ibis House, Great Yarmouth).

[Besides the above interesting record relating to the Gurnard, in Mr. Bateson's 'Materials for the Study of Variation,' pp. 57-8, will be found instances of the "bull-dog" variety in the Carp, Chub, Minnow, Pike, Mullet, Salmon, and Trout."—ED.]

#### CRUSTACEA.

**A Gigantic Lobster.**—Some of our daily papers having published the statement that the New York Aquarium contained the largest Lobster in the world, the Editor wrote to the Director of that institution, who has kindly supplied the following note on the subject:—

“Replying to your letter of April 20th, I am not authority for the statement that a large Lobster, recently exhibited in the Aquarium and now in the taxidermist's hands, is the ‘largest Lobster in the world.’ Its weight, as given to me by an assistant of Prof. Bristol, of New York University, was 33 lbs., of which the large forceps furnished 17 lbs. The total length he found to be  $23\frac{3}{4}$  in., from rostrum to end of telson, not including hairs. The straight measurement of the large forceps is 15 in., and its girth  $20\frac{1}{2}$  in. The length of the small forceps is  $15\frac{1}{2}$  in., and its girth  $15\frac{1}{4}$  in. The carapace is  $9\frac{3}{4}$  in., exclusive of rostrum, which is  $2\frac{5}{16}$  in., and its girth behind the cervical groove is  $19\frac{3}{4}$  in. The Lobster is *Homarus americanus* (M. Edw.). The example was taken by a cod-fishing smack off Sandy Hook late in March. It lived in the Aquarium only three weeks. The lower salinity of the water supply and the reduced pressure were the probable causes of its death. It took no food during captivity. When the salinity of the water is greater, as occurs in the fall of the year, it is practicable to keep large Lobsters alive during the entire winter, and they can easily be induced to feed upon pieces of cod or herring.”

—TARLETON H. BEAN, Director (New York Aquarium).

## NOTICES OF NEW BOOKS.

*Problems of Nature: Researches and Discoveries of Gustav Jaeger, M.D.* Edited and Translated by HENRY G. SCHLICHTER, D.Sc. London: Williams & Norgate. 1897.

THIS volume contains a selection made from numerous essays published by Dr. Gustav Jaeger, who is well known to the English-speaking world through his hygienic discoveries and researches. To many it will come as a surprise that the familiar name of the author is also attached to many original contributions on the subject of organic evolution, and that his work was not only approved, but commended, by Darwin himself. The contents of the present volume are divided into Part I.—Zoological; Part II.—Anthropological; Part III.—Varia. In each section zoologists will find much to interest them, though probably our readers will be more attracted by the first part.

Dr. Jaeger is an original thinker; his views are enunciated with much force and accentuated by brevity, whilst quotations and foot-notes are phenomenally absent. He seizes his problem, wrestles with it, and, it must be said, usually declares that he has conquered it. Essays V. and VI., "On the Origin of Species" and "Sexual Selection," though devoted to now somewhat hackneyed subjects, are brimful of original suggestions and fresh points for consideration; in fact, it is quite a relief to find a writer treating these topics by the Darwinian method and yet from his own point of view. As regard sexual selection Dr. Jaeger is one of the small *coterie* who are gradually acknowledging the strength of this hypothesis—in fact, to use his own words, he is "inclined to attribute considerably more importance to sexual selection than Darwin does." Another most interesting zoological essay is "On the Physiological Importance of Savourous and Odorous Matters (matters which can be tasted and smelled)." The author's "starting-point is that every animal species has its specific odour." He also claims the same diversity in taste, not only as regards the birds, but that the eggs of every



species are distinctly different. From his own experience, as director of the Zoological Gardens at Vienna, he is able to state, and from his own examination, that many birds, such as the Cassowary, Turkey, Peacock, Guinea-fowl, Pheasant, Californian Quail, "have specifically different eggs." He therefore comes to the conclusion that "the substances which produce these specific odours and tastes have not been acquired by the animal during its embryological development, but that they form an important constituent of the germ-plasma itself."

Our limits will not allow of more reference to other essays or more quotations from the same, but they all have the merit of raising fresh thought-concepts, even when not securing the reader's conviction on their main thesis; they at least quicken when they do not convince, and are a valuable addition to the ever increasing literature on speculative zoology.

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*Pheasants: their Natural History and Practical Management.*

By W. B. TEGETMEIER, M.B.O.U., &c. Third Edition, enlarged. Horace Cox. 1897.

THE third and enlarged edition of this book will be welcomed alike by the naturalist and the sportsman, both at home and in our colonies, for the Pheasant, though an introduced bird by, or anterior to, the Romans, is still by most Britons cherished almost as a visible sign of a British institution. The name is always familiar; even in South Africa it is applied to species of *Pternistes* and *Francolinus*, and there are now more or less successful attempts at introducing the real bird in that much-talked-about region. Mr. Tegetmeier's volume should in our colonies be widely known and read, for it contains the information that is absolutely requisite to enable the bird to become established in those outlying estates of the Greater Britain. It is but a few years back that even in the Transvaal a wealthy Boer asked the present writer for advice on the subject, and stated his intention to procure birds from Holland. The present volume was the very one to have been placed in his hands, and might have inculcated also a better love for things British. We linger on this point, because the book is already so well known

in our own country, while it is able to supply an actual want in the Colonies, where the Pheasant will certainly join his emigrant preservers. What is required there is a thorough knowledge of home methods as to breeding and preserving, qualified by adaptation to local conditions, and preservation from the attacks of foreign "vermin."

A wide margin of selection is possible, as the chapters on "Pheasants adapted to the Covert" amply testify, and the birds described therein are beautifully illustrated. But the illustrative charm is to be found in the vignettes, which represent many mutilations and distortions interesting to the zoologist, and "still" game which will not, as is often the case, appal the critical eyes of the experienced sportsman.

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*Papers presented to the World's Congress on Ornithology.* Edited by Mrs. E. IRENE ROOD, under the direction of Dr. ELLIOTT COUES. Chicago: Charles H. Sergel Company. 1896.

THIS volume is a souvenir of the World's Columbian Exposition of 1893. The Congress on Ornithology was decided on rather late, and but a few weeks elapsed between the formation of the Committee and the actual session of the Congress. The design of the Committee was "to have the Congress treat of birds from the standpoint of the scientist, the economist, and the humanitarian," and the last position has certainly been well represented.

The Presidential Address of Dr. Elliott Coues is a most interesting ornithological contribution, and reminds one very much of a compressed analogy to some of the letters in the 'Introduction to Entomology' by Kirby and Spence, for it details with much freshness the many benefits and the fewer injuries derived from birds. Dr. Coues emphasizes the fact of their beneficial qualities by a very practical remark, and one which to-day possesses as much force in England as in America. "The usefulness of birds as insecticides is measurable in money—and that is something everybody can understand."

A very suggestive paper entitled "Hints at the Kinship and History of Birds as shown by their Eggs" is contributed by Mr.

Jas. Newton Baskett. Some coloration seems to be regarded by the author as of a survival nature. "The modern birds have come out of an unknown region, bringing with them their desire to get back—and their eggs marked to suit the foreign surroundings. . . . The bird which in the Arctics long ago may have lined its nest with green moss or grey lichens, may now floor it with flax in Dakota, or pad it with cotton in Texas; and yet in either deposit a solid green or mottled greyish egg in keeping with the colours of 'the old house at home.'"

Another instructive memoir is that by J. J. Quelch "On the Birds of British Guiana." The birds of this habitat have very pronounced features, such as the large number of species, the marked abundance of the individuals of a species, and an astonishing brilliance of plumage. Food relations are also peculiar: many Hawks examined at different times of the year, and in different places, have revealed only a diet of moths, beetles, grasshoppers, locusts, leaves, and fruit. The vultures, *Cathartes*, in the forest districts, contain almost invariably a preponderance of fruit and leaves; while *Mycteria*, the Giant Stork, in the depth of the dry and wet seasons lives on beetles, grasshoppers, and locusts. We must conclude a hasty survey by noticing the more personal contribution of Paul Leverkühn, of Bulgaria, on "Ornithologists, Past and Present." The author possesses a collection of ornithologists' portraits "which is said to be the richest one in the world," and he is still desirous of receiving additions to his albums. It is well to know where such collections are amassed, and it is to be wished that copies of some may from time to time be published. How we would all value to-day the inspection of a portrait of Gilbert White of Selborne.

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*Wild Bird Protection and Nesting Boxes.* By JOHN R. B. MASEFIELD, M.A. Leeds: Taylor Bros. 1897.

THIS delightfully illustrated little volume is written by a true lover of birds, who, by protection and affording facilities for nesting, has during the last few years had no fewer than thirty-six "species of our wild birds nesting in and around my own garden,

shrubby, and buildings," and the main object of the publication is to give "some information from actual experience on this subject, which I trust may induce others to do something for the preservation of our fast-diminishing wild birds."

Parts I. and II. are devoted to a *résumé* of the governmental edicts passed in this country for wild bird protection, and to the mediæval bird laws directed to the same purpose.

Part III. deals with the more important consideration of "Bird Nesting Boxes," in which the author not only details his own successful contrivances, but gives examples of similar measures pursued for the same purpose by other well-known naturalists and admirers of our native avian fauna. One observation is to be noted: "Many of our bird lovers seem to consider that success in attracting birds to nesting-boxes depends to a great extent on the aspect in which the boxes are placed, and probably a south or south-east aspect is the best, as the birds then get more sun; on the other hand, I have frequently found Flycatchers building against walls having a westerly and even northerly aspect, and Tits and Redstarts nesting in holes directly facing the north; so that it seems really to be of little moment in what direction a nesting-box or hole faces, if the bird finds the spot sufficiently quiet to carry on its nesting and family duties, and sufficiently sheltered from rain."

But with all care and contrivance three enemies must be reckoned with during the nesting season, *viz.* the small boy, the cat, and the House Sparrow. The evil propensities of the last-named bird as experienced by the author are clearly stated. "No doubt remains that he is a determined destroyer of the eggs of other small birds, and to the House Martin he is an inveterate plague, taking possession of its nest, and appropriating it to his own use."

The volume concludes with an enumeration of "Orders applying to Counties, &c., under Wild Birds' Protection Acts."

The illustrations, the result of photography, give a peculiar charm to a remarkably interesting and useful little book.

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*Birds of our Islands.* By F. A. FULCHER. Andrew Melrose. 1897.

THIS is an excellent book to put in the hands of a bird-loving boy or girl, or better still to serve as a school prize book. We well recollect how little natural history was found in the academical volumes presented to the weary scholar some forty years ago; and when some zoological treatise was dispensed it was usually a mixture of second-hand observation and turgid teleology. Now all this is changed, and there seems to be a danger sometimes that the mass of juvenile literature will end in amateur science.

Mr. Fulcher writes pleasantly on our native birds, and treats his subject on the lines of a somewhat conversational narrative, in which a considerable amount of information is afforded as to habits, nesting, &c. The method is purely non-scientific—not by any means unscientific—the English bird names being alone given, and classification quite ignored; the principal works used in verification and amplification of the author's own observations being, we are told, Hudson's 'British Birds' and Dixon's 'Eggs and Nests of British Birds.'

The illustrations are numerous, but we cannot help thinking that the facial expression of the Long-eared Owl given at p. 249 is of a particularly benign and human-like description.\*

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*The Fauna of British India, including Ceylon and Burma: Hymenoptera.* Vol. I. By Lieut.-Col. C. T. BINGHAM. London: Taylor & Francis. 1897.

WE recently noticed the completion of Sir G. F. Hampson's contribution to this series on the Moths or Heterocera. With commendable promptitude Col. Bingham's first volume of the Hymenoptera—Wasps and Bees—has appeared. Indian naturalists as a whole and oriental entomologists in general will gladly welcome this publication. The Hymenoptera have not attracted numerous workers and students as the Lepidoptera have done, and yet, as our author remarks, the "Hymenoptera have a right to be considered the most highly developed mentally of all

\* This figure is clearly a reprint from 'A Year of Sport and Natural History.'

insects." Many observations have proved this, but many also are lost through field naturalists being often unable to recognise the species, nay, even the genus, of the insect whose economy or traits they have observed. It is sometimes a modern habit to decry the labours of the describer—in fact, species-monger is not an unknown term—and the taxonomist is often looked upon as a harmless enthusiast of the type of the "Scarabee" of Oliver Wendell Holmes. But how can any philosophical observation be recorded concerning a species which belongs to no nomenclature and is outside a known classification? Such a book as we now notice becomes a positive boon as much to the observant naturalist as to the future specialist. It is the code by which we identify the creatures whose habits we study, or whose bodies we preserve.

The method of this volume is in accord with that of its predecessors; but "keys" are given to species as well as to genera, and of the last a typical illustration is always afforded. Four coloured plates are appended, and we welcome a volume we would gladly have possessed when sojourning years ago in the region to which it refers. We can speak from sad experience of how the portals of nature remain hidden by the absence of a technical guide, and of how a good taxonomic volume is not a hindrance, but frequently a positive necessity, to one who would record his observations made in the field.

The illustrations are from drawings by Horace Knight, and the chromo-lithography is the work of West, Newman & Co.

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*Investigations into Applied Nature.* By WILLIAM WILSON, Junior.  
London: Simpkin, Marshall, Hamilton, Kent, & Co.,  
Limited. Aberdeen: John Rae Smith. 1896.

THIS small volume consists mainly of various papers and lectures contributed by the author to different institutions and publications during the last decade, and comprise some of a purely botanical and agricultural interest, and others of a zoological nature. Mr. Wilson has evidently an extensive knowledge of general agricultural and farming pursuits in Aberdeenshire, and has also devoted no little observation to the general fauna and flora of his county. Even under such a non-zoological

title as "Our Indigenous Flora as Food-plants," we meet with facts illustrating the change of diet animals can sustain under necessity, and our author has seen sheep eating fronds of *Asplenium viride*, *Trichomanes*, and *Adiantum nigrum*, when he considers the ferns were supplying the place of trefoils "on our cultivated fields."\* In 1883 and 1884 he also observed that all ferns in a certain district were "occasionally eaten by quadrupeds."

In a paper on the habits and instinct of the Rook, we obtain a few local facts relative to the visitation of birds as modified by man's action on the environment. In this part of Scotland drainage has brought about the disappearance of the Snipe, whilst other birds "more inclined to wade into water" have in some cases resorted to moors. The Pied Wagtail has been seen by Mr. Wilson several times inland during the winter season, and the Lapwing has of late years shown a similar tendency. The "Great Curlew," according to our author, only found its way into the moors of Aberdeenshire some forty years ago. The Common Gull, *Larus canus*, came to the moors of Aberdeen a few summers ago, and nested there.

In conclusion we may remark that, if many of the records are not told for the first time, the volume abounds with the natural observations made by a shrewd Scottish yeoman and lover of natural science, and should be interesting alike to those who manage an estate or cultivate a farm. It would, however, be improved by the supervision of a good "reader," for we do not all write with the majesty of Milton or the charm of Macaulay, and style has not only been known to float a bad book, but also to ruin a good one.

\* Low in his 'Domesticated Animals of the British Islands' long since told us how the sheep of the Zetland and Orkney Islands at certain seasons find their way from the mountains to the shores, and feed on the *Fuci* and other marine plants.

## EDITORIAL GLEANINGS.

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IN the 'Annali del Museo Civico di Storia Naturale di Genova,' Ser. 2a, vol. xvii. (xxxvii), under the well-known title "Viaggio di Leonardo Fea," which has headed very many zoological contributions by different specialists during recent years, is found a "Riassunto Generale dei Risultati Zoologici" by the traveller and collector himself. Fea made some most extensive zoological collections, embracing many orders, in Upper Burma, and these, under the energetic supervision of Dr. Gestro, have been, with the excellent method pursued by the institution over which he presides, distributed for identification amongst well-known specialists. This has resulted in the publication of ninety-five different special memoirs, and three others which partially refer to the zoological spoils of this expedition. The present summary forms in its separate condition a most interesting volume, in which Signor Fea has given to zoologists the results of a naturalist's observations and impressions made in a most productive region. We have placed our copy by the side of the Rev. F. Mason's early work on the Biology of Tenasserim and Burma, published at Maulmain in 1852.

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IN the 'Bulletin de la Société Nationale d'Acclimatation de France' for April are some interesting notes on the "Fish-oil" industry of Japan, by Daniel Bellet. Sea-fishing affords great employment to the Japanese. A French consul has recently estimated that no less than 3,300,000 individuals are engaged in the vocation, and these figures are apparently accurate from the statistics afforded by other documents. There are 710,610 fishermen, each of whom is the head of a family; 186,517 households salt fish or prepare marine manure; 1,592,690 persons gather seaweed; and 748,231 occupy themselves as under-salters, or with other work connected with the industry. The proceeds of these fisheries are valued at thirteen millions of yens—a yen is *nominally* a dollar or a little less than five francs, though *actually* it is a little less than three francs—including the fish-oil, but not counting the secondary productions. The Japanese thus largely practise an industry well known in Europe, and Herrings, Sardines, Whitings, Haddocks, Skates, Congers, Tunnies, and Shads are used for the purpose. In the same 'Bulletin' for March we read that M. Edouard Foa, the well-known traveller, has sent home from Central Africa a tube containing specimens of the Tsetse Fly in a dry condition, which will doubtless prove



useful for bacteriological study. These insects will be distributed in the special laboratories "de l'Institut Pasteur, de l'École d'Alfort, de la Faculté de Médecine ou du Muséum."

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UNDISMAYED by the daily Monday to Friday performances of the Press Band in the Embankment Gardens, a pair of Sparrows have built a nest in the ornamental ironwork of the band stand, immediately over the conductor's head, and within a few feet of his bâton. Here a young family is being reared, with apparently healthy appetites; for the old birds, taking no notice of the performers, even in the loudest passages, nor of the big crowd of listeners surrounding them, come every few minutes to their untidy nest and feed the youngsters. ('Westminster Gazette,' May 27th.)

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AT Mearbeck, near Settle, the beautiful residence of Mrs. Preston, a large rookery, which has been there for a very considerable number of years, has unexpectedly been abandoned. Mr. Wooler, the gardener, says that in February last a large number of Rooks came to their old nests and, he thinks, took out the linings of the nests, which can be seen on the ground. Afterwards every Rook disappeared, and the place is now unusually quiet for this time of the year. ('Craven Herald,' Skipton, April 30.)

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LIEUT.-COLONEL H. W. FEILDEN and Mr. H. J. Pearson, who made a successful expedition to Novaya Zemlya in 1895, are about to proceed to the Petchora river and the coasts of Siberia. The start will be made from Norway, and the explorers will study the geology and zoology of the North Russian shores, and make collections for the British Museum. Some years ago Col. Feilden spent an entire winter in Grinnell Sound—the most northern portion of the globe in which fossil remains have been brought to light—and there obtained ample proof that animals were on the move the whole time.

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IN 'Nature' for May 27th, Grassi and Calandruccio, supplementing their last announcement on the larva of the Common Eel, that they had succeeded in following the transformation of *Leptocephalus brevirostris* into *Anguilla vulgaris*, now supply figures of a specimen of *L. brevirostris* with its larval teeth still intact, and also of another specimen captured by Dr. Silvestri in the Straits of Messina, which is described as follows:—"Its total length is 71 mm. The anus is about 29 mm. from the apex of the snout, the anterior extremity of the dorsal fin being about 25 mm. from the apex of the snout. The head and the point of the tail have already noticeably acquired the known special characteristics of the Eel. The larval teeth

have totally disappeared, while the distinctive ones seem still entirely absent. It lacks all traces of pigment." The authors consider that these characteristics are sufficient "to convince anyone of the reality of the metamorphoses discovered by us." As Mr. J. T. Cunningham has previously pointed out, "it is a curious fact that the larvæ, now identified as those of the Eel, are found in greatest abundance in the stomach of the Sun-fish, *Orthogoriscus mola*, which Grassi believes to be a deep-sea species. In the Straits of Messina this fish rarely appears, except in the months from February to September, and the occurrence of *L. brevirostris* is limited to that period."

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IN the 'Athenæum' for May 29th Canon T. K. Cheyne has contributed a most interesting communication on "Mythic Singing Crocodiles":—"Reading Dr. James's introduction to his 'Apocrypha Inedita,' ii., in the Cambridge 'Texts and Studies,' vol. v., No. 1, I was interested to see that he illustrates the strange flying creatures called Chalkadri, with the feet and tails of lions and the heads of crocodiles and wings like those of angels (a description which also applies to the phœnixes), by Vishnu's bird Garuda. Long ago this same mythical bird was introduced into discussions on the Hebrew cherub, on which Jehovah is said to ride (Ps. xviii. 10), since it is Garuda's chief function to act as the animated chariot of Vishnu. It was new to me that Garuda is also said to have carried Aruna (Vishnu's charioteer) on his back and placed him in front of the sun to prevent it from consuming the world by heat. This gives an interesting parallel to the use of the wings of the phœnix and the Chalkadri, but suggests that Aruna, and not Garuda, is a parallel to these two mythic birds. Garuda still seems to me a distant relative of the cherub. As to the name Chalkadri, I cannot agree with my friend Mr. Charles that it is a transliteration of *χαλκίδραϊ*, brazen hydras or serpents. The serpents of Num. xxi. 6 have no solar connection whatever: neither did the old writers attribute any to the brazen serpent. It seems to me that one of the two French scholars to whom Dr. James's volume is dedicated has given the most reasonable view of the name Chalkadri. I will not take up space with recapitulating M. Berger's interesting analogies and arguments, for which see a recent number of the French journal of folk-lore called 'Melusine.' His conclusion is that Chalkadri is a corruption of 'Crocodile,' the letters being mixed up, as so often happens in corruptions. I know that the description only speaks of the head as being that of a crocodile. But the name preceded this description. The only thing which M. Berger has not cleared up is the combination of the phœnix and (*ex hyp.*) the crocodile as attendants on the sun. Can this arise from the fact that the sun-god was identified (among other symbolic animals) with the *bennu* or phœnix and the crocodile (see Brugsch, 'Religion

und Mythologie der alten Aegypter,' pp. 24, 105)? How animals with crocodiles' heads were supposed to sing, I do not know. I presume that the phœnix (which was confused apparently with the swan) sang before it had the misfortune to get a crocodile's head, and that the crocodile learned the secret of the phœnix! The references in the introduction to the dragon are also very interesting. Has Dr. James intentionally omitted mentioning the old Babylonian dragon-myth? It is true this has become sadly distorted. In the act of closing this letter I find in the Palestine Fund 'Quarterly Statement' for July, 1888, a note by Col. Conder on crocodiles in Palestine, in which he points out that these animals are mentioned as 'corcodrils' by Sir John Maundeville; this is very near Chalkadri. He also quotes from a tract of the thirteenth century, showing that crocodiles were then called 'cocatrices.'"

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THE author of the above has subsequently added the following note to the same journal:—

"Mr. H. Bradley points out to me that the Chalkadri of the Slavonic Enoch would naturally arise out of *calcatrix* (cf. 'Cockatrice' in the 'New English Dictionary'). *Calcatrix* is a literal translation of *ἰχνεύμων*; the *ichneumon* and the crocodile were confounded. This would introduce a fresh element into the strange mingling of animals represented by Chalkadri, and an element entirely inconsistent both with the phœnix and with the crocodile from the point of view of (Egyptian) solar mythology. For the sun-god hated the *ichneumon* (the symbol of Set) as much as he must have loved the phœnix and the crocodile (his own symbols). That the writer takes the most important part of the Chalkadri (the head) from the crocodile is, however, satisfactory to a mythologist, and we may, perhaps, rest assured now, thanks to M. Berger and Mr. Bradley, that the Chalkadri was in no sense either a serpent or (in spite of its wings) a bird. And if M. Berger pointed in the right direction, the 'New English Dictionary' suggests the probably right conclusion."

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At the May meeting of the Norfolk and Norwich Naturalists' Society Mr. Southwell exhibited a remarkably fine example of the old race of Norfolk Great Bustards, which had recently come into his possession, and had not hitherto been recorded. The specimen is a very old male, and is even larger than the fine male killed in 1818, now in the Castle Museum; it was shot at Swaffham early in the present century, probably about 1830, by a Mr. Glasse, Q.C., who then occupied Vere Lodge, Raynham, near Fakenham, Norfolk, as a shooting box. It remained in the possession of the Glasse family until recently sold with the effects of the daughter, Miss Glasse, who died at Bournemouth.

THE Galapagos Archipelago was visited by Darwin in 1835; its remarkable zoology, sketched by the 'Voyage of the 'Beagle,' at once aroused the highest interest among naturalists, whilst Darwin's deductions concerning the origin of the Galapagoan fauna are amongst the best known passages in his writings. Since the visit of the 'Beagle,' our knowledge of the avian fauna has been increased by the large collections made by Dr. Habel in 1868, the naturalists of the 'Albatross' in 1888 and 1891, and by Messrs. Baur and Adams in 1891. In 1876 Salvin published his well-known paper "On the Avifauna of the Galapagos Archipelago," which has remained the most important contribution to the subject. Mr. Robert Ridgway has now brought the subject thoroughly up to date by an exhaustive contribution on "Birds of the Galapagos Archipelago," published in the Proc. U.S. Nat. Mus., vol. xix., 1896. During recent years at least one of the indigenous birds has become extinct, the larger Mocking-bird of Charles Island, *Nesominus trifasciatus*, being no longer found. "Others appear to have become extinct on the islands where they were originally found." Forty-six genera of birds have thus far been found in the Galapagos Archipelago, of which six appear to be peculiar, but from a study of the genera alone it is impossible to decide whether the "non-peculiar portion of the Galapagoan avifauna is most nearly related to that of lower Central America or the West Indies." The number of species which have been ascertained to occur in the Galapagos Archipelago is one hundred and five. Even now the study is incomplete, for Mr. Ridgway mentions—"The anomaly of individuals adult as to plumage, but with bills suggesting immaturity, and of others which show exactly the reverse, remains to be explained; and there are other questions which only protracted field-studies by a competent investigator can decide."

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MR CHARLES A. WITCHELL, writing in the June issue of 'Knowledge,' describes 'The Swift's Night-flight':—"During June and July, dwellers in places where the Swift abounds may investigate its recently discovered habit of soaring upward at evening and (apparently) spending the night in the sky." It was during the last cloudless Jubilee June (1887) that this extraordinary incident in the life of a diurnal British bird was first noticed in England. Mr. Witchell finds, "It is convenient to watch the Swifts from a somewhat elevated spot, so that they may be kept within view as continuously as possible, since, if they pass out of the field of vision at a distance, it is almost impossible to find them again. It is also desirable to have a support to lean upon, for without this the constant gazing towards the zenith becomes very tiring, especially if field-glasses are used. It is not often that the birds can be seen during the whole of the upward flight; they generally swing around in wide circles for some time, and pass out of



sight towards the horizon, after which the repeated cry 'swee ree' first indicates their return."

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PROF. A. E. VERRILL, in the Amer. Journ. Sci., January, 1897, from information forwarded to him, recorded the capture of a gigantic Cephalopod on the Florida coast, the body having been described by its discoverer as eighteen feet in length by ten feet in breadth. Prof. Verrill remarked that the proportions given indicated that it might have been a Squid-like form, and not an *Octopus*. Additional facts, however, have since come to hand, and it is found that the remains are not those of a Cephalopod at all. Several large masses of the integument of the creature, preserved fairly well in formalin, have since been forwarded to Prof. Verrill, who has now come to the conclusion "that the mass cast ashore is only a fragment, probably from the head, of some large vertebrate animal covered with a blubber-like layer of great thickness." The record of the giant *Octopus*, or Cephalopod allied to *Octopus*, must therefore be considered as completely refuted.

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LIEUTENANT PEARY will start his Arctic voyage of exploration about the 10th of next month, having obtained five years' leave of absence from his duties in the United States Navy for the purpose. He will probably be accompanied by three scientific parties, which will land, according to Mr. Peary's intention, on the coast of Labrador, Baffin Land, and Greenland, for the purpose of studying the botany, glaciology, and ethnology of the northern regions. This year Mr. Peary will go to Whale Sound, on the north-west coast of Greenland, and on returning he will pick up the members of the expedition at the three places indicated. We have little doubt that zoology will also receive due attention.

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Two Barbary Wild Sheep and two Tozenburg Goats have been born in the gardens of the Royal Zoological Society of Ireland.

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THE third edition of 'The Naturalist's Directory' has this year been issued by L. Upcott Gill. This small volume, published at one shilling, is intended for the use of "Students of Natural History, and Collectors of Zoological, Botanical, or Geological Specimens, giving the names and addresses of British and Foreign Naturalists, Natural History Agents, Societies and Field Clubs, Museums, Magazines, &c." Zoologists who possess this small book will find it one of handy reference, and can add to its value by forwarding any corrections and additions, which should be included in the next edition, to the publisher, as the Editor's name is not given.

WE recently received the pleasure of a visit from Herr H. Fruhstorfer, of Berlin. The last journey made by this entomological collector was to the Celebes. He is now engaged in working out his Celebesian Rhopalocera, and intends returning to the Malay Archipelago, towards the end of next year, on another entomological expedition.

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AT a meeting of the Dublin Microscopical Club, held on April 8th, Mr. W. F. Sinclair sent for exhibition two specimens of shagreen. The first was an example of white Asiatic shagreen, such as is used in some English sword-hilts and many Eastern. It was from the skin of *Trygon sephen*, or some closely allied species of Sting-ray. The principal sources of Asiatic shagreen are the Trygons or Sting-rays, and especially *T. sephen*, in which the tuberculated area is usually large in proportion to the total surface; and the tubercles (called in trade the "pearl"), though of various sizes, are arranged so as to present a pretty regular pattern, the lesser filling up the interstices of the greater. Their vertical axis, also, is usually at a right angle to the long axis of the fish, which is important to the sword-cutler, as the hilt covered with such shagreen gives a good "cut-and-thrust grip." The Japanese, the best artists in shagreen, usually arrange the two or three large spinal tubercles of this fish so as still further to improve the grip. *Urogymnus asperrimus* furnishes a skin used for some fancy articles. The *Plectognathi*, especially *Triacanthus* and *Balistes*, furnish a little, of small size and poor quality. Rays, amongst other merits, are much easier to skin than Sharks and Dog-fish; and on the Indian coast, men who never fail to skin *Trygon sephen* can scarcely be persuaded to do so with any other fish, unless it comes handy just when they want some shagreen. The second specimen was identified by Mr. Boulenger as belonging to *Centrophorus granulatus*, a deep-sea Dog-fish, widely distributed and especially abundant about Madeira. This is used for the hilts of the best English regulation swords.

# THE ZOOLOGIST

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No. 673.—July, 1897.

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## A FLYING VISIT TO DIRK HARTOG AND THE HOUTMAN'S ABROLHOS ISLANDS, WESTERN AUSTRALIA.

BY J. J. WALKER, R.N., F.L.S.

IN November, 1890, H.M. Surveying Ship 'Penguin,' Capt. W. Osborne Moore, was on a voyage from Gascoyne Roads, West Australia, to Fremantle, *en route* for Hobart, Tasmania, after an arduous and successful surveying season on the north-west coast of Australia. On the afternoon of the 12th, while steaming across Shark's Bay, a strong breeze sprang up right in our teeth, and we accordingly anchored, two hours before sunset, in smooth water under the lee of the north end of Dirk Hartog Island. We were within half a mile of the shore, which consisted of sandstone cliffs about 150 ft. high, and dunes of blown sand covered with rough grass and scattered bushes; nothing like a tree being visible, although such parts of the interior of the island as could be seen from the ship appeared to be fairly well clothed with grass and herbage.

Our boatswain, who was an indefatigable fisherman, soon had his line overboard, but without getting a single bite for a long time. At last he hauled in a very handsome reddish-silvery Bream-like fish, which I recognized at once as the "Snapper," *Pagrus unicolor*, well known and highly esteemed all round the Australian coast. Every fishing-line in the ship was quickly over the side, and for an hour quite exciting sport was

enjoyed, until sunset, when the fish suddenly left off biting. More than a hundred were obtained, varying in weight from ten to fifteen pounds each, and sufficient to serve for three or four good meals for the whole ship's company. They deserved their vernacular name by the eagerness with which they attacked the bait, and when hauled on board made a slight grunting noise, and emitted a peculiar and rather agreeable smell, somewhat like that of our English Smelt, only not so pronounced. The back-fins of numerous small Sharks could be seen above the surface of the water, and I noticed an enormous Turtle floating fast asleep just before the ship anchored.

We were to have resumed our voyage at sunrise the next morning, but the breeze was still very strong from the southward, and we remained at anchor. Early in the forenoon a boat was sent on shore to procure some sand, and I was by no means slow to avail myself of the opportunity of landing on this out-of-the-way island. The beach, on which there was little or no surf, was composed of fine yellow sand, broken at low-water mark by ledges of dead coral; and the first thing which struck me on commencing to ascend the cliffs—which were not particularly steep, but fatiguing to climb under the blazing Australian sun, owing to the deep loose sand which covered the slopes—was the much greater variety and the totally different character of the vegetation from what I had met with all along the coast to the northward and eastward as far as Port Darwin. I had evidently come within the boundary of the rich, varied, and most peculiar flora of South-Western Australia. Not, indeed, that there was any very great luxuriance, even the Eucalypti and Acacias, of which there were several species, being mere bushes not exceeding six or seven feet in height. Large clumps of a bright yellow “everlasting,” diffusing a pleasant aromatic scent, grew at the base of the cliffs; and on their summits the general character of the vegetation was somewhat like that of an English heath, or still more like the varied growth on the open treeless waste lands in the south of Spain near Gibraltar, but almost every plant was entirely strange to me. Of animal life there was very little; I saw one Kangaroo-rat, a creature about the size of a Rabbit, and a few small Lizards. In places somewhat sheltered from the breeze two or three species of blue butterflies were flitting about



and some pretty little beetles were found by examining flowers ; while the dead shells of a small, but rather handsome *Bulimus*, *B. onslowi*, Cox, were plentifully scattered over the sand, though no living examples could be found. The southern part of Dirk Hartog Island has, I believe, been occupied as a sheep-run, but the northern half is marked " uninhabited " on the chart ; and indeed it seemed to me as if no human being had ever set foot on this desolate shore. In accordance with a standing order of the ship, I carried a navy revolver for defence against possibly hostile natives, but here at any rate it seemed somewhat unnecessary.

After walking along the top of the cliff for nearly a mile, I saw the recall-flag hoisted on board the ship, and repaired without further delay to the boat ; and the wind having moderated a good deal, we left our anchorage in the afternoon for Geraldton, in Champion Bay. On getting through the " Naturaliste Channel," between Dirk Hartog and Dorre Islands, into the open ocean, we found the breeze still very strong and dead against us, and a heavy head sea developed the capacity of the 'Penguin' for pitching and rolling to its utmost extent. The next two days were uncomfortable enough, as, although the weather was fine and bright, the southerly gale was as strong as ever, and all the steam-power which we could obtain with the detestable Australian coal we had on board did not suffice to force the ship against the head sea in the direction of Champion Bay. On the morning of the 16th it became evident that, under the present circumstances, our remaining supply of coal would not be sufficient to enable us to visit that port and go on thence to Fremantle ; so our course was altered for the Houtman's Abrolhos, to which we were now quite close, and where it was proposed to remain until the weather moderated. Towards noon the northern outliers of this little archipelago of islets and coral-reefs were sighted, and soon afterwards we were snugly at anchor, in smooth water about a mile from the shore, under the lee of East Wallaby Island.

Although I regretted that our visit to Champion Bay, where I had expected to meet with many fine beetles and other insects, had to be postponed, if not altogether abandoned, I was by no means sorry that this opportunity had occurred of landing upon one of these remote and even now little-known islands. In many

respects the Houtman's Abrolhos are of great interest, as they are, with the single exception of Bermuda, the locality farthest removed from the equator where reef-building corals are to be found in active growth; and, although they can scarcely be regarded as true "oceanic islands," being only ninety miles from the west coast of Australia, and the soundings between them and the mainland not exceeding one hundred fathoms, several peculiar forms of animal life (and I believe some peculiar plants also) have been developed upon them. They are memorable, too, in the early history of Australian exploration, as having been the scene of the disastrous wrecks of two Dutch discovery ships. The first of these, the 'Batavia,' Commodore Pelsart, was lost in 1627 on one of the southern islands of the group, a small remnant only of her crew reaching Java, after terrible sufferings from want of food and water. The mouldering timbers of this vessel were found by Capt. J. L. Stokes during his visit to the islands in 1840. The other ship, the 'Zeewyk,' was wrecked here in 1728, her people, more fortunate than those of the 'Batavia,' escaping to Java in a sloop built of fragments of the wreck. Many relics of this disaster were also found by Capt. Stokes, including a very curious brass four-pounder with a movable breech-block, showing that breech-loading guns are not entirely a modern invention; this gun is, I believe, to be seen in the museum of the Royal United Service Institution. Capt. Stokes also mentions the finding of numerous square bottles, arranged in rows in the sand, and evidently used for the storage of water by the shipwrecked crew. I afterwards saw some of these bottles in the museum at Perth.

The Houtman's Abrolhos were first closely examined by Capt. Stokes, of the famous little surveying-ship 'Beagle,' in April and May, 1840, and many interesting details are given in his narrative of the voyage ('Discoveries in Australia,' vol. ii. pp. 140-166). Of late years the large deposits of guano on Rat Island and other southern members of the group, to which he was the first to direct attention, have been actively worked by a West Australian firm, but the northern islands are very seldom visited.

I went on shore on East Wallaby Island soon after the ship anchored, with three of my messmates, who were bent on

shooting, and we landed without any more inconvenience than a walk of a few yards over a rugged coral-reef in shallow water. The island does not in any part exceed fifty feet in height, and its shape may be described as a roughly equilateral triangle, each side measuring rather more than a mile in length, and with a long projection from the north-eastern angle. The soil consists almost entirely of clean white calcareous sand, on a base of coralline limestone, which crops out here and there in wide stretches covered with loose blocks, and contains many recent corals and shells in very good preservation. Along the shore this limestone is broken into miniature cliffs eight or ten feet high, curiously undercut by the action of the waves. Much of the island is covered with tolerably dense but low brushwood, with white sand-drifts showing here and there, and a small cairn with a weather-beaten pole on the highest point marks the visit of some former surveyor, possibly of Capt. Stokes himself.

Scarcely two minutes had passed after we landed before the report of a gun was heard, and a "Wallaby" was its victim. Before sunset no fewer than thirty-five of these animals were shot, and any number could have been obtained if wanted. Indeed, they might have been literally said to swarm among the low brushwood, and I was continually meeting with them. They evinced very few signs of alarm, and went off at quite a leisurely pace, and with more of a running than a leaping action. This species is the *Halmaturus houtmanni* of Gray, discovered during the visit of H.M.S. 'Beagle'; it is peculiar to the Houtman's Abrolhos (though closely allied to a West Australian form), and appears even to be confined to this and the adjacent West Wallaby Island, not being found in the more southern islands. It is about the size of a large hare, standing, when erect, nearly two feet high, and weighing from seven to ten pounds; the fur is rather long and soft, and of a general dark brown colour, a little paler on the under parts. These Wallabies, with others shot on the following day, were served out as fresh meat to the ship's company, but except at first were not much appreciated; the flesh was tender, but very dark in colour, and flavoured with the strong-scented herbage on which the animal subsists. We found they made very tolerable soup.

I rambled about the island until sunset, finding the vegetation



almost entirely of a shrubby character, and not very easy to get through in some parts. *Compositæ*, *Chenopodiaceæ*, and *Rutaceæ* seemed to be the prevailing natural orders, with a few stunted Acacias, as well as a small round-topped bush or low tree with a stem about as thick as one's leg, and ovate leathery leaves, which was not in flower at the time; so I could not make out its affinities. The beach above high-water mark was clothed with "bent-grass," and in some of the more open parts a yellow *Senecio*, and a *Mesembryanthemum* with bright pink flowers, carpeted the sandy soil. Except for the Wallabies, there appeared to be no great amount of animal life, as this island, unlike the southern members of the group, is apparently not a breeding station for sea-birds. I could find no traces of guano in any part, nor any burrows of the Sooty Petrel or "Mutton-bird," *Thiellus sphenurus*, Gould, though a good-sized black Petrel, presumably of this species, was commonly seen on approaching the anchorage, and the adjacent West Wallaby Island is described as being a perfect warren of these birds (*cf.* Stokes, *loc. cit.*, and Gould, 'Handbook, Birds of Australia,' vol. ii. p. 466). Neither could I meet with any evidence of the two Noddies, *Anous stolidus*, Lath., and *A. melanops*, Gould, or of the Sooty Tern, *Sterna fuliginosa*, Gmel., all three of which breed in such multitudes on Rat Island and others of the south islands, nesting in the scrub. Along the sandy beaches, which were encumbered with great piles of washed-up *Zostera*, numerous Gulls and Terns were to be seen, the former being represented by the common Australian species, *Larus novæ-hollandiæ*, Steph., and the large and powerful *L. (Galianus) pacificus*, Lath.; while the latter included, among others, the handsome "Caspian Tern," *Sterna (Hydroprogne) caspia*, and the delicate little *Sternula nereis*, which the late Mr. Gould, its describer, aptly calls "a beautiful representative, in the Southern Ocean, of the Little Tern of the European seas. Occasionally an Osprey, or an Australian Sea-eagle, *Polioæetus leucogaster*, Lath., was to be seen soaring high overhead; and on the coral-flats left bare by the receding tide, the pretty little *Ægialiophilus ruficapillus*—very similar in habits, and also, except for its chestnut-red head, in appearance, to our own Ringed Plover—was busily feeding in company with Black and Pied Oystercatchers, *Hematopus fuliginosus*, Gould, and *H. longirostris*,



Vieill., these latter being remarkably tame, and allowing themselves to be approached within four or five yards.

Lizards were fairly numerous, both in the open and under the blocks of coralline limestone, but I did not see more than three or four kinds. Of these, the most remarkable was a dark grey, rather spiny species, sometimes nearly a foot in length, with an exceedingly long tail (*Amphibolurus barbatus*). This was by no means rare, and, although active enough, was so tame, or rather so stupid, as to be caught without the slightest difficulty. A little red-headed Lizard, which I had frequently seen on the islands off the north-west coast of Australia, was, on the contrary, as nimble and wary as these creatures usually are, and I could not succeed in securing a specimen. Under the stones I found a very curious "Gecko," *Phyllodactylus marmoratus*, with a thick carrot-shaped tail, suddenly constricted at the base. The wind was too strong for insects to be moving freely, but I found a good many small but interesting beetles, chiefly by searching in the sand at the roots of the bent-grass. Numbers of land-shells, all of minute size and mostly dead, were strewn about in hollows among the sand-hills; they principally consisted of several species of *Pupa* (three of which, *P. contraria*, Sm., *P. wallabyensis*, Sm., and *P. mooreana*, Sm., were undescribed), with a little *Truncatella* found abundantly near the shore, where it was accompanied by many weathered shells of the well-known and widely distributed *Spirula australis*.

The wind had gone down somewhat on the next day (17th), but not sufficiently so as to induce us to leave our anchorage; and a party of five officers, including myself, left the ship after an early breakfast to spend a day on the island. We hauled our boat up on a sandy beach, on which I found numerous specimens of a pretty little weevil of the family *Cossonidæ* under the heaps of *Zostera*; and then each went his own way, my messmates to shoot, and I to look for insects, or anything else that might turn up. By keeping under the lee of the high sandy banks next the sea, where the sun was hot and the breeze was not so much felt as elsewhere, I soon found some butterflies on the wing. These were of two species only—a little "blue" (*Lycæna* sp.), and a very pretty little "skipper," in appearance recalling our British *Cyclopides paniscus* on the upper side, and handsomely marked

beneath with silvery-white spots and bands on a tawny ground. It proved to be the rare *Telesto argenteo-ornatus*, Hew., previously recorded from "Western Australia"; and as it was fairly common here, I did not neglect to secure a good series. A good-sized black-and-white day-flying moth (*Nyctemera* sp.) was also not uncommon. I walked over to the far side of the island, and spent some little time in looking for shells on a stretch of coral-reef left dry by the receding tide, but met with very little success. A large light-coloured *Purpura* (*ægrotæ*), which had in almost every instance several specimens of a *Crepidula* partly embedded in the substance of its thick shell, was almost the only species observed. Many more shells were to be picked up on the sandy beaches, two handsome species of *Voluta* (*nævosa* and *volva*) being met with among others; and a Pearly Nautilus, in very good condition, surely a long way out of its latitude, was found by one of the boat's crew. Large numbers of the dried and bleached skeletons of sponges were strewn along the beach at high-water mark, and I came across a rounded block of pumice, much bigger than a man's head, which had drifted hither from some far-distant volcano, perhaps from Krakatao.

At noon we all met at the landing-place for lunch, of which the *pièce de résistance* was a boiled Wallaby shot that morning. A very little of this creature, however, went a long way, as it was about the most unpalatable dish I have ever tasted. This arose from the fact that the cook had forgotten the salt, and we had none of this necessary article with us. Sea-water was suggested as a substitute, but it could not be used, as all the water near the shore was charged with sulphuretted hydrogen, arising from the decay of the seaweed and *Zostera* washing about in it. The first lieutenant's face was a study when his beautifully white-painted whale-boat returned to the ship in the evening stained all over with a rusty-black hue, by the action of this gas on the white-lead paint. My messmates had enjoyed fairly good sport, as, besides the Wallabies, there were numbers of a very beautiful "bronze-wing" Pigeon, *Phaps elegans*, Temm., among the low bushes; and in the more open grassy places, a Bush-Quail, *Turnix scintillans*, Gould, was frequently flushed. This latter species is a little bird of sober though beautifully varied plumage, and appears to be peculiar to the Houtman's Abrolhos, having been first obtained there during the visit of the 'Beagle' in 1840.

In the afternoon I walked to the eastern extremity of the island, which part is more open than elsewhere, with extensive stretches of almost bare limestone rock. Water appears to stand here in places during the rainy season, as I found a good many empty shells of a species of *Succinea (scalarina, Pfeiff.)*, as well as some very young living specimens adhering to the under side of large stones. I was very much pleased to find here the remarkable Scincoid Lizard, *Egernia (Silubosaurus) stokesii*, Gray, discovered by Capt. Stokes on Rat Island in the southern part of the group ('Discoveries in Australia,' vol. ii. p. 145), and exceedingly well figured in the Appendix to that valuable work. The first specimens were obtained by raising a large flat block of limestone, under which several were snugly stowed away; these were secured without the least trouble, as for a Lizard it is the most sluggish and stupid creature imaginable. It is, however, able to give a pretty severe bite, and holds on to any object which it has seized with its jaws with the tenacity of a bull-dog. The largest examples attain a length of nine or ten inches; it is of a rather stout and clumsy build, with short legs, and is covered with rather shining keeled scales, which on the tail assume the character of short spines. In colour it is a rich and peculiar blackish olive, thickly mottled with pale yellow spots, which are confluent on the under parts. The habits of this Lizard appear to be somewhat predatory, and in all probability it is of this species that Mr. Gould's collector, Gilbert, speaks in his very interesting notes on the breeding of the Terns, &c., in the Southern Abrolhos ('Handbook, Birds of Australia,' ii. pp. 414, 415). He writes as follows:—"By the middle of January the eggs [of *Anous stolidus*] were nearly ready to hatch, and there would be an overwhelming increase of this species yearly but for the check which nature has provided in the presence of a small Lizard, which is very abundant in their breeding-places, and which finds an easy prey in the young of this Noddy and of *Sterna fuliginosa*. I am satisfied that not more than one out of every twenty birds hatched ever reaches maturity, or lives long enough to take wing; besides which great numbers of the old birds are constantly killed. These Lizards do not eat the whole bird, but merely extract the brain and vertebral marrow; the remainder is, however, soon cleared off by the *Dermestes lardarius*,



an insect which occurs in amazing numbers, and gave me a great deal of uneasiness and constant trouble to preserve my collection from their repeated attacks." (I may remark that I saw no trace whatever of this beetle on East Wallaby Island, though I was specially on the look-out for Coleoptera.)

Soon afterwards I found the *Egernia* quite commonly in a rather restricted space, but always under stones, and never seen in the open. I brought off six or seven of the largest in a bag, most of which were subsequently consigned to the spirit-tank as specimens; but I kept two alive for several months afterwards, feeding them when they would eat, which was but seldom, on small pieces of raw beef. As the afternoon was now well advanced, I went down to the landing-place, where I found the whaler almost filled with game, a large number of Wallabies having been shot, chiefly for the benefit of the ship's company, but without any apparent diminution of their numbers when we landed on a subsequent occasion.

We were still detained at our anchorage on the 18th by the wind, which had sprung up again very strongly from the old quarter, accompanied with exceedingly brilliant sheet lightning after sunset; and no boat landed on the island that day. Contrary to our expectations, fishing from the ship met with very little success, only two or three "Snapper" and several Blow-fish, *Tetraodon laevis*, being caught; the latter were a nuisance, as, besides being quite useless, if not actually dangerous, as food, their powerful front teeth at once severed almost any hook that was put overboard. Sharks were, if anything, more numerous than at Dirk Hartog Island, and several were caught and despatched by the sailors during the day; the stomach of one about eight feet long (which appeared to be the widely distributed *Galeocerdo arcticus*) contained, besides the carcasses of two or three Wallabies which had been thrown overboard, more than a bushel of the remains of a large species of Sea-crawfish (*Palinurus* sp.), among which were some nearly perfect specimens.

On the 19th the southerly wind continued very strong all the morning, but the day was otherwise fine, and in the afternoon I was able to land again for two or three hours. A few fresh species of beetles rewarded my search, as well as several more fine specimens of Stokes's Lizard, which as before I could find



only in one small spot near the east end of the island. Ascending a low hill on the north shore, I obtained a good view of the adjacent West Wallaby Island, which was connected to the eastern island by an almost continuous series of reefs and coral-flats, so that it appeared quite practicable to cross from one island to the other on foot at low water, the distance being about two miles. Close to this hill was one of the two wells or watering-places mentioned by Capt. Stokes in his account of the island; this was a circular hole in the limestone rock, about a yard in diameter and ten feet deep, with a few inches of slightly brackish but clear and fairly good water at the bottom. No more Wallabies were shot to-day, as the men had got tired of them; but a fair number of bronze-wing Pigeons and several specimens of the peculiar Quail were bagged by our sportsmen.

We were able at last to get away from our anchorage at day-break on the 20th, and, abandoning finally our proposed visit to Champion Bay, as our stock of coal on board was very low, we shaped our course direct for Fremantle, where we arrived on the morning of Nov. 22nd.

## EARTHWORM STUDIES.

BY THE REV. HILDERIC FRIEND,

Author of 'Flowers and Flower-Lore.'

## III. PHOSPHORESCENCE AND LUMINOSITY.

AMONG the various members of the Animal Kingdom which possess the power of emitting a phosphorescent glow are certain inhabitants of Wormland, to some of which we wish to draw attention. The notice of the public, so far as my researches show, was first directed to the subject in the year 1670 by Grimm; but scientific observation was then scarcely known. Later came Flauguergues in 1780; his paper on the phosphorescent light of Earthworms appearing in 'Lichtenberg's Magazin' in the German language. It may also be seen under the French title "Sur la Phosphorésine des Vers de terre" in 'Rozier Journ. de Phys.,' xvi. (1780) pp. 311-313. In 1873 Cohn's observations on the same subject were published in the 'Zeitschrift für Wissenschaft. Zoologie,' vol. xxiii. pp. 459-461, and entitled "Leuchtende Regenwürmer"; while numerous recent writers have further contributed to our knowledge, especially in relation to the continental species. Thus in 1872 an article appeared in the French 'Ann. Sci. Nat.' ser. 5, t. xvi. by Panceri, entitled "Etudes sur la phosphorescence des animaux marins," in which he states that the luminosity observed in the case of certain worms is due to a secretion from the girdle where special glands exist, and that with the evolution of light there was no perceptible raising of the temperature. In this respect, therefore, the glow corresponds with that emitted by the Firefly, Noctiluca, and Glowworm. One investigator at least has tested the colour and composition of the luminosity by the spectroscope, and says that it is not unicolored or monochromatic, but compounded chiefly of the red and violet rays. Other students regard the substance which produces the light as homogeneous.

In 1838 Eversmann published an article in Russian on a night-shining worm (*Lumbricus noctilucus*, see *Zapisk. Kazan. Universit.*, 1838, pp. 156-7), and in 1871 Breese, an English naturalist, delivered an address on the Earthworm before the West Kent Natural History Society, from a meagre abstract of which we learn that he had spent some years on the subject of annelid luminosity, having studied it historically from the year 1805, when Viviani wrote on the phosphorescence of the sea, down to the date of his own investigations. According to Breese the luminosity exists in the excreted glutinous material with which the outer skin of the animal is covered. It is much to be regretted that (so far as I can learn) the researches of this naturalist have never been given to the public in detail.

More than one creature has at different times borne the name of the phosphorescent worm. In 1837 Dugès, a French writer, described a species under this name (*Lumbricus phosphoreus*) with a girdle extending from the 13th to the 16th segments, and a somewhat flattened body behind. After the lapse of exactly half a century this curious creature was examined again, and named by Giard *Photodrilus*, or the luminous worm. It has eight setæ just as our common species have, but they are separate, and not in couples. There is no gizzard, nor does the lip dovetail into the segment behind. It is a small, transparent, rose-coloured worm, and decidedly phosphorescent.

A paper on this worm by Barrois appeared some time ago under the title "Sur la présence du *Lumbricus (Photodrilus) phosphoreus*, Dugès, à Groffliers (Pas-de-Calais)" in the 'Revue Biolog.,' iii. pp. 117-119. Beddard places it under the genus *Pontodrilus*, and gives the following brief summary of its characters and history:—

"DEFINITION.—Length 50 mm.; diameter 2 mm.; number of segments 110. Setæ in eight rows. Clitellum xiii.—xvii. Hearts in x.—xii. Sperm-sacs in xi., xii. Spermathecæ in ix. with a diverticulum. Habitat—France.

"This species has been investigated by Giard, who, however, has not yet published an illustrated account of his researches. The main facts in its structure are given in the above definition. In addition to the points there mentioned there exist on segments xii., xiii., and xviii. sacs of modified setæ in addition to

the ordinary ventral setæ; instead of a bundle of about four setæ there is sometimes only a single seta. This worm appears to be luminous at night, whence the name given to it by Dugès."—Beddard, 'Monograph of Oligochæta (1895),' p. 472. It is now known as *Pontodrilus phosphoreus* (Dugès).

In 1843, when the British Association met at Cork, specimens of an annelid were exhibited by Dr. Allman, which he had discovered in the bogs of the south of Ireland, and which was the cause of a luminous appearance. When irritated the worm gave out a phosphorescent light, which is said to have been much increased by exposing the creature to the vapour of alcohol. The light was of that peculiar soft greenish hue which is characteristic of the phosphorescence usually observed in living animals, and familiar to most readers in connection with the Glowworm. It was said to be closely allied to the Earthworm. Another gentleman was reported to have observed the same peculiarity in some annelids which exist in the bogs of Connaught. I have been unable to find any recent reference to or confirmation of these curious observations, and this though I have examined many hundreds of specimens of terrestrial and aquatic worms from different parts of Ireland, have made special enquiries, and even visited Ireland myself in 1896 purposely to examine the annelid fauna for the Royal Irish Academy. Ten years later Mr. Henry Cox exhibited an Earthworm which was phosphorescent at a meeting of the Literary and Philosophical Society of Liverpool, held November 14th, 1853.\*

While few records of a reliable nature respecting the observation of luminous worms in Britain are available, a good deal has been done by our continental fellow-workers. Vejdovsky, who wrote a very valuable work on the various species of annelids in 1884, entitled 'System und Morphologie der Oligochæten,' gives us some results of his personal experience, which I believe have never been placed before the English reader. He says that he had the good fortune once to observe an interesting case of

\* See 'Proceedings,' No. viii., p. 57. In 1893 I received news of a phosphorescent Worm having been found in London, but it proved on examination to be not a Worm at all. In fact, many of the instances of so-called phosphorescence in worms may be traced to the popular habit of calling centipedes and all other lowly wriggling creatures by this comprehensive name.



phosphorescence in connection with the Brandling. It was one warm July night in 1881, when he was exploring a dung-heap. (Naturalists do not usually work with kid gloves and diamond rings.) Presently a spot of soft, bluish white light appeared, which, however, was changeful and unsteady. Now it would disappear, then return anew and shine forth over a larger space, though never with a brilliant hue. He thereupon removed a portion of the manure from the spot where he had observed the luminosity, and found that the light appeared brighter, and shone for a longer time without disappearing, or before it migrated to another spot. By means of a lantern Vejdovsky was able to secure a large number of specimens of the Brandling from the dung-heap, which he placed in a vessel for the purpose of subjecting them to careful observation. To his great surprise he found that his finger soon glowed in the darkness with the phosphorescence, which extended generally over the hand where it came into contact with the worms. It was therefore apparent that the luminosity was the product of a fluid secreted by the cutaneous glands, which had attached itself to the hand of the investigator, and now manifested itself in this curious way.

We have an interesting observation on the same subject by Prof. Von Stein, which was published at Leipzig in 1883. One evening in the middle of September, the Professor was spending some time with a circle of friends at a parsonage not far from Potsdam, when the conversation turned upon phosphorescence and the phenomena of light. Hereupon one of the younger members of the family—who are usually the keenest and most shrewd observers of Nature, and the best friends of the naturalist—remarked that there were fountains in the adjoining gardens, the water from which was frequently observed to be full of light-bearing creatures when it was violently agitated. He regarded the affair at first simply as a hoax, or an attempt to make a fool of him,—as people are ever ready to do with a hobby rider,—but ascertained eventually that the luminosity was due to the presence of a species of Worm which possessed the property of shining when disturbed. As with Vejdovsky, so with Prof. Von Stein, the finger which had come into contact with the Worm continued to glow for some time after. What species of Worm was under observation is not recorded.

In the 'Report of the British Association' for 1887 (p. 767) we have a note by Mr. Harker "On a Luminous Oligochæte." But here again the same remark applies. Much good work, alas! is rendered valueless for want of a little accuracy in nomenclature.

It now becomes a question what end could be served by the possession of this property. The philosopher no sooner learns a new fact than he begins to pry into the secret which lies beneath, and stands to it as cause to effect. We have analogy to guide us. The water worms may be compared with the marine animals which produce phosphorescence, while the Brandling may be studied in the light of a Glowworm. It may be objected that as worms, except in a few rare cases, have no eyes there can be no advantage in their luminosity. But such an argument would be based on the erroneous assumption that a creature without eyes is incapable of receiving impressions from light. That worms are influenced by light is proved both by their habit of avoiding it, and by the experiments which have been carried out by various students. Darwin remarks that as worms are destitute of eyes he at first thought that they were quite insensible to light. He found, however, that "light affects worms by its intensity and by its duration." Hoffmeister states that, with the exception of a few individuals, worms are extremely sensitive to light, and from my own observations I have been able to demonstrate that there are marked differences in the susceptibility of the different species—some being very much more susceptible than others.

Now it follows that if a number of species of worms lived together in one place, as they usually do in a manure-heap, it would be a great advantage for a given species to possess a distinguishing feature, such as that of luminosity, to enable two individuals to discover each other's whereabouts, just as the male Glowworm detects the female by the light emitted from her upturned abdomen.

Viewed in this light, a new field of research is opened up which hitherto has been totally unworked, but which may be hoped to yield remarkable results if diligently, patiently, and intelligently tilled.

It will not be out of place in this connection to quote from

the 'Gardeners' Chronicle' of January 9th, 1847, some very interesting remarks by Mr. J. Wighton on insect luminosity, seeing that many cases of phosphorescence attributed to worms really come under this head. He says:—

“The Centipede (*Scolopendra electrica*, L.) is one of the few luminous insects met with in this country. Its specific name *electrica* seems to be a misnomer; *lucifera* or *phosphorifera* would be more applicable. It would take a large number of Centipedes to give a sensible shock, even supposing the creature capable of doing so at all. In other electric animals, as the Torpedo, no flash appears, even when they give a discharge strong enough to stun a horse; still less do they shine with the steady light of the Centipede or the Glowworm. The luminosity of the *Scolopendra electrica* appears to proceed from a clammy slime exuded from the body of the insect, which is analogous to the phosphoric mucus that comes from the skin of certain fishes in an early state of decomposition. Like that, it may be removed from the surface from which it proceeded, and objects smeared with it become luminous. Walking one damp night on a dark road, I picked up something shining from the ground; I screwed it up in paper, and took it home. On unfolding the paper a Centipede crawled out and escaped, leaving its phosphoric slime adhering to the paper. It is doubtful for what purpose this secretion is given to the insect. It can hardly be to attract the opposite sex, as its habits are mostly subterranean, appearing to feed on dry half-decayed roots and leaves, and in no way injurious to living vegetation, but probably beneficial by admitting air into the soil, and preparing dead organic matter to be more quickly suited for the food of plants. Some mention that it is carnivorous, feeds on small insects, and like the *Lithobius forcipatus*, or 'Fifty-foot,' of which it is said that it wounds its prey with a venomous fluid emitted from its claws, but I think this cannot be relied on. Indeed it is difficult to do more than guess at the final causes of many curious phenomena among animated beings. One author (De Geer) says that it is by no means certain that the light of the Glowworm is given it for the purpose of inviting the male, because he has proved that the female insect can shine in its infant state, in that of larva, and even after it has taken the form of nymph. But the same sort of reasoning would lead us to



conclude that, because milk is found in the breast of a new-born babe (a singular fact, best known to every nurse), when it cannot be required to give suck, therefore the same child is not to give suck when she has become a woman, and has children of her own.\* The light of the Glowworm proceeds from a lantern in the under side of the tail, protected by a transparent skin. The researches of such an anatomist as Swammerdam would probably find a dark shutter or slide between the glass of the lantern and the lamp within, moveable at the pleasure of the insect. If you crush a Glowworm while it is shining, the light will smear about exactly like that of the Centipede. I have never tried the experiment by day, or at times when they do not shine. The Glowworm appears to know, by an unerring instinct, the proper time for it to begin its exhibition, which is shortly after sunset. I have repeatedly kept them all day long in a dark cellar without being able, by the gloom or the coldness, to make them withdraw their curtain; but on returning in the evening, I have found them glittering as brightly as in their native copse. The best way to keep them in confinement is to have a live turf at the bottom of a glass globe. All day long they remain hidden close to the earth, but at the appointed hour of evening they will mount the blades of grass as high as they will bear them, turn up the ends of their tails, and display a splendour more steady and beautiful than either gas or camphine. The duration of their performance is very variable, sometimes not more than half an hour, sometimes till what the Scotch call the 'sma' hours.' Whether this depends upon the weather or the health of the creature, is best known to itself. After a while, also variable, they lay their eggs among the turf, and themselves in the dust, to shine no more. So briefly perish these stars of the earth, in fit contrast with those of heaven, glittering as they do, through ages upon ages, with undimmed and never-tiring lustre."

It is curious that among all the suggestions which have been offered to account for the luminosity of the worm we find no mention of the use of phosphorescence for protection. When the water was agitated, Von Stein's worm became luminous. Was not that protective? The enemy of the Centipede, Glowworm, or annelid would fear the fire, and keep at a respectful

\* An illustration and argument drawn from Kirby and Spence.



distance. The Brandling, tit-bit of Trout and other fish, may readily be supposed to exhibit a luminous skin when attacked or affrighted; and the fact that these lowly creatures seldom appear luminous except when irritated or exposed to danger, apparent or real, lends probability to the idea that the phosphorescent display is protective. A light flashed out in time of danger would scare a would-be intruder, which would soon become used to a regular light and learn its innocuousness. If, as Pietro Martire tells us, the people of the West Indies were alarmed when they met a fellow in the dark whose face had been smeared with the phosphorescence of an insect, it is not unreasonable to suppose that a Trout would be alarmed if a Brandling suddenly lighted its lamp. Further observation on this subject is greatly to be desired. At present it is far from being as complete as the scientist could wish. In the 'American Naturalist' (vol. xxi. p. 773-4) is a note by Mr. G. F. Atkinson entitled "A Remarkable Case of Phosphorescence in an Earthworm," which I have unfortunately been unable to consult. Reference may also be made to Moniez's paper in the 'Rev. Biol.,' i. pp. 197-200, Kirby and Spence's 'Introduction to Entomology,' and Secchi, 'Nouv. Observ. in Ann. Sci. Nat.,' series 5, vol. xvi., 1872, p. 68.

## FROM BUFFON TO DARWIN.

BY THE REV. T. R. R. STEBBING, M.A., F.R.S., F.L.S.

[The Author has favoured us with the following revised report of his Presidential Address to the First Congress of the South-Eastern Union of Scientific Societies, held at Tunbridge Wells in May last.—ED.]

THE Societies which have joined our Union are almost exclusively Natural History Societies. They are quite friendly to philosophy and literature, to mathematics and chemistry, to agriculture and political economy, to astronomy and the use of the globes, but they find their own more special and serious employment in zoology, botany, and geology. Towards these branches of knowledge the attitude of the public mind has changed in an extraordinary manner during the last hundred and fifty years. Fully to explain how this change has been brought about would require a volume—such a volume as Sir John Lubbock, or Sir Archibald Geikie, or Mr. Lecky might produce with fascinating effect. My intention to-day is only to recall briefly to your memories some of the more striking factors in the revolution.

In the forefront may be set a certain number of men whose work has had the distinctive quality of sooner or later exciting enthusiasm.

Of the French naturalist Buffon it has been said that “the warmth of his style and the brilliancy of his imagination are inimitable.” In these days we are inclined to cavil when too much of the imaginative element is introduced into descriptive zoology, but Buffon had knowledge as well as brilliance, and was able by this combination to win the attention of Christendom to his accounts of the animal kingdom. Evidence direct and indirect of his merit and importance may be drawn from two very different sources. The direct is found in the circumstance that the famous French school of zoologists in the first half of this century called their encyclopædic history of animals ‘Suites à Buffon.’ They were content to describe it as a continuation of

what Buffon had begun. The indirect evidence may be taken from our own Oliver Goldsmith, of all English authors perhaps at once the most vain and the most delightful. He himself wrote a *Natural History*, though he can scarcely disguise his contempt for naturalists. He confesses that at first he had thought of translating the credulous Pliny, and of adding his own precious comments to make the work amusing, treating, as he says, what he then conceived to be an idle subject in an idle manner. But Buffon's '*History of Quadrupeds*' appeared, and Goldsmith bowed to the authority of a master mind.

The same year that gave Buffon to France gave to Sweden Linnæus. His name, like Shakespeare's, is one of the few so perfectly familiar everywhere, so universally renowned and cherished, that the owner of it seems to belong to every land as much as to his actual birthplace. He taught the world that Nature has a system. He took all naturalists for his pupils, and taught them how to speak. He taught them, I mean, how to name the objects of their study. He did in this respect for science what the inventors of money did for trade and commerce. He bade us designate each species by a couple of words instead of by a descriptive paragraph. By thus making simple and easy what before was complicated and cumbrous, he for the first time made possible a thorough discussion of all plants and animals, and threw open the study to mankind at large. Moreover, he took for his pupils men of special devotion, Kalm and Hasselquist and Forskäl and many others, and sent them travelling over the world to observe its treasures. He made an orderly record of all the natural history objects discovered by all men everywhere. He gave, in short, by his example and by his teaching, by what he himself did and by what he induced others to do, such an impetus to our science as no one man had ever given it before.

The name of James Hutton is far less dazzling, by far less widely celebrated, than that of Linnæus; but it has been shown by those competent to judge that Hutton's services to science were of the order which can truly be described as epoch-making. His '*Theory of the Earth*' upset many ancient opinions as deeply rooted as mountain chains, as widely spread as the main oceans. Contrary to the apparent evidence of men's senses, he maintained that the crust of the globe is a great piece of machinery perpetually

at work. When you travel between Tunbridge Wells and London, you know that the train on the railway is kept going under the influence of fire and water. But before Hutton men little realized that the everlasting hills and seas with barriers supposed to be impassable were likewise under the influence of fire and water repeatedly exchanging places. When Hutton put forward the truth, there were few at first to believe it.

Before Hutton died, William Smith was at work. No Linnæus has yet arisen to regulate the naming of human beings. Therefore this William Smith has to be distinguished from others of the same name in an unscientific and roundabout manner. By one of the singular genealogical expressions which are used to confer honour, he is known as "The Father of English Geology." He became the parent of this giant offspring when he was as yet little more than a boy, by discovering the laws of stratification. He made it clear that the layers of the stratified rocks could not have all been formed at once, that the sequence in position of upper and lower implied a sequence in age of newer and older. If in housebuilding it would be difficult for a man to begin with the attics and the roof, and afterwards to lay the foundation and construct the ground-floor, it would be equally difficult for Nature, after laying down one stratum upon the ocean-bed, to deposit a newer one, not on the top of the older, but underneath it. William Smith showed, moreover, that the relics of life are not distributed hap-hazard through the water-formed rocks, but that over large areas there is a definite relation between the age of a stratum and the character of its fossils, from which it follows that, at least within those areas, at different ages of the rocks there have been differing sets of living organisms. In this respect the strata must not be compared with our houses, for an old Elizabethan mansion may shelter a family of the Victorian age, and the same ancient abbey enshrine the bones of warriors and poets of many successive periods; but in an old Silurian stratum you will never find Cretaceous or Miocene fossils.

Born in the very same year with William Smith, but in a different rank of life, was the illustrious Cuvier, Georges Chrétien Léopold Frédéric Dagobert, Baron Cuvier. Goldsmith somewhere speaks of the public as "that miscellaneous being, at



variance within itself, from the differing influences of pride, prejudice, and incapacity." The genius of Cuvier was able to inspire this "miscellaneous being" with an interest in the science of comparative anatomy. Few minds could fail to be struck and powerfully impressed by the wonderful principle of correlation, which enables the skilful anatomist from a small portion of an organism ideally to reconstruct the whole fabric; from a fossil tooth, to explain the shape, the food, the habits of an animal that had never been seen by the eye of any mortal man. Round Cuvier gathered a great band of scientific workers, and in his own special subject he remains the monumental standard of comparison by which other men's abilities are estimated.

A colloquial but expressive phrase describes a dull boy by saying that "he will never set the Thames on fire." In the estimate of his friends apparently Charles Darwin was a dull boy. He ended by setting not only the Thames on fire, but the whole world ablaze, with the light and heat that his speculations kindled. What Linnæus had been to the latter half of the eighteenth century, that was Darwin to the latter half of the nineteenth. The artificial classification of Linnæus is discarded by botanists. Every specialist can in his own subject point out errors committed by Linnæus. And yet the glory of the man remains untarnished. Natural History of the modern era began with him. He is the founder of it. In like manner the fame of Darwin will not suffer diminution, if some of those whom he has sent wandering through the thousand avenues of research find something to correct in his arguments or to modify in his theories. Biology of the modern era began with him. He is the founder of it.

Whether any of these illustrious men personally deserved credit is a pleasing subject ever open to debate. Original ideas always run two risks, first of being condemned as mischievous novelties, and then of being stigmatized as shameless plagiarisms. The ancients have constantly been convicted of stealing our best jokes, and they have evidently tried to rub the gloss off some of our finest scientific discoveries by rather too plainly speaking of them before they were made. Therefore, while extolling the men who seem to have been most signally effective in raising natural science out of obscurity into prominence, we may readily own that minds and ideas, like species, are no result of abrupt

creation, but the product of a long process of evolution. These men were as seeds that had lighted upon a fertile soil. The age was ripe for them. We shall not be unmindful of the brilliant company of their peers, a long procession extending from the past into the present, a glorious muster-roll, including such men as Harvey and Redi, Ray and Réaumur, Pallas and Humboldt, Savigny and Lamarck, De Candolle and Milne-Edwards, Playfair and Barrande, Sedgwick and Lyell, Owen and Huxley, with others too numerous now to mention, all of whom have passed away, but have obligingly left for our benefit inheritors of their inexhaustible industry, their skill in controversy, their lucidity of style, their penetrating insight, and other enlivening gifts of genius.

Auxiliary to the wits of the naturalists, and giving the modern period a substantial advantage over earlier ages, there have been a series of triumphs won by other men's wits, for other purposes and in other domains. Carry back your minds to the almost unthinkable time when printing was unknown, when as yet there was no post office and no freedom of the press, when paper was costly, and when men had to do their travelling without steamers and without railways. You will see that under those conditions naturalists were almost as helpless as monkeys, elephants, dogs, and other sagacious animals which are kept at a low level of civilization because their means of communicating and keeping on record bright and improving ideas are so extremely imperfect.

Work of astonishing accuracy has no doubt often been done by lovers of nature with very simple apparatus, but the modern student will not disown his indebtedness to the perfection of modern appliances, and especially to the improvements in the microscope. These, or rather those who devise them, have progressively been making research more easy, more fruitful, more attractive. The wonder of the thing appeals not only to the man with a purpose, but to the man without one, and in the exaltation of science the concurrence of the idle, the leisurely, the contemplative, is not to be despised. From the law court and the camp, from the ledger and the counting house, men turn sometimes for amusement's sake to Natural History. They find it a delightful and absorbing pastime. That in itself is something. But, though the original motive may have been "to treat an idle subject in

an idle manner," the original motive will often be outgrown. In the use of the microscope one thing is very likely to happen. A curious sensation of shame will steal over an observer when he becomes conscious that what is really ridiculously small is not the animal or plant which he is handling, but his own knowledge of its functions and powers and organization. This very feeling, however, will give him an assurance that he has an endowment for life in things strange and beautiful to be observed and studied. Nature is prodigal, and in the hope of rearing a couple of sprats will produce five thousand eggs, and more than half a million for a couple of flounders. We need not then be surprised if many hundreds or thousands of observers are used up in unproductive labour or self-amusement for every true light of science that shines upon a generation. Yet the laborious accumulation of knowledge by very humble workers may ultimately be of service to mankind. Thus Gilbert White of Selborne not improbably traces the extirpation of leprosy from this part of the globe to the improved knowledge and therewith the greatly extended use of vegetables. So happy a result could never have been foreseen by the botanists who trifled away their unremembered lives in studying kales and carrots and "sweet smallage."

It is commonly supposed that the advance of science has been greatly hindered by the persistent and often recurring opposition of theologians. That may be true of the middle ages, but of the last century and our own it is extremely doubtful. The new views on the age of the earth, on the antiquity of man, on the transmutation of species, severally in their turn aroused, it is true, the most violent hostility. The evidence adduced crashed in among accepted beliefs like the bomb of a nihilist. Denunciation and ridicule were freely employed against the new opinions. The "conspiracy of silence" was adopted wherever it could be made effective. The social discouragements, which we all more or less unconsciously apply to those whose opinions we dislike, were no doubt brought to bear as remorselessly as ever upon the happiness and prosperity of many outspoken geologists and evolutionists. But the very fierceness of the controversies helped to arouse attention and keep it awake. Besides, the age was an age in which freedom had found her voice, and the country in which



the controversy began was the sworn lover of freedom. Hence it came about that Geology, the science which deals not in warm life and lovely colours, but in mud and stones and bones and old refuse, obtained a predominance and a publicity which it could not otherwise easily have secured. Persons of candid mind would naturally wish to hear both sides of an exciting question. Persons of pre-occupied mind would still sometimes wish to see for themselves what nonsense the geologists were writing. Of course it was foolish of them, for if a man has made up what he calls his mind he ought never to hear the other side. But anyhow, through wisdom or through folly, by degrees the light of truth was enabled to penetrate some of the darkest corners of prejudice, and the process still continues.

For truth to win any lasting and valuable victory, it is essential that contradictory opinions should be brought face to face. Facts so opposed that they cannot be true together should be confronted one with another, and the antagonism of each to each made manifest and expressly declared. Now, the men of science, with rare exceptions, make no claim from the scientific point of view to know what goes on in Heaven or in Hades; but, as I understand the matter, they are modestly certain that our globe has lasted for hundreds of thousands of years; that within the human period the whole of its surface has never been submerged at once; that no human being ever lived to the age of nine hundred years; that the human species began quite otherwise than with an abruptly created pair; that no woman was ever formed of a rib taken from the side of a man; that no serpent ever spoke with human voice to tempt a woman, or for any other purpose; that no warrior, however noble or sacred his cause, ever stayed for a single instant the cosmical motion of earth, or moon, or sun; that the rainbow has exhibited the colours of the solar spectrum to living eyes capable of perceiving them in absolute independence of any terrestrial inundation, past or future; and that the diversity of human languages, due to causes still in operation, has been the result of gradual divergence, not of any sudden supernatural intervention. But again, as I understand the matter, a large body of our pastors and masters, of men who have a prescriptive right and a splendid vantage-ground for teaching morality and religion, deny in these respects what the



men of science affirm, and affirm what they deny, or else they ignore the matter, or else they are ignorant of the points in dispute and take no interest in them. But the fact is that no one can stop the revolution of the earth by simply saying that it does not move, and no teacher can influence his disciples if in his argument he pre-supposes as accepted and impregnable truth what they, rightly or wrongly, regard as incredible legends.

If even opposition has promoted the knowledge of nature, much more must the innumerable societies established expressly for its promotion have been efficacious. The growing appreciation of science led to their being founded. Their foundation has led to an ever-extending growth in the appreciation of science. Much the same may be said of periodical scientific literature, although that is a subject almost too mountainous, too labyrinthine to enter upon just now. So, too, it is impossible here to make more than a passing allusion to the celebrated Marine Biological Station at Naples, established five and twenty years ago by Dr. Anton Dohrn, with results, direct and indirect, of far-reaching value. For my immediate purpose it may suffice to speak of the British Association. It was founded, as most of you know, in 1831. It is a missionary organization, a peripatetic school of philosophers. While most societies are like ordinary vegetables, rooted to the soil, this has the superior characteristic of an animal, as being capable of free movement. It can flit from Aberdeen to Oxford, from Glasgow to Plymouth, and from Plymouth to Dublin. It can wing its way from Liverpool to Toronto, from Toronto to Bristol, and then leaving "The Queen of the West," pitch its camp, as we confidently expect, the year after next, in Dover. It has brought the wonders and surprises of advancing knowledge to men's own doors. It beats the drum outside their windows, so that they cannot altogether shut their ears to the music. The reception of it entails upon the hospitable town an astonishing amount of trouble and expense. Nevertheless the welcome it receives is not only everywhere extremely cordial, but the pleasant sight is witnessed of rival towns or cities competing for the honour of giving it entertainment. What this parent association does on an imperial scale, our Union hopes to do for a limited area, not by inopportune mimicry, but by judicious following of a great example.

That the British Association is broken up into sections, designated by letters of the alphabet, from A to K, is due to the enormous extension of modern science, which makes division of labour a matter not of choice but of necessity. Each section is an association in itself. Each is fully, and sometimes more than fully, occupied with its committees and reports, and papers and discussions and recommendations. Our own energetic honorary secretary, Dr. Abbott, has printed on the back of your tickets a list of thirteen departments of scientific investigation in which he invites you to take an active part for the benefit of our Union and Congress. He does not pretend that the list is exhaustive, and in fact he does not mention either Bryology or Embryology or Bryozoology; he has omitted Mycology and Malacology and Carcinology; he has steered clear of Morphology and Physiology and Seismology, of Zoogeography and Phytogeography and Crystallography; he says nothing about plankton or nekton or benthos, and he saves his credit, as I must do mine, by alluding to all the rest as "allied subjects." This at least is patent, that of subjects there is no dearth, but no one can any longer hope to be a specialist in all of them or in many. To know everything about something or something about everything is becoming increasingly difficult. Every one recognises the intellectual danger of extreme specializing, of working too exclusively in a single groove, but the modern hermit no longer sighs for—

" The hairy gown and mossy cell,  
Where [he] may sit and rightly spell  
Of every star that heaven doth shew  
And every herb that sips the dew."

Thoroughgoing astronomy by night and thoroughgoing botany by day are no longer so readily combined as they may have been in Milton's time. The force of circumstances is making it ever less and less easy to induce the man who is investigating the properties of helium or studying the corona of the sun to sympathise with the other man who is carrying on researches into the genealogy of a centipede or the domestic economy of a cockroach.

Nevertheless, through the marvellous unity of Nature—that unrivalled argument for the oneness of a Divine Author of it—

there seem to be no branches of knowledge so remote and unconnected that they cannot upon occasion benignantly illumine each the other. Therefore a Congress like ours aims at bringing together men engaged on different lines of research, that from time to time and in a measure all may understand what all are doing. It aims also at bringing together men pursuing the same line, that they may learn from one another the best methods and the best results. It aims at bringing together those who are willing to learn, that the men of long practice and mature counsel may explain to the inexperienced, and to beginners full of youthful vigour and energy, what is worth observing and how to observe it. The object of our Union is to win for science such benefits as are found to accrue in manufactures from division of labour, and in trade, commerce, and finance from co-*opération*. We think that the good work which is being done by numerous local societies in isolation will be better done if they are brought into sympathetic contact and join hand to hand in unselfish brotherhood.

The present Union is not the first of its kind. In this world, as we know it, nothing ever is the first of its kind. To ourselves there is this advantage, that we can explain our hopes and purposes by reference to valuable work already done elsewhere. For instance, the important and long-established Yorkshire Naturalists' Union, besides having monthly summer excursions, and an annual congress and an annual subscription, issues transactions, publishes a monthly journal, and maintains a library. It is divided into sections, with their several presidents and secretaries, and it has a great many committees of research, of research connected with the great county from which it is named. *Mutatis mutandis*, the sort of work which we hope to do may be inferred from the list of these Yorkshire committees—the boulder committee, the coast erosion committee, the fossil flora committee, the geological photographs committee, the marine zoology committee, the micro-zoology and micro-botany committee, the wild birds' eggs committee, and the mycological committee. Another suggestive indication may be borrowed from the proposal for a photographic survey of Devon, made to the Devonshire Association by Mr. C. E. Robinson. He says: "The subjects for inclusion in the survey might comprise the following:—



“Churches, monuments, tombs, castles, old houses, bridges, streets, ruins, historic documents, coins, paintings, carvings, very old people.

“Celebrated trees, loggan stones, rocks, caves, geological sections.

“Effects of lightning, storms, floods, landslips, earthquakes, &c.

“Rare birds, beasts, fishes, plants, and fossils, remains of pre-historic men and animals.”

The work pleading to be done is, in fact, so overwhelmingly extensive that it may be refreshing to hear of some work pleading to be not done. For fostering a love of natural history, the ideal method long practised was to encourage young people, and beginners in general, to make collections of eggs and birds, of butterflies and beetles, of flowers and fossils. It still remains absolutely essential that a student should have materials for his study. But the enormous increase in the number of collectors, often having only a commercial or other quite unscientific object in view, has made it necessary for the lovers of nature to protest loudly against rapacity and ravage. Of some butterflies it has been lately said that “their extinction will only be checked by the extinction of ‘the mere collector’ and the dealer who supplies him.” As for eggs and birds, that zeal for rare specimens which, in a former age, would have qualified a man to be president of a learned society, is now more likely to subject him to prosecutions and penalties. That is, perhaps, for us the necessary way of forming a healthy public opinion, just as our ancestors thought that scourge and gibbet, rack and faggot, must be freely used to keep the social machine in order. Of course I know that revenge is sweet, and that it is delectable to bring others round to our way of thinking under compulsion. Still our Union will be content to produce the effect rather in a different manner, by spreading knowledge, by showing that it is for the common benefit and general happiness not to have the fauna and flora of the district devastated, and by gradually persuading the spirit of the age that things rare and strange and beautiful, when open to all, should be under the protection of all, and should be appropriated only for legitimate use, and not sacrificed to greediness or vanity.

One other point must be mentioned, which concerns the



literature of science. Professor Flinders Petrie lately used a memorable expression, that this age is drunk with writing. Anyone who has tried to light a fire will know that when too much paper is used in the kindling, the flame is extinguished by its own smoke. From these metaphors you may understand the risk to which scientific truth is exposed of being disabled and smothered by the multitude of its exponents. Observations must be recorded. Writers can only attain efficiency by reiterated efforts. But it is not necessary that every beginner's essays, every crude attempt at research, every uncompleted investigation, every reproduction of the obvious and the commonplace, should be printed and published. Those who are engaged in bibliography, classification, and monographic work of every kind, however free they may be from critical cynicism, cannot close their eyes to the difference of merit in the writers whose works they are obliged to examine. The difference often ranges from supreme excellence to detestable badness. By publishing what is old as though it were new; by incomplete, inaccurate, confused and misleading descriptions of what is really new; by hypotheses based on easily avoidable ignorance, authors win themselves no honour, and they grievously trouble science. Those, too, do an injury to themselves and their neighbours who, out of carelessness, or out of self-will, or out of superfluous modesty, use irregular, unrecognised, and obscure means of publication for discoveries that are valuable and good.

Our Union will have justified its existence if it can persuade its members and all who come within the sphere of its influence to put mischief and destructiveness out of countenance, to discourage the diffusion of useless knowledge, to bring loyal effort and arduous exertion in the service of truth into prominence and the full light of day.

More I shall forbear to tell you anent the wisdom and the profit of all that we wish to do and to do not; remembering how even the eager and enquiring Queen of Sheba, on her visit to the Hebrew Linnæus, was so tired out with all that she heard and saw that there was no more spirit in her. Only to timid and hesitating beginners I may venture to say one concluding word. Believe me, that ever as you pursue your path through the fairy-land of science, and become more and more acquainted with the

riches and splendour of the scene, you will more and more be convinced that the fame of it has not exceeded the reality, that at your outset the half was not told you. If you feel that ignorance and superstition cannot be the proper pillars to uphold the welfare of the world and support the throne of God, if you agree with the Swedish Linnæus that without knowledge of the Universe, so far as it lies within our ken, neither filial reverence nor due gratitude can be intelligently offered to its author, you will see that Nature is given as the dominant instructor of mankind, you will think of its students as nobles round a king, and will be disposed to say to their sovereign as the Queen of Sheba said to Solomon, "Happy are thy men, happy are these thy servants which stand continually before thee and hear thy wisdom." It is open to all men to join their company and to share their felicity.

## O B I T U A R Y.

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 JOHANN JAPETUS SIMON STEENSTRUP.

THE death is announced at Copenhagen of Dr. Steenstrup, formerly Professor of Zoology at the University of Copenhagen and Director of the Museum of that city. Dr. Steenstrup was born in 1813, and had thus reached the eighty-fifth year of his life. He published much on Natural History, but he will be principally remembered by his work on the subject of "Alternation of Generations." Our best course is to quote Geddes and Thomson on this point. "The progress of marine zoology and the study of parasitic worms gave naturalists like Sars, Dalyell, Lovén, Von Siebold, and Leuckart early glimpses of many alternations in life-history, but Steenstrup was the first to generalise the results. This he did (1842) some twenty years after Chamisso, in a work entitled 'On the Alternation of Generations; or, the Propagation and Development of Animals through Alternate Generations, a peculiar form of fostering the young in the lower classes of animals.' In 1849, Owen submitted this essay to stern criticism, and subsequently "the labours of some of the foremost naturalists have both extended Steenstrup's observations and rendered them more precise."

The late Professor also studied the prehistoric remains found in his own country, both as regards fauna and flora, and in 1866, in conjunction with Sir John Lubbock, contributed a memoir to the Ethnological Society of London "On the Flint Implements recently discovered at Persigny-le-Grand." He was appointed to his zoological Professorship and Museum Directorship in 1845, previous to which he had acted as Lecturer on Mineralogy at Sorøe. In 1885 he retired into private life.

## NOTES AND QUERIES.

## MAMMALIA.

## CHIROPTERA.

**Daubenton's Bat on the Derbyshire and Staffordshire Border.**—Daubenton's Bat frequents the river Dove in some numbers at the spot where it is crossed by the Derby road, near Uttoxeter. The mill-dam below the bridge and the fringe of willows and alders on the banks furnish a quiet shaded pool such as this species haunts by preference. In the early part of June I had several opportunities of watching the Bats late in the evening as they flitted in their characteristic fashion across the shadows just above the surface of the stream. This species and the Whiskered Bat, unlike the noisy Noctule and Pipistrelle, appear to feed in silence. I have never heard either of them utter a note when on the wing.—CHAS. OLDHAM (Sale).

**Daubenton's Bat in Bedfordshire.**—Whilst recently visiting Bedford I noticed that this little species was plentiful over the river along the promenade. By their habit of always keeping within a few inches of the water and circling about in limited areas these Bats can be easily recognized. I have previously recorded this species from another locality in the county, and it would undoubtedly be found a common one if those interested cared to seek in other parts of Bedfordshire for it. It is common at Southhill, over the lake in the park, where I have recently seen it.—J. STEELE ELLIOTT (Dixon's Green, Dudley).

**Habitat of *Ametrida minor*.**—A specimen of this rare Bat was recently presented to me. It was captured in November, 1896, in a house at Manaos, a town on the Amazons, about 1000 miles above Para. The measurements being rather less than those given by Dobson for *Ametrida centurio*, I sent it to Mr. Oldfield Thomas, who pronounced it to be *A. minor*, a species described from a single unlocalized specimen.—T. A. COWARD (Bowdon).

## INSECTIVORA.

**Lesser Shrew in Anglesea.**—On June 11th we obtained about thirty pellets from the roosting-place of a Barn Owl, among some ivy overhanging the cliff in a small cove near Rhos Neigr, a few feet above high-water



mark. The bird flew out while we were collecting the pellets. On examination of the contents we found two skulls of the Lesser Shrew, *Sorex minutus*, and, as this is probably the first time this animal has been noticed in Anglesea, it is worth recording. The pellets also contained remains of the following:—One young Rabbit, *Lepus cuniculus*; four Rats, *Mus decumanus*; seven Mice, *M. musculus*; ten Long-tailed Field Mice, *M. sylvaticus*; six Water Voles, *Microtus amphibius*; twelve Field Voles, *M. agrestis*; two Water Shrews, *Crossopus fodiens*; nineteen Common Shrews, *Sorex vulgaris*; four small birds; and the elytra of five beetles, *Melolontha* and *Geotrupes*.—T. A. COWARD (Bowdon).

## CARNIVORA.

Pine Marten in the County Waterford.—I was much interested in Mr. A. Heneage Cocks's note (*ante*, p. 270), and now write to say that I have had the pleasure of seeing for the first time, alive and in a state of nature, a fine Pine Marten. On the 21st of this month (June) I was walking through the beautiful woods of Curraghmore, which adjoin Coolfin, when I heard a regular uproar by birds. It came from a spot a hundred yards or so away. Walking in the direction as quietly as possible, I expected to see a Fox carrying off a young bird. Among the branches of some low oaks was a large party of Blackbirds; one of them, a fine cock with bright orange bill, being greatly excited, scolding away at the top of his voice, and with outspread wings facing a point from which he expected trouble for himself and family; and there among the leaves, lying close along a branch, was a Marten, crouching low as if he was going to spring. It was a most interesting sight, and neither the Marten nor birds seemed to pay much attention to me as I watched them. Nothing can exceed the gracefulness and quickness of movement in the Marten. It twists and turns its lithe and supple body in every direction, and with wonderful rapidity. One must see it in a state of nature to appreciate what a deadly foe it must be to birds both old and young. Having watched them for some time I went away, and on my return both Marten and birds had disappeared. He was probably having his supper on the old cock, or a younger member of the family.—WILLIAM W. FLEMING (Coolfin, Portlaw, Co. Waterford).

Albino Badger in Hants.—On Feb. 9th of this year a Badger was caught near Basingstoke, exhibiting the following curious form of variation. The fur is quite white except at the tail, which is reddish brown; the eyes are pink, a feature correlated to albinism. The animal is mature, and a fine specimen; it is in the possession of Mr. Spriggs, of the Royal Hotel, Winchester, who will be glad to show it to anyone who wishes to see it.—G. W. SMITH (College, Winchester).

## RODENTIA.

**Bank Vole in Denbighshire.**—As little appears to be known of the distribution of the Bank Vole in Wales, it may be well to record its occurrence at Colwyn Bay. Early in May last I trapped two in a roadside hedge on the borders of the Pwllcrochon Woods. Colwyn Bay is in an isolated portion of Carnarvonshire, but for distributional purposes should be considered as part of Denbighshire.—CHAS. OLDHAM (Sale).

**Black Rat in Bedfordshire.**—I was recently shown, by Mr. Wright, taxidermist, of Clifton, two Black Rats, *Mus rattus* (male and female), which he received on Dec. 9th last. Mr. Bowman, to whom they belong, informs me that they were caught at Stotfold, near Shefford, and that he believes there are still a few left in that locality, one or two having been previously taken. I should be pleased to hear of any additional information respecting this Rat in that locality or other parts of the country.—J. STEELE ELLIOTT Dixon's Green, Dudley.

## AVES.

**Honey Buzzard in Staffordshire.**—I should like to suggest, in the interests of our rapidly vanishing Accipitres, that idiotic and wanton massacres such as from time to time are recorded in the 'The Zoologist' and elsewhere as having taken place on this, that, or some other estate, should be promptly, when possible, brought to the notice of the proprietors of such estates. The present generation of country squires are not without an intelligent appreciation of what tends so immeasurably to the varied natural attractions of their woodlands, and a continuance of the senseless slaughter by ignorant and irresponsible keepers of Common and Honey Buzzards, Kites, and Hobbies—not to mention the more familiar Kestrels—would in many instances doubtless receive a very summary check could those in authority be made acquainted with the murderous proclivities of their underlings the moment they espy a rare and harmless bird upon their beat. To quote a case in point: in the October number of 'The Zoologist' for 1895 was recorded the attempt of a pair of Honey Buzzards to breed during the summer of that year at Bishopswood, in Herefordshire. The nest was found, the eggs taken, and both birds fell victims to an undiscerning keeper's gun. Mr. Harry M'Calmont, the owner of Bishopswood, happened to be a friend of mine, and I at once notified him of the occurrence, of which he knew *nothing* until the receipt of my letter. The upshot of my mediation resulted in the keepers at Bishopswood receiving strict injunctions to henceforward protect and preserve all the rarer Accipitres seeking to establish homes on the estate. The communication from Mr. E. Baylis in the May issue (p. 232) of 'The Zoologist' has reawakened my active sympathies for a beautiful, inoffensive, yet much persecuted

species; one, too, which most field-naturalists will ever sentimentally associate with Selborne Hanger and Gilbert White. — H. S. DAVENPORT (Ormandyne, Melton Mowbray).

**Little Owl near Newark-on-Trent.**—A bird of this species was shot at the above locality in September, 1896. The late Lord Lilford turned out a number of these birds in Northamptonshire, but this, the first recorded occurrence in Notts, is worthy of mention. — F. WHITAKER (Rainsworth, Notts).

**Hybrids in St. Stephen's Green Park, Dublin.**—We have at present a brood of hybrids between a male Ruddy Sheldrake, *Tadorna casarca*, and a female Egyptian Goose, *Chenalopex aegyptiaca*. In shape they are decidedly like the Goose, having long legs and depth of bill, but in colour the Sheldrake shows out unmistakably. Some years since a brood of hybrids between the Paradise Sheldrake of Australia (male) and a Ruddy Sheldrake (female) were hatched out, producing a lot of exceedingly handsome birds, in which a rich mahogany-brown was the predominant colour; the top of the head being pure white. This year one of these birds, a male, has bred with a female Ruddy Sheldrake, having a brood of six. At present they are not old enough to exhibit the colours distinctly. There is another curious cross—Bar-headed Goose and White-faced Bernacle; but both birds are so mixed up in the plumage that they are certainly anything but handsome. The White-faced Bernacle bred two years ago, but from some cause forsook the nest. The eggs were then placed in a Sevastopoll Goose's nest, and were hatched out and reared successfully. Ever since they have been inseparable companions of their foster-parents.—E. WILLIAMS (2, Dame Street, Dublin).

**Scaup inland in Lancashire.**—Late in November or early in December, about five years ago, Mr. George Parker shot a Scaup on the reservoir near Hyde Road Station, on the outskirts of Manchester. The bird, which Mr. Parker has kindly allowed me to examine, is a female or an immature male. — CHAS. OLDHAM (Sale).

**Night Heron in Derbyshire.**—I have recently had an opportunity of examining a Night Heron in adult plumage, which was shot by the late Mr. William Jackson at Coombs Reservoir, a large sheet of water near Chapel-en-le-Frith, some time in the early sixties. This species has not, I believe, been previously recorded for Derbyshire.—CHAS. OLDHAM (Sale).

**Black Tern in Anglesea.**—On June 10th, Mr. T. A. Coward and myself watched a Black Tern for some time on one of the lakes near Valley. The bird flew leisurely to and fro at a slight elevation, making frequent stoops to take food from the surface of the water, on which it once alighted for an

instant. At intervals of a few minutes it returned to rest on a small bank of pebbles a few yards from the shore, from which it had taken flight on our approach.—CHAS. OLDHAM (Sale).

**Black Terns in Warwickshire.**—During the afternoon of May 16th two Black Terns, *Hydrochelidon nigra*, were seen over Bracebridge Pool, Sutton Coldfield, and in the evening I found them again at Powell's Pool, in company with some hundreds of Sand Martins, hawking flies over the water. By their graceful movements and activity they seem in this pursuit as equally adept as the latter. They had disappeared the following morning. This makes the fourth recorded occurrence of this bird on these pools.—J. STEELE ELLIOTT (Dixon's Green, Dudley).

**Occurrence of a rare Plover, *Charadrius dominicus*, on the River Thames.**—On August 6th, 1896, I shot a small Golden Plover off Shell Haven Point, opposite Hole Haven (River Thames), which I sent at once for preservation to Mr. Cook, taxidermist, of 31, Lower Road, Rotherhithe. I recently took it to the British Museum (South Kensington), where it was instantly identified as the Asiatic species, *Charadrius dominicus*. As this bird is, I believe, of very rare occurrence in this country, I thought the record might prove of interest to your readers. It can be seen at any time at my address, and I shall be happy to afford any of your readers further information as to where and how it was shot. I may add in corroboration that a friend, Mr. Herrtage, of the firm of Smith and Herrtage, 22, New North Road, City Road, was with me when I shot the bird, and he got out of the punt and picked it up.—H. NUNN (5, Spurrow Corner, Minories).

**Memory for Locality in a Nightjar.**—During the summer of 1894 I more than once flushed a cock Nightjar from a certain rock among some gorse on a hill about nine miles from here. One day, with the hope of seeing the bird before it flew, I approached cautiously, and was rewarded by seeing it squatting on the rock, and at a distance of only a few yards. The bird's plumage harmonized so well with the rock that it was not only difficult to see at first, but also required a good deal of directing to show it to friends I had with me. This is now the fourth summer in which the Nightjar has regularly occupied the same spot during the daytime, for I found it there as usual on June 12th. I feel sure it must be the same bird, for it is always in exactly the same place; and I take friends with full confidence that it will be there.—HERBERT C. PLAYNE (Clifton College).

**Blackbird stealing Eggs.**—While sitting by the side of one of the numerous small streams near here on May 20th, watching a Dipper diving in a small pool, and securing food for its young, which were in a nest in an old water-wheel close at hand, I was suddenly attracted by a noise a little



urther up stream, where a hen Chaffinch was sitting on her nest in the fork of an alder. On creeping up behind a big boulder, to within about five yards of the nest, I saw a cock Blackbird, *Turdus merula*, which had made his way to the nest,—in spite of being mobbed by the cock Chaffinch,—peck at the hen-bird till she flew off, and, deliberately picking up an egg in his bill, fly away with it. I was so astonished that I jumped up the bank to try and mark him down, and see what he was going to do with the egg, but unfortunately he entered a small but dense plantation, where I lost all trace of him, and could find no Blackbird's nest with young or eggs. I wish now I had waited to see if he came back for more. I visited the Chaffinch's nest two days afterwards, and the eggs were all gone, but whether taken by the marauding Blackbird I cannot say.—OXLEY GRABHAM (Heathwold, Goathland).

The Voices of the Blackbird and the Nightingale compared.—There are some slight traces of generic vocal resemblance between these two birds. The Blackbird's rattling alarm, it is true, is widely distinct from the croak of the Nightingale; but the latter exclamation is sometimes spread out, as it were, in a succession of ticking sounds, reminding one of the "lit it it" cry of the Robin, the more simple rattling alarms of the Blackbird, and the rapid "chick ik ik" alarm of the Whitethroat. The Nightingale employs these clicking notes especially towards the young, to whom a single "tick" appears to be addressed as a parental hush. The connection between these sharp sounds and the croak is obvious, for often an exclamation begins with the croak, and merges into a succession of ticks. Similarly the Robin has the habit of beginning the "lit it it" alarm very quickly, and ending slowly. Another note, apparently an alarm, which I have heard (I think) from the female Nightingale, is a single, short, full whistle, closely like the "quilt" alarm of Blackbird and Redwing. I have also heard a Nightingale near its young utter a long high "distress note"—practically the same as the high "distress note" of the Robin; and Dr. A. G. Butler informs me that he has heard the same note in the Nightingale. It has also a simple short squeak, closely like the call of the Robin, but less like the call of the Blackbird. When living at Stroud, I had some difficulty in observing the Nightingale, which was not common there. One day I followed a family party of two old ones and three young, in a thicket, and watched the feeding of the young, having often a very clear view of the whole operation. It was then that I came to the conclusion that the cry of the young Nightingale was practically identical with that of the young Blackbird of the same age, and I so stated my opinion ('Evolution of Bird-Song,' p. 103). Near Eltham I have observed many young Nightingales, and I find that their cry is not like that of the young Blackbird. In making my former observations I must have been misled by

the notes of some young Blackbirds in the surrounding bushes ; but as there is so little variation in the cries of the young of any species, I felt justified in describing the note of the young of a species from the observation of only one family of nestlings. It is curious that while the songs of the Blackbird and Nightingale are so dissimilar, several of the strains of the latter have the same intervals of pitch, and practically the same rhythm, as some of the more elaborate rattling alarms of the former. Often have I heard a Nightingale sing a phrase which if heard in winter, at a distance, would be easily mistaken for a Blackbird's alarm. — CHARLES A. WITCHELL (Eltham, Kent).

**Nightingale near Scarborough.**—In 'The Zoologist,' 1896, p. 304, Mr. W. J. Clarke records a Nightingale near Scarborough in the summer of that year. This year, in the second week of June, I saw a Nightingale within two miles of Filey, in a thicket near the roadside, with a caterpillar in its beak, and within a few feet—a bird of the year. The range, however, of this species is now recognized as extending to the extreme north of England, and Mr. Bolam, of Berwick-on-Tweed, records an undoubted instance of its occurrence, in the 'Annals of Scottish Natural History,' in Northumberland, near Callaby Castle, in the summer of 1893.—JOHN CORDEAUX (Great Cotes House, Lincoln).

**Icterine Warbler at Lyme Regis.**—While staying at Lyme Regis during this last May, I several times heard and identified the beautiful song of the Icterine Warbler, *Hypolais icterina*, in the wooded undercliff at Ware, about a mile to the west of the town, and well within the Devon boundary. I heard the bird first on May 4th ; it was singing in a large whitethorn, quite in the centre of the bush, and although I waited for some time with the bird singing away within a few feet of my head, it did not come into view. The next time I heard it was on the 15th. It was in the same bush, and again would not show itself. On this occasion I was accompanied by a friend, who exclaimed, "How delightfully that Nightingale is singing!" but I was able to point out to him the differences between the trills of the Nightingale and the clear Thrush-like notes we were listening to. On the 17th the bird was heard singing from the same bush by my wife, who is well acquainted with the song of the Icterine Warbler ; a keen N.E. wind then set in, stilling all bird-song, and, although I revisited the spot several times, I did not hear the bird again. I may add that on May 4th I heard a second Icterine Warbler singing, also in the centre of a dense whitethorn, about a quarter of a mile away from where I heard the first. I call this Warbler the Icterine Warbler, although the Melodious Warbler, *Hypolais polyglotta*, is the western representative of *Hypolais*, and therefore the one most likely to visit our southern shores.

Still, the song I heard was certainly that of the Icterine Warbler. There can be no doubt that this bird is a regular summer visitor to this country, only requiring those acquainted with its song to identify its presence.—MURRAY A. MATHEW (Vicarage, Buckland Dinham, Frome).

**Rare Warblers in Sussex.**—On May 1st last two Warblers, male and female, were sent to Mr. Bristow, of St. Leonards, for preservation, from Burwash, in Sussex. The female, which turned out to be *Hypolais icterina*, I exhibited at the May Meeting of the British Ornithologists' Club. The male I did not have an opportunity of seeing till to-day (June 24th), and on comparing it with the female I was struck by its relative shortness of wing. I then examined them more closely, and found that in the female (*H. icterina*) the first primary was just shorter than the primary coverts, and the second intermediate in length between the fourth and fifth; whereas in the male the first primary was longer than the primary coverts, and the second intermediate in length between the sixth and seventh, the third, fourth, and fifth forming the tip of the wing. This, I see, is just the difference given by Herr Gätke between *H. icterina* and *H. polyglotta*. It is curious that these two birds, male and female, should have been shot on the same day and at the same place, and a pity that in May they should not be safe from persecution.—A. F. TICEHURST (Guy's Hospital, S.E.).

**Variety of Grasshopper Warbler.**—On July 10th, 1892, Daws, the taxidermist at Mansfield, and a friend, were seeking butterflies near Mansfield, and when beating some sedges on a brook-side a small bird flew up, which Daws caught in his net. This proved to be a variety of the Grasshopper Warbler, and as it is the only variety of which I have ever heard, think it, though so far back, as worth mentioning in 'The Zoologist.' The plumage is paler than usual; the first two flight-feathers in right wing are white, as are the first four in the left; there are also a few small white feathers over the flights. Daws most kindly gave me the specimen, which I value as a very rare variety.—F. WHITAKER (Rainsworth, Notts).

**Variations of Habit in the Blue Titmouse.**—In 'The Zoologist' for 1896 (p. 103), I recorded the unusual habit of a Blue Tit in soaring on motionless wings from perch to perch. I afterwards saw this bird often, and this year it exhibited exactly the same behaviour. On one occasion it rose from the top of an oak, and then sailed along, in the manner of a Tree Pipit, to the top of a lower tree. The best "sail" it executed was when passing over a road to the lamp-post in which its nest was afterwards built; it was going against the wind, and seemed to creep along the air in a charming manner, and was closely followed by another Tit, to which it had been addressing ardent call-notes. The Blue Tits here nest in the lamp-posts. The lamplighter tells me they all rear their young, and I



lately heard the cry of a young one from the top of a lamp-post, and several others, just able to fly, were around the spot. An old Tit occupies about a minute in descending and re-ascending a lamp-post, and probably it proceeds by rapidly hopping from side to side; there is not enough room for the spreading of its wings.—CHARLES A. WITCHELL (Eltham, Kent).

**Red-backed Shrike near Rainworth.**—I saw one of these birds in a garden near the village here, and sent my son up to look for the nest, which he soon found. In it there were five eggs. This is the first time this bird's nest has been found in these parts, but not first in the south part of the county, though it is far from common there.—F. WHITAKER (Rainworth, Notts.)

**A probable Second Brood of Starlings.**—In Yarrell's 'British Birds,' 4th edition, vol. ii. p. 234, it is stated respecting the Starling that "occasionally the same hole may be tenanted twice in the season; but such an occurrence seems to be very rare in this country." A pair of these birds had a nest this spring under the eaves of a house close to this. The young appeared in the gardens about three weeks ago, but for fully the last ten days they have ceased to be fed by the parents. These latter are now (June 13th) busily engaged in carrying nest materials to the spot where the old nest was situated. A quantity of bean-sticks in my garden, which were put in the ground scarcely a week ago, have already been nearly decorticated by the birds. I look forward with interest to the advent of the second brood.—R. McLACHLAN (23, Clarendon Road, Lewisham).

[As we go to press, Mr. McLachlan informs us that the young of the second brood have appeared and are out of the nest.—ED.]

**Unusual Position for the Eggs of the Starling, Song Thrush, and Sparrow.**—While staying in Gloucestershire last April, I was surprised at finding the eggs of several birds, namely, the Starling, Song Thrush, and Sparrow, laid on the ground. I was walking in a field one day, when I found a Starling's egg on the grass. About twenty yards from the spot was a tree in which I knew some Starlings had a nest. I turned round and began to walk to the tree, in order to pace the distance, when I found another egg, also a Starling's, about five feet from the first. They were both uninjured, and, on blowing, proved to be fresh. About three weeks afterwards I climbed the tree, and found the nest in a hole. It contained two young ones. The fact of there only being two seems to prove that the eggs on the ground were laid by the owner of the nest. About an hour after finding the Starling's eggs I startled a Thrush from under a hedge in the same field, and on looking found a Thrush's egg on the ground. In the hedge just above the egg was an empty Thrush's nest. A week after



this a friend found another Thrush's egg on the ground in a field, and I myself found a new-laid Sparrow's egg in the middle of a tennis-court. It seems to me that the most probable reason for eggs being laid on the ground is either that the bird has been disturbed while in the act of laying, and has been obliged to lay the egg before it was able to get back to the nest, or that the bird has deserted its nest when it has only laid, say, two eggs, and has been obliged to lay the remaining three (in the case of its laying five) somewhere outside the nest. Are not these cases rather unusual?—**BERNARD RIVIÈRE** (Flaxley, 82, Finchley Road, N.W.).

**The Song of the Greenfinch.**—I have stated, in 'The Evolution of Bird Song' (p. 126), that the "tewy" alarm (a slurred whistle) is never uttered in the song of the Greenfinch. I regret to say that this statement was inserted in the correction of the proof, and was made from memory, without reference to my notes. I find that the cry in question, the true danger-cry of the Greenfinch, is sometimes included in the song. Also, it is not always slurred upwards, but sometimes remains at the same pitch, when it much resembles a note given by the common Canary in the presence of a stranger. The Greenfinch employs the note in the presence of a Hawk, Cuckoo, Cat, Dog, or Weasel. One day last spring I heard a kind of rhythmical repetition of this note, it being alternately slurred upward and downward by some Greenfinch, so that the song seemed to run: "tewy tewoo, tewy tewoo, tewy tewoo," and so on. After listening to this for a minute I thought I had discovered a new strain in the Greenfinch, namely, one composed entirely of the danger-cry. On investigation I found a female Greenfinch, evidently disturbed, on the lower branch of an oak in the thicket. She was watching something below her; and soon a Cuckoo flew up, and, seeing me, went off. The notes of the Greenfinch immediately ceased, and were not renewed. On other occasions the single cry has been given when a Cuckoo was near.—**CHARLES A. WITCHELL** (Eltham, Kent).

**Change of Plumage in the American Nonpareil Finch.**—In answer to Mr. Graham Renshaw, my experience of examples of this species, which I have kept at various times, is that (when kept either in cage or aviary) abundance of insect-food retards the loss of colour, but does not prevent it. If but little insect-food is given, the crimson of the under parts disappears in patches, each moult leaving the bird with more yellow and less red in its plumage, until, by about the third or fourth moult, the red has wholly disappeared. If, after the under parts have become wholly yellow, the bird is removed to a sunny and well-ventilated aviary, and plenty of cockroaches are daily supplied in a "demon beetle-trap," so that the bird can freely help itself to as many as it requires, the plumage

becomes deeply tinted with orange at the following moult. I regret that, owing to the death of the bird with which I experimented at this stage, I am unable to say positively that perseverance in the same treatment would have completely restored the wild plumage; but it is quite reasonable to suppose that such would have been the case. I should judge that the gradual and uniform change of colouring from red to orange in Mr. Renshaw's bird was due to his giving it abundance of insect-food; similarly treated in a large sunny open-air aviary, it is probable that the typical colouring would have been retained.—A. G. BUTLER (124, Beckenham Road, Beckenham, Kent).

**Nest of the Reed Bunting.**—I found a nest of this species on the 2nd of this month (June) built in a somewhat unusual position. It was at the extreme edge of an osier-bed skirting a small tributary of the river Suir. The nest was built at the junction of two branches of willow, crossing each other, and was perfectly suspended, and overhung the water, from which it was distant  $5\frac{1}{2}$  ft. I watched the hen for some time. She uttered occasionally a single note, and behaved quite differently to a pair of Lesser Redpolls which had a nest close by, and which were very noisy and excited. There were four young birds in the nest. They were apparently four or five days old, and the hen had her mouth full of small pieces of willow-leaves, which I saw her gather, evidently for the young. It was a very untidy nest, composed of moss and catkins of willow roughly put together.—WILLIAM W. FLEMING (Coolfin, Portlaw, Co. Waterford).

**Grey Wagtail Nesting in Lincolnshire.**—When recording this in the last number of 'The Zoologist,' I forgot to mention that the nest was lined exclusively with *white cow-hair*, a material which appears to be invariably used by the Grey Wagtail. Also that within an hour of the young leaving the nest the old birds had succeeded in getting them to the nearest running water, about three hundred yards from their nesting place.—JOHN CORDEAUX (Great Cotes House, Lincoln).

**Nesting of the Grey Wagtail in Leicestershire.**—Mr. John Cordeaux always wields an attractive pen, but, so far as I personally am concerned, exceptional interest attaches to his note on the breeding of the Grey Wagtail in Lincolnshire—the first recorded instance for that county—as detailed in the June issue of 'The Zoologist.' Mr. Cordeaux, apart from the intrinsic interest of his narrative, has eloquently demonstrated the unwisdom of placing too much reliance on preconceived ideas; in other words, the mistake of assuming that because such and such a bird has never been known to breed in such and such a county, it is next door to impossible for it ever to do so. In 'The Vertebrate Animals of Leicestershire and

Rutland,' published in 1889, the author refers to the Grey Wagtail as follows:—"A winter migrant, sparingly distributed, and not recorded as remaining to breed in the counties." The sentence italicised is wholly misleading and contrary to the fact. In the spring of 1878 I found the Grey Wagtail nesting in the bank of the Eye Brook, close to Skeffington Wood; the young were fledged by the end of the first week in May, and there was an addled egg left in the nest, on which, by the way, I one morning discovered the hen-bird sitting. This was the first verified instance of the species breeding in Leicestershire; yet, in spite of remonstrance, my note on the subject was discarded by the author of the work quoted above on the score that I must have mistaken the Yellow, or Ray's, for the Grey Wagtail! Nevertheless, apart from the fact that, according to my experience, Yellow Wagtails do not repair to the banks of streams for purposes of nidification, I should consider the end of the first week in May in any year an early date for a full clutch of eggs of this species (*vide* Zool. 1896, p. 354). I should add that the Curator of the Leicester Museum has since expressed regrets at having excluded—on no other grounds but those of unwarranted scepticism—a perfectly authenticated communication on a subject of interest to all scientific ornithologists in this midland county, he himself having chanced upon a pair of Grey Wagtails breeding within the last half-dozen years somewhere or other in the Loughborough district. It has been well said that seeing is believing! While recognizing and making full allowance for the difficulties encountered by compilers in sifting the wheat from the chaff when engaged in ornithological researches with a view to publication, and, at the same time, cordially approving of the judgment which prompts the suppression of the thousand and one notes which deal with the fancied identification of rare species here and there as they momentarily flit across the gaze of the observer, one cannot help regretting that duly authenticated discoveries, backed by "chapter and verse" and all the proof that can be considered needful, should be excluded from embodiment in what purposes to be the trustworthy history of a county's avifauna, and so lost to science. And my lament, too, is the more emphasized when I reflect that such exclusion is capable of being based upon what I can only designate as mere editorial caprice.—H. S. DAVENPORT (Ormandyne, Melton Mowbray).

**White Wagtails in Warwickshire.**—Amongst the many Pied Wagtails that visit the locality of Sutton Coldfield during their spring movements, I have for years been on the look-out for the White Wagtail, *Motacilla alba*, amongst their numbers. On May 2nd I was pleased to be able to identify a pair of these birds along the dams of Wyndley Pool, which were so tame as to allow me to advance within a few feet of them. Walking thence to Powell's Pool, another pair were noticed amongst a quantity of Pied

and Yellow Wagtails, which I believe were also these birds, but which were too wild to allow me to fully identify them by a nearer approach.—J. STEELE ELLIOTT (Dixon's Green, Dudley).

**Avicultural Notes.**—Canaries in my out-door aviary, at the autumn moult, had their yellow feathers almost obscured by long grey hairs; these are now shed, and they are their usual bright yellow colour, so that it would seem as if in the first year of turning out they revert back to nature in this respect also. Dr. Butler is clear, and I think evidently correct, in his article on Foreign Finches and their combative qualities in aviaries, notwithstanding some of our experiences may vary a little first one way or the other. In my own little experience, birds whose behaviour last year left nothing to be desired are this year quite pugnacious; therefore to be in a position to dogmatise one must, as Dr. Butler says in his opening statement, be an observer over a number of years.

I am much interested in the manner in which those birds whose summer and winter plumage is dissimilar assume their gaudy summer attire. In such birds as Chaffinches and other *Fringillidæ*, whose plumage, though the same, is yet much brighter during the breeding-season, the result is brought about by the abrasion or wearing away of the fluffy hairs produced in the autumn moult; but this is not the case with such birds as Weavers, &c. Now, in the case of two Black-faced Weavers which I have successfully wintered in my garden aviary, during this change I have noticed all over the head, shoulders, neck, and breast—the principal parts affected—spines were produced so thickly as to resemble moulting; but there certainly was no moult, save with a few of the larger primaries. Can these spines be colour-glands? I much regretted that my aviary was so full, and with one or two pairs sitting it was not possible to catch them and make a close examination; but they are very tame, and by close observation I ascertained these facts. I shall certainly alter my arrangements and increase my specimens for next season, so as to ascertain fully and clearly the detail of the whole process. I believe myself that these spines (as I have called them) are produced in the quill of the existing feathers—visible, as before recorded, just before and while the change is taking place; and that these spines—or as I have called them colour-glands—bursting, the transformation is brought about, or else a new feather is almost produced on the old stem from these spines, and the whole matter shed and the change produced that way. I shall increase my specimens of *Ploceidæ* and extend my observations upon this interesting point. Will other fellow-aviarists do likewise, and I am sure much interesting and instructive data will be the result?—W. T. PAGE (6, Rylett Crescent, Shepherd's Bush, W.)



## AMPHIBIA.

Toad attacked by a Weasel. —On May 20th last, while walking by a pond not far from St. Andrews, I came suddenly upon a Weasel, which, on being roused, immediately took refuge in a drain. On coming up to the spot I discovered a Toad, evidently much exhausted, with its hind limbs terribly lacerated. The Weasel had, in all probability, been trying to drag the Toad towards the drain-mouth, as far as one could judge from the marks on the soft ground. The Weasel, from its small size, was evidently a female. Is it not unusual for a Weasel—or any carnivorous mammal—to prey upon the Toad? I can find no allusion to it in Mr. J. E. Harting's article of two years ago.—A. H. MEIKLEJOHN (St. Andrews, N.B.)

[There is apparently little record of any carnivorous mammal attacking the Toad, especially in Britain, though the American Skunk is reported as not only doing so, but eating that Amphibian as well. If we substitute Frogs for Toads—and it is probable that both frequently come under the same category—the information is not so scanty. In this country the Rat, Weasel, Badger, and Polecat have all been reported to eat, or at least attack, Frogs. Going further afield, we find similar habits ascribed to the crab-eating Mongoose of the Indian subregion, *Herpestes urva*; the common Raccoon of North and Central America, *Procyon lotor*; the Beech-Marten of Europe, *Mustela foina*; the American Mink, *M. vison*; and the Cape Polecat, *Ictonyx zorrilla*. It seems too much to affirm that where the Frog is eaten the Toad is avoided, without very much further and stronger evidence.—ED.]

## PISCES.

Notes from Great Yarmouth. — STRANGE POSITION OF A LESSER WEAVER.—A very unusual thing in connection with this fish occurred on May 15th. I was asked to go to a cabstand and name a strange fish which had come up out of the salt-water pipes, and which was then swimming about in a basin of water. I found it was a full-grown Lesser Weaver, *Trachinus vipera*. Our streets are watered with salt-water, sewers flushed with the same, &c., so that many thousand gallons are pumped up weekly. I have before seen Gobies' tails protruding from the pipe-holes at the back of water-carts and pulled them out; but a five-inch fish must have been particularly unfortunate to have been sucked in with the indraught.

AN ALBINO TURBOT.—A perfectly white specimen of this fish was brought in on May 24th. Length 15 inches. I have seen albino Brill previously.

BULL-DOG VARIETY OF THE SAPPHIRINE GURNARD.—Another specimen of this variety, recorded and figured last month (pp. 275-6), and of the same size, came in on May 28th. It is most remarkable that when a rare or curious fish appears it is seldom a solitary specimen. This was most

notorious in the case of the White Goby, *Latrunculus alba*, which appeared some few years ago. I obtained a specimen and put a premium on others, but the smacks-boys then obtained such a quantity that I was compelled for financial reasons to withdraw my offer.

**LARGE ANGLER FISH.**—An extraordinarily large specimen of this fish was brought into Yarmouth on June 3rd. Its weight I estimated at 1 cwt.

**VARIETY OF THE COMMON MACKEREL.**—On June 15th I secured the first—out of the thousands I have seen—concolorous variety of the Mackerel, *Scomber scomber*; length 15 inches. The back was of a deep blue-black colour without a single dot or stripe. I sent it to the Norwich Museum.

**PILCHARDS.**—Some of these fish, *Clupea pilchardus*, was taken here on June 23rd.—ARTHUR PATTERSON (Ibis House, Great Yarmouth).

#### CRUSTACEA.

**Meristic Variation in the Edible Crab.**—On May 29th I received from one of the stall-keepers—who recognise me as a general repository for



NORMAL FORM.



VARIETY.

all kinds of monstrosities—a strangely malformed claw of the Edible Crab, *Cancer pagurus*. It had three points, but I am sorry to say the under half of the pincer had not been preserved.—ARTHUR PATTERSON (Ibis House, Great Yarmouth).

[Bateson has already given illustrations of variations in the chelæ of this species, but with none of these does the above agree.—ED.]

#### ECHINODERMATA.

**The Scutellated Star-fish.**—At p. 170 Mr. James Sutton recorded the occurrence at Lindisfarne of a species of Star-fish he identified as *Asterias tessellata*, considered as a synonym of *Pentagonaster granularis*, Retzius. Mr. Watson has since obligingly submitted this specimen to the examination of Prof. Jeffrey Bell, who reports it as *Hippasterias phrygiana*, not uncommon on the eastern coasts. Mr. Watson, however, states that such is not his experience on his part of the coast.—ED.

# THE ZOOLOGIST

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No. 674.—August, 1897.

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## NATURAL HISTORY NOTES FROM THE WEST INDIES.

BY PERCY RENDALL, M.D., F.Z.S.

EARLY this year I spent three months in the Antilles collecting zoological specimens of all kinds. The bulk of this time was passed in Trinidad, or, as the Indians call it, Iëre, and most of my collecting was done in the south-west province known locally as the district of Savana Grande. Geographically both this island and Tobago (which is nineteen miles further north) are portions of the South American Continent, and the respective faunas bear strong resemblance therefore one to the other. The small mammals from these islands are, however, so little known that I contribute a few remarks upon those I captured.

Most of my work was done with break-back traps baited with banana, Indian corn, and sweet cassava, but the last named was much the deadliest. My rendezvous was a Government rest-house, but though I had genuine primæval forest within a mile, I found that all the small things were to be taken along the course of a little stream, with a growth of balisiers and mixed bush, that fringed the cultivated but partly-cleared gardens and cocoa groves.

For the scientific names I am indebted to my friend Mr. Oldfield Thomas. The English equivalents are those used by the "natives," who seem to be any colour, and combine strains of

French, Spanish, and Indian blood with a basis generally of emancipated negro. The native is more useful to the naturalist than to the struggling planter, as he objects to all work, though he often has a sporting tendency.

*Didelphis marsupialis*. Large Manicou.—Ruthless war is waged by all and sundry upon these Opossums, which have a great predilection for poultry. They are to be found in Trinidad, Tobago, and St. Vincent to my knowledge, and in the last-named island I found that on moonlight nights they were to be shot in certain trees, the fruit of which acted as an unfailing lure. I have seen them killed in the day time with a mongrel pack of dogs, but their habits are generally nocturnal. They used to show their carnivorous propensities by eating my trapped victims; sometimes carrying the trap away also. One female which I dissected carried seven immature young in her pouch.

*Philander trinitatis*. The Yellow-eyed Manicou.—Though this little animal was only described by Mr. O. Thomas about three years ago, I found it plentiful and generally distributed wherever I collected.

*Marmosa murina*. The Black-eyed Manicou.—This is much the most common of the three marsupials found in Trinidad. Many partially eaten rats in my traps I fancy may be put to their credit, though banana was their favourite bait. One which I caught in a hollow stump in the daylight opened its mouth, and as it showed its teeth “swore” at me in the most unmistakable manner, with a sound like the rasping of a metal comb. It is found in Tobago.

*Dasyprocta aguti*.—This animal is the usual species taken in Trinidad; it is hunted with dogs and eaten by the natives, who will not let their hounds eat the entrails, which they say “disagree with them, as they feed on poisonous berries.” Whether this is true I know not, but they always carefully disembowel these rodents and hang the intestines out of reach.

*Dasyprocta cristata*.—The main difference to the eye in *D. aguti* is the red rump, which in this species has a markedly yellowish hue. Before I brought the two species back from Trinidad, only the former had been recorded from that island. Both of them give excellent sport, and I have had several good runs with dogs in their pursuit. One that the dogs ran into in



the open squealed like a rabbit sometimes does under similar circumstances. In the forest they make regular tracks or paths by constantly taking the same line of country. They are very smart and up to every wrinkle, often escaping from some bolt-hole which has been overlooked, whilst they are being dug out, after having been run to earth. The native hunters frequently remark that "an old Agouti always knows where he is going when he once starts to run"—and admit *that he often fools them!*

*Calogenys paca.* The Lapp.—This, the largest rodent of Trinidad, is such good eating that the Catholics have thought it worth while to obtain special permission from the Pope to sanction its flesh as a Lenten comestible! They say it is amphibious and ranks with fish. Certainly it dives and swims well when it is hunted, and it is perhaps convenient for them that the See has such a slender zoological knowledge. Its earth is always a hole in a bank, often amongst the tangled roots of some large tree, and is generally near water. It is rapidly becoming rare in the neighbourhood of the most elementary civilization. It is not found in Tobago.

*Tatusia novemcincta.* The Tattu.—Some of the commonest signs of wild life in the high woods are the scratchings which this Armadillo makes amongst the dead leaves, &c., in the damper spots. I have eaten this animal, and even prefer it to the "Lapp." One female which I examined had four fœtuses in utero in the middle of February. Its habits are nocturnal, and its home is invariably some hole in a bank.

*Sciurus æstuans.* Squirrel.—In both Tobago and Trinidad the cocoa-planters employ a man to shoot these little animals, as they raid the trees and destroy an immense amount of cocoa-pods. Though they may in some cases destroy only the outer covering of the pods, they do the Woodpeckers and other birds a service in many cases, by making their work of destruction the more easy. They are sometimes kept in the ordinary Squirrel's cage, and I have seen them thriving in captivity in more than one instance.

*Rhipidomys couesii.* Tree Cocoa Rat.—This species I found very rare and difficult to secure. Traps have to be set for them *in* the cocoa trees, and at a considerable height from the ground,

*Oryzomys brevicauda*. The Garden Rat.—Widely distributed in both islands; the bulk of my captures consisted of this species, and a long series showed that there was considerable difference in the colour of the pelage.

*Nectomys palmipes*. Water Rat.—On the margins of the small streams this rat was always taken, and never away from water. The immature specimens were much darker and the pelage much shorter than in the adults.

*Akodon urichi*. Black Garden Rat.—Difficult to catch, and scarce everywhere; only taken in Trinidad.

*Mus rattus*. Black Rat.—This species was only secured in one cocoa shed, and had only taken up its quarters there after the Brown Rat had been poisoned.

*Mus decumanus*. Common House Rat.—Generally distributed wherever I collected. They were trapped in the out-door kitchens used in the West Indies, but in the day time retired to the bush to return at nightfall

*Mus musculus*. House Mouse.—The foregoing remarks also apply to this species. I found both this and the House Rat living in the arrowroot fields in St. Vincent.

*Heteromys anomalus*. Pouched Rat.—Local in its distribution, and found at some elevation (800 feet). I had reliable information of its existence in Tobago. It is at times caught with both cheeks stuffed with seeds or corn.

*Loncheres guianæ*. Porcupine Rat.—In Trinidad these curious spiny rats are common on the large mangrove bushes that fringe the mouth of the Caroni river; they are to be seen lying parallel with the branches at some height above the water. They must be pugnacious in their habits, as both their ears and their tails are often found mutilated. The immature of this rodent shows very little difference in the length of the ears compared to the adult, and is in contrast with other small rodents belonging to kindred species. My friend Mr. R. R. Mole, of Trinidad, informs me that they are the chief food of the large water Pythons, and in their excreta he has found great quantities of their typical spiny bristles. I caught one of these rats in Tobago, in a tree a considerable distance from the Great Dog River; it was larger than any of the long series I obtained in Trinidad, and the basal portion of the pelage was more red in coloration.

*Echimys trinitatis*. Long-tailed Piloui. — Otherwise called the “No-tail Piloui.” The fact that some specimens of this species are found to have no tail, which others possess, has led the natives to give to it the second name, under the very excusable belief that it was another species. I understand they are eaten with relish.

*Coassus nemorivagus*. Deer.—I procured one pair of the horns of this deer, which were said to be the largest ever seen; they measure  $5\frac{1}{2}$  in. This animal is very plentiful on the borders of the high woods, and does an immense amount of damage to young plantations of cocoa, nutmegs, &c. They are very wary, and though I heard them, and constantly saw their fresh spoor, I never even once got a snap-shot, and I was perpetually on the alert to obtain a complete skin and skull. Very few are ever killed, as they simply scorn the mongrel dogs, who cannot live with them for even a mile, and generally refuse to take up their fresh trail.

There are other points of zoological interest perhaps worthy of note; but, as Mr. Rider Haggard remarks, “that is another story!”

## ON THE BREEDING RANGE OF THE YELLOW WAGTAIL IN IRELAND.

BY ROBERT WARREN.

THE Yellow Wagtail, *Motacilla raii* (according to Yarrell and H. Saunders), is generally distributed as a breeding species throughout England and Wales in all suitable localities. In Ireland it is a remarkable fact that, as far as at present known, the breeding range of this species is restricted within the very limited areas of the shores and islands of four lakes (Loughs Neagh, Carra, Mask, and Corrib); though once, according to Mr. E. Williams of Dublin, a pair bred a few miles from that city. Up to the date of the publication of William Thompson's 'Birds of Ireland' (1849-1851) this bird was only known to breed on the shores of Lough Neagh and Derrywarragh Island; and in his appendix to the third volume the author mentions "visiting, on May 4th, 1850, in company of his friend Mr. Garrett, the Wagtails' breeding haunts on Derrywarragh, where they saw not less than forty of them; in one little piece of pasture three pairs appeared within twenty-five yards of each other, and three or four birds were frequently seen only a few feet apart on the ground, or on wing at the same moment."

Since then the late Lord Lilford found a nest on the shore of Lough Corrib, in Co. Galway; and Mr. W. H. Good, of Westport, Co. Mayo, informed me (in 1891) that he discovered them breeding on the shores and islands of Loughs Carra and Mask, in South Mayo; but it was not until June, 1893, that, in company of my friend Mr. W. Williams, of Dublin, when visiting Lough Carra, that I had the pleasure of seeing and hearing the Yellow Wagtail in its breeding haunt. We had walked from Ballinrobe to the bridge at the end of the lake, and, while watching some Terns fishing, Mr. Williams suddenly exclaimed, "I hear the calls of a Yellow Wagtail"; and shortly after we saw a female with food in her bill, standing on a tall thistle in an oat-field alongside the



road. Mr. Williams began imitating the call, and did it so cleverly that in a short time the female was joined by a lovely male; and as he continued to call, a second male also came up to where the other two birds were; but although we spent more than half an hour searching for the nest, we were unable to find it, and had to return disappointed at our want of success. The next evening we saw the birds at the same place, and again searched for the nest without success, but felt quite satisfied that two pairs were breeding at the place somewhere about the oat-field.

On June 5th, 1895, I again came across the Yellow Wagtails, when visiting Lough Mask in company of my friend Mr. R. J. Ussher. Landing on some islands on the western side of the lake, opposite Cushlough, we met two pairs, evidently having nests from the anxiety they evinced while we were exploring the islands; and later in the day, when landing at the Cong end of the lake, we saw a fine male on the rocky shore. The next morning, when proceeding from Cong across Lough Corrib to Currarevagh, Mr. H. Hodgson's place, we met a pair on an island about half-way across the lake; and two days after Mr. Ussher saw two pairs on islands lower down the lake towards Oughterarde, thus showing that the birds were widely distributed along the shores and islands of these two lakes. It is very strange and impossible to explain why these birds should be restricted to these four lakes, while no trace of them in the breeding season is to be found on other lakes throughout the island which are apparently as well suited in every respect.

Mr. R. J. Ussher, who has on two or three occasions thoroughly explored Lough Erne and its islands, has neither met with nor obtained any intelligence of the bird there; nor in his explorations of Lough Ree, on the Upper Shannon, has he come across it. When visiting the Donegal lakes, those of Roscommon, and the midland counties, no trace of it has been found. Again last summer, when visiting in his company that beautiful lake near Sligo, Lough Gill, and Lough Melvin near Bundoran, we neither saw nor heard anything of this bird. And although I have often explored that fine sheet of water in North Mayo, "Lough Conn," with its companion lake Cullen, the bird has neither come under my notice, nor that of several of my

friends who fish the lake every season in May and June, and who are well acquainted with the Yellow Wagtail in England. If it frequented the shores or islands of the lake it could not long elude the notice of those so well acquainted with the bird in its English haunts.

As the Grey Wagtail, *M. melanope*, is commonly known in Ireland as the "Yellow Wagtail," many mistakes are made in confusing the two species, and I have often been told of the Yellow Wagtail nesting in certain localities; but on further enquiry as to where the nests were found, the description of the sites always proved the nests to be those of the Grey Wagtail.

*Addendum.*—Last June my friend Mr. R. J. Ussher, when exploring the lower end of Lough Corrib between Oughterarde and Galway, met this bird distributed amongst the islands, showing that its haunts were all about the lake, and extended through the three lakes Carra, Mask, and Corrib without a break.—R. W.

## A NEW BRITISH WORM.

BY THE REV. HILDERIC FRIEND.

My attention was drawn during the last week in July to the fact that in the neighbourhood of Birmingham the China Aster was perishing from some form of blight. On pulling a sickly plant from a flower-bed at King's Hill, Wednesbury, Staffordshire, and examining the roots with a pocket lens, I detected a minute worm. This evidently was the cause of the mischief. On submitting specimens of the annelid to microscopic examination I found it to be an Enchytraeid; and so far as I am aware it is new to science, unless it has been examined by some of the florists and described in journals which I am unable to examine. I should recommend all periodicals which deal with the flower-garden to copy this description.

## THE ASTER WORM.

ENCHYTRAEUS PARVULUS, *Friend*. This destructive pest is 3-4 mm. or about one-eighth of an inch in length, and when seen at work is of a silvery white colour. It has no coloured blood, and may be called a white worm—no uncommon thing in this group of annelids. It lodges under the epidermis of the root and feeds on the juices and tender vegetable substances, thus absorbing the plant nutriment and preventing the roots from performing their natural functions. It is gregarious, for quite a colony will sometimes be found in one plant. The average number of segments is thirty, and on segment XII. a girdle is developed, somewhat papillose, with a pair of pores associated with pear-shaped bodies. The ventral setæ are absent from this segment, their places being occupied by the pores. In the hinder extremity there are four sets of setæ in each segment, each set containing three setæ. The anterior differs from the posterior, inasmuch as the lateral setæ are in couples and not triplets. Thus in segments II.—XI. we have two setæ in each lateral bundle, and three in each ventral bundle. On segment XII. we find two lateral pairs only, then for a few segments more there are two in the lateral and three in the ventral bundles, while the last ten or dozen segments have four triplets each.

The nerve-cord shows a tendency to enlargement between segments III.-IV. and the brain is pear-shaped with a rounded or convex hinder margin. There is a large head-pore between the prostomium and the first segment, and through this the coelomic fluid and other floating materials from the body-cavity and head are poured out when a little pressure causes inconvenience to the worm.

The question naturally arises, Can this be the same as Michaelsen's Silver Worm (*E. argenteus*), found on the shores of the Elbe, or not? Unfortunately I do not possess the author's pamphlet, and the digest in Mr. Beddard's monograph is too brief for a decision. The descriptions correspond as far as they go, but I have not been able to verify the account of the nephridia, nor are we told in what way the setæ are disposed, or what the habits of the Elbe species are. In any case *the species is new to Britain*, and its predatory character raises the serious question—What is the best thing for the flower-grower to do if he finds them attacking his asters?

THE BEST REMEDY is the drastic one of pulling up every plant which shows signs of sickness and consigning it instantly to the flames. It might be possible to save some plants by carefully cutting out the roots which appear to be affected; but the operation would have to be performed the instant there were signs of failure, it would have to be conducted with the greatest care and delicacy, and there would still be two risks. Either the plant might succumb to the treatment, or the disease might reappear owing to the eggs of the worm having been left in the roots. The eggs are so minute that even the microscope would be of little service in their detection after they had once been extruded.

There is no doubt but that many of our minute annelids are parasitic. Heretofore, however, we have heard little of their ravages. The reason is probably to be found in the fact that so little was known formerly of annelid anatomy that when a worm was discovered its description lacked scientific precision, and so the different parasitic worms remained uncatalogued and unknown.



## TWENTY YEARS ON THE NORFOLK FENS.

BY LAST C. FARMAN.

BEFORE entering into details respecting the fauna of the district in which I reside, it will perhaps be best to describe the locality.

The little old-time village of Haddiscoe nestles on the verge of the watery vale of the Waveney, and abuts the main turnpike road. In a north-easterly direction is situate the famous town of Great Yarmouth, some eight miles distant as the crow flies. About the same amount of mileage would take us to the easternmost point of England, *viz.* the town of Lowestoft. Immediately on passing through the village, we reach the celebrated Norfolk fen or marshland, stretching away in a northerly direction as far as the eye can reach, its flatness only broken by the numerous drainage mills dotted about like sentinels. Looking in a north-easterly direction one sees the Herringfleet Hills, covered with heather and bracken and crowned by tall firs. It is but two miles from the village to these hills, to reach which we must cross one of the narrowest parts of the fens by the main road, locally called the dam, bent and twisted about like some huge serpent, and studded on either side with closely planted willows. At the foot of these hills meanders the old brown Waveney, from which this valley takes its name. In the midst of the fir trees we have referred to, ripple the waters of Fritton Lake. This lake during the winter months teems with wildfowl, and decoy pipes are successfully worked, some hundreds of Duck and other species of wildfowl annually having their necks wrung by the decoyman's hands. When winter storms burst upon us, thousands of wildfowl congregate on this lake, and fighting at night they scatter around the district, dropping all over the fens into the weedy ditches and shallows. It is almost needless to state that in such a district, and despite the revenue tax, wildfowlers are numerous, and on favourable nights an almost incessant fusillade

is kept up in select spots when heavy rains or some breakage in the river's bank have flooded a few acres.

Having tramped these fens almost daily during the past twenty years, and during the shooting months with a gun for a companion, and having an eye upon the wondrous works of nature, it may prove interesting to the readers of 'The Zoologist' to learn something of my observations during that period. In particular, I, like many, most deeply regret the decrease in several species of our breeding birds.

I will now give a list of the birds which still breed on the fens here; this will not include the broads, where several other species continue to nest, though in diminished numbers. We number Heron, Wild Duck, Teal, Dabchick, Moorhen, Lapwing, Redshank, Common Snipe, Reed Warbler, Reed Bunting, Kingfisher, Sky Lark, Meadow Pipit, Yellow Wagtail, Pied Wagtail, Pheasant, Partridge, and Red-legged Partridge.

HERONS.—There is a Heronry within a short distance of my home, and the birds seem to be fairly numerous throughout the district. Many are daily fishing in the ditches, which abound with Jack, Roach, Tench, Bream, and Perch in plenty, but Eels are scarcer every year, the Heron playing a great part toward diminishing the same. Many a tussle have I witnessed between Heron and Eel. In 1894 I counted twenty-six Herons on a twenty-acre marsh going through a toilet of wing preening, &c.; most of these were young birds. Fortunately for the Heron he is not a table bird, otherwise he might not survive here in such plenty. Specimens of both the Purple and Night Herons have been shot in the locality.

WILD DUCK.—With the common Wild Duck I note a great falling off during the breeding season. In the early days of my observations it was not an uncommon occurrence to stumble across half a dozen clutches of young Ducks whilst tramping across the fens during the month of June. A few couples still breed here, and recently I flushed four in one lot and seven in another at sunrise and sunset. Little parties ranging up to ten in number may be seen tacking about the fens. In a wood not a mile from my home a Wild Duck successfully hatched a family several years in succession on the topmost branch of an oak tree.

**TEAL.**—A few pairs of Teal annually breed here, and I always flush some of the birds from the ditches during the months of August and September.

**DABCHICK.**—A few Dabchicks still remain in the locality, nesting on the Waveney, but I note a great decrease in this species.

**MOORHEN.**—The Moorhen appears to be a very uncertain breeder in this neighbourhood. In the year 1885 scores of these birds nested in the district, and although some hundreds of eggs were taken, wherever one went the little black fluffy young could be seen, while the call of the mother birds and the weep of the young ones could be heard all over the fens. These diminished yearly till none were left. In 1894 we had another inrush, the ditches seemed alive with them, and whilst walking across the fens one morning I counted thirty nests containing eggs. Last year I only saw six nests, and this season I have not noticed one.

**LAPWING.**—Twenty years ago the Lapwings which nested with us were almost countless, now not one remains. The year 1894 saw the last three couples topple and twist over the old familiar breeding-grounds. What few remain are driven, mainly through steam drainage, to the Suffolk side of the Waveney, where the marsh is yet suitable for them, between the river and the Herringfleet Hills. Owing to the long drought, the land is now almost as hard as rock. The young Lapwings are thus seeking their sustenance by the water's edge at the ditches. A Lapwing—and we suppose it was the same bird—laid white eggs on the same marsh several years in succession.

**REDSHANK.**—Redshanks, like the Lapwings, have entirely forsaken the old haunts; fifteen years ago, many couples of these birds nested on the rushy marshes at the foot of the uplands, quite two miles from the river. Just ten years ago the last couple nested there, and in 1894 the last of the Redshanks nested on the Norfolk side of the Waveney. In early spring by the river side it is not uncommon to witness twenty Redshanks in one flock before they pair for nesting. I have noticed this species on the fens in almost every month of the year, and in 1894 I saw one on Christmas Day.

**SNIFE.**—Few Snipe breed with us now,—I have not heard of a nest being found during the past five years. Some, however, lay on the Herringfleet Rands on the Suffolk side with the

Lapwing and Redshank. I generally shoot a few young ones during the month of August, high tides driving them from the Rands to the fen ditches.

REED WARBLER.—The Reed Warbler is nothing near so numerous in the district as of yore. When a youngster, I was fond of trailing through the tall reeds to search for Reed Warbler's nests, and had little difficulty in finding half a score. Now it would take a lot of searching to find that quantity of nests, and judging from the few birds one sees, this species has decreased very much during the past ten years.

REED BUNTING.—The Reed Bunting, like the Warbler, is on the decrease. Several, however, still remain and breed by the side of the deep ditches. Strange to say, though I have lived with these Buntings during a period extending over twenty years, I have only found two nests, one containing five young ones, the other four eggs, which I added to my collection.

KINGFISHER.—Alas, for our gaudiest of British birds! Are we to retain it in Norfolk, or will this handsome bird, like the Great Auk, become extinct? It is rare at the present day to see a Kingfisher. I still know one place where a couple annually breed, and fortunate for such the owner of that particular nesting-ground worships their presence as a Hindoo would a god. Woe be to the miscreant who would dare to disturb that pair of sacred fishers. If any bird requires protection in Norfolk, it is the Kingfisher. In the year 1883 Kingfishers were very numerous on the fens, and I could see them daily. Occasionally I noticed as many as half a dozen together. Severe winters and the gun have almost exterminated this beautiful species as far as Norfolk is concerned.

SKYLARK.—The Skylark breeds profusely all over the marshes, and during nesting-time eggs can be found anywhere and everywhere. During the past twenty years I have found several nests of the Skylark containing young Cuckoos, the latter being very common at present in the gardens and thickets on the verge of the fens.

MEADOW PIPIT.—Of late years the Meadow Pipit seems to be on the decrease, though several still breed with us. I have seen a few nests myself this season, and allowed the same to remain undisturbed.



**YELLOW WAGTAIL.**—The Yellow Wagtail is only second to the Skylark in breeding numbers. Annually, at the beginning of April, a large number of these handsome birds visit us, and I have seen some scores of them dotted about the fens. Their bright yellow plumage very much resembles the blossom of the dandelion, which at that time abounds in the locality. I fail to see any decrease on the part of the Yellow Wagtail in the district.

**PIED WAGTAIL.**—A pair or two of these nest on the fens, the majority taking to the uplands. I have taken some curious eggs of this species, and have on several occasions found their nests inhabited by a young Cuckoo. We have a liberal supply of Pied Wagtails in Norfolk.

**PHEASANTS.**—Pheasants breed all along the verge of the fens, and they seem to thrive and do well on these lowlands. Several breed amongst the tall grass by the side of the river Waveney.

**PARTRIDGES.**—Both the English and Red-legged Partridges nest on the fens, the former in numbers, the latter having very much decreased in the locality of late years. We have not a tithe of the number we had ten years ago.

A friend of mine in this neighbourhood commenced to make a collection of rare birds with his own gun. To give the readers of this Journal an idea of what Norfolk contains in the shape of avifauna, I will mention some of the rarest of the species he obtained, all shot within the last twenty years and within a few miles of my home; such as, Avocet, Spoonbill, Bittern, Scoter, Scaup, Shovellers, Smew, Gargany Teal, Spotted Redshank, Green-shank, Red-throated Diver, Common Arctic and Black Terns (a Sandwich Tern fell to his gun, but he failed to secure it), Little Gull, Pallas's Sand Grouse, Ring Ouzel, Woodlark, Grasshopper Warbler, and Pied Flycatcher. Besides many other waders, he also secured the following:—Curlew, Whimbrel, Golden and Grey Plovers in summer plumage, Turnstone, Sanderling, Little Stint, Temminck's Stint, besides a number of commoner species.

**RAILS, &c.**—The Landrail or Corn Crake is rather rare in the locality. Whilst shooting at Kessingland last September I saw several, probably collected near the sea-coast preparatory to migration. I shot a fine specimen of the Spotted Crake by the

Waveney in 1893, the only one I ever obtained with my own gun. The Water Rail used to be very common, but I seldom see one now. One of this species was shot at Oulton last season without legs. A Woodcock was shot the same day with short stumps, hard as horn; the legs must have been cut or shot off some considerable time, as the bird was in good condition. Speaking of Woodcocks, I saw a pure white specimen which was shot at Acle in 1894. The following white birds have also been shot in the district:—Several Wild Duck, Blackbird, Fieldfare, Starling, Jackdaw, House Sparrow, House Martin, Greenfinch, and Robin with red breast.

Not having sufficient time to give a full list of the rarities killed or seen in the district, I will confine myself to mentioning the following:—Three or four Hoopoes of recent years have fallen victims, one Golden Oriole, several Waxwings, a Two-barred Crossbill, and a Raven shot on the marshes, besides Grey and Red-necked Phalaropes. As probably most or some of these have previously been duly recorded in these pages, further comment is needless. Two Cranes have fallen to the gun during my period of observation, one of which I saw myself. Several Bitterns have been killed near the river Waveney, two of which fell to the gun of a cousin of mine, as well as a Little Auk. Several of these birds have been picked up all over Norfolk after strong gales from the north-east. I saw several flocks of the famous Pallas's Sand Grouse when visiting us a few years back.

In October, with an easterly wind, come the winter migrants streaming across the fens—thousands of Rooks, Jackdaws, Kentish Crows, Skylarks, Chaffinches, Lapwings, and Golden Plover. I have noticed these birds coming from the sea, tracking after each other six or seven days in succession.

We generally see a few young Golden Plovers in August, but the main body arrive about November 27th, and a number remain till severe weather drives them elsewhere. We had some thousands of these birds last winter on the fens, mingled with which were Dunlins and Ring Plovers. We usually have a good day or two with the Snipe in November, but these birds have very much diminished during the past twenty years, our marshes becoming more solid and unsuitable for them, and we have to tramp the ditches for the few couple we yearly obtain. We have some

good sport with Snipe during moonlight weather by sitting near a swamp of shallow water facing the moon, and I have knocked over several in an evening. They come screaming through the air like bullets, and dropping into the shallow water can be easily discerned in the moonlight, and, with care, shot sitting. You do not see them when once on the wing. Lapwings and Plovers are similar in habit, and these come before the Ducks' flight. After having done with the Snipe, &c., you can often add a Duck or two to your bag.

In some winters we have a number of Geese on the fens, but, owing to absence of cover, not many are shot. In 1890 we had some large strings of Geese feeding quite close to the village, and these remained several weeks. I managed to shoot one Bean Goose out of seven; a friend shot three Grey Lags out of twenty-one, besides a fine specimen of the Canada Goose; and my father shot a Bernacle Goose. Specimens of the Brent and Egyptian Geese have also been shot here. I counted eighty-four Grey Lags in one company. Some winters produce Swans. In the year 1894 we had several in the district, and I shot one Whooper; while a specimen of Bewick's Swan was also shot. A friend of mine killed three Whoopers with one shot.

During the severe weather of 1894 we had some fine Smew and Goosanders up the river, besides Sheldrakes, Scaup, Tufted Ducks, Golden-eyes, Crested Grebes, and Coots in numbers, driven from the broads.

There still remain a few Hares on the fens, and some Otters. Several of the ditches teem with fish of late years. Pike have been taken, from nineteen pounds downwards; I captured a Bream in 1896 weighing six pounds and a half, besides four excellent Tench. We had a few years back abundance of Eels, but, owing to steam drainage and constant persecution by Eel-pickers and Herons, they are becoming scarce in the ditches.

## THE AUTUMN SONG OF BIRDS.

BY CHARLES A. WITCHELL.

IN a paper on "The Evolution of Bird-Song" which appeared in 'The Zoologist,' 1890, p. 233, and attracted some criticism, I stated that "in autumn the young male Sky Larks, Thrushes, and Blackbirds begin to sing," and Mr. Aplin supports this statement (Zool. 1894, p. 411), saying that on account of the quality of the autumn songs it seems likely that they are produced by young birds of the year. He had never heard a Blackbird sing the autumn song; nor have I; but I have heard the young Blackbird practising a soft-warbled strain in October, in the manner of a young Thrush.

Mr. Aplin classes the Robin and Starling with the Thrush and Hedgesparrow, as commencing to sing in November, or even in October (Zool. 1894, p. 410); but the two former birds begin their autumn song (if such it be) in August (see Zool. 1890, p. 242, also 'Evolution of Bird-Song' [1896], p. 65), or earlier. I have often observed the Robin recommencing its song during the first week in August; and this year, in Kent, numbers began before the middle of July. The Starling I have observed year by year to recommence in the first week in August.

Mr. Aplin found the Willow Wren silent soon after the middle of June (Zool. 1894, p. 411); and so have I for a week or two; but I have heard numbers in song early in July (in Gloucestershire and in Kent), and this year and last dozens could be heard every morning. I have often seen a Willow Wren sing when in heavy moult. This bird is the most persistent singer of all our summer visitors, not ceasing till the middle of August. The Blackcap I have once heard in September.

I can find no distinction between the spring and autumn songs of these birds, except that the Robin makes great use of



the call-note (and even of the distress-note) in its morning songs in August (and see "Bird-Songs in Summer," in 'Knowledge,' July, 1897), and that the Starling at the same period rarely utters its love-call in song ('Evolution of Bird-Song,' p. 53). The Robin's song is often employed before combat (*op. cit.* p. 38).

If an autumn singer makes much use of its call-note, we may infer that the song has an exotic origin, but when the call is not used (as in the Starling) it is difficult to see why we should not credit the singer with a sense of pleasure in his surroundings expressed in song; and this is the more reasonable since so many birds have a strong local attachment.

A LIST OF BIRDS OBSERVED IN SHETLAND,  
MAY AND JUNE, 1897.

BY BERNARD A. E. BUTTRESS.

THE following is a list of the birds which I observed during a three weeks' stay in the Shetland Isles. It will be noticed the number of species given is sixty-three; of these I found the eggs of twenty-seven, while twenty-three of the remainder were undoubtedly nesting.

In spite of the law protecting them, I was sorry to find on Foula some thirty robbed nests of the Bonxie (Great Skua), and only two or three containing eggs. I think I am quite within the mark by putting the number of this fine species trying to breed there at forty pairs.

The occurrence of the Buzzard breeding so far north has not, I think, been for some time noted, although Dr. Saxby, in his book, mentions it as nesting.

From enquiries made, there are at least five nesting places of the White-tailed Eagle still remaining, most of them in quite inaccessible spots.

*Saxicola œnanthe*. Very numerous everywhere. Eggs found.

*Pratincola rubicola*. Three pairs on Unst. Nesting.

*Phylloscopus trochilus*. Saw a single example at Walls.

*Troglodytes parvulus*. Fair scattering, especially round lochs.  
Nesting.

*Motacilla raii*. Approached close to pair at Haroldswick, Unst.

*Anthus trivialis*. Noticed three pairs in different localities.  
Nesting.—*A. pratensis*. Very abundant in places. Eggs found.

—*A. obscurus*. Quantities on all the shores and cliffs. Nesting.

*Chelidon urbica*. Many at Foula; also in other parts. Nesting.

*Cotyle riparia*. Saw several at Symbister, Whalsay.

*Passer domesticus*. Several pairs around each house. Eggs found.

*Acanthis flavirostris*. Extremely abundant everywhere. Eggs found.

*Emberiza miliaria*. A fair scattering in inhabited districts. Nesting.—*E. citrinella*. Two or three pairs at Walls. Seen building.

*Sturnus vulgaris*. Numerous in most cliffs. Eggs found.

*Corvus monedula*. Several about Lerwick. Nesting.—*C. corax*. By no means uncommon. Young seen.—*C. corone*. One bird at Vaila Sound.—*C. cornix*. Very numerous. Eggs found.

*Alauda arvensis*. Abundant on all sides. Eggs found.

*Buteo vulgaris*. One pair nesting on Unst. Eggs found.

*Haliaëtus albicilla*. One at Bressay. Nests on Noup of Noss.

*Falco peregrinus*. Pair at Hermaness, Unst. Nesting.

*Phalacrocorax carbo*. Fair number round Scalloway. Nesting.—*P. graculus*. Immense numbers on coast. Eggs found.

*Sula bassana*. Two or three odd birds flying overhead.

*Anas boscas*. Fair sprinkling about. Young seen.

*Fuligula marila*. Solitary example on loch near Walls.

*Somateria mollissima*. Abundant on mainland. Eggs found.

*Mergus serrator*. Two or three pairs near Walls. Nesting.

*Columba livia*. Common in all cliffs. Eggs found.

*Crex pratensis*. Pair on Foula; one heard at Balta Sound.

*Gallinula chloropus*. Pair at Walls. Nesting.

*Ægialitis hiaticula*. Abundant; generally distributed. Nesting.

*Charadrius pluvialis*. Fairly numerous on the hills. Young found.

*Vanellus vulgaris*. Many pairs in places. Nesting.

*Hæmatopus ostralegus*. Abundant on coast. Eggs found.

*Gallinago cælestis*. Pairs scattered on moors. Eggs found.

*Tringa alpina*. One pair on Saxaford Hill.

*Totanus hypoleucus*. Several round Walls. Nesting.—*T. calidris*. Two pairs at Bridge of Walls.

*Numenius arquatus*. Commoner on Unst than elsewhere. Eggs found.—*N. phæopus*. Flock of seven at Walls.

*Sterna fluviatilis*. Fair number on lochs and coasts.—*S. macrura*. Abundant in some districts.

*Larus ridibundus*. Saw few pairs, but exceedingly local.—*L. canus*. Large colonies on holms in lochs. Eggs found.—*L. argentatus*. By far the commonest Gull. Eggs found.—*L. fuscus*. Generally distributed. Eggs found.—*L. marinus*. Very

fair scattering on west coast. Nesting.—*L. glaucus*. Saw one individual in Blue Mull Sound.

*Rissa tridactyla*. Large colonies in several places. Nesting.

*Stercorarius catarrhactes*. Small colonies on Foula, mainland, and Unst. Eggs found.—*S. crepidatus*. Breeding in considerable quantities. Eggs found.

*Alca torda*. Plentiful on suitable cliffs. Eggs found.

*Uria troile*. Saw many colonies on west coast. Nesting.—

*U. grylle*. Scattered almost everywhere on coasts. Eggs found.

*Fratercula arctica*. Vast numbers on Unst. Eggs found.

*Colymbus glacialis*. One pair near Clonstel. Eggs found.—

*C. septentrionalis*. Several pairs near Walls. Eggs found.

*Fulmarus glacialis*. Large colony on Foula. Eggs found.

*Puffinus anglorum*. Colony on Foula; one bird, Unst. Eggs found.

*Procellaria pelagica*. Saw few at Hermaness. One egg found.



## NOTES AND QUERIES.

## AVES.

Swallow-tailed Kite in Suffolk.—This British example of *Elanoides furcatus*, recorded by Mr. Butterfield (*ante*, p. 270), was restored by Mr. Bristow, of St. Leonards, some years ago, and the Mr. Travers who shot it told him it was eating a partridge at the time.—G. W. BRADSHAW (Hastings).

Alleged Nesting of Montagu's Harrier in Kent.—About the last week in June a young lady, a near neighbour, called to tell me that she had found a nest that she was anxious to identify, bringing with her a feather which had fallen from the bird as it left the nest. I at once recognized the feather as one of the outer tail-feathers of a Harrier, but of which particular species I did not feel sure at first. It certainly was not a Marsh Harrier's, and therefore was either from the Hen Harrier, *Circus cyaneus*, or Montagu's, *C. cinerascens*. The locality, a marsh, did not accord with the usual breeding places of the Hen Harrier, and on my showing a specimen of a female of each of these species, an objection was raised that the Hen Harrier was too large. A further comparison of the tail-feathers of each left no doubt on my mind that the nest was one of *C. cinerascens*. The nest was in a dry part of the marsh, and placed in a thick clump of rush and *Carex*. Some of the material, which was also brought for my inspection, consisted of broken pieces of dry reed. The nest was described as very slight in construction. There was one pale bluish-white egg, and this was left in hopes that more would be laid. On a second visit the egg was gone, probably abstracted by a Rook, as no footmark or trodden herbage was visible; nor was the bird seen again. I think there is no doubt whatever that this Harrier (Montagu's) had bred here.—W. OXENDEN HAMMOND (St. Alban's Court, near Wingham, Kent).

Summer Appearance of Wild Geese in Fifeshire.—On July 1st a small flock—about twenty in number—of Wild Geese flew over the links here, going in an easterly direction. Species undetermined, though probably "Pink-footed," which are common here in winter.—A. H. MEIKLEJOHN (St. Andrews, N.B.).

Strange Occurrence of an Albatross in Cambridgeshire.—Mr. Travis, the birdstuffer at Bury St. Edmunds, has lately received in the flesh a bird which is probably new to the European fauna—one of the

Albatross family, of which I am unable to give the specific name. It was caught near Linton, Cambridgeshire, on or about July 1st, and sent to Mr. Travis, with the written order (which I saw) to "stuff this gull." The bird in colour much resembles a Great Black-backed Gull, and measured in the flesh perhaps thirty-four or thirty-six inches, with an expanse of wing Mr. Travis estimated at seven feet. The back and wings are somewhat paler in colour than in *Larus marinus*, but the tail is blackish instead of white; the head, neck, breast, and belly pure white. It arrived in a perfectly fresh condition, and the colour of the feet and legs at once attracted the operator's attention; he described them as "fleshy blue," and this was quite perceptible when I saw the bird, though it had been set up for some ten days. So far as I am aware, only one Albatross of any species has ever reached England alive, and this lived for a short time in the Zoological Gardens some twelve or fourteen years ago; but the beautifully clean plumage of the Cambridgeshire bird quite precludes the possibility of its ever having been in confinement.—JULIAN G. TUCK (Tostock Rectory, West Suffolk).

[This specimen has since been submitted to Mr. Howard Saunders, who has again consulted Mr. O. Salvin, our great authority on the Petrels. Both these experts pronounce the bird to be *Diomedea melanophrys*, the species "which haunted the Færoes for thirty years, and which has also been taken high in the N. Atlantic."—ED.]

**Black-throated Diver breeding in Shetland.**—During a recent stay in the Shetland Islands, I was assured by a resident that he had several times taken the eggs of *Colymbus arcticus*. I found that he had an extremely good knowledge of ornithology, and was perfectly certain of the birds, having more than once shot them off the nest. He also gave me an undoubted egg taken by himself last year, but had been unsuccessful in observing any this season.—BERNARD A. E. BUTTRESS (Hendon, Middlesex).

**Curlew laying Five Eggs.**—On June 5th last I discovered a nest of *Numenius arquatus* which contained five eggs. They were all identical in shape, size, and colour, with the exception of one, which was of a slightly greyer tinge and rougher texture. I have not before noticed any mention of more than the usual complement of four eggs being found.—BERNARD A. E. BUTTRESS (Hendon, Middlesex).

**Cuckoo's Egg in Nest of Song Thrush.**—On June 24th I found an egg of the Cuckoo in a Song Thrush's nest in my garden with three eggs of the owner, the nest being apparently deserted. The Song Thrush's nest is, I believe, very rarely chosen by the Cuckoo for the reception of her egg. On July 8th I had an egg of the Cuckoo from a Hedgesparrow's nest, which was certainly laid by the same Cuckoo, the two eggs being exactly alike, but quite different from any of the others (eighteen or twenty in all)

which I have obtained this season.—JULIAN G. TUCK (Tostock Rectory, West Suffolk).

**Young Cuckoo in Nest of Twite.**—This year I have been led to a moor where one of our provincial birds is abundant—the Mountain Linnet or Twite, *Fringilla flavirostris*—and there I found one busily nursing a young Cuckoo. I believe the incident worthy of notice because the foster-parent in this case is the only species of small birds which remain constantly in the locality, one too exclusively moorland and closely clad with heather for such birds as Chaffinches, Yellowhammers, Larks, &c. It is evident that the nature of the food here provided must differ materially from that which the young ones would receive in more inland or sylvan situations, and it appears to be a question of considerable scientific interest how far the differences of food and natural surroundings may affect these remarkable birds at their different places of nativity, combined with the peculiarities of the various species of birds which are called upon to be their foster-parents. How the young Cuckoo may act as soon as able to provide for itself is also an interesting matter, for in the case under notice the surroundings are those typical for Red Grouse. The young Cuckoo in this case soon ejected all the other occupants of the nest, and became very fierce, making a dart with its bill at one's fingers with all the combativeness of an infuriated male Turkey. The foster-parents displayed their usual vigilance when any one approached the nest, being as much interested in the intruder as they could have been in their own offspring.—WILLIAM WILSON (Alford, Aberdeen, N.B.).

**Hawfinches in West Sussex.**—These birds have been a great nuisance here this season with their attacks on the garden peas. They seem to be far more numerous of late years; in fact, till ten years ago they might be termed locally rare, but since then scarcely a season passes without some stray individuals turning up.—H. MARMADUKE LANGDALE (Thorneycroft, Compton, Petersfield).

**Apparent Summer Appearance of the Shore Lark in Devonshire.**—On the 14th inst., at about 4 p.m., I saw near Paignton, Devon, a bird which I think could be no other than *Otocoris alpestris*, the Shore Lark, an adult male in full summer dress. It was perched on a lower bough of a small tree in a meadow not twenty yards from the seashore, the sun full on it, and I had a clear view at ten or twelve yards distance for perhaps nearly a minute. The back was light brown with darker markings, the head with apparently bluish grey on crown, and conspicuous black and white at side; but, excepting a black streak above the eye, I cannot define the exact marking from memory. The bill was short and thick, the throat, breast, and all under parts nearly white, excepting a conspicuous black band

horizontally across the breast, with, it seemed to me, nearly square ends. I should think the band was  $1\frac{1}{2}$  in. by  $\frac{1}{2}$  in. The bird was shortly joined by another, presumably the female, the general colour of which was light brown upper, and very light grey or dusky white under parts, but, so far as I could see, with no dark pectoral band. In endeavouring to approach the birds from the other side by going round a deserted building, I lost sight of them. The meadow on the land side sloped into marshy ground, which, covered with high reeds, &c., extended some distance up a narrow valley. Several people were walking on the sands, and though I was so near the bird it betrayed no shyness. My view of the female was imperfect and brief. Considering that the Shore Lark has hitherto been only known as a winter visitor to the British Isles, this occurrence, if referable to no other species, will, I think, be of great interest.—H. M. EVANS, Hon. Curator of Birds (Athenæum, Plymouth).

Alpine Pipit in Carnarvonshire.—The early part of April was marked by cold unsettled weather, with much snow on the mountains and easterly winds approaching a gale on the 3rd and the morning of the 4th. On the afternoon of that day the wind dropped considerably, and I observed a strong immigration of Pied Wagtails and Meadow Pipits on the marshes along the Carnarvonshire side of the river Glaslyn. Among a party of the latter, which were feeding on the side of a muddy pool, I observed one conspicuously larger and lighter coloured than the rest. This bird I watched for some time through a glass at a distance of about thirty yards. On the following morning most of the Wagtails had departed, and the Pipits were less abundant, but the stranger still remained in the same place. It was, however, very wild, and I had some difficulty in shooting it. It proved to be a male of the Alpine Pipit, *Anthus spinoletta*, in nearly complete summer plumage, and is the first occurrence of this species on the west coast. The specimen was exhibited by Mr. Howard Saunders on April 21st at a meeting of the British Ornithologists' Club.—G. H. CATON HAIGH (Penrhyndeudraeth, Merionethshire, North Wales).

Quails in Sussex.—A pair of Quails have again taken up their quarters in our valley. Their visit has become almost an annual occurrence, and it is interesting to note that they are generally first detected within an area limited to three small fields.—H. MARMADUKE LANGDALE (Thorneycroft, Compton, Petersfield).

Appearance of Migrants in Aberdeenshire during 1896 and 1897.—The first was an early and the second a late season. Jan. 1st, 1896, about a dozen Tree Sparrows feeding on the fields here along with the common birds, but not seen again; Jan. 2nd, a Magpie, which now seldom appears here. 1896, Lark singing, Feb. 6th; in 1897, Feb. 15th. 1896, Lap-



wings appeared, Feb. 6th; in 1897, Feb. 16th. 1896, Curlew appeared, Feb. 10th; in 1897, Feb. 20th. 1896, Grey and White Wagtails, March 12th; in 1897, March 8th. 1897, Yellow Wagtail, March 28th; Ring Ouzel, April 5th; Cuckoo heard, April 26th. These three birds were earlier than usual. Dunlin Sandpiper, about April 20th. Swallows, more numerous than usual and earlier, appeared May 4th. We may also notice that the Corncrake nested here in 1896, and has not been known to do so for many years. Lapwings, Ring Ouzels, and Swallows are more numerous than formerly, and recent protective legislation may be making itself felt in that direction. The Lapwings' eggs were in much request, and the Ring Ouzel was much persecuted on account of its predaceous habits upon fruit, though I believe that it does more good than harm by eating slugs, caterpillars, and other insect-pests in gardens. We have seen two avian combats—one between Grouse and Hooded Crows—when the latter attempted to interfere with the nesting operations of the former. Grouse show marked powers of organization in such cases, rallying to assist each other, and raising a peculiar noise on such occasions. The second fight, of a less serious nature, was between Lapwings and Partridges. A number of the latter were introduced here in 1896, their eggs being hatched and young reared under barn-door hens. These birds have spread, and their requirements necessitating more ground than formerly have brought about the strife with Lapwings. The Partridges are bold, and resist successfully the onslaughts of the Lapwings, which are made on wing, and on the Partridges while moving on the ground. Redbreasts were earlier about farm-buildings in 1896, those seen previously being in August. In 1896 a flock of Geese passed northwards about March 20th, and in 1897 about a month later. On Sept. 30th, 1896, about thirty passed southwards. It is rarer to notice them here in the autumn than in spring.—WILLIAM WILSON (Alford, Aberdeen, N.B.).

**Inherited Habit in Birds.**—I have recently had an additional and very striking proof of the fact that birds build their nests in obedience to inherited law and not by imitation. I considered the instances already mentioned respecting my Canaries quite good enough, but the case which I now have to record is, if possible, even more conclusive. To most scientific ornithologists the little bird familiar to aviculturists as the Bengalee will be almost unknown; it is, however, abundantly bred and regularly exported by the Japanese, and has been produced by them probably for many centuries. The origin of Bengalees is not known for certain, some breeders believing that they were originally derived from the Sharp-tailed Finch, *Uroloncha acuticauda*, others from the Striated Finch, *U. striata*; whilst Mr. Abrahams holds that they are the result of a cross between the latter and the Indian Silver-bill, *Aidemosyne malabarica*, a belief which, from a

study of their variable markings and a consideration of their feeble reproductive powers, I am strongly inclined to support. How long ago Bengalees were first produced it is impossible to say, for the Japs certainly kept and reared birds long before aviculture was thought of in Europe; but it is certain that, from the first development of this pseudo-species, small cages only were used in which to breed them. A year or two ago, finding that a large consignment of these birds had arrived in London, I purchased some of each of the three varieties, and kept them in three separate flight-cages, supplying them with Hartz Canary cages hung high up, in which to build. From the "pure-bred" Bengalees I reared only two or three young in as many years, but from Bengalee and Striated Finch I reared five in one season, all of which are still living. This year, finding that none of my Bengalees were doing any good, I turned out the whole of them into one of my largest aviaries. Here they at first took possession of Hartz Canary cages as before, and began to build in the usual slovenly fashion; they were, however, constantly disturbed by other small finches desirous of occupying the same receptacles. One day in July I collected a large handful of flowering grasses—a very favourite food with all small finches—and flung it into the aviary, where it was immediately covered by a crowd of little birds. The Bengalees, however, as if recognizing this as the natural building material of their ancestors, flew off with it stem by stem to a small bush, where they constructed a neatly domed typical Mannikin's nest, with the usual circular opening in front. In this nest one egg was deposited, and then some other birds began to pull the domed portion to pieces for their own use; nevertheless these little Mannikins persevered, repairing the nest whenever fresh grasses were supplied to them. Now I think all candid readers must admit that when birds which were reared in a small cage within a cage, and whose ancestors were so reared for hundreds (perhaps thousands) of years, can at any given moment exactly reproduce the typical nest of their remote wild ancestors without any model whatever to guide them, it is absolutely certain that the laws regulating their method of building are inherent in their natures, and not acquired. The aviculturist has proofs before him almost every day that birds do not build by imitation, for wild-caught birds, unless turned out into enormous garden aviaries, generally depart at once from their usual habits, building in boxes and cages in preference to bushes and twigs. On the other hand, Canaries and Bengalees, having for centuries been bred in cages, are stimulated by the comparative freedom of a large aviary, and the rebound causes them to reproduce the homes of their wild ancestors. At any rate, I see no other reason why they should ever return to their natural method.—A. G. BUTLER (124, Beckenham Road, Beckenham, Kent).

## AMPHIBIA.

Frog attacked by Weasel, and Toad by Hedgehog.—I was much interested in Mr. Meiklejohn's account of the above, never having had the good fortune to observe the same; but I have twice come across a Weasel devouring a Frog, the last occasion being two or three years ago, in the month of September. I was out Partridge shooting, and on walking down a field to join the other guns, I heard a commotion in a high hawthorn fence. On creeping quietly up, I saw a Weasel almost at the top of the fence, which was about twelve feet high, tearing a Frog to pieces. I watched it unobserved for about half a minute; then it caught sight of me, let drop the Frog, and bolted down into the ditch. This was a large Weasel, and therefore presumably a male. My late father-in-law, some years ago, when going down a hay-field of his in Lincolnshire, heard a curious noise going on, for which he could not account, on the other side of the fence; he quietly got over, and found a Frog held by the hind leg by a Mouse, but, not being a naturalist, he was unable to tell me what species of Mouse it was. In addition to those animals mentioned in the editorial note which attack the Toad, I can add another, *viz.* the Hedgehog. At my old home in my father's lifetime we had a large walled-in orchard adjoining the garden, where we kept various reptiles, amphibia, birds, and mammals, and amongst the latter were a score of Hedgehogs. We had a lot of common Toads, common Frogs, and about a score each of Natterjack Toads and Edible Frogs, the latter of which I had brought from the Continent. We were considerably annoyed to find dead specimens of all four species lying about, all of them having merely the thighs torn and eaten. A strict look-out was kept for the culprit, and one day, a message being brought that the gardener wished to see me at once, I hurried down, and found that he had caught *Erinaceus europæus* in flagrante delicto, just finishing off one of my Natterjack Toads.—OXLEY GRABHAM (Flaxton, York).

[The editorial note to which Mr. Oxley Grabham refers relates principally to the carnivorous mammals which have been known to attack the Frog, and to these may be added the domestic Cat, as recorded in 'The Zoologist' for 1865, p. 9814. A writer in 'Loudon's Mag. Nat. Hist.' vol. iv. (1831), p. 557, states that he had "seen the mouths of Dogs swelled fearfully from worrying Toads."—ED.]

## PISCES.

Strange Occurrence at Durban.—It is reported from Natal that in the early part of June last, at the port of Durban, hundreds of big heavy Salmon were driven ashore on the back beach, it was supposed by Sharks, and subsequently the fish were conveyed to town by the trolley-load. There are, as is well known, no Salmon in the Indian Ocean, and it seemed

scarcely probable that our old friend the so-called "Cape Salmon," *Otolithus æquidens*, could be the fish referred to. I therefore sought, and not in vain, the opinion of Mr. G. A. Boulenger, of the British Museum, on the subject, who has informed me that the fish was probably a Herring, *Chanos salmoneus*. Dr. Günther describes this species as "extremely common; it enters fresh waters, and exceeds a length of four feet; its flesh is highly esteemed."

## INSECTA.

**The Common Cockroach.**—A few days ago my daughter brought me a full-grown Cockroach, *Periplaneta orientalis*, of a pure white colour, excepting the eyes; it was even whiter than the white satin moth, but before I had time to kill it the colour had changed to a light brown. It was found among some papers in a closet.—JAMES SUTTON (33, Western Hill, Durham).

[Immediately after the moulting of the Cockroach its colour is of a creamy white; but after a few hours, and the influence of air and light, it acquires the depth of coloration characteristic of its age. Before reaching the adult form it changes the skin an uncertain number of times—not less than five, probably as many as seven. A good account of the Common Cockroach may be found in E. A. Butler's 'Our Household Insects.'—ED.]



## NOTICES OF NEW BOOKS.

*The Migration of Birds: an Attempt to reduce Avine Season-flight to Law.* By CHARLES DIXON. Amended Edition. Horace Cox. 1897.

THIS is a very interesting volume on a question of transcendent interest to ornithologists, to whom the problem of the migration of birds is as difficult of solution as is that of mimicry by entomologists. Avine migration as treated by Mr. Dixon derives a freshness by the perfectly original—almost revolutionary—method by which it is sought to be explained. The old teachings as to the part played by the important factors of change of climate and scarcity of food, and the theory of Polar dispersal, are quite discarded, and the author's main contention is that "the grand centre of Life's dispersal across the globe is an equatorial one, and that, from those regions where the greatest stability of climate and the most favourable conditions for the development of animal and vegetable forms are to be found, Life in two grand streams has flowed towards the poles." Glacial epochs are considered as exterminating influences and not as dispersing agencies, and on their cessation the areas over which they have exercised their icy and lifeless sway are again colonized from Nature's headquarters in the equatorial regions. Then again the old theory of avine hibernation, so generally considered as belonging to the limbo of forgotten suggestions, is not only revived, but its scanty evidence also amply discussed, and the conclusion stated that—"Strange, nay almost incredible as avine hibernation is, however, it must always be remembered that the evidence against it is purely negative; and that, although it has not yet been sufficiently established to satisfy the sceptical science of to-day, it has never been refuted."

With all the painstaking investigation now being pursued on the subject of migration by enthusiastic ornithologists, the industrious tabulation of their facts, and the critical collocation

to which these facts are subjected, we still feel that much remains unrecorded owing to the difficulties of observation. Mr. Dixon forcibly expresses the opinion that migration is largely "a nocturnal drama of the air," and that "a captive balloon floated above some spot where migration is notoriously prevalent, as for instance at Spurn Point on the Yorkshire coast, in the Wash, on the Sussex downs, or, better still, over Heligoland, fitted with a powerful electric search light and various meteorological instruments, would result in priceless information concerning the annual movements of birds is absolutely certain."

Mr. Dixon's hypothesis is that both the northern and southern regions receive their migrants from the equatorial belts, but that "no migratory bird normally crosses the tropics to breed or to winter, in either hemisphere"; and as subsequently expressed, "one set of individuals passing to the Arctic tundras, the other set to Antarctic breeding grounds—from an equatorial winter centre." To make the author's proposition clear, and to accentuate his argument, we must give another quotation:—"We may conclude that the migration of birds in autumn is neither due to a fall of temperature nor a failure of food, although to the casual observer this invariably appears to be the case; but is initiated by a nostalgic impulse to return to certain centres which are in the majority, if not in all, cases associated with that gregarious instinct which in most species is only subservient to reproduction, and in not a few others is equally as strongly developed, as is proved by so many migratory birds breeding in societies and displaying social tendencies right through the summer."

It will be thus seen that the volume is surcharged with new matter, that we vainly hope will meet with the candid consideration of naturalists, though perhaps with small chance of general acceptance among ornithologists. In fact, our author almost anticipates "being 'handled without gloves' by some mud-and-torpor-despising bruiser critic for my heresy." This is surely unlikely, for the book is full of facts as well as suggestions, again proves how the new method of enquiry has invaded ornithology, and is written throughout with a felicity of language and sustained advocacy which affords every weapon for the theory except conviction, though this is all that can be expected in a general way when new views are first promulgated.

'*Cambridge Natural History.*' Vol. ii. *Worms, Rotifers, and Polyzoa.* Macmillan & Co., Limited. 1896.

THIS third volume of the Cambridge Natural History—vols. iii. and v. having previously appeared—fully maintains the interest and character of the series. No fewer than seven contributors have assisted in the publication, which renders the task of an adequate notice somewhat difficult in our limited space.

"Flatworms and Mesozoa" have been entrusted to the pen of Mr. F. W. Gamble. Besides a fully biological treatment and a system of classification, the general zoological reader will find many of those natural history narratives to which the pages of this Journal are always open. We may instance as an example a reference to the Liver-fluke of the sheep, *Distomum (Fasciola) hepaticum*, which produces the disastrous disease liver-rot. This "has a distribution as wide as that of a small water-snail, *Limnæa truncatula*, the connection between the two being, as Thomas and Leuckart discovered, that this Snail is the intermediate host in which the earlier larval, sporocyst, and redia stages are passed through, and a vast number of immature flukes (Cercariæ) are developed. These leave the Snail and encyst upon grass, where they are eaten by the sheep. Over the whole of Europe, Northern Asia, Abyssinia, and North Africa, the Canaries, and the Faroes, the Fluke and the Snail are known to occur, and recently the former has been found in Australia and the Sandwich Islands, where a Snail, apparently a variety of *Limnæa truncatula*, is also found."

The Nemertines are treated by Miss L. Sheldon. These worms are common on the British coasts, and about forty species have been recorded from this area. They "are often very diversely and brilliantly coloured, the hues most commonly found being white, yellow, green, deep purple, and various shades of red and pink." There are also land and freshwater forms, in the last of which there are certainly many new genera and species to be discovered. Altogether a zoologist in want of a speciality might well take up the Nemertine worms, and he will find Miss Sheldon an excellent "coach."

Mr. A. E. Shipley, one of the editors of the Series, writes on "Threadworms and Sagitta." If these little animals are not the

most interesting objects of study to the general zoologist, they are at least not unimportant to man and his surroundings. Minute Nematodes abound in moist soil around the roots of plants, &c. In animal parasites we have the round worm, *Ascaris lumbricoides*, which inhabits the alimentary canal of man; *A. mystax*, found in the cat and dog, and *A. megalcephala* in the horse and ox. Parasitic in plants, they cause the formation of galls and other pathological growths; while the "Vinegar Eel," *Anquillula aceti*, "which occurs so often in weak vinegar, is another familiar example of this group." No fewer than "twenty-two species have been described as parasitic in man," and hence the *cui bono* which has often irritated so many amiable naturalists can scarcely be applied with effect to the specialist who investigates the life-histories of these unbidden guests.

Rotifers are under the charge of Mr. Marcus Hartog. These microscopic animals always recall to the mind of the writer that, in conjunction with Hudson, his old correspondent, P. H. Gosse, so aptly designated by Charles Kingsley as "that most pious and most learned naturalist," passed the last years of a long zoological vigil in their Monograph. Gosse was undoubtedly a true zoologist, but there is a danger lest he be principally remembered as the author of that bizarre publication 'Omphalos.' Mr. Hartog bears witness to the value of the 'Monograph,' and may be said to supplement it by giving the true biological details of the group. It is surprising how many interesting details may be studied in the life-histories of Rotifers. "Almost any organic infusions freely exposed to the open air will yield Ploima shortly after the active putrefaction is completed. The finer water weeds yield most of the beautiful tubicolous forms. A whole group of species and genera are quasi-pelagic in fresh and salt water, constituting a large proportion of the 'plankton' or floating life near the surface; and some of them are found in deep water, or in the depths of the lakes." Others again are parasitic.

Mr. W. Blaxland Benham has contributed a very useful treatise on the Polychaet worms. Most marine anglers are acquainted with that well-known and common bait the Lug-worm, *Arenicola marina*, amongst other Polychaet lures, which form part of the group of "marine worms, whose bodies are usually elongated and cylindrical; they either lead a free life swimming



in the open sea or crawling along the bottom, or they pass their life in burrows or definite tubes of various kinds." Amongst other peculiarities, some species are polymorphic. "Claparède was the first to show that *Nereis dumerilii* may occur in at least five different mature forms; these differ from one another in size, colour, mode of life, character of the eggs, &c." Fission and gemmation and the regeneration of lost parts are not the least uninteresting details of these in general beautifully-coloured worms, which vie in hue with butterflies, but whose tints are far more difficult to preserve.

Earthworms and Leeches have become so associated with the name of Mr. Beddard, and his 'Monograph of Oligochæta' is so widely known and generally consulted, that we might perhaps confine our remarks by saying that this portion of the volume is from his pen, and those of our readers who have recently read the "Earthworm Studies" which are appearing in our pages, will do well to consult this memoir also. The classification of Leeches is evidently attended with some difficulty. As no fewer than sixty-four colour varieties of the common *Hirudo medicinalis* are said to exist, "it is not wonderful that the labours of some systematists have been severe, and have provoked much criticism and alteration on the part of others." We are not therefore surprised at the remark of Sir J. Dalyell, which is quoted in a footnote: "It does not appear that the history of the Leech has advanced in proportion to the number of *literati* who have rendered it the subject of discussion."

Mr. Shipley has also written the account of "Gephyrea and Phoronis." The Gephyrea are exclusively marine, and have been the subject of considerable taxonomic discussion. They were formerly associated with the Echinodermata; Lamarck placed them near the Holothurians; and Cuvier "also assigned them a position amongst the Echinoderms." Quatrefages regarded these animals "as bridging the gulf between the Worms and the Echinoderms." The Sipunculids have a diet which seems to consist almost entirely of sand, and, as Mr. Shipley observes, "The enormous amount of sand and mud which passes through the bodies of the Sipunculids shows that they must take a considerable part in modifying the mineral substances which form the bottom of the sea. Just as Earthworms, as shown by

Darwin, play a considerable rôle in the formation of soil, so must these animals, in conjunction with Echinids and Holothurians, effect considerable modifications in the sand and mud which pass through their bodies."

The concluding section is devoted to the Polyzoa, and is from the pen of Mr. S. F. Harmer. The Polyzoa may be said to have existed without a history till the beginning of the present century. "Originally passed over as seaweeds, their real nature was established in connection with the discovery of the animal nature of corals." Even now the echoes of the controversy which raged as to whether Thompson's name of Polyzoa or Ehrenberg's term Bryozoa should be used are sometimes faintly perceptible. The first is employed by the majority of English writers, while the second is almost universally used by all continental authors. Many of the marine forms have a very wide distribution, Mr. Hincks having described several species as occurring from Norway to New Zealand. We are glad to see that Mr. Harmer still describes Mr. Hincks's 'History of the British Marine Polyzoa' as "invaluable," and his excellent contribution will, we feel sure, if studied, lead many more zoologists to study these somewhat neglected creatures, who are undoubtedly as interesting as "birds, beasts, or fishes."

In conclusion, we can only generally praise a most welcome addition to zoological literature, a volume we do not value because it only contains what is new, or is without any views that may be controverted, but because it affords the life-histories of animals whose study and observation are little in vogue, while the information is imparted by specialists who have pursued the modern biological method.

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*L'Année Biologique. Première Année, 1895. Paris: Schleicher Frères. 1897.*

THIS is a worthy supplement to our own 'Zoological Record,' and all naturalists who seek to study the mysteries of the life, as well as the form, habits, and distribution of species will place the volumes of this series by the side of those we have mentioned, and which we so well thumb. 'L'Année Biologique' is under the general direction of Prof. Yves Delage, assisted by a

strong staff, amongst the names of whom we notice enrolled our own countrymen, G. Mann of Oxford, J. A. Thomson of Edinburgh, and B. Windle of Birmingham. Each reference is in the form of a lengthy abstract and signed by its compiler, and the whole subject is distributed under sections which bear the names of the familiar studies which are now reconstituting the aims of Zoology. As we glance through these *résumés* of thought and work going on as it were beneath the surface of our own arena, the question arises whether we do not now only constitute the remnant of the "Old Guard," and that the Zoology of the future will be an edifice of which our hardly wrought bricks will form but the foundation. We welcome the appearance of the first volume of this excellent contribution to a knowledge of current Biology, and trust the work may annually increase its usefulness.

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*Traité de Zoologie.* Publié sous la direction de RAPHAEL BLANCHARD. Fas. XI. Némertiens, par LOUIS JOUBIN. Fas. XVI. Mollusques, par PAUL PELSENEER. Paris: Rueff et Cie. 1897.

ZOOLOGY, once a playmate for the curious, a reference for the collector, and the strength of a popular museum, is fast becoming one of the most serious of sciences. The anatomy and physiology of animals is too often neglected; in fact, one sometimes remembers the jest made by Edward Forbes and related by Huxley, to the effect that the pure systematic zoologist was unaware that the stuffed skins he named and arranged ever had contained anything but straw. It is perhaps better, however, that we have specialists who devote themselves to each branch of our study, while our pages still remain that "home for destitute truth" relating to the natural history of living animals.

The Nemertine worms (*Nemertinea*) are described by Prof. Louis Joubin. In writing the word "described" we are not referring to specific diagnosis, but to the description of the worms themselves, their exterior characteristics, anatomy, physiology, and life-history. The principles of their zoological classification are well set out, followed by an "Index bibliographique" and a very full general index. The illustrations are numerous and, we may add, excellent, and, with the recent

contribution on the same subject in the Cambridge Natural History, we feel that these lowly organized creatures are at length receiving adequate treatment.

Dr. Paul Pelseneer, in his necessarily larger contribution on the Mollusca, has pursued a similar treatment of his subject, which he has divided into the sections Amphineura, Gastropoda Scaphopoda, Lamellibranchia, and Cephalopoda. It has often been asserted that there were conchologists who devoted their whole study to the outside covering or shell of the species which they collected, and should such specialists find time or inclination to investigate the nature of the living animal itself, Dr. Pelseneer will at least prove a not inefficient guide.

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*Practical Taxidermy: a Manual of Instruction to the Amateur in Collecting, Preserving, and setting up Natural History Specimens of all kinds, &c.* By MONTAGU BROWNE, F.Z.S., &c. Second Edition. L. Upcott Gill.

TAXIDERMY, in some form or other, if not an ancient art, was at least an early practice. Besides the Egyptian mode of embalming to which Mr. Browne refers, we are told by Gibbon, that according "to the voice of history," on the death of the Roman Valerian, Sapor's illustrious prisoner, "his skin, stuffed with straw, and formed into the likeness of a human figure, was preserved for ages in the most celebrated temple of Persia." Animal effigies, for they could be called by no other name, must have had considerable influence in inculcating an early knowledge of Zoology, as well as the living wild animals imported for the purposes of imperial holidays. A Zoology without the practice of Taxidermy or animal preservation, is the science independent of museums and private collections, and valuable as field observations are, and recorded perhaps nowhere with greater alacrity than in the pages of this Journal, students still require both the living and the dead. Moreover, the love of Zoology is not always combined with the qualifications of Midas, and a knowledge of the art is necessary for the collector with a moderate income at home, as well as for the travelling naturalist abroad. Taxidermy is *now an art*, a thing of joy to the naturalist as he examines those beautiful cases of British Birds in our National



Collection, and many who can spare the cash and not the time or energy, will gladly rely on professional assistance. As our author remarks, there is really no reason for "the narrow way in which most professional taxidermists bolster up their art in a secret and entirely unnecessary manner—unnecessary because no amateur can, but by the severest application, possibly compete with the experience of the technical or professional worker."

We cannot pretend to criticise a book which demands a special and technical knowledge. Mr. Browne is an advocate of non-arsenical preservatives, which perhaps prejudice alone may have prevented our having personally used. There are also to be found the recipes for numerous preservative fluids both for fish and reptiles, some well known and others apparently novel. Besides these, we are told how to fight and overcome museum pests, the material with which to mend broken specimens, how to clean skins and prepare microscopic objects, and to fit up cases and cabinets; of course the directions to skin and set up mammals, birds, reptiles, fishes, &c., are fully detailed, and the volume concludes with advice on museum arrangement. We have found so many useful hints in the perusal of this manual that we now regard it as a friend on the book-shelf to be often consulted, for there are few zoologists who are not collectors, and few collections that do not sometimes give anxiety. This is a subject which might well find a place in our "Notes and Queries."

### EDITORIAL GLEANINGS.

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WE are glad to see by the 'Journal of the Anthropological Institute' that the endeavour to establish an Ethnographical Bureau for the British Empire has not been abandoned. As the President observed:—"The splendid precedent of the Bureau of Ethnology attached to the Smithsonian Institute, confined as it practically is to the races which formerly existed on the American Continent, shows what might be done on the much wider field of enquiry that we possess, if only the public spirit of the nation and its rulers could be awakened to the priceless value, not to say the absolute necessity, of the enterprise." Prof. Macalister had previously remarked:—"It is little short of a national disgrace that in the largest empire of the world, within whose bounds there are nearly as many separate peoples and tribes and kindreds and tongues as in all the other nations put together, there is no Imperial Department having for its functions to collect and classify the facts of the physical, psychical, and ethical history of our fellow subjects."

The Ethnographic Survey of the British Association has continued its useful work. The collection of physical observations from various parts of the United Kingdom is steadily growing, and at the same time collections of folk-lore are being made.

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IN travelling on the African Continent, or in reading the narratives of other travellers, we meet with much difficulty in properly identifying the various species of Zebras which still roam, often in sadly diminished numbers, that interesting region. Mr. R. J. Pocock, of the British Museum, has recently (Ann. & Mag. Nat. Hist.) thoroughly examined the problem, and given us a revised list based on the studies he has made. He recognizes four species—*Equus zebra*, Linn., *E. quagga*, Gmelin, *E. burchelli*, Gray, and *E. grevyi*, Oustalet. To *E. burchelli* he adds six subspecies, thus making seven forms or local races—*antiquorum*, H. Smith, *chapmanni*, Layard, *wahlbergi*, nov., *selousii*, nov., *crawshayi*, de Winton, and *grantii*, de Winton. Of these *E. zebra*, though formerly abundant on the mountainous districts of Cape Colony, "is now verging on extinction," while the Quagga is generally admitted as extinct.

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ACCORDING to the Pretoria 'Press,' within the last two years the Hippopotamus has almost entirely disappeared from the Lower Shire River, and

is very seldom seen now in the Upper Shire. It is only a few years ago that these animals rendered navigation by boat positively dangerous on the Shire between Katunga and Chiromo, and there have been many boats upset and much cargo lost through their attacks. Crocodiles seem to be as numerous as ever, and in all parts of the river carry off numbers of people annually.

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A CORRESPONDENT in Natal draws the attention of the 'Daily Chronicle' to a point interesting to naturalists. In a lagoon of the river Umgeni, six miles from Durban, there remain, he says, a number of Hippopotami, which, saving a few in Zululand, are the last "Sea-cows" left in British South Africa. They are preserved by a game law of 1891 as "royal game," and permission to shoot them can only be obtained from the Natal Government between May 1st and August 15th. But the herd devastates the plantations of Messrs. Townsend Brothers, who have asked the Government to put up a fence which will cost £740. This the Government declines to do. It is certainly hard that the Hippos should be preserved at the cost of a private firm, and if the Natal Ministry is anxious, as it declares, to preserve them, the cost of a substantial fence, or in the alternative the employment of watchmen, ought not to stand in the way. A herd of Hippos ranging even for one night in a plantation would damage hundreds of pounds' worth, and destroy a hundred times as much as they eat, and if a fence is required for the preserve it ought not to be difficult to get the money voted for the enclosure of a permanent breeding ground. The correspondent, however, raises a larger question. He "advocates the formation on the high veld of a permanent enclosed game preserve, in which might be kept some specimens of the Giraffe and other of the rare and rapidly disappearing South African fauna. In four or five, or at the most ten years, it will be too late to attempt the formation of such a park, as there will be none of the larger game left, and as the country gets settled, land will become more difficult of acquirement. Unless something is done quickly, where will South African animals be got for our menageries and zoological gardens?"

The Durban correspondent of 'South Africa' is quite hopeful on this matter. He writes:—"As this is near the election, the fencing will be undertaken, and the ministry will remain in office!"

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'DIE NATUR' records that Prof. Rudolf Leuckart, the renowned German zoologist, has been made a Knight of the Order pour le Mérite in Science and Art by the German Emperor.

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IN the list of the recent Jubilee honours we were glad to see the name of our contributor, Mr. E. W. Brabrook, as a recipient of the distinction of the "C. B."

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THE Zoological Society are exhibiting in their Gardens a specimen of *Testudo daudini*, which is said to be the largest land Tortoise now living, and which has been deposited there by the Hon. Walter Rothschild. It was originally obtained from the Aldabra Islands, in the Indian Ocean, but has been a captive elsewhere for over 150 years. The daily papers have not lost so fine a subject for comment, and extraordinary ages have been invented for the animal, which has doubtless attained a considerable but uncertain longevity. Its total length is about 4 ft. 7 in., its breadth 2 ft. 10 in.; while its present weight, about 5 cwt., may be taken as capable of considerable increase by generous and judicious feeding.

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WE learn from Durban that the largest Turtle known on the coasts of Natal has recently been brought ashore at Port Shepstone, and which when alive weighed upwards of 700 lbs. Its shell, which measured 3 ft. 9 in. by 3 ft. 6 in., has been polished, ornamented with a gold shield and suitable inscription, and presented by its owner, Mr. Osler, to President Krüger of the Transvaal Republic. This gift will undoubtedly serve to localize and preserve the specimen.

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A GIANT Salamander of Japan, that had lived for thirty-seven years in the Jardin des Plantes, died on June 15th, having a length of 1·30 metre, and a weight of 24 kilograms.—('Natural Science.')

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AN egg of the Great Auk was sold to Mr. Middlebrook at Stevens's Sale Rooms, on July 27th, for the sum of 160 guineas. This egg was sold in the same place on June 25th, 1895, for 165 guineas. Its description, as given in the sale catalogue, was as follows:—"Taken in Iceland about 1830, by a shipowner of St. Malo, who bequeathed it to the Comte Raoul de Beracé, whose collection was purchased by the Baron d'Hamonville. This specimen (slightly cracked), which, in colouring and texture, is unique, was figured in the Memoirs of the Société Zoologique de France in 1888, plate 6, fig. c, and additional notes on its history appeared in the Bulletin of the Société in 1891."

The Editor would be glad to receive information as to the remaining eggs of this bird contained in British collections, so that a complete list of the same may be published.



MR. R. J. USSHER has recently discovered bones of the Great Auk in Co. Waterford. In a communication to the 'Irish Naturalist,' Mr. Ussher states he has investigated some kitchen-middens on the Waterford coast, from which he not only obtained bones or horns of Ox, Goat, Horse, Pig, Red-deer, and domestic Fowl, but also an abundance of shells of Oysters, Cockles, Mussels, and Limpets, with many pot-boilers or burned stones. But the great find consisted of some birds' bones, which were submitted to Prof. Newton, who examined them with the great assistance of Dr. Gadow. Prof. Newton, writing to Mr. Ussher, observes:—"I congratulate you on possessing remains of at least two Great Auks, for you will notice that the two coracoids are of the same side. . . . Read in the light of these relics, Mr. Davis's famous bird of 1834 must have been visiting the home of its forefathers."

On a subsequent visit Mr. Ussher again found bones, which Dr. Gadow determined as containing a humerus, tibia, and metatarsus of Great Auk. Remains of this bird have already been recorded from Co. Antrim, and the present discovery shows that the range of the Great Auk extended in Ireland nearly as far south as 52° N. latitude.

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In the Bulletin de la Soc. Zool. de France, Mai-Juin, 1897, Mons. Ch. van Kemper gives details of colour variation, hybridity, and "anomalies" in birds and mammals in his own collection. Ornithologists will find much to interest them in the records of the colour variation of the thirty-seven birds enumerated, while several British varieties will be seen to have found a home in this collection.

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CANON INGRAM, rector of St. Margaret, Lothbury, writing to the 'City Press' in July, says:—"A pair of Wood-Pigeons have built their nest in one of the trees in the little garden-churchyard in front of my rectory house in Ironmonger Lane, and the young birds were hatched last Thursday. The tree is within a hundred yards of historic Cheapside, the busiest thoroughfare probably in London; at about the same distance from the Bank of England; and within, I suppose, two hundred yards as the crow flies of the Mansion House. I should imagine that there is no previous record in the modern history of London of a pair of wild birds building their nest and rearing their young so near the very heart of the City."

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'THE House Sparrow,' *Passer domesticus*, is the title of a leaflet, written by Miss Ormerod and Mr. Tegetmeier, which has just appeared. In it is condensed much of the authentic information which has been given by

some of our best observers as to the destructive nature of this bird. For instance, from Mr. J. H. Gurney's report on the monthly food of the Sparrow, and which details the contents of the stomachs of *six hundred and ninety-four* birds, conviction is surely obtained. As Mr. Gurney remarks, "It may be said that about 75 per cent. of an *adult Sparrow's* food during its life is corn of some kind." In their summary the authors draw up this further indictment:—

"In the present space it is impossible to enter fully on this important national matter, but still we find, in addition to what all concerned know too well already of the direct and obvious losses from Sparrow marauding, that there is evidence of the injurious extent to which they drive off other birds, as the Swallows and Martins, which are much more helpful on account of their being wholly insectivorous; also that, so far from the Sparrow's food being wholly of insects at any time of the year, even in the young Sparrows only half has been found to be composed of insects; and of the food of the adults, it was found from examination that in a large proportion of instances no insects at all were present, and of these many were of kinds that are helpful to us or harmless. Also it is well on record that there are many kinds of birds which help us greatly by devouring insects, and that where Sparrows have been systematically destroyed for a long course of years all have fared better for their absence; and also attention should be drawn to the enormous powers of increase of this bird, which under not only protection, but to some extent absolute fostering, raises its numbers so disproportionately as to destroy the natural balance."

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M. CABALZAR, a French aeronaut, made a balloon ascent at Annecy on the occasion of the dedication of a monument to Carnot, says a despatch to the 'Petit Journal.' The town is separated by a lake from a mountain 1800 mètres in height, which is the home of many Eagles. While the balloon was descending an enormous Eagle swooped down on it and lit on the edge of the balloon near where the ropes that supported the car were attached. The Eagle's weight made the bag sway violently, and M. Cabalzar feared an accident. The Eagle hung on, staring at the aeronaut, until the balloon was within 200 yards of the earth, when the shouts of the peasants drove him away.—('Westminster Gazette.')

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WE learn from the 'Wombat,' published at Geelong, Victoria, Australia, that "the bonus offered by the Government for the destruction of Cormorants has been discontinued, owing to the amount voted last year for this purpose having been exhausted." On the other hand, it was intended to issue a proclamation on March 24th, to change the close season

for the Emu, and to protect this bird, along with the Grey and the Red Kangaroos, from January 1st to December 31st.

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“ON Yorke’s Peninsula,” writes the ‘Adelaide Observer,’ “those who have gardens and vineyards almost worship the Little Plover, and woe betide the man who shoots one in the vicinity of Stansbury. The ‘sportsman’s enemy,’ as it is called, from the alarmist cry it utters when it sees any one creeping on game, is encouraged to visit the gardens on Southern Yorke’s Peninsula, and appreciating its position of safety the Plover runs about in search of insects. The birds have been found exceedingly valuable in ridding the vines of the grub which does such an amount of damage, especially to young vineyards. The amount of grubs one Plover can consume is simply surprising.”

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THE ‘Avicultural Magazine,’ the Journal of the Avicultural Society, has now reached its third volume and its thirty-fourth number. The August issue contains two coloured plates drawn by Mr. Frohawk of the Blue-winged Green Honey-sucker or Bulbul, *Chloropsis hardwickii*, and the Diamond Dove, *Geopelia cuneata*. Both these birds seem desirable inmates of the aviary, or, to speak more correctly, do well in captivity; and details are given as to their proper housing and food. This publication seems a marvel in cheapness. The subscription to the Avicultural Society is 5s. per annum; the entrance fee is 2s. 6d.; and the magazine is sent free to members monthly.

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WE are glad to see that Economic Entomology is now not neglected either at home or abroad. Of the ‘Indian Museum Notes,’ published at Calcutta, part 2 of vol. iv. has just reached our hands. From this we learn that a collection has been prepared for exhibition in the Indian Museum, with a view to illustrate the life-histories of some of the more important “economic” insects, both injurious and useful, in the various stages of their development.

Among reprints is one of a report by Barrows and Schwarz (Bulletin No. 6, U.S. Depart. Agricult. Div. Ornithol. and Mamm. 1895) on “The Common Crow of the United States as an enemy to Insects.” The stomachs of 909 Crows were examined, and the insect-material found in these was almost 24 per cent,

We have also received No. 2 of ‘Contributions from the Department of Zoology and Entomology,’ Iowa State College of Agriculture and Mechanic Arts. This is written by Herbert Osborn and E. D. Ball, and

is chiefly devoted to contributions to the Hemipterous Fauna of Iowa, and principally to the Homopterous Family Jassidæ, "which swarm, often by millions to the acre, upon various species of grasses."

THE Committee for Protection of Insects in danger of Extermination, of which Mr. Chas. G. Barrett is Hon. Sec., and to whom we are indebted for the following information, recently held a meeting, and resolved that the following species of Lepidoptera, being local species in danger of extermination, be more particularly recommended for protection:—

<i>Papilio machaon</i> , L.	<i>Nola albulalis</i> , Hübn.
<i>Leucophasia sinapis</i> , L.	<i>Eulepia cribrum</i> , L.
<i>Pieris crataegi</i> , L.	<i>Porthesia chrysorrhæa</i> , L.
<i>Melitæa athalia</i> , Esp.	<i>Clisiocampa castrenis</i> , L.
<i>M. cinxia</i> , L.	<i>Drepana sicula</i> , Schiff.
<i>Apatura iris</i> , L.	<i>Diphthera orion</i> , Esp.
<i>Limenitis sibylla</i> , L.	<i>Acosmetia caliginosa</i> , Hübn.
<i>Thecla pruni</i> , L.	<i>Dianthæcia irregularis</i> , Hübn.
<i>Polymmatas arion</i> , L.	<i>Plusia orichalcea</i> , Fabr.
<i>Cyclopides paniscus</i> , Fabr.	<i>Epione respertaria</i> , L.
<i>Hesperia actæon</i> , Esp.	<i>Fidonia conspicuata</i> , Schiff.
<i>Trochilium scoliaeforme</i> , Hübn.	<i>Scoria dealbata</i> , L.
<i>Zygæna meliloti</i> , Esp.	<i>Cidaria reticulata</i> , Fabr.
<i>Z. exulans</i> , Hoch.	<i>Lithostege griseata</i> , Schiff.
<i>Nola strigula</i> , Schiff.	<i>Agrotera nemoralis</i> , Scop.
<i>N. centonalis</i> , Hübn.	<i>Pterophorus rhododactylus</i> , Schiff.

In these 32 species it will be seen that no fewer than 11 of our butterflies are considered as dangerously approaching extinction in these islands.

IN the 'Athenæum' of June 19th was a reprint of Mr. Jno. Murray's list of publications as advertised in that magazine of Dec. 30th, 1837. This affords some reminiscence of the zoological publications at the commencement of the Jubilee reign. Besides well-known books, such as Mrs. Somerville on the Physical Sciences, and the fifth edition of Lyell's 'Principles of Geology,' we notice those well-known, though perhaps now little read volumes, 'The Journal of a Naturalist,' and Jesse's 'Gleanings in Natural History.'

DR. CARLOS BERG, the Director of the Museo Nacional of Buenos Ayres, is on a visit to Europe. We met this well-known naturalist in London quite recently, and he informed us that he returns to the Argentine Republic next October. The Rev. J. W. Holland, lepidopterist, of Pittsburgh, Pennsylvania, has also paid a visit to London. He is undoubtedly the possessor of one of the best, if not the best, collection of general Lepidoptera in the United States, which is particularly rich in African species.



A CORRESPONDENCE has recently been continued in the 'Saturday Review' on the alleged extermination of rare British birds. This has now been reprinted and issued as a leaflet by the Humanitarian League. We are glad to learn from the testimony of Sir Charles Dilke that the Kingfisher is not "near extinction," at least on the Thames. He writes:— "Mr. Collinson, in a letter to you on 'The Destruction of Rare Birds,' in which I agree, speaks of 'the near extinction' of the Kingfisher. This statement, which is often made, is an erroneous one, and may damage our case. Some years ago, when I gave evidence on behalf of the Thames users before the Select Committee on the Thames, I had to allude to Kingfisher-shooting, and the result was a clause which prevented all shooting on the river. Since that time the bird has increased on the Thames, and there are as many now as there were in 1863, when I first began to row much on the river. At Dockett Eddy I have two nests this spring, though I have seldom previously known more than one. A third pair was broken by a recent shooting case; but, owing to the public spirit of an innkeeper at Chertsey Bridge, prosecution and conviction followed."

[The Editor well remembers the year mentioned by Sir Charles Dilke as representing an epoch when the Kingfisher was no great rarity on the Thames. He was then an enthusiastic Roach-fisher, and when angling off an eyot above Hampton has, on more than one occasion, seen a Kingfisher alight and rest on his long bamboo-rod, while the bushes almost concealed himself from view.]

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A NEW monthly, devoted to the lore of the area from which it takes its title, 'East Asia,' has just been launched, and the first number (July) has reached our hands. An article on the Cocos Keeling and Christmas Islands, based principally on a "British Blue-Book," contains an interesting zoological observation. Mr. Ross, who may be almost styled the proprietor of these coral islands, once witnessed a fierce combat between two huge Sharks, in water so shallow that they could not turn on their backs according to usage. "In this instance the creatures faced each other and dodged warily, while each made fierce attempts to reach the base of his antagonist's tail. As each parried the attack in turn, their jaws locked and remained so for a space, until they mutually disengaged. This fight continued for some considerable time, till at length, avoiding the jaws of his adversary, one seized the other by the vulnerable spot at which he aimed, killing him instantly with one crunch of his teeth."

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FROM the Annual Report (1895-96) of the Curator—Prof. Alex. Agassiz—of the Museum of Comparative Zoology at Harvard College, we see that

funds are not withheld from this well-known American institution. We are told that the Commonwealth came forward most generously, and sustained, often under most unpropitious circumstances, the interest it had shown in the Museum. From the treasury of the Commonwealth no less than 240,000 dols. has been received at various times, and up to the beginning of 1895 more than 1,580,000 dols. (exclusive of income) has been received from all sources, including the State grants, the subscriptions of friends, and the gifts of the family of Prof. Agassiz.

This large sum is represented by the buildings, exclusive of the botanical and mineralogical sections; by the collections and the work expended upon them; by the library, and an extensive series of publications (twenty quarto volumes of Memoirs and thirty octavo volumes of Bulletins); and by an endowment of over 580,000 dols., the income of which is available for the salaries and running expenses of the Museum of Comparative Zoology and its allied departments.

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THE Thirty-ninth Annual Report for the year 1896 of the Chicago Academy of Sciences has appeared, and the natural history collections of the Museum seem steadily increasing. This is particularly noticeable in the department of Mollusca. In 1895 the Academy acquired the collection of *Cypræa*, owned by Mr. Jno. Walton, of Rochester, N. Y., and the collection of *Muricidæ* owned by the Curator. "The first collection numbers 160 species and over a thousand specimens, among which are fine specimens of *pulchra*, *aurantium*, *thersites*, *exusta*, *decipiens*, *leucostoma*, &c. The *Muricidæ* number 112 species, represented by about 300 specimens, among which are a number of type-specimens, an excellent set of *Magilus antiquus*, showing tubular development, with the operculum, besides varietal sets of *Purpura*, *Murex*, *Eupleura*, &c.

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## OUR ECONOMIC SEA FISHES.

BY DR. JAMES MURIE,

Member of the Kent and Essex Sea Fisheries District Committee.

It would seem to be a racial peculiarity of the British community concerning those matters in which ultimately they attain preeminence, that they should, more often than otherwise, only be arrived at through a series of blundering experiences. Expressed otherwise, the English slow-to-move habit and perfect do-as-you-like freedom beget a tendency to let things move in their old circle until personal interests of a few spread to the many. Then follow surging and activity, seldom resting until leeway is made up, and they are abreast of, perchance push beyond, the nations started earlier and more systematically disciplined in the given field. Unfortunately too many examples might be cited, particularly in the political sphere, as well as in those of literature, art and science. Speaking broadly, British efforts, as a rule, have sprung from private individual exertion, the Government only falling in perforce, whereas Continental nations in the main reverse the process.

Our economic Sea Fish and the associated industries are instances in point. Seemingly it has taken a long time to realize and arrive at the conclusion how close is the connection between these and Ichthyology.

When her Majesty ascended the throne, and indeed almost for half her reign, the Cuvierian and Müllerian classifications of Fish,

perhaps with some few exceptions, were alone regarded in the light of science, while study of the useful groups of Sea Fish were little better than meagrely referred to or looked at rather in the light of a trade subject. How could it be otherwise when the genial but distinguished Yarrell was shunted by the Royal Society as only a tradesman and pseudo-scientist?

Yet, after all, though late in the field, it looks as if Fish economy is bound to revolutionize some of the older doctrines current among Ichthyologists. It is a case of evolution in science; the microscope and embryology have helped Fishery questions over the stile, so that practical or economic Ichthyology—namely, the life-history of our Food Fishes—is the new departure of this branch of Zoology.

There are two circumstances which stand out in relief in the chronicles of commercial Sea Fish. One, the oft-recurring scares as to the decline and probable destruction of the British Fisheries, with repeated Parliamentary enactments thereon; the other, the antagonism of the fishermen and ichthyologists.

What took place, say, in the sixteenth or seventeenth centuries onwards, is certainly reproduced with but slight variation up to the present date. Forsooth, there has been no want of legislation; the old Statute Books teem with it. For example:—Catch and traffic in Herring; preservation of Sea Fish spawn and fry; width of mesh of nets; regulations for Pilchard fishery; grievances of Lowestoft *versus* Yarmouth; encouragement of British Fisheries; relations with foreigners *re* Fish and Fishing, &c., &c.—nearly all subjects worrying the Sea Fisheries Boards of to-day as much as they did Parliaments in the reigns of the Henrys, Elizabeth, and the Georges.

The fact is, as in every other trade, that of fishing is liable to fluctuations; but the problem in this case and the remedies are far more intricate than in an ordinary business. Even the methods of science, as of political economists, hitherto have failed to unravel the laws of, still less to point out modes of relief to, the fishing industries, though there is a dawn, it is to be hoped, of better things in store. Wherefore non-agreement between fishermen and ichthyologists is easier accounted for. Why inquire about common things, our catch, or where a particular sort of fish is found, &c.? It cannot mean business, but may only hide



some design probably against the fishers' interests, therefore interrogators must be baffled. In illustration I may mention that only a dozen years or so ago the streets of St. Andrews witnessed some high jinks. Amidst sounds of merriment an effigy of the Natural History Professor was paraded about and ultimately burnt on the sands. The University don had dared to announce the heretical notion that certain sea-fish spawn floated; they, the fishermen, knew better, and further concluded some evil intention lay in the Trawling Commission. The real victim enjoyed the joke, and went out to witness his incineration. Ask those fishermen to-day regarding the occurrence; they smile at the "lark," but swear by the Professor.

Among the Statutes of Edward III. were those relating to Herring, since which there have been a shower of others, besides Commissions on the same fish. Indeed it has mainly been through this shoal-roamer, the staple at least of the northern part of the kingdom, that in this country the naturalist has been called in as arbitrator—exactitude *versus* loose opinion—and Dr. Knox, Harry Goodsir, and Professors Allman and Huxley have acted as the thin end of the wedge.

In the issue of Couch's 'British Fishes' (1862-64) the author announces as his intention:—"It has been deemed of special importance to give with as much precision as possible an account of the characteristic habits of each species . . . with frequent communications from practical fishermen of great intelligence."

About the same time Bertram, in his 'Harvest of the Sea,' in a prefatory note says he believes his is the "first work in which an attempt has been made to bring before the public in one view the present position and future prospects of the Food Fisheries of Great Britain."

What doubtless in some measure helped in due season to modify the attitude and hasten the change of British scientific men towards Fishery questions was the Norwegian Prof. Sars' discovery (1862) of the floating (pelagic) nature of the Cod's ova as contradistinguished to the sunken (demersal) nature of those of the Herring and presumably of other fishes.

It is due though to Frank Buckland to accentuate the circumstance that for a number of years, in and out of season as the case might be, he kept drumming into the ears of the public, in

his own humorous but vigorous fashion, the importance and necessity of Sea-fishery investigations. His communications more often appeared in 'The Field' and 'Land and Water,' and occasionally from their literary style suggested a smack of the charlatan. But the best evidence of the earnestness and worth of the man was the devotion to his Fish-cultural Museum at South Kensington, ultimately endowed and bequeathed by him to the nation.

A wholesome impetus was also given to fish studies by F. M. Balfour's Monograph on Elasmobranchs, quickly succeeded by his Treatise on Comparative Embryology; Buckland and Walpole's Government Report 'On Sea Fisheries of England and Wales' (1879); Dr. Günther's 'Study of Fishes'; and Dr. Day's 'British Fishes,' but especially Buckland's Appendices (II.-IV.) of Report, pressed home the subject of our Economic Sea Fish.

The fishing industry itself (chiefly Grimsby and Hull trawlers), on account of the moot question of deterioration of the Sea Fisheries, and supposed relation of this to the capture and sale of immature fish, resolved itself into a National Sea Fisheries Protection Association, with affiliated branches throughout the kingdom. Their conferences and public agitation no doubt had considerable influence in after-movements of corporate bodies and the Government.

At this juncture came the Norwich and Edinburgh, followed by the London International Fisheries Exhibition of 1883, with its abundance of foreign and American element; the latter even in certain sections of food-fish and appliances far outstripping the English collections. Much of the Exhibition literature and conferences was of a practical kind, widening yet urging the current of British Fish industry in the new direction.

Still one thing was manifest, *viz.* "That our knowledge of the habits, time, and place of spawning, food peculiarities of the young, migrations, &c., of the fish which form the basis of British fisheries is lamentably deficient, and that without further knowledge any legislation or attempts to improve our fisheries by better modes of fishing, or protection, or culture, must be dangerous and indeed unreasonable."

But the echoes of the consensus of opinion at the Fisheries Conferences, as above quoted, had hardly died away ere the said

defects were being amended. Complaints of the line and drift-net fishermen stirred the Government to a commission of inquiry on the trawl-net and beam-trawl fishery. Its chairman (the late Earl of Dalhousie), supported by Prof. Huxley and Mr. Brady (Inspectors of English and Irish Fisheries), and colleagues were all experienced and energetic. Prof. McIntosh fortunately was appointed "to undertake a series of observations upon the results of the use of the beam trawl-net, and upon the distribution of the food-fishes taken by trawlers upon the grounds which they frequent at different seasons of the year." Thus reaching a climax, one may say, for from the Report of this Commission has sprung that activity and fusion of the interests of science and fish industries in Britain.

The Fishery Board for Scotland (reconstituted from the old White Herring Fishery Board) started into new life. Coincidentally and at short intervals thereafter there arose Marine Laboratories, to wit, those of St. Andrews, Granton, Plymouth, Liverpool (Biol. Soc.), and others, and, later on, a Sea-fish Hatchery at Dunbar.

Whilst the Government could not see their way to carry out the recommendations of the 1883 Commission *in extenso*, they yet adopted some of them with modifications, and departmental changes resulted. The Sea Fisheries Act of 1888, taken in connection with the creation of County Councils, was the means of introducing the Sea Fishery District Committees of England. With them, as in the instance of Lancashire, further activity took place in fishery problems, though many of them were already being solved through the active and practical efforts of the Scotch Fishery Board and the Marine Laboratories. In fact, ichthyological science had at length been brought in touch and amalgamated with the interests of the fishing communities themselves, and this partly by some of the County Council's Technical Instruction Committee's organizations.

In brief, then, the Victorian Era, inasmuch as commercial Sea Fish and fisheries' lore are concerned, commenced with a distinct paucity of knowledge of the life-histories and habits of the species. Yarrell's 'British Fishes' may be taken as the starting point, adding Parnell's 'Forth Fishes' as a twin sample of their economy and the local faunas then extant. The Jubilee goal or



opposite extreme presents us with Cunningham's 'Marketable Fishes' and McIntosh and Masterman's 'Food Fishes.' For the first four decades the progress was slow. A few years of interregnum with indications of change of front succeeded. Lastly, fully another decade of rapid issue of quite a different order of fish literature, and information as to their everyday habits, breeding, &c.

I have avoided discussing, except by mere incidental reference, what influence other countries may have exerted in the production of change in our own. As a matter of fact this has been considerable. To continental and American authorities and their governmental action we are primarily indebted for many important investigations and movements in fishery questions. The Cod and Herring breeding and migration, the surface fauna, sea-fish hatching and marine laboratories, besides other matters, have often received their earlier attention, and we in this country, lagging behind, have at last only too gladly availed ourselves of their priority. Our haphazard mode and mere outcome of individual personal interest have obliged us, one is almost ashamed to say, to follow the stranger's leading. That hurry-up of the last decade, as of old, has been a matter of necessity to keep in line with the advance guard. It may be questionable if we are not yet the rear guard in some ways.

To whither we have arrived at in the study of our economic Sea Fishes is best made evident in the pages of the lately published volumes of McIntosh\* and of Cunningham,† respectively the product of the St. Andrews (Gatty) and of the Plymouth Marine Laboratories. The authors, while having been active workers themselves in the subjects under consideration, yet avow that their form of book production is but intended as a summary of the most recent and important scientific investigations, otherwise scattered through many British and Foreign Transactions, journals, periodicals, &c.

\* 'The Life Histories of the British Marine Food Fishes.' By Prof. W. C. McIntosh and Asst. Prof. A. T. Masterman, University of St. Andrews. 8vo. London, 1897.

† 'The Natural History of the Marketable Marine Fishes of the British Islands.' By J. T. Cunningham, Naturalist, Brit. Marine Biol. Assoc. 8vo. London, 1896.



The contents of the aforesaid Food Fish volumes are ostensibly identical, but their treatment somewhat dissimilar. That from St. Andrews is illustrated by twenty-one coloured plates containing some 250 figures, besides forty-five woodcuts distributed in the text. These represent the eggs, larval and post-larval conditions of the great bulk of our food-fishes. That from Plymouth has 159 woodcuts, and two maps of the fishing grounds of the British Islands and west coast of Europe. The authors freely acknowledge their indebtedness to the many workers of all countries. Besides other subsidiary matter the text deals with the pelagic fauna generally, egg development, and subsequent growth of the larvæ to adolescence onwards; but the major portion is devoted to the life-history of particular families and species of Sea Fish used for consumption. All the dry reading on synonymy and the opinions of the early classical or ichthyological writers are dispensed with. Both are excellent epitomes of the methods and results of modern research as adapted to the practical issue of fisheries questions.

No longer is the fish described from a shrivelled or spirit-preserved specimen. Rather is it now studied in the living condition in the aquarium in large tanks, or it is hunted out in its native haunts at all seasons, and frequently even in inclement weather there and then watched and examined in every stage as to age, condition, food, and surroundings. The eggs themselves are fertilized and hatched under the eye of the observer, and from the transparency of the pelagic ova, under the microscope and reagents, every change from fertilization to final hatching can be followed step by step with ease. Thereafter the post-larval changes and habits to adolescence are noted and compared with those of the adults at freedom in the sea.

While it could have been said with some show of propriety in the early eighties that none or very few indeed of our commercial sea-fishes' life-histories were known, now at least it may be affirmed that the great majority of them are tolerably well ascertained. For instance, of the *Gadidæ*, take the Cod as being that whose pelagic ova first attracted Sars' attention, and which have since undergone the close scrutiny of several able naturalists. It spawns from February till May, the female carrying from two to nine million ova. These diminutive glassy

spheres, at first scarcely visible, float freely, and in still water rise to the surface. The embryo hatches about the eighth or tenth day. At first the larval Cod are impelled about helplessly, often the yolk-sac uppermost. These tiny fish have black transverse bars, giving them quite a characteristic appearance. In a week's time the yolk-sac is absorbed—the post-larval stage—and the barred pigmentation becomes tessellated or tartan-like. The future back and belly fins are originally continuous membranes. When about three weeks old the head becomes pigmented, while the body assumes more of a greenish yellow hue. Shortly after there is budding of ventral and separation of dorsal fins, and a tendency to longitudinal pigmentation of the body. When arrived at about an inch long or over, the fish has assumed quite an adult facies, with barbel and fins complete. From the rock-pools and upper water they descend among the shore algæ. By the late autumn they are four or five inches, and by the spring a foot long. A seaward migration then takes place, and in their third or fourth year they return in immense companies as full-grown Cod.

Sexual maturity, according to Holt, is when the Cod are from twenty-two inches to three feet long, though McIntosh is inclined to deem twenty inches a fair average. Quite a variety of annelids, crustaceans, and fish form the Cod's diet; but it is a most voracious, indiscriminate feeder.

The embryology, post-larval up to the adult stages, of other members of the Cod family have in similar manner received assiduous attention. Besides the movements, the food and the everyday life of the fish themselves in their marine habitat have been carefully watched on all parts of the British coasts, both within (shorewise) and beyond the territorial limits. Thus a mass of evidence and information has accrued, practically instructive alike to fishermen and scientific seekers.

The young Ling undergoes remarkable transformation in colour and in curtailment of ventral fins, which in the early stage are relatively of enormous length. The eggs of the Torsk and Ling are distinguished by a great oil-globule, which renders them more conspicuous in the water than those of their allies. The Haddock, and to some extent the Whiting, keep to deep water offshore grounds till reaching five or six inches in length, when

they take to swarming in the inshore and estuaries—in this respect the opposite of the ways of the Cod.

With regard to the *Clupeidæ* (Herring family), McIntosh and Masterman say that:—"In the case of the four common Clupeoid species—the Herring, Sprat, Pilchard, and Anchovy—the most superficial examination of their eggs with the naked eye is sufficient to distinguish them. The opacity and thick adhesive membrane of the first, the translucence and delicate capsule of the second, the clear peri-vitelline space and oil-globule of the third, and the unique shape (ovoid) of the last are all characters readily recognizable without the assistance of the lens."

Size alone distinguishes the Gadoid eggs. The Herring's egg belongs to the sunken type (demersal), a feature not shared by its immediate family allies, nor of the Cod and flat-fish families; these groups embracing the chief economic British fishes. It is this very exceptional circumstance, together with the occasional eccentric periodic migratory habit of the fish itself, that has compelled the Government repeatedly to recognize the necessity for inquiry into the creature's ways, as a matter involving the nation's fisheries' welfare.

The fluctuations in the Herring fishery can scarcely yet be satisfactorily accounted for, though the hue and cry against trawling is met by the reply that the spawning areas, so far as is known, are not those usually frequented by the trawlers.

There is a slight excess of males among Herring. The female carries from 20,000 to 50,000 ova. Spawning time varies round the coast. Experiments instituted by Dr. Meyer, of Kiel, and corroborated by other observers, prove that temperature of the water materially influences the hatching process. Though seven to ten days is the normal period, cold may vary this to forty days, and *pari passu* the size of larvæ. When first hatched the larva is more advanced than in the Sprat, a buoyant egg-form. The larval Herring has a biggish head, attenuated colourless body, and the gut passes to proximal tail-end; a broad fin-membrane extends posteriorly from yolk-sac uniformly over back and belly. In the early post-larval stages growth is lengthwise, thickening of body not increasing in the same ratio. There is yet absence of scales or silvery sheen. Later on, however, fins differentiate, the anus acquires a more forward position, the body deepens,



fine pigmentation appears, and shortly afterwards the silvery hue commences—the Whitebait stage.

McIntosh and Masterman thus summarize the early Herring:—“The young larva, hatched at from 5 mm. to 7 mm. in length, lives near the bottom till about 10 mm. is attained by a rapid increase in length. The attenuated post-larval Herring then migrates upwards through the mid-water to the surface, the mid-water stage lasting from about 10 mm. to 23–24 mm., and the surface stage from 24 mm. to 27–28 mm. [roundly speaking, one inch or thereabouts], when a movement shorewards takes place, and the littoral habit is acquired.”

Their further increment and subsequent erratic movements are a more tangled skein to unravel. Growth and maturation are complicated and confused by a double spawning period. Data give a length of three inches the first twelvemonth, to five inches the second year, and to eight or nine inches the third year, when sexual maturity is attained; but British and foreign observers are not quite in unanimity thereon. It would appear though that in the case of the Baltic as well as British Herring there are two marked spawning seasons, the so-called winter and summer Herrings. The same Herrings, however, do not spawn twice annually, the summer and winter stock being races apart, whose spawning localities essentially differ. Winter spawners frequent inshore brackish waters, whereas summer spawners are more strictly sea-dwellers, coming near the coast, but not into estuaries at spawning season. The Clyde, Forth, and Plymouth Herring are winter, the North Sea group summer breeders. The former estuarine fish come and go within a limited area, the latter offshore have a wider sea migration. In both cases, though, it is a see-saw towards and away from the coast, the so-called summer Herring spawning in deeper water further distant from land.

The supposed mystery of the fish returning to their own special grounds, Cunningham thinks is due to their habit of herding in shoals. Temperature and food drive the fry up an estuary, and there as they grow, meeting older brethren, associate and accompany them back to the sea-spawning ground.

Of other Clupeoids, it is singular that the Sprat is much more used as an article of diet in England than in Scotland, though to



be found equally abundant in both. According to McIntosh Sprats spawn well up reaches in estuaries, but Cunningham avers that spawning occurs in the deep water. From such data it may be inferred that they have a summer and winter spawning season in different areas like the Herring. Yet there are manifest physical differences in their entire career. In the Sprat the female but carries 5400 ova; the eggs are pelagic, though inclining groundwards, and they are markedly reticulate; incubation short, three to four days; a slower larval and post-larval development; at the early stage mouth closed and absence of pigment in eyes and body generally; transformation at  $1\frac{1}{4}$  in., about a year old 2 in. or 3 in., and the sexually mature stage 4 in. to  $4\frac{1}{2}$  in. long, *viz.* two years of age.

The Pilchard essentially is only a south-west British form, and its winter home the English Channel. They are rarely caught in the gravid condition; their ova count some 60,000. They spawn far off shore. The egg is typical of those that float, but unique in possessing a large egg-membrane space, a segmented yolk, and an oil-globule—these three characters not being united in Clupeoids or other families. Incubation takes four or five days. The early larva is one-seventh of an inch long, the yolk still large, the mouth closed, and pigmentation sparse. At three days the mouth develops, at five days they feed, are one-fifth of an inch long, and the yolk absorbed. At the Sardine stage, four inches or over long, they are about one year old, and they are sexually mature at two years of age, then being eight or nine inches long. The Anchovy is also chiefly a southern British form, and for it there is no regular fishery; but that of Holland, on the contrary, is very valuable. Cunningham infers that the Dutch Anchovies retreat in October towards the English Channel, the same again migrating north in the spring to spawn. Their sausage-shaped egg is quite exceptional among floating eggs. The Shads have the Salmon habit of running right into fresh-water streams, where they spawn. They are less a food product in this country than in America, where Shad hatcheries are quite in vogue.

The *Pleuronectidæ*, or flat-fishes, nowadays holds a high position in the English fish-trade. Not being used in the salted condition, formerly their consumption was restricted coastwise;

but after the introduction of trawling into the North Sea, of steam, and especially railways, with the use of ice, they regularly found their way to interior markets in quantity in the fresh condition. Herring and Cod of yore were the grand staple of fish-trade in this country and the Continent; yea, much rivalry and many a pretty local and international quarrel arose thereon. Even yet witness the Newfoundland grievance.

There are quite a number of species of Pleuronectid food-fish in household use. If not individually of the most intrinsic value, yet collectively the Plaice probably heads the list in mercantile superiority. Its life-history consequently has received due attention. Broadly speaking, the old fish are quite offshore dwellers, whereas the young are estuarine, bay and sandy shore frequenters. The cycle pursued is thus traced. The ovarium may contain from 250,000 to double that number, the spawning process being by driblets. It is the earliest spawner of the flat-fish, commencing in January or prior to that date. The egg, of large dimensions, is pelagic, with striated capsule and minus oil-globule. Incubation varies according to temperature, &c. At St. Andrews, in April, eight or nine days; at Dunbar, in January, sixteen to eighteen days; at Granton, in (?), twenty-seven days. The newly-hatched Plaice resemble the Flounder and Dab, but are larger, *viz.* about one-fifth of an inch. The mouth is closed, the gut opens immediately behind the yolk, pigmentation is diffuse, the eyes are on each side of a deep, vertically compressed body, and there are broad marginal fin-membranes. From larval to post-larval stage there is a gradual descent from surface to mid-water, and then to bottom. Then turning upon their left side, this loses its pigment by absence of light, whilst the left eye begins to pass towards the right one. Meantime the young fishes by degrees travel shorewards. When verging on half an inch long the body broadens, the eye has got well towards the right, the dorsal fin has advanced to its hinder border, the lateral line looms up, and brown pigment is diffused throughout the upper or right surface of the fish. Growth meanwhile proceeds apace. When a couple of months are over it may be about one inch long, at eight months three inches, a year old four and a half inches, when sixteen to eighteen months reaching about six inches long. Towards the end of second year it averages ten inches, and in the spring of

third year it arrives at sexual maturity, say, twelve to fifteen inches; though growth continues thereafter, Plaice of thirty inches being recorded. There appears to be a northern large and southern small breed of Plaice, a circumstance confusing in legislating on size limits for market purposes. Experiments by the Scotch Fishery Board officials in St. Andrew's Bay and Firth of Forth prove that the young Plaice travel in definite directions. From seaward where let free a semi-rotary course was followed by south shore westerly, then by north shore easterly, towards their spawning grounds; many specimens spent a long time in traversing the route. This tallies with Holt's observations on the opposite shore of the North Sea. There the currents trend to the Heligoland bight, the ova floating in that direction, where the post-larval fish spend a period, again to return to the offshore spawning areas. Their chief food is molluscs of various kinds and marine worms.

The Sole has had a finely illustrated monograph devoted to it by Cunningham (Mar. Biol. Assoc.). In this its embryology, adult structure, and economy are fully treated, and various species of *Solea* meet descriptive notice. The egg, very characteristic, has a ring of minute oil-drops and a segmented yolk. Incubation lasts four to ten days. The larva is hardy and restless; the post-larval changes in the main resemble those of the Plaice. At nine months it is two and half inches, a year old six or seven inches, second year nine to eleven inches, and third year nine to fifteen inches long. There is a migratory movement analogous to the Plaice, but Soles seek the deep water during cold weather, and *vice versa*. The Turbot, though not an abundant fish, would seem prolific, judging from its one to ten million ova. Eggs hatch in six or seven days. At their later stage these assume quite a red appearance, and this pigment coloration is a marked feature of the larva, though soon changing to orange hue. In the post-larval stage the head has a spine armature, which afterwards disappears. Few of the Turbot's pelagic ova are found either offshore or inshore. It spawns offshore, where the larval and post-larval stages are spent; in their later youth they disport themselves inshore, but when ten to eleven inches they again seek the deep water. Its predacious Herring-feeding habits keep it moving after these vagrant fish. The Brill spawns earlier than



the Turbot, but their development and habits throughout closely resemble each other. The Brill is likewise a fish-eater, Sand-eels, Sprats, and smaller members of the Cod tribe being its chief fare.

The Halibut, king of *Pleuronectidæ* in size, when about a foot long, are occasionally found shorewards, but the adults are quite deeper sea dwellers, and are fish and crustacean feeders. The Flounder, though closely allied to the Plaice, differs widely in habits and migration. It arrives early at maturity, and is exceptionally fecund. There is much disparity in the sexes, the females largest, the males most numerous. It is quite estuarine in habit, a mud, sandy shore lover; but it ascends and dwells in rivers quite to the fresh-water mark, though the adults migrate seaward to reproduce. The Dab has an exceedingly small egg; it is not a prolific fish, and the male is smaller than the female. They are not sexually mature till the third year, growth thereafter being slow.

Of other families of British food-fish, the Mackerel doubtless is most important, but unfortunately the chapter in its life-history is still wanting in several particulars. The Red Mullet is remarkable inasmuch as in the larva the "yolk-sac projects far beyond the front of the head, and the oil-globule is placed at the extreme end of the projecting portion," a feature, however, in part shared by the Comber or Smooth Serranus. The Bass, the Grey Mullet, the Skates and Rays (the poor man's food), and Conger and some others, are each and all of considerable consumption; but it is enough to say that modern students of piscine biology are at present trying hard to unravel that ancient mysterious puzzle, Whence the Eel and Conger?

The whole scope and essence of this new-born Food-fish study resolves itself into the *elucidation of general laws applicable to the finny tribe*. It is thought that by the aid and exactitude of modern scientific appliances and methods this may be attained, and the knowledge imparted to the fisher fraternity themselves. Towards such inquiry there is wide scope, for living things, physics, and variety of surroundings lend complexity. It is not easy then to gauge the respective influences and their values, and formulate laws accordingly. Hence where certain difficulties



present themselves there is a loose tendency to phylogenetic speculation. This last may temporarily satisfy our ignorance, but yet is an unstable platform to rest on where practical issues are at stake.

Necessarily many of the researches now in progress appear superfluous or insignificant, but science abounds with instances of seeming trifles leading to unexpected beneficial results. It cannot be affirmed with absolute certainty that there has been material increase in British fisheries since the advent of the laboratory and out-of-door investigations. But there is no gainsaying the fact that a sound foundation has been laid for a study of their economy; witness McIntosh and Cunningham's volumes afore-said. Take, for example, investigations of embryotic and post-larval conditions: it is a long jump from 0 to over eighty species to be recorded.

The spawning grounds, the periods of spawning, and the varied lengths of the spawning process in different fish, are in many cases far better understood, whilst it is pretty well proved that temperature has a manifest effect on the duration of hatching, a fact established by Higginbotham (1850)\* in experiments on the Frog, and now shown likewise to be the case in fish-eggs. Migratory habits are gradually getting law-evolved. As to cases in point, there is that of the to-and-fro movement from offshore to inshore, and the reverse. Of a certainty it can now be said of some fish, that on hatching the larva and post-larva uniformly and gradually make for shore or shallow water, there to spend their young stage, to retreat again to deep water on becoming older, and this in a definite course. There is regular congregation and migration during spawning season, partial dispersion thereafter. Search for food assuredly induces wandering habit, and atmospheric changes drive to greater depths. The factors conducing to erratic wholesale emigration, or the sudden departure from a long frequented spot or area, each fish's particular enemies, and their diseases aside from effects of parasites, are still *sub judice*.

Probably there is no more promising field still requiring exploration on British shores than that of the surface organisms,

\* The circumstance was known, however, to Spallanzani, Rusconi, and others, in Amphibia a century ago.

and this is likely to yield substantial data to clear up several of the knotty fish problems. McIntosh kept a record for a year of those pelagic fauna found in St. Andrew's Bay, and the monthly variation is most interesting and instructive. He compares the whole to a spindle, the thick mass corresponding to May-July, therefrom tapering on either side to the ends=January. To these surface forms, as a whole (plants and animals), Hensen has applied the technical term "Plankton" (*πλαγκτός*, wandering).\* He believes the economical food yield of the ocean can be statistically determined by quantity. Without here questioning his theory, one doubted by Haeckel, it certainly is more obvious that there is an intimate interdependent relation between marine life and seasonal fish numbers. This through plants furnishing pabulum to invertebrates, and these again to piscine groups. To pursue the links in the chain further, the plant profusion is determined by meteorological conditions, and we have arrived at physical causes more within our ken, and probable after results determinable beforehand. Thus step by step are we likely to arrive at reasons for the annual gluts or dearths of fish, early or lateness of seasonal appearance, food migrations, &c. The more pressing or immediate interests of fisheries' industries, meanwhile, have not been lost sight of by the scientific inquirer. Much has already been accomplished towards ascertaining the limits of sexual maturity in both sexes, and the vexed questions of trawling and temporary closure of areas have received due attention. Into these I do not propose to enter other than by pointing out the assumption (a fashion revelled in by the younger biologists) that our fishing is producing a stunted race of flat-fish (?).

The institution of Sea-fish Hatcheries, so extolled in America, is yet on its trial in this country. Opinions thereon are divided, the balance being rather in favour of those who maintain the Scotch verdict of "not proven." It is questionable whether the working of a hatchery could be made profitable or not. The weak point in the Dunbar hatchery is liberation only in the fry stage. To remedy this defect, what in contradistinction may be termed "nurseries" are suggested. In these, with larger enclosed

\* The German remarkable "Plankton" Atlantic Expeditions are object lessons.

areas under suitable more natural conditions, the fish could be retained until older and better able to avoid enemies when set free. From the foregoing statements it may be allowed that research has passed beyond probability, and a tangible result obtained, though still more is wanted ere rational legislation and full benefit accrue. To get this within reasonable time additional State aid seems necessary, for, as the nation generally is to benefit, it is not the *rôle* of private adventure.

We have four University Marine Biological centres. Port Erin (= Liverpool), with voluntary workers, does a fair share of investigation, chiefly, not exclusively, of a local character. The Lancashire County Council contribute towards sea fisheries and technical instruction, otherwise all is private energy. At Plymouth (= Oxford) the researches carried on are of a high standard. The Treasury grant £1000 a year, and the Fishmongers' and Drapers' Companies in round numbers £500 without equivalent. Other funds come from sale of specimens and admissions of public, &c. Most unfortunately this station carries a "white elephant," *viz.* a building of huge proportions and officials proportionate. This I strongly warned the originators to avoid, but Naples was the model taken, and my advice was disregarded, though now, I fear, discovered too late. It was started with a very large fund (£12,000), but it is to be regretted it suffers from the initial error. Milport (= Glasgow) heretofore has been modest in its aspirations and gratuitous in its labours, though it is advantageously situated towards the peculiarly deep salt-water lochs worthy of further study. St. Andrew's (= Gatty), the first started in Britain, has all along been hampered by paucity of means. For some time the Scotch Fishery Board allowed a slender annual donation (for their fisheries purposes—said donation now withdrawn); otherwise all its high-class work has been solely by private energy. Nevertheless for deeds accomplished she has worthily stood abreast of her more favoured southern rival. Lord Reay\* puts it in a nut-shell when he says: "There is one feature . . . of which I can speak without being

\* Address at the opening of the new building (Marine Laboratory), generously presented to the University of St. Andrews by the Rev. C. H. Gatty, East Grinstead, Kent, 1896.

specialist, and that is the extraordinary economy which has been practised."

With this Jubilee year, and the stock-taking of the Victorian Era, on comparing the mother with her daughter colonies, and with other nations whose fishing industries are relatively less than our own, it stands out that the British Government only lukewarmly responds to the science requirements of the most important national Sea Fish food question in its broad aspect. Hence the time has arrived, if we are to keep place in the race, when a further impetus might well be given to speed the good efforts in this direction. It behoves moreover that distribution of funds should be so judiciously spread that Universities' heart-burnings be moderated, withal stimulated.



## THE BREEDING HABITS OF THE PURPLE HERON.

BY F. B. WHITLOCK.

IN May of the present year I visited a certain district in France where the Purple Heron (*Ardea purpurea*) breeds in moderate numbers. As my experience of the nesting habits of this species differs in some respects from previously published accounts, a few notes should not prove uninteresting.

The district to which I refer should be a paradise for Herons, as numerous large ponds or meres, of one, up to many hundred acres in extent, are scattered over a wide extent of country. All, however, are not favoured as breeding-places by the Herons, and it is only in those which are covered by a dense forest of reeds and other aquatic vegetation that colonies are found.

In a mere of about one hundred acres, occupied by one vast reed bed, and where in the few open spaces round the margins I found the lovely white water-lily growing in profusion, I observed Herons rising at intervals from the thickest portion of the reeds. Having been told that a colony existed here, I determined on making a closer examination. The only plan appearing to be to wade out and force a passage into the reeds to the part to and from which the birds were passing, I naturally carefully took my bearings as I sat on the bank eating my lunch. Once amongst the reeds I could only trust to my sense of direction, as they grew to a height of seven or eight feet above the water. I was glad to find when I commenced to wade that the depth of the water rarely exceeded four feet, and that underfoot was a good firm bottom free from mud.

It was laborious work pressing through the reeds with a mass of vegetation round my waist, and a long tail trailing behind, not to speak of the hot sun overhead, and I must have travelled quite two hundred and fifty yards before putting up a Heron a little distance away to my right. Turning in the latter direction, I found, after five minutes' search, a large nest containing eggs.

Further explorations revealed seven more; two of which, however, belonged to *Ardea cinerea*, the remainder to *Ardea purpurea*. The nests of both species were identical in structure, and were formed entirely of the dried stems of the surrounding reeds. They were rather shallow, but very bulky; one would have perhaps filled an ordinary clothes-basket. The foundations of the nests rested on broken-down reed-stems, and were on a level with the water. Standing by the side of one I could just comfortably get my chin over the rim of the nest. Those of *A. purpurea* contained 6, 6, 6, 5, 5, 5 eggs respectively; but those of the larger species, in one case, had young, perhaps a week or ten days old; and the other, three young and two unhatched eggs. This was on the 11th of May. The eggs of *A. purpurea* in several cases were quite fresh or nearly so, and in others incubated for perhaps a week or thereabouts. Each nest stood in a little clearing, due, as I surmised, to the materials having been gathered by the parent birds close at hand. The Purple Heron appears to be a close sitter, for on my invading the colony the owners did not rise in a body, but got up singly as I approached the nests; though on one occasion when I blew a whistle to re-assure an anxious companion on the bank, two rose very precipitately, but without any cry betokening alarm. All flew off, indeed, without any sound or protest, nor did I hear a single cry from the flock of forty or more individuals, which my companion counted, circling around some two hundred yards above the mere. Some of the latter must have gathered from the surrounding country, as I did not put up anything like this number from amongst the reeds.

In the part of France to which these notes refer the Purple Heron is much commoner than its larger ally, and I estimated that fully ninety per cent. of the Herons I observed were *A. purpurea*. The latter species is readily distinguishable from *A. cinerea*, even at a distance, by its smaller size and by its distinctly reddish appearance, due in part to the rufous colour of the scapulary plumes, and also to its chestnut under parts; whilst close at hand the black stripe down the sides of the neck in contrast with the clear grey neck of *A. cinerea* is very conspicuous.

Most of our recognised authorities,—Dresser, Seeböhm, Yarrell, Saunders, &c.,—in writing on the nesting habits of the

Purple Heron, quote the account by Lieut.-Col. Irby of his visit to a colony in the south of Spain. It is interesting to learn that the latter ornithologist only found three or four eggs in each nest, in the place of five or six in my own experience. Abundance of food may perhaps account for the greater fecundity of the Herons I came into contact with, for Dresser states that the Purple Heron is said to devour large numbers of young Green Frogs (*Rana esculenta*). Now these creatures abound in the large ponds before mentioned, and the Herons must have no difficulty in eating their fill throughout the nesting season. Some divergence of opinion may be noted on the dimensions of the eggs of the present species. Seebohm states that they are indistinguishable from those of *A. cinerea*, except that they are *slightly* smaller. He gives the following measurements: length 2.45 to 1.95 in. by 1.75 to 1.45 in. in breadth. Dresser states that eggs taken in Hungary varied from  $2\frac{4}{10} \times 1\frac{23}{40}$  to  $2\frac{10}{40} \times 1\frac{27}{40}$  in. The average dimensions of eggs of *A. cinerea* the latter author gives as  $2\frac{1}{2} \times 1\frac{27}{40}$  in. Saunders, in his 'Manual of British Birds,' states that average eggs of *A. purpurea* measure  $2.2 \times 1.5$  in. These dimensions I find approximate to the sizes of the eggs I took in France; my largest specimen being equal to 2.23 in. in length by 1.62 in. in breadth, and my smallest but  $1.95 \times 1.47$  in. An attenuated egg, however, has a length of 2.30, but a breadth of only 1.50 in.

Comparing these measurements with those of eggs of *A. cinerea* kindly supplied me by Mr. R. J. Ussher, who has had considerable experience with the latter species in Ireland, I think it may be laid down as a general rule that large eggs of *A. purpurea* in size rarely overlap those of small ones of *A. cinerea*. According to the above-named ornithologist, eggs of *A. cinerea* vary between  $2.63 \times 1.71$  in. and  $2.39 \times 1.7$  in. These dimensions, I may say, tally with those of eggs in my own collection.

## THE AUTUMN SONG OF BIRDS.

BY O. V. APLIN, F.L.S., M.B.O.U.

MR. CHARLES A. WITCHELL, in a communication in the August number (p. 358) referring to a paper by me on "The Autumn Song of Birds" ('Zoologist,' 1894, p. 411), states that I classed the Robin and Starling with the Thrush and Hedgesparrow as commencing to sing in November, or even in October; and Mr. Witchell adds: "But the two former birds begin their autumn song (if such it be) in August, or earlier." This only presents a part of my meaning, and, I think, misrepresents that. What I really said, as anyone who reads my paper should see, was that the song which the Robin and Starling began to sing in November, or even in October, was "not an autumn song, properly so called. It is the beginning of their ordinary song, which they will continue through the following spring." And on page 411 I stated that "The Robin's autumn song is of course familiar to everybody." This last is the song which is heard at the beginning of August or the end of July.

Since writing my paper, I have twice heard the Blackbird singing in autumn, *viz.* on Sept. 1st, 1895, and Nov. 22nd, 1896; and probably on both occasions it was singing the autumn song properly so called. On the second occasion a bird sang for some time just before sunset (it was a very mild day); the notes were rather poor, but numerous; perhaps the singer was an early-hatched bird of the year. A correspondent has sent me notes of a Blackbird singing on October 19th and 20th and December 28th. But I feel sure that these four are only very exceptional cases. The same correspondent sent me a note of Blackcaps singing in a very low and subdued tone on September 5th and 8th; and I may add that in the first days of August this year I heard, at close quarters, a Blackcap singing a few notes in an undertone in the intervals of eating my fruit. But these feeble attempts cannot be compared with the autumn song uttered by some other birds.



I cannot quite agree with the latter part of the statement that the Willow Wren "is the most persistent singer of all our summer visitors, not ceasing until the middle of August." The Willow Wren, in my experience, becomes silent soon after the middle of June. The time varies a little in different years and different localities, and probably some may be heard singing very early in the morning in the first days of July in some years; for, like certain other birds, it sings in the small hours after it has ceased to sing in the daytime. But during the greater part of July it is silent. So far from ceasing in the middle of August, it is about that time (I said about the second week in my paper) that it strikes up its autumn song. I heard it this year on August 17th, and again yesterday (August 22nd). The Chiffchaff, whose spell of singing lasts from the end of March (the third week sometimes) until the last week in July in some years, does not open the autumn song so soon. In 1885, however, I heard a Chiffchaff on August 15th. In 1883 it was singing on October 1st. I have heard the Wren in September, also in the first week in August. The Starling often sings a little at the end of summer and in early autumn; for instance, on August 19th and 22nd this year.

The early autumn seems to be the only time of the year when the birds enjoy leisure and plenty. After the winter, when they generally have to work hard for food, come courtship, nesting, rearing young, and moulting. But when the last is over, it seems natural that in the warm hazy days of early autumn, when the birds have plenty of time to bask on the tree-tops and tall hedges, they should sing in a lazy, contented fashion. Also that the young birds of the year should try their voices, and produce weak and imperfect strains. Even the Rook adopts a soft caw; but I do not at this moment remember having heard in autumn the softer quavering croak which the Carrion Crow assumes in spring.

TAXIDERMY—*DE OMNIBUS REBUS.*

BY OXLEY GRABHAM, M.A., M.B.O.U.

AT my suggestion that a small portion of 'The Zoologist' should be devoted to the above science in all its branches, whereby many who, like myself, are deeply interested in the matter could exchange ideas and views to our mutual benefit, the Editor has most courteously replied as follows:—"I am entirely in sympathy with your views respecting the admittance of taxidermal notes into 'The Zoologist.' I cannot imagine a science of zoology which is not dependent more or less on some knowledge of animal preservation: now, as to method! I will devote a section of our Notes and Queries to Taxidermy and Preservation of Animal Specimens, which will focus correspondence. . . . The difficulties I see are possible lack of contributions on the subject, and confining it in a purely non-professional area." With regard to contributions, I venture to hope that these will be ample, for most naturalists, be their speciality what it may, are of necessity to a certain extent collectors also. Few dwellers in the country have access to a well-stocked museum containing all the types and varieties of whatever branch of zoology they happen to be specially interested in, and therefore they either preserve their own specimens, or get a professional to do it for them. To many people the term collector is synonymous with exterminator, and I am sorry to say that in numerous cases this is only too true, and it is owing to the greed and the search after £ s. d. of these so-called naturalists that many of our rarer species, both of fauna and flora, are rapidly becoming exterminated; but I am writing now of the naturalist in the truest sense of the word, who only collects where there is the certainty of an ample number of living specimens being left, and where, through accident or otherwise, various rarities from time to time fall into his hands. Surely in such cases as these no one can find fault with the wish to preserve and save from decay any

species of the animal world in the nearest approach to its original form and beauty, for when so preserved they are a lifelong delight to their owner and to others of a kindred spirit. Then with regard to the professional taxidermist, of course it is only right that as he has his living to make by the business he should be chary of gratuitously imparting his skill and knowledge to others; but the day has gone by when the knowledge of these things was held only by a few, and every first-class professional man is always ready and willing to give instruction for a reasonable *quid pro quo*. I could name one or two, regular readers of 'The Zoologist,' who, if I mistake not, would gladly contribute on the matter, as it is one thing to be told how to do it, and quite another to do it. No one can hope to succeed who has not infinite patience and a love for his work, and then indeed practice makes perfect. In these days when Taxidermy has been raised to a high art, as witness the beautiful cases in the national collection at South Kensington, where every detail is made as true to nature as possible, there is no room for bad work. It is as easy to be accurate as the reverse, but many men who can set up a bird passably well as regards form, fail lamentably in those niceties of detail, inattention to which completely spoils a specimen. How often does one see birds placed in impossible positions, legs and beak painted the wrong colour, the tint of the iris completely ignored, fearful and wonderful productions called rockwork covered with all sorts of impossible leaves and plants and bits of variously coloured glass, birds in winter plumage cased amidst summer surroundings, and *vice versâ*, and even the breasts of sea-birds whitewashed! *Quot homines tot sententiæ*, and so with Taxidermy: one man opens his birds up the breast, another under the wing, and another down the back; one uses soft stuffing entirely, another a hard body exactly the size of the one he has removed from the skin, and another uses a combination of the two, and as in the hands of a past master each method is capable of producing excellent results, everyone must choose for himself. With regard to preservative powders,—liquids, soaps, &c.,—their name is legion, from the most deadly to the equally efficacious though most harmless. Most professionals pin their faith on the deadly ones; one man that I knew had his finger-nails eaten away, suffered from salivation, and the usual concomitants of mercurial poisoning,

from using corrosive sublimate with the greatest carelessness; and another, a well-known north country birdstuffer, had to give up his work for a long time owing to arsenical poisoning. Never shall I forget one day when, on calling to see him in his workshop, I found him in a cloud of powdered arsenic, dusting it on by the handful. Needless to say with me it was a case of "*Erupit, evasit*, as Tully would phrase it." I bolted as fast as I could. My remonstrances were of no use until he found his health failing, and then he took to equally good but less suicidal preparations.

There are several excellent works on the art nowadays, both English and American. When I began as a boy to skin and mount specimens there were very few, and they generally contained a great deal that was new and a great deal that was true; but, as some philosopher has observed, unfortunately that which was true was not new, and that which was new was not true. To my thinking, the best of the lot was Captain Browne's '*Manual of Taxidermy*.' As I write I have not my books by me for reference, but, if I remember rightly, he inculcated very truly at the head of his list of preservatives,—

"*Contra vim mortis non est medicamen in hortis,*

Against the deadly moth can I from herbs no remedy supply."

Of course, no matter how well a bird is done, it is impossible to make it exactly true to nature. Take a Knot, for instance, as one sees it puffed out in a round ball, standing on the mud-flats. Perfection is not to be attained in this vale of tears, but still we can approach closely to it, and there is a very great satisfaction in preserving and mounting one's own specimens, when a very great deal more can be learned about them than could otherwise be done, for one is led almost unconsciously to study their various natural attitudes, &c., and the various little details that go so much to enhance the value and beauty of a specimen. There is nothing done without hard work, but in this, as in everything else, if a man means to succeed, he will. There is nothing like beginning early, for a boy does not take it so much to heart as one of maturer years, when, after having spent hours over elaborating a specimen, bird or animal, and having completed it to his entire satisfaction, a kind friend on being shown it remorselessly picks it to pieces from head to tail, metaphorically



speaking, till it literally hasn't a leg to stand on; and as soon as his back is turned, the unfortunate artist kicks it out of the window, or plays hockey with it in his despair and rage. I have been through the mill myself and I know what it is, and, though decidedly unpleasant at the time, it certainly does one good. At the present day when natural history is becoming so popular, when there are numerous small and great societies, each of which has its periodical meetings for the exhibition of specimens, &c., it is a very great boon to the members thereof to know how to mount the various objects in which they are interested in a proper permanent and scientific manner, and so far as I am aware there is no periodical or magazine which regularly opens its pages for the discussion of matter of this kind. To do so embraces a very wide range, and a variety of subjects. One man collects the eggs, another preserves the whole or part of the skeleton of a bird, another keeps the skins for reference and comparison, and the fourth mounts his birds in natural attitudes. The same with the collector of mammals and fish; another may go in for casting models of his special objects. Then there is the question of suitably casing and housing all these treasures, and preserving them from the ravages of moth, dust, damp, &c. Nor is it only with Vertebrate Zoology that Taxidermy is concerned; there is the setting of insects and their larvæ; the preserving of shells, starfish, crabs, *et hoc genus omne*; the use of spirit for many of the lower forms of life; and many more objects of the animal world and methods of preserving them, all of which are included in the comprehensive title of Taxidermy. Therefore I venture to hope that, as the pages of the 'Zoologist' have been so courteously opened to us for the discussion and interchange of ideas and methods in connection with the preservation of the various members of the animal world in its broadest sense, there will be no lack of contributors to the matter in hand. In this, as in most things, an ounce of practice is worth a pound of theory; and to a beginner I would say, have a few lessons from a careful first-class man, and you will learn more than by reading the best book on the subject in existencé. It is when one has acquired some practical knowledge of the matter that books—good ones that is—and the interchange of ideas with others, becomes of the greatest use and assistance. One word more. I

do not for a moment wish to pose as a first-class taxidermist myself, and I write rather to obtain information than to give it. One has to specialize in this as in most things, and a man is seldom found equally good at mammals, birds, and fish; but I am exceedingly fond of the art, and if those of my readers who have the same tastes as myself have derived as much pleasure from so harmless and instructive a hobby as I have, I think they will own that they have no very great grounds for complaint.

## GARDEN LISTS OF BIRDS.

BY THE REV. MURRAY A. MATHEW, M.A., F.L.S.

MUCH might be ascertained concerning the distribution of our British Birds, of which we are still very far from possessing a full knowledge, by close observation of them for a series of years in such limited areas as are provided by the gardens and pleasure grounds immediately surrounding our houses, if lists were kept of all the species seen, not only of those that constantly occur and nest, and of all occasional visitors, but even of those that are identified flying over, with dates and other particulars. These lists should be headed with a description of the environments, whether wood and copse, or meadow and pasture, &c., with the elevation above the sea, how far distant from water in the form of brooks, rivers, and ponds, or from the nearest point of the coast, arm of the sea, or tidal river, which might be expected to be a flight-line of migrating birds. If carefully kept, such lists would prove of great service for exchange or comparison, and might be forwarded to ornithological correspondents in other parts of the kingdom, who could send their own in return. Having kept such lists for the last thirty years in the three different homes which I have occupied in succession, each for nearly an equal term, and each surrounded by about the same extent of garden, it would appear from them that any observer in a similar area might expect to be able to record at least seventy species of our British Birds as visiting it; while, if he lived near to a tidal river or to a large wood, he might count upon a considerable addition to that number. In submitting my own lists, I am hoping to encourage the rising generation of bird lovers, and can assure them that the patient watchfulness requisite for their compilation will afford much pleasure and interest. Of course the greatest accuracy must be aimed at, and no species be entered unless its identification be complete. Even now, it is with a keen feeling of delight that I return to my house to note

down any fresh bird that has made its appearance in my garden. Several of my correspondents have adopted my plan, and we have exchanged lists to our mutual benefit.

LIST NO. I.—BISHOP'S LYDFARD, WEST SOMERSET.

*Birds observed in the Vicarage grounds at Bishop's Lydeard, West Somerset, between 1870 and 1880.*

Bishop's Lydeard, at hardly any elevation above the sea, is situated at the western end of Taunton Dene, a celebrated breadth of rich meadow and pasture. Immediately to the north-west of the village the Quantock Hills rise some 1200 feet, opposing a barrier in the direction of the Bristol Channel about twelve miles distant. The Vicarage gardens, with a meadow adjoining, contain about eight acres; a warm ditch at one side was seldom without a Snipe in frosty weather, and enabled such species as Woodcock and Green Sandpiper to be included in the list. There was no large wood near, and the village brook was half a mile to the south.

B, after a species, signifies that its nest was observed.

Mistle Thrush, B.	Red-backed Shrike, B.	Green Woodpecker.
Song Thrush, B.	Spotted Flycatcher, B.	Kingfisher.
Redwing.	Swallow, B.	Cuckoo.
Fieldfare.	House Martin, B.	White Owl.
Blackbird, B.	Sand Martin.	Tawny Owl.
Wheatear.	Greenfinch, B.	Sparrow Hawk.
Redstart, B.	Hawfinch.	Peregrine Falcon, pass-
Black Redstart.	Goldfinch, B.	ing over.
Redbreast, B.	Siskin.	Kestrel.
Whitethroat, B.	House Sparrow, B.	Heron, passing over.
Blackcap, B.	Chaffinch, B.	Mute Swan, ditto.
Golden-crested Wren.	Brambling.	Wild Duck, ditto.
Chiffchaff, B.	Linnet, B.	Ring Dove, B.
Willow Wren, B.	Lesser Redpoll.	Turtle Dove.
Hedge Sparrow, B.	Bullfinch.	Pheasant.
Long-tailed Tit.	Corn Bunting.	Partridge.
Great Tit, B.	Yellow Bunting, B.	Land Rail, B.
Coal Tit.	Reed Bunting.	Water Rail.
Marsh Tit.	Starling, B.	Moor Hen. [over.
Blue Tit, B.	Jay.	Golden Plover, passing
Nuthatch, B.	Magpie.	Lapwing, ditto.
Wren, B.	Jackdaw.	Woodcock.
Tree Creeper.	Raven, passing over.	Snipe.
Pied Wagtail, B.	Carrion Crow.	Jack Snipe.
Grey Wagtail.	Rook.	Green Sandpiper.
Tree Pipit.	Sky Lark.	Curlew, passing over.
Meadow Pipit.	Swift.	Common Gull, ditto.

Total birds observed, 80; total birds nesting, 28.



*Notes.*—Besides the Birds on the above list, escaped Parrots of two species visited the garden without being secured; and a wandering Peacock spent several days with us, and then left again.

**BLACK REDSTART.**—Only one example seen at the beginning of March; this proved a young male of the preceding year, and was in the *Ruticilla cairii* plumage.

**HAWFINCH.**—A winter visitor, frequenting the gardens until April, and then departing just when we were hoping they would nest.

**SISKIN.**—A cage containing two tame Siskins was hanging near an open window, when one day a small flock of wild ones visited them, several coming into the room, the rest remaining on an acacia just outside.

Although the Cirl Bunting was not uncommon in the district, and was several times noted just outside my bounds, I was never able to include it in my garden list.

#### LIST No. II.—ST. LAWRENCE, PEMBROKESHIRE.

*Birds observed at Stone Hall, in the parish of St. Lawrence, Pembrokeshire, between 1880 and 1888.*

Here the elevation was about 250 feet; the gardens and shrubberies extended to about twelve acres, with small woods adjoining. In the garden was a small stream and an old fish-pond; below the house, a quarter of a mile distant, ran a good Trout stream. The sea, at St. Bride's Bay, was five miles to the west; the general character of the surrounding country was moory, with patches of meadow and arable land.

Mistle Thrush, B.	Dipper, B.	House Martin, B.
Song Thrush, B.	Long-tailed Tit, B.	Sand Martin.
Redwing.	Great Tit, B.	Greenfinch, B.
Fieldfare.	Coal Tit, B.	Goldfinch, B.
Blackbird, B.	Marsh Tit, B.	Siskin.
Wheatear.	Blue Tit, B.	House Sparrow, B.
Redbreast, B.	Wren, B.	Chaffinch, B.
Whitethroat, B.	Tree Creeper, B.	Linnet, B.
Blackcap, B.	Pied Wagtail, B.	Lesser Redpoll.
Golden-crested Wren, B.	Grey Wagtail, B.	Bullfinch, B.
Chiffchaff, B.	Tree Pipit.	Yellow Bunting, B.
Willow Wren, B.	Meadow Pipit.	Reed Bunting.
Icterine Warbler.	Spotted Flycatcher, B.	Starling, B.
Hedge Sparrow, B.	Swallow, B.	Jay, B.

Magpie, B.	Tawny Owl, B.	Pheasant, B.
Jackdaw, B.	Sparrow Hawk, B.	Corn Crake, B.
Raven.	Peregrine Falcon.	Water Rail.
Carrion Crow, B.	Kestrel, B.	Moor Hen, B.
Rook.	Cormorant.	Golden Plover.
Sky Lark.	Heron.	Lapwing.
Swift.	Bean Goose, passing	Woodcock.
Nightjar.	over.	Snipe.
Wryneck.	Wild Duck, B.	Curlew, passing over.
Green Woodpecker, B.	Teal.	Common Gull, ditto.
Kingfisher.	Tufted Duck.	Herring Gull, ditto.
Cuckoo.	Ring Dove, B.	Lesser Black-backed
White Owl, B.	Turtle Dove.	Little Grebe. [Gull, ditto.

Total species observed, 80; total species nesting, 45.

*Notes.*—CHIFFCHAFF AND WILLOW WREN.—One summer thirteen nests of Chiffchaff and two of Willow Wren were detected in the grounds, probably the relative numerical proportion of the two species in North Pembrokeshire. Both nests of the Willow Wren were lined with the small feathers of the Heron, numbers of these birds frequenting the pond on the lawn near which the nests were found.

ICTERINE WARBLER.—Was detected by its beautiful song in the spring of 1886. Many people used to come to listen to the bird, which I frequently saw while in song. As it remained for weeks, it might have had a mate and nest. It did not return the following year.

TITS.—As there were numerous evergreens in the plantations, all the species of Tit were abundant, and some beautiful nests of the Long-tailed Tit were found: one, in an oak, was constructed of dead oak-leaves mixed with the glaucous lichen from the trunk of the tree; another, in a willow overhanging the stream, was built of green moss, in which were worked numerous short and bright feathers from the Cock Pheasant.

CARRION CROW.—This bird was a pest, flocking into the shrubberies to nest from the bare country round. One spring I waged war against them, and destroyed over twenty nests, getting a fine series of nearly one hundred eggs.

WRYNECK.—Was only once seen on passage in April.

TAWNY OWL.—Semi-domesticated and very tame; nesting every year in old pigeon boxes against the house; and in old Crows' nests.

TURTLE DOVE.—Only one seen late in October.

TUFTED DUCK.—A single example visited the pond on lawn.

WOODCOCK.—Often flushed in kitchen-garden and in shrubberies. A small plantation of two acres adjoining the house was one morning beaten through, when fourteen were flushed.

By the side of the stream below the house the Common Sandpiper was regularly seen in the spring working its way to its nesting-station on the moors; and the Wood Sandpiper was once identified. Close outside the confines of the grounds Snipe occasionally nested, and both Whinchat and Stonechat; while Hen Harrier, Marsh Harrier, Buzzard, and Merlin were all noted.

Water Rails were common throughout the year, and it is believed that they occasionally nested in the shrubberies.

In one very severe spring, when snow lay on the ground until the middle of April, both Golden Plovers and Lapwings came into the garden; they were nearly starved, but would not eat the food put about for them.

Cormorants were frequently noted passing over, and were only too often found poaching in the Trout stream below.

### LIST No. III.—BUCKLAND DINHAM, E. SOMERSET.

*Birds observed in the grounds of the Vicarage, Buckland Dinham, East Somerset, between 1888 and 1897.*

The parish of Buckland Dinham is in the East of Somerset, three miles north of Frome, and only three miles from the borders of Wilts. It stands 420 feet above the sea-level on a hill which rises gradually above it to over 600 feet. It contains rich meadows and pastures, and some of the finest Cheddar cheeses are made in the dairies. A large wood of over 200 acres is within half-a-mile; the local ornithology is rich in Warblers and Woodpeckers. A small stream runs at the foot of the hill on which the village is built.

Mistle Thrush, B.	Blackcap, B.	Nuthatch.
Song Thrush, B.	Garden Warbler.	Wren, B.
Redwing.	Golden-crested Wren, B.	Tree Creeper, B.
Fieldfare.	Chiffchaff, B.	Pied Wagtail, B.
Blackbird, B.	Willow Wren, B.	Grey Wagtail.
Whinchat.	Hedge Sparrow, B.	Yellow Wagtail.
Redstart, B.	Long-tailed Tit.	Tree Pipit.
Redbreast, B.	Great Tit, B.	Meadow Pipit.
Nightingale.	Coal Tit, B.	Red-backed Shrike, B.
Whitethroat, B.	Marsh Tit, B.	Spotted Flycatcher, B.
Lesser Whitethroat, B.	Blue Tit, B.	Swallow, B.

House Martin, B.	Magpie.	Peregrine Falcon, pass-
Sand Martin, B.	Jackdaw.	Kestrel. [ing over.
Greenfinch, B.	Rook.	Heron, passing over.
Hawfinch.	Sky Lark.	Bean Goose, ditto.
Goldfinch, B.	Swift.	Ring Dove, B.
House Sparrow, B.	Nightjar.	Stock Dove.
Tree Sparrow.	Wryneck, B. [pecker.	Turtle Dove.
Chaffinch, B.	Great Spotted Wood-	Pheasant.
Brambling.	Lesser Spotted Wood-	Partridge, B.
Linnet, B.	pecker.	Corn Crake, B. [over.
Lesser Redpoll.	Green Woodpecker.	Stone Curlew, passing
Bullfinch, B.	Cuckoo.	Lapwing, ditto.
Crossbill.	White Owl.	Brown-headed Gull.
Yellow Bunting, B.	Tawny Owl.	Herring Gull, passing
Starling, B.	Sparrow Hawk.	over.

Total birds observed, 76; total birds nesting, 36.

*Notes.*—The absence of any pond or stream close at hand occasions this list, in spite of its greater richness in the Warblers and Woodpeckers, to contain fewer species than the preceding ones.

**REDWING.**—Has not been seen for the last five years, and from some cause appears to have deserted the immediate neighbourhood.

**NIGHTINGALE.**—Only occasionally seen in the shrubberies, and does not nest; the situation is apparently too high for it. About a mile away, in thick hedges on lower ground, it is numerous.

Just outside my bounds several other Warblers, not included in the list, are common; these are Wood Wren, Sedge Warbler, and Grasshopper Warbler. Sitting on the lawn one beautiful midsummer night, at least half-a-dozen Grasshopper Warblers were heard "reeling." It was between ten and eleven o'clock, and the village had become hushed in quiet, when first one of these little Warblers began to "reel" in the valley below; another soon started singing, and then another, until their song was heard proceeding from all directions. I have twice identified the Marsh Warbler by the side of the Vallis brook, about a mile to the south of us; on one occasion I watched the bird while it was singing in a poplar by the side of the water.

**SAND MARTIN.**—Has been detected nesting in some holes left in the garden-wall where scaffold-poles were once inserted.

**HAWFINCH.**—Rarely seen in the garden in summer; a pair or two nest annually in the parish; the village boys have taken the eggs.



**TREE SPARROW.**—Has only twice been identified in the garden, and does not appear to nest with us.

**LESSER REDPOLL.**—A brood of young birds seen in the garden were supposed to have been reared there; nests and eggs have been taken close at hand.

**CROSSBILL.**—A small flock, about fourteen or fifteen; two broods got together and probably reared at no great distance; visited an avenue of Scotch firs in August, 1894; and early in July in the following year a flock of about the same size attacked the ripe raspberries.

**GREAT SPOTTED WOODPECKER.**—Nests annually in Orchardleigh Park, about a mile distant, always selecting a lofty abele, and excavating its nest in the trunk at a great height from the ground.

**STOCK DOVE.**—Has only once been seen.

**BROWN-HEADED GULL.**—One spring about half-a-dozen appeared in the meadow before the house; others were seen flying about. They were probably a detachment from some gullery questing about for a new breeding station. Small flocks have been noted passing over at various times, one at the end of July this present year. We are thirty miles from the Bristol Channel, and about sixty from the nearest gullery near Wareham, in Dorset.

## NOTES AND QUERIES.

## MAMMALIA.

Mammals of Trinidad.—Dr. Percy Rendall's notes on this subject in last month's 'Zoologist,' pp. 341-345, are evidently largely based on experiences in a locality where it was my privilege to collect during March and April, 1893, and I have therefore read them with unusual interest. His capture of *Dasyprocta cristata*, Desm., struck me as one of especial importance, for I had previously supposed this animal to be restricted to the Lesser Antilles, where its presence has been considered to have a significant bearing on the relation of the fauna of these islands to that of the mainland. I find, however, that the Agouti has been previously recorded from Trinidad by Dr. Sclater,\* on the basis of two animals presented to the Zoological Society's Gardens in 1885 by T. J. Guy, and one presented in 1891 by R. J. L. Guppy. Both of these presentations were unknown to Dr. Allen and myself when writing our list of the mammals of Trinidad,† and I take this opportunity to acknowledge and correct an oversight. In stating that there are but "three marsupials found in Trinidad," Dr. Rendall has evidently overlooked *Thylamys carri*, described by Dr. Allen and myself from three specimens taken at Caparo in March, 1894.‡ Here also, as in other parts of the island, I found *Heteromys anomalus* abundant, and not of "local" distribution. Sixty-nine specimens were taken, and the animal was apparently as common in the mountains at Caura as in the lowlands of Savanna Grande.—FRANK M. CHAPMAN (American Museum of Natural History, New York).

## RODENTIA.

"The Seasonal Changes in the Common Squirrel."—Those who read Mr. Thomas's remarkable paper with this title, published in 'The Zoologist' for 1896, at pages 401-407, will be interested to learn that sixty years earlier the late Edward Blyth appended a striking note on the same subject

\* 'List of the Vertebrated Animals now or lately living in the Gardens of the Zoological Society of London.' Ninth edition, 1896, p. 132.

† 'On a Collection of Mammals from Trinidad, with Descriptions of New Species.' Bull. Am. Mus. Nat. Hist. v. 1893, pp. 203-234.

‡ 'On a Second Collection of Mammals from the Island of Trinidad, with Descriptions of New Species, and a Note on some Mammals from the Island of Dominica.' Bull. Am. Mus. Nat. Hist. ix. 1897, pp. 13-30.

to his edition of White's 'Selborne' (London, 1836, pp. 280, 281, note). It may be here transcribed:—"The changes of appearance which the Common Squirrel undergoes have not been noticed in any work that I have met with. They shed their covering twice in the year, and in summer the ornamental ear-tufts are entirely wanting; the whole fur also is then much coarser, more shiny, and redder; and it is a curious fact that those young ones born in early spring are first clad in the winter livery (which, I believe, they do not the first summer exchange), while the second litters, which are produced about midsummer, are decked in the summer coat, and have no ear-pencils." On comparison it will at once be remarked that some of the conclusions arrived at by Mr. Thomas are not quite so novel as their accomplished author at the time supposed. It would be of interest to have further light cast upon the "curious fad" with which Blyth concludes his note, and it is to be hoped some reader will be able to do this.—W. RUSKIN-BUTTERFIELD (St. Leonards).

## A V E S.

**Honey Buzzard in Suffolk.**—A remarkably fine specimen of the Honey Buzzard, *Pernis apivorus*, was shot in Bull's Cross Wood, on the Edwardstone Hall Estate, about four and a half miles south-east of Lavenham, in Suffolk, on or about July 1st, by a gamekeeper, who mistook it, in thick covert, for a Wood Pigeon. It is in perfect adult plumage, having the lower parts almost entirely white, and has been preserved by Mr. Travis, taxidermist, Bury St. Edmunds, in whose shop Mr. J. H. Gurney and I had the pleasure of examining it shortly after it was mounted.—E. A. BUTLER (Brettenham Park, Ipswich).

**Golden Eagle in Ross-shire.**—A fine specimen of the Golden Eagle, two years old, and measuring 36 in. in length, and over 7 ft. in expanse of wings, and weighing 11 lb., was caught a few days ago in Ross-shire, and has been sent to me to be preserved.—JOHN MORLEY (King Street, Scarborough).

**Nesting of the Great Northern and Black-throated Divers in Shetland.**—The August number of 'The Zoologist' contains two very important statements by Mr. Bernard A. E. Buttress. The first occurs in his "List of Birds observed in Shetland, May and June, 1897" (p. 362), and is in these words: "*Colymbus glacialis*. One pair near Clonstel. Eggs found." As the Great Northern Diver has not, up to the present time, been satisfactorily proved to breed in any part of the British Islands (although strongly suspected of doing so), I hope Mr. Buttress will not withhold further particulars of this interesting and important occurrence. The second statement (p. 364) is to the effect that eggs of the Black-throated Diver have been taken several times in Shetland by a resident, and that an undoubted

egg taken by him in 1896 is in Mr. Buttress's possession. This species does not figure in the list of birds observed by Mr. Buttress in 1897, a fact that may possibly be accounted for by the fact that the discoverer of the eggs has more than once shot the birds off the nest. Saxby, during his long residence in the Shetlands, never saw the Black-throated Diver there; and, according to Mr. Howard Saunders, "this species has not . . . been identified in the Shetlands at any season" ('Manual,' p. 698). Seebohm stated that large examples of the eggs of the Black-throated Diver cannot be distinguished from small eggs of the Great Northern Diver, nor small examples from large eggs of the Red-throated Diver ('History of British Birds,' vol. iii.). The hitherto unsuspected presence of *C. arcticus* as a breeding species in the Shetlands, therefore, if fully proved, makes the paternity of some supposed Northern Divers' eggs taken in those islands more doubtful than ever.—O. V. APLIN (Bloxham, Oxon).

**Black-throated Diver in Derbyshire.**—In January or February of this year a Black-throated Diver was shot on Combs\* Reservoir, near Chapel-en-le-Frith, by a man named Peter Muir. The bird is in immature plumage, the feathers of the upper parts being edged with pale slate-grey, and the white plumage of the chin, throat, and sides of the head is slightly suffused with brown. The following measurements will be sufficient to distinguish the bird from the Great Northern Diver, a species more frequently met with inland:—Wing, 11·9 in.; length of bill, 1·8 in.; depth of bill at nostril, ·65 in.—CHAS. OLDHAM (Sale).

**Spotted Flycatcher's Nest constructed in Nest of Hawfinch.**—I am forwarding you a this year's Hawfinch's nest with a Spotted Flycatcher's nest built inside, as I was not aware that Spotted Flycatchers built in other birds' nests. I found the Hawfinch's nest in the fork of a whitethorn bush in Wychwood Forest on May 26th, with the egg-shells lying on the ground under the nest. They had been sucked either by Cuckoos or Jackdaws. These birds appeared to be sucking every egg that was laid, for nearly every nest of eggs had shared the same fate, both Cuckoos and Jackdaws being very numerous. When passing the same spot on June 28th, I noticed a Spotted Flycatcher sitting on the same nest, which looked somewhat different. On climbing up to the nest I discovered that it contained two eggs. Feeling certain that these eggs would share the same fate as the last, I took one (which I now send you) of the two eggs, with the result that when I passed the place the following week the remaining egg was sucked.—R. U. CALVERT (Ascott-sub-Wychwood, Oxford).

\* I desire to substitute the word "Combs" for "Coombs" at p. 329, line 7 from bottom.



**Proximity of Magpie's and Wood Pigeon's Nests.**—On June 18th I noticed a rather unusual coincidence in Fyfield Wood, Oxon. There was a Magpie's nest situated in a slender birch tree, containing four young ones nearly ready to fly, and close by was a sapling oak, in the upper part of which was placed a Wood Pigeon's nest containing two hard-sat eggs, off which the old bird flew. The two nests could not have been three yards apart at the most.—R. U. CALVERT (Ascott-sub-Wychwood, Oxford).

**Hedgesparrow appropriating a Thrush's Nest.**—A short while ago a little girl showed me a Hedgesparrow's nest with eggs which she found this season in rather an unusual situation. The locality was Monkton Combe, about five miles from Bath. Both nests were about the usual size, and completely finished. I have come across a Wren's nest in a similar situation, but was surprised to find a Hedgesparrow having utilised another bird's nest in the above manner. In 'The Zoologist,' 1895, p. 275, there is a note concerning a pair of Greenfinches having appropriated a Thrush's nest, and rearing a brood successfully.—C. B. HORSBRUGH (4, Richmond Hill, Bath).

**White Eggs of Hedgesparrow.**—Early in the season a boy, much interested in birds and their eggs, brought me an egg taken from a nest built in a hedge of thorn and holly. The egg was perfectly white and shining, reminding one forcibly of eggs of the Lesser Spotted Woodpecker, and not of that chalky whiteness we find in eggs such as the Swift's. The boy told me the nest contained three other eggs, and a few days after he informed me another had been laid, exactly similar, and that the bird—a Hedgesparrow—was sitting upon them. Strange to say, the bird was unmolested, and hatched three of the eggs, the other being addled; and when the young were flown the boy brought me the nest as a proof of his observation and veracity.—G. B. CORBIN (Ringwood, Hants).

**Lesser Grey Shrike (*Lanius minor*) in Kent.**—I am pleased to be able to record another occurrence of this very rare visitor to this country, which I observed on May 15th last on the range of hills in mid-Kent, while in company with my friend Mr. John Wood. As we passed under an ash-tree I heard a strange note overhead, and, looking up, I saw a bird fly out with a rather jerky flight, and uttering short notes, resembling, as well as I can remember, the sounds "chur-tic, chur-tic, tic." These notes were new to me, and from the appearance of the bird, as seen against the background of brilliant blue sky, I was quite at a loss to make out the species; but it soon dipped down, and its striking colours became visible against the hill under which we were standing. The bird then alighted on the ground for a few seconds, when I brought my friend's field-glasses to bear on it, which at once revealed the pattern and richness of its plumage. I then instantly knew

what a rarity I was watching ; the silvery grey, deep black and white of the upper parts, and the delicate pink breast and flanks, looked particularly rich in the sunlight, and in strong contrast with the turf on which it stood. It then flew up and perched on a small hawthorn, from that again to the ground, and then on to a furze-bush. After two or three such movements it disappeared over the brow of the hill. After waiting a short time I saw it again further along the hill-side, chasing a smaller bird, I think a Linnet ; but the distance was too great to make sure of the species, though the colouring of the Shrike was plainly visible. From the intensity of the black markings it was clearly a male. I think it very probable that it had taken up its abode on the hill for nesting purposes, for which the character of the place was admirably adapted ; and if opportunities had been afforded, I intended paying another visit to the ground later on, with the hopes of seeing more of the bird and perhaps its nest.—F. W. FROHAWK (34, Widmore Road, Bromley, Kent).

“**Kentish Crow.**”—Your correspondent, Mr. L. C. Farman (*ante*, p. 356), mentions “*Kentish Crows*” visiting the Norfolk fens. I should be very glad to know the scientific name of these birds, as the term is new to me.—C. B. HORSBRUGH (4, Richmond Hill, Bath).

[The Crows to which I referred were Hooded or Grey Crows, *Corvus cornix*. These are known all over Norfolk as *Kentish Crows*, and remain with us in quantity throughout the winter.—LAST C. FARMAN.]

**Crossbills near Bournemouth.**—Scarcely a winter passes without this varied plumaged and interesting species occurring in greater or less numbers—sometimes not uncommonly—in the neighbourhood of Ringwood and the New Forest, and on one occasion I saw a small flock of eight or ten busily engaged in discussing the cones which grew on a few Scotch firs not far from Salisbury ; but I was somewhat surprised and unprepared to detect its presence near Bournemouth at the end of July. Enforced idleness, caused by indisposition, compelled me to seek change in the beautiful health-giving pine-woods of Branksome and its neighbourhood, where on the sandy heather-clad slopes the Lizards panted, or glided silently along in the hot sunshine, and over them flitted the “grayling” (*Satyrus semele*) in some abundance, accompanied by a few common blues (*Lycana bellargus*), and small coppers (*Chrysophanus phlæas*), or the tiny fry of *Crambus pinetellus*, *Endotricha flammealis*, and other moths of a still lesser bulk. One morning, whilst seated underneath a tree, my attention was taken from the book I was perusing to the notes of some bird which were unfamiliar to my ear, although a number of Sparrows, Tits, and Warblers were chirping and singing in the branches above me. Looking up in the direction from whence the sound proceeded, I could see two or three birds in the tree-tops, but the thickness of the foliage and the bright light shining between the

open spaces prevented my detecting even what colour they were, much less what species they belonged to, although the thought crossed my mind, Can they be Crossbills, and are the notes I am listening to the same as Long-fellow calls "Songs, like legends, strange to hear"? I, however, was not long in doubt, for one of the birds descended from the tree in pursuit of a fallen cone, and there on the white sandy soil, only a few paces from me, was a beautiful specimen of the bird, in the orange-red plumage, with "marks of blood and holy rood," as the translated legend informs us. I was much interested in the occurrence, and in almost breathless silence watched it tear the cone to pieces—in a very parrot-like fashion—with its beak, holding the cone in position with one of its feet. I think I have read somewhere that the beak of this bird has been considered a deformity of nature, but the ease and dexterity with which the instrument was used on this occasion proved, I thought, its adaptability as a "means to an end." I watched the bird closely until it flew away to its companions in the branches above, and then I went and picked up the small cone upon which it had been working so intently, and found that the scale-like processes of the cone had merely been torn asunder (not severed from the central "core," as a Squirrel does its work), so that the immature seeds could be extracted by the scissors-like beak. I saw a number of male cones scattered beneath the trees similarly treated, but I am not at all prepared to state that Crossbills were the cause of their mutilation, for, strange to say, although I daily visited the spot both before and after the occurrence, I only once heard the birds, and did not see them again. I think I have heard that the species has been detected nesting in this particular neighbourhood, and although perhaps my present observation proves nothing either for or against that fact, yet it is interesting to know that a species we usually connect with more northern localities should occur so far south in the middle of summer; and yet it seems to me its occurrence here at such a time is not frequent, or else some of our ornithological peers (many no doubt visiting this well-known locality every season) would not have been silent on the point, and left it to my poor pen to describe. Of course it goes without saying that the majority of the cones were in a very unripe state, and consequently with seeds quite undeveloped, and perhaps that was partly the cause why the birds stayed so short a period in one particular spot. While wandering about in the woods one thing was very apparent, *viz.* the comparative abundance of the House Sparrow and the scarcity of the Squirrel (for one naturally expects to find this little rodent amongst its much-loved fir trees, especially as it is so common only a few miles away); but this seeming anomaly may be met in the fact of so many houses having sprung up in unlooked-for situations amongst the trees. As we are well aware, the bird delights in the proximity of human habitations, whilst the quadruped shuns them; or it may be that the scarcity of the latter is partly attributable to the



presence of the numerous children—naturally full of young life and fun—who, with bags and nondescript hand-carts, gather the fallen cones for fuel.—G. B. CORBIN (Ringwood, Hants).

**Unusual Sites chosen by Birds for their Nests.**—The following instances have come under my notice this season:—1. A Chaffinch built her nest early in the summer, and reared her young in an old Swallow's nest which was fixed on a beam in a field shed. 2. A Great Tit laid four eggs in the cup of a Blackbird's nest, apparently of this season, and brought off her young. She lined the larger nest with the usual mass of hair-felt. The Blackbird's nest was in the fork of a yew-bough, some four or five feet from the stem, and about four feet from the ground. The young appeared newly hatched when I saw them on June 16th. Probably the Tits had lost their first nest, and could not find a suitable cavity unoccupied when they went to nest again. But this reason can hardly account for the curious freak of the Chaffinches, who could have had no difficulty in finding plenty of convenient positions.—W. H. ST. QUINTIN (Scampston Hall, York).

**Birds nesting in August.**—Last year I contributed a note (Zool. p. 303) recording some thirty nests found in the course of a few hours on Aug. 3rd in Cambridgeshire. This year, on Aug. 2nd (Bank Holiday), I was in the same locality, and in about three hours found the following:—Twelve nests of Turtle Dove, ten nests with eggs, two with young; two nests of Ring Dove, both with young; three nests of Yellowhammer, all with eggs; one nest of House Sparrow in a hawthorn-bush only five feet from the ground, with four fresh eggs; one nest of Red-legged Partridge, with three eggs in hatched-out nest; one nest of Meadow Pipit, with four eggs; one nest of Reed Bunting, with three young and one infertile egg; two nests of Linnet, with eggs, one set fresh, the other hard-sat; two nests of Greenfinch, with eggs, both sets fresh. Two years ago I found a Blackbird's nest, with five fresh eggs, in the same neighbourhood, and heard of two Partridges' nests, on which the old birds were still sitting, the first week in August. The Yellowhammer, I should say, sometimes rears three broods in the year, for I have found, even in Scotland, newly-hatched young as early as April 19th. The earliest date I have for the Reed Bunting is a full set of five eggs on April 20th.—R. H. READ (Bedford Park, W.).

**Birds seen in the Yukon District of Canada.**—The following is extracted from a report of Mr. W. Ogilvie (Dominion Land Surveyor):—“Birds are scarce. A few Ravens were seen along the river [Yukon], and three or four remained in the vicinity of the boundary all the winter. They were generally more active and noisy on stormy days than at other times, and their hoarse croak had a dismal sound amid the roar of the elements.



A few Magpies were seen near the Nordenskiöld river" [a tributary of the Lewes river], "and a few White-headed Eagles were noticed. During the winter, near the boundary, numbers of small birds, somewhat resembling the 'Chick-adee,' were seen, but they were much larger, and had not the same note. Of Owls, not a specimen was met with anywhere. Partridges were very scarce, only half a dozen or so of the ordinary kind being noticed; but at the head of the Tat-on-duc and Porcupine rivers Ptarmigan were abundant. Wild Geese and Ducks are plentiful, and of Ducks there are many more species than I have seen in any other part of the territory. A very beautiful species of Loon or Diver was met with on the Porcupine. It is smaller than the Great Northern Diver, but marked much the same on the body, the difference being principally in the head and neck; the bill is sharper and finer, and the head smaller, but its chief distinguishing feature is the neck, which is covered with long beautiful dun-coloured down for more than half its length from the head downwards." [This bird was probably (?) the Red-throated Loon, *Urinator lumme*.]—BASIL W. MARTIN (39, Victoria Street, Westminster).

## REPTILIA.

Smooth Snake (*Coronella lævis*) in the New Forest.—The late Canon Kingsley centred a peculiar interest on the probable occurrence of this reptile within the forest boundary, and often asked questions on that particular point, as he knew I had seen and taken it on the heaths on the other side of the river, near the spot where it was first discovered as an inhabitant of Britain; but it was only a short time before his lamented death that I could positively say I had seen it *in* the forest; then I was fortunate enough to catch one in the neighbourhood of Minstead, not far from the well-known Rufus stone. Since that time I have seen or known of a number of specimens from the district, especially during the great and continued heat of the summer of 1896. Two were seen—but not taken—near Sway; three specimens, an old female and two immature individuals, were taken very late in the season on the heaths between Beaulieu and Brockenhurst; and in August a nephew of mine whilst entomologizing caught one near Boldre Wood, and brought it to me thinking it was an Adder (*Pelias berus*). Strange to say, the same lad caught another, almost on the same spot, this season, at the end of July, but so mutilated it that it was worthless to preserve. It seems a pity to destroy the poor little harmless creature whose movements amongst the heather are so graceful and interesting, and whose body, especially the under parts, shine with an iridescent gloss in the hot sun, and when taken in the hand the keelless scales which envelope its body make it feel cold and smooth to the touch, like an eel. My comparatively limited experience of this particular species

has led me to suppose that it lacks the disagreeable smell which is sometimes so apparent in presence of the Common Snake (*C. natrix*), but I know on this particular point opinions differ.—G. B. CORBIN (Ringwood, Hants).

#### AMPHIBIA.

**Enemies of the Toad.**—An instance of a Weasel having been seen carrying a Toad in its mouth was recorded in the 'Field' a short time since by Mr. E. Stanford, Honiton, Devonshire. I cannot unfortunately recollect the exact date of its appearance, but believe it to have been about a year ago, more or less. I have myself seen a tame Hedgehog devour a Toad which was more than half grown. Doubtless there are very few mammals, and not many birds, which ever make a meal of a full-grown Toad. The Common Buzzard, however, is known to do so, and in the spring Rats make great havoc among Frogs and Toads alike in the marsh ditches. The vast armies of young Toads which, after completing their change from the tadpole state, leave the water and spread abroad over the face of the country, are beset by many dangers. Numbers are no doubt crushed by wheels and the hoofs of horses and cattle, while others fall a prey to rats, fowls, ducks, &c. I once saw a cock calling his hens together to partake of some choice morsel he held in his beak. This he afterwards dropped, and on picking it up it turned out to be a small Toad. A Corncrake caught by a dog near Orford, Suffolk, in August, 1887, when taken in the hand, disgorged a very young Toad, and immediately afterwards a Frog of much larger size.—G. T. ROPE (Blaxhall, Suffolk).

[Mr. J. H. Gurney (Zool. 1883, p. 303) states that Common Snakes prey chiefly on Toads, which he had found to form the most frequent contents of their stomachs.—ED.]

#### INSECTA.

**Stridulation of Cicadidæ and Orthoptera.**—In the Editor's excellent and interesting "Zoological Rambles" (p. 159) the following passage occurs:—"Protective resemblance can scarcely be a factor in the insect's existence when by its piercing notes it proclaims the place of its concealment. In collecting I was usually apprised of their whereabouts by their stridulating music." I should like to ask if this is the experience of observers generally. I have many times listened to the highly-pitched sounds emitted by Cicadas, Grasshoppers, Crickets, &c., in Africa and South America, and have often searched for a considerable time without being able to discover the whereabouts of the insects. In my experience a highly-pitched shrill sound, even when very loud, is most difficult to localize exactly, and I say this with the sounds uttered or made by both birds and insects in my mind. I remember one evening, when I was in Uruguay, an intensely loud and highly pitched or shrill Grasshopper's trill suddenly began in the room.

It was so loud and ear-piercing as to leave an unpleasant and irritating void in the ear when it momentarily ceased. Although the room was scantily furnished, in a manner suitable to a hot climate, several minutes elapsed before we could discover the large bright green grasshopper (about two inches long) which was producing the sound while perched in a conspicuous position. The sound gave us no idea of the direction from which it proceeded. Cicadas, crickets, &c., become silent (p. 160) if you approach them closely (not, however, when they are in a tree twenty feet or so overhead), but begin to trill again if you keep quite still.—O. V. APLIN (Bloxham, Oxon).

#### PRESERVATION OF ZOOLOGICAL SPECIMENS.

**Dermestes lardarius eating Specimens of Moths.**—Some weeks ago I set eight specimens of *Sphinx ligustri*, and in a few days I noticed that the bodies of the insects had been disturbed and the paper which covered the setting-boards had been eaten. I removed the insects, and from one of them there came out two *Dermestes lardarius* beetles; I examined every one of the *ligustri*, but found no more *Dermestes*. The *ligustri* were put into a store-box, and on looking at them a few days ago I found their bodies completely eaten away; so much so that with the slightest touch the wings came off and out rolled a number of the larvæ of the *Dermestes*, a disgusting creature, and the greatest enemy of the zoological collector; but I have never before heard of their attacking entomological specimens. I have many thousands of butterflies and moths here, from all parts of the world, but this is the first time a *Dermestes* has given me any trouble in this direction.

**NON-POISONOUS PRESERVATIVES.**—Three years ago I made a trip to India for sporting and collecting purposes, and had the great misfortune to consult one of the leading firms of taxidermists in London, and following their advice I applied no poison to any of the skins and heads I got, with the result that when I reached home the specimens were swarming with *Dermestes*, and many quite spoilt. Now on former expeditions, of which I have made several, I have always poisoned my skins, &c., liberally, and not a single *Dermestes* has ever bothered me before. I should like to know what the experience of other sporting collectors is in this matter—to be able to dispense with poisons is very attractive, and has no doubt tempted many to do without them—but I wonder how they have got on. Every room in my house is filled with heads, skins, and preserved specimens of all sorts, most of which are poisoned, and none of which, I am thankful to say, have been touched. There is, however, clear proof that *Dermestes* is on hand, and how to guard against the ravages of his hairy larva with the appetite of a hog, and who is the incarnation of everything pestiferous, is a matter of considerable anxiety just now. Any hints or suggestions would be thankfully received.—C. DALLAS (Wootton, Lympington, Hants).



EDITORIAL GLEANINGS.

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THE opening passage of Prof. L. C. Miall's Address to Section D. (Zoology) at the recent meeting of the British Association at Toronto will receive the hearty approval of most readers of 'The Zoologist':—"It has long been my conviction that we study animals too much as dead things. We name them, arrange them according to our notions of their likeness or unlikeness, and record their distribution. Then perhaps we are satisfied, forgetting that we could do as much with minerals or remarkable boulders. Of late years we have attempted something more; we now teach every student of zoology to dissect animals, and to attend to their development. This is, I believe, a solid and lasting improvement; we owe it largely to Huxley, though it is but a revival of the method of Döllinger, who may be judged by the eminence of his pupils, and by the direct testimony of Baer, to have been one of the very greatest of biological teachers. But the animals set before the young zoologist are all dead; it is much if they are not pickled as well. When he studies their development he works chiefly or altogether upon continuous sections, embryos mounted in balsam, and wax models. He is rarely encouraged to observe live tadpoles or third-day chicks with beating hearts. As for what Gilbert White calls the *life and conversation of animals*, how they defend themselves, feed, and make love, this is commonly passed over as a matter of curious but not very important information; it is not reputed scientific, or at least not eminently scientific."

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DR. D. G. ELLIOT has contributed to the Zoological Series of the Field Columbian Museum, Chicago, a List of Mammals from Somali-land, obtained by the Museum's East African Expedition. One observation bears witness to the danger of a solely museum knowledge of an animal. *Madoqua phillipsi*, Thomas (Phillips's Dik-Dik), has a remarkable peculiarity in "the immense deposit in the antorbital vacuity of a black pigment, which stains everything it touches. It forms a swelling just in front of the eye, and from its jet-black colour and considerable size makes a very conspicuous mark. No trace of this exists in the skin, and as the skull shows a cavity at this point, no one would imagine that there would here be a prominence on the face instead of a depression. The lack of knowledge of such facts as this causes the mounted specimens in museums



to appear totally unlike the living animal—more caricatures than the real object—and I have never seen any drawing that correctly represented a Dik-Dik.”

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MR. A. W. MOORE and Dr. John Beddoe have recently written a paper on the “Physical Anthropology of the Isle of Man,” which is published in the last issue of the Journ. Anthrop. Instit. A “Descriptive Book” of the “Royal Manx Fencibles,” which contains the names of about 1300 men who passed through the ranks between 1803 and 1810, affords material for the memoir. From this number have been subtracted “all those under eighteen years of age (chiefly drummers), and those not born in the island, also all those whose names are either not Manx, or are not known in the island for a generation before 1800, even though they were born in the island.” The book describes the complexion, eyes, hair, and stature, and it mentions the parish where each man was born and the trade to which he was brought up.

The results of this study are thus summarized:—“Generally speaking, they distinctly confirm Dr. Beddoe’s conclusions that the population of the Isle of Man is Scandio-Gaelic, and that there is no very great difference in the proportionate distribution of Norsemen and Gaels in the north and south. Our results, however, enable us to state further that there appears to be a decided preponderance of Norsemen in the parishes of Jurby, Ballaugh, and Michael, and of Gaels in the parishes of Maughold and Louan, while there are distinct traces of alien elements in the districts of Douglas, Castletown and Peel, especially in the latter, where the large proportion of dark eyes and fair hair is very remarkable.

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EVOLUTION seems to be now no longer a word of evil import. At the Catholic International Congress held at Fribourg in August, Dr. Zahm, of Indiana, and with the approval of the meeting, spoke as follows:—“As against the alternative theory of Creationism, the evidence, all must admit, is overwhelmingly in favour of evolution. I am quite willing to agree that as yet the theory is not proven by any demonstrative evidence. I freely grant that *à priori* Creationism is quite possible. But is it probable? Science answers ‘No.’ As to affording any positive evidence in favour of the special creation of species, it is absolutely mute; and the negative evidence is of such a character that there are few, if any, serious men of science who are willing to consider it as having any weight: *à priori*, Creationism is possible; *à posteriori*, it is so highly improbable as to be practically ruled out of court.”

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CONSIDERABLE public interest has been evinced by the importation of German Foxes into some parts of Bedfordshire. An 'Evening News' representative has interviewed Mr. G. Reuben Taylor, of Leadenhall Market, on the subject:—

“‘How a farmer can tell that they are German cubs,’ said Mr. Taylor, ‘is a wonder. There’s no perceptible difference. A little lighter perhaps, but that distinction disappears when the cub gets older. Austrian cubs, now, are a bit shorter in the leg.’

“‘No, it’s not the farmer who can tell; the person who will know is the unfortunate person who will hunt them. They don’t run straight like an English Fox—they don’t give the sport. As to their viciousness and destructiveness, they certainly are very vicious, but I doubt whether they are so destructive as Scotch and English cubs.’

“‘It seems that the only advantage possessed by the German cub is his cheapness. English or Scotch cubs two to five months old fetch fifteen to twenty-one shillings each; Germans from seven to ten. There is no great trade in English Foxes, because the Fox-hunting fraternity is a brotherhood in more than name, and comfort each other with superfluous hounds and Foxes.

“‘Scotch Foxes, Mr. Taylor said, form the staple supply. They come from mountainous parts, where hunting is impossible. During this season, commencing roughly May 1st, and terminating about the end of June, he has sold over three hundred Scotch cubs to only five English. The trade is of course now finished, and later on comes the time for old Foxes, and in these the relation between German and English as to price is the same. This year Mr. Taylor sold four Canadian cubs, and is awaiting results with considerable interest. They were exactly like the home article, and were, he avers, probably descendants of English ancestors. Whether a Fox be English, German, or any other nationality, he, it seems, invariably possesses the bouquet of Reynard in undiminished strength.”

# THE ZOOLOGIST

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## FEN VERSUS MARSH.

BY THOMAS SOUTHWELL, F.Z.S.

IN the Introduction to his 'Birds of Norfolk,' the late Mr. Stevenson gave an admirable description of the physical features of the county of Norfolk, in which he pointed out that its surface might be sharply divided into six very distinct sections, both with relation to the very marked characters of each area, and also in the light of its distinctive fauna and flora. These divisions, which may be traced with the greatest precision on the map, he designated—1st, "the Broad" district, including the great alluvial plains bordering the sluggish rivers of East Norfolk, which have always hitherto been known as "Marshes," Reed Ronds, or Levels; 2nd, the "Cliff"; 3rd, the Meal, consisting of sandy warrens and salt-marshes near the coast; 4th, the "Breck," consisting of the extensive (for the most part unenclosed) lands and sheep-walks to the west and south-west of the county; 5th, the "Fen," confined to the south-west border; and 6th, the "Inclosed," or more highly cultivated portion, constituting the east central division of the county, extending from north to south. It is only with the first and fifth of these divisions that we have here to deal, and my purpose in contributing the following remarks is to protest against the misuse of the term "Fens," which has of late been frequently applied (*e. g.* in your own Journal, p. 351)\* to the fine tracts, mostly of

\* "Twenty Years on the Norfolk Fens."

splendid grazing "marshes," which characterize the eastern portion of the county of Norfolk, and which term, however correct it may be from a strictly etymological point of view, is certainly in the present case misleading, and a breach of a convenient distinction perfectly understood by the inhabitants of the respective districts.

The "Fen" district of Norfolk is perfectly distinct both in its physical aspect, its geological formation, the character of its inhabitants, and to a considerable extent in its fauna and flora, from the eastern "marshes"; it is entirely confined, as has been said, to the south-western portion of the county, and, although sharply defined on the whole, its outline is much broken. Commencing near Brandon, its eastern boundary follows the high land in an irregular line near to the towns of Hockwold, Feltwell, Methwold, and Stoke Ferry, at which latter point it takes a sudden bend westward along the valley of the Wissey to Fordham, approaching nearly to the river Ouse, and, after sending off a branch along the Nar valley, is continued nearly up to the town of Lynn. To the west it merges in the great Cambridgeshire Fens, and includes the north-west corner of Norfolk, rightly known as "Marshland," the whole forming a portion of the great Bedford Level. Marshland, properly so called, and rightly distinguished even here from the adjoining fens, consists of some 57,000 acres of very fertile land, which have gradually been recovered from the sea by means of artificial embankments, and is absolutely distinct both in name and origin from the adjoining "Fens." In an article entitled "The Fens and Fen-Folk," which appeared in the 'Transactions' of the Norfolk and Norwich Naturalists' Society (vol. iii. p. 610), I endeavoured to convey some idea of the past and present condition of this remarkable tract of country, as well as of its former inhabitants, a totally different race to the hardy sons of Norsemen inhabiting the north and east coasts of Norfolk; to this article I must refer your readers should they care to pursue the subject, but perhaps I may be allowed to quote a few passages from an address which I had the honour to deliver to the same Society at their Annual Meeting in 1894, briefly referring to the same subject:—

"Of the true Fen there is little left to enable any conception to be formed as to its appearance, even, say, a century ago, much



less in still earlier times, when the land was forest clad and inhabited by the Wolf, the Wild Boar, and the Beaver; whilst giant Stags and herds of fierce Urus roamed its glades, and Cranes and Pelicans made their homes in its fastnesses. The trees have been swallowed up by the growing peat, which has also preserved the remains of its vanished fauna. One little spot, however—at Wicken, in Cambridgeshire—no doubt fairly represents one of the aspects of the Fen before modern draining and cultivation had destroyed for ever its former characteristics; here unbroken tracts of Sedge, *Cladium mariscus*, clothe the wet soil, and the dead level is only relieved by an occasional clump of dwarf willows; the effect, however, is destroyed even here by the ‘loads’ which convey the water to the draining mill, the tall chimney of which may be seen in the distance.

“The fauna and flora of this district must have been exceptionally interesting; of the latter, doubtless, a fairly accurate conception can be formed, but of the former we have few indications. Whether the Crane ever bred in the Norfolk Fens in historic times is uncertain, but seems probable;\* it appears, however, to have been by no means a rare species.† I think there can be no doubt the Greylag Goose was formerly a regular breeder in this county, as well as in the Fens of Cambridgeshire and Lincolnshire,‡ but when we come to the Bittern, there is no doubt on the subject; till their haunts were destroyed they were extremely plentiful, especially about Poppelot; but now this characteristic denizen of the Fens no longer

‘ Undulates her note  
Like a deep-mouthed bassoon.’

Its former haunts know it no more; but a man from that neighbourhood, with whom Prof. Newton conversed in 1853, assured him that his uncle had killed five Bitterns in one day’s shooting, and that his grandfather used to have one roasted every Sunday

\* See ‘Birds of Norfolk,’ vol. ii. p. 125.

† The Le Stranges of Hunstanton, entertaining the prior of Coxford, Sir Henry Sharbourne, and others, in the year 1520, dined off a Crane, six Plovers, and a brace of Rabbits. This bird is mentioned in the ‘Household Book’ five times, and is valued at precisely the same sum as the Curlew, varying from 4d. to 6d.

‡ *Op. cit.* vol. iii. p. 3.

for dinner. From the same source Prof. Newton learned that the Herons, now nesting at Didlington, formerly resorted to the sallow bushes and sedges in Hockwold and Feltwell Fens for that purpose, a mode of nesting which they also had recourse to in times past in certain of the reed-beds of the Broads. Redshanks and Ruffs of course abounded, and lingered as long as there were suitable feeding grounds, and even returned in 1853, as Prof. Newton has told us in his interesting paper (*vide infra*), after the great flood had temporarily restored the Fen somewhat to its former condition. Ducks, as may be imagined, were very abundant, and there were Decoys at Stow Bardolph, Hilgay, Methwold, Hockwold, and Lakenheath, where immense numbers of Shovellers, Pintails, Pochards, Gadwals, Wigeon, Teal, and Mallards were taken. A man named Wilson, generally known as 'Old Ducks,' was a great slaughterer of fowl at a Decoy on Methwold 'Severals,' but one Williams, at the Lakenheath Decoy, seems to have been even more successful still.

"The glory of the Fens were the various species of Harrier; these birds must have been especially abundant there, as they were also in the Broad district on the other side of the county. At Poppelot so numerous were they that it is even said the fensmen amused themselves on a Sunday, at a public-house in the centre of the Sedge Fen, by pelting each other with their eggs! Now both the Sedge Fen and the birds which used to inhabit it are gone, but it is remarkable how tenaciously the Harriers held on; constant persecution, however, was too much for them, and first the Marsh Harrier (always far less numerous than the other two species), then the Hen Harrier, and finally Montagu's Harrier, disappeared—the latter most reluctantly, for a long time clinging to one or two favoured spots, but now, I fear, quite restricted to the north-east portion of the county, where a pair or two of this and the Marsh Harrier may still be found in most years; but the Hen Harrier is exceedingly rare. The same fate awaited the Short-eared Owl, which followed in the wake of the Harriers. Another bird common in the Fens was the Grasshopper Warbler, or 'Reeler' as it was called by the sedge-cutters; and yet another, a rarity of the first water, Savi's Warbler, was found breeding at Poppelot.

"Speaking of the Fenland, which lies in the valley of the

Ouse, Spelman says:—‘ All these parts often suffer loss from the river overflowing the marshes, but yet the gain annually is not small (from the fertilizing nature of the waters), besides the great abundance of fish and other water creatures (as wildfowl that are there attracted). This river is, as it were, the milky way to many inland places, for by it they import and export largely merchandise and the necessaries of life.’ But this is as nothing to his praises of Lynn, with his remarks on which earthly paradise I must depart out of the Fens. ‘Lynn,’ says Spelman, ‘is so well provided by nature with esculents and drinks, that it may seem to be the storehouse both of Ceres and Bacchus; for on its eastern side there is a great abundance of corn, eggs, Rabbits, and land birds, while on the western side there is a like abundance of cheese, butter, Oxen, Swans, and marsh birds; and in the neighbourhood of fish—on the one side sea-fish, and on the other river and fresh-water fish; so that scarcely in all Britain, perhaps in all Europe, is so great an abundance of eatables to be met with in like space.’”

We will now cross the county, and visit the great alluvial plain intersected by sluggish rivers, and studded with open sheets of water known as “Broads,” lying in the south-eastern corner, and extending southward to Lowestoft, in Suffolk. The rivers are the Bure, the Yare, and the Waveney, with their tributaries flowing through valleys excavated in the glacial beds, the alluvial deposit in which is of great depth, and the process of growing up is still rapidly progressing, whilst the drier portions known as mowing marshes year by year are becoming more solid. In the north are the Horsey and Waxham marshes, further inland the valley of the Bure has its miles of reed-rond and mowing marsh; but the finest stretch of all is the great level plain, affording in summer and early autumn pasturage for innumerable cattle and sheep, through which the traveller by rail passes in his journey from Reedham eastward to Yarmouth, or south-east nearly to Lowestoft. I do not know the extent of the marshes in the valley of the Waveney to which your correspondent, Mr. Farman, refers, there must be many thousands of acres; but, confining my remarks to the county of Norfolk, this great alluvial plain comprises some 14,000 acres. Again quoting from the address before referred to:—



It "forms roughly a triangle, of which the ridge of high land running north for six miles from Reedham to Acle Bridge constitutes the base, and the two sides are represented by the courses of the rivers Bure and Yare, each for a distance of about seven miles in a straight line, converging at Yarmouth, and enclosing a tract of country shown on Faden's fine map, surveyed in the years 1790-94, with but a single marsh-road winding along near its centre, from Halvergate to a point about half-way between Reedham and Yarmouth, where it joins a similar track which follows the river bank from the former place; their joint course is then continued along the north banks of Breydon to the town of Yarmouth.

"Marshall, in his 'Rural Economy of Norfolk,'\* speaking of this great level, significantly remarks that it is 'tolerable in summer,' and then relates his experience of a visit which he paid on the 17th June, 1782. Entering the marshes at Halvergate, he says that for nearly the first mile they rode to their horses' knees in water! They then inspected a marsh-mill, of which Faden's map shows only thirteen in the whole level (these doubtless altogether not equal in efficiency to one of the powerful steam mills which have supplanted them), and, making a sweep towards the middle of the marsh, they returned to Wickhampton, where, he states, the entrance to the marsh was always free from water. This great expanse of marsh was perhaps the finest Snipe ground in England; as many as seventy or eighty couple are there said to have fallen to one gun in a single day; and it formed the breeding-place of thousands of Ruffs, and who can tell what other birds, for there is little known of it and its inhabitants in those days, when only the shepherds and sportsmen ever trod its splashy soil. Although perfectly treeless, this great plain was not one dead level; there were sufficient irregularities to render certain portions drier than others, and these 'hills,' as they were called by the marshmen, formed the nesting-places of the Ruffs, Redshanks, Snipes, and other marsh-loving species, which frequented them in summer in large numbers; whilst on the wooded highlands to the north, along which the old Yarmouth road runs, Herons had their homes; and at Acle

\* Edit. 2, vol. iii. p. 276.



and Mautby were celebrated Duck Decoys, now no longer worked, and earlier still the Cormorants nested at Reedham.

“How changed is all this in the present day! From Acle to Yarmouth an excellent road runs straight across the marshes, whilst a railroad takes much the same course; and a second line of railway follows very nearly the same route as the old riverside track I spoke of earlier. Large sums are expended annually on drainage, and all through the summer, and often far into the autumn, the flat rich marshes are dotted over with cattle and sheep innumerable, luxuriating in the rich herbage.”

From an ethnological point of view the men of North and East Norfolk are a vastly superior race to the mixed inhabitants of the Fens; they are silent, and, as might be expected from their lonely life on the sea or in the solitude of the marshes, very superstitious; but they are honest, brave as lions, quarrelsome over their cups like their Viking progenitors, but otherwise gentle as lambs. Not easy of approach, but once their confidence gained they are full of information, and with an abundance of ready wit expressed in a dialect peculiar to themselves. Many a time have I looked with admiration on these stalwart giants, and been struck with the easy grace of their bearing, their finely-cut features, crisp, curly, tawny-coloured hair and beards, the picture of manly beauty—the stuff that our Shovells, Minns, and Nelsons are made of—but such as are never bred in the “Fens.”

## FIELD NOTES ON SOME WEST INDIAN BIRDS.

BY PERCY RENDALL, M.D., F.Z.S.

THE Indian name for Trinidad is "Iëre," of which the translation is "The Land of the Humming Bird"; and amongst the birds I collected the *Trochilidæ* were one of the chief features. Special interest attached to these collections, since little accurate knowledge was available, owing to the fact that the skins exported had been procured in consequence of the hateful demands created by French *plumassiers*, &c. Though labelled indiscriminately "Trinidad," many of them had been collected on the mainland of Venezuela. Wise legislation in the West Indies has placed some check upon the slaughter of the Hummers, though it has not been entirely stamped out.

There is an old collection of birds in the Victoria Institute which comprises 356 separate species, made by the late Dr. Leotaud, and it includes fourteen different kinds of Humming Birds. The following birds I obtained:—

*Lampornis violicauda*, Bodd. "The Mango-hummer."—As with most other members of this family at the time of year I collected, the chief resort of this species was the "bois immortel" tree, which was then in flower. Two varieties of this tree have been imported, and it is extensively used as "shade" for young cocoa and nutmeg plantations. Though the flowers are different in shade and size, they are apparently both very melliferous, being equally patronized by these birds. There is a popular belief, as ill-grounded as most others, that Humming-birds never perch; this seems almost superfluous to contradict, but let me say that it is their constant practice (though they feed on the wing only, and may visit several trees for that purpose) to resort to a favourite perching-twig to rest in the intervals.

*Chrysolampis mosquitus*, Linn. "Ruby Topaz."—The commonest species in both Trinidad and Tobago; the specimens I collected cleared up a doubtful point bearing on the plumage of

the adult female (see 'Ibis,' July, 1897, p. 431). I found its nest in February, 1897, and watched it rear its two young in safety.

*Chlorestes carulea*, Vieill. "Small Emerald."—Under this heading I will describe a ruse I used for attracting small birds, as I believe the necessitated victim belonged to this species. By imitating the high-pitched whistling call of the Pearl Spotted Owlet, I attracted a fine assortment of all the small birds within hearing, who promptly held an indignation meeting. As this procedure generally brought the Owlet as well, it produced the the most amusing scenes. Two of these small spitfires repeatedly hurled themselves, like flashes of light, at the intruder, who seemed only half-awake, whilst the other small birds shrieked in unison. Presently, however, it chanced that Mr. Blinks turned his head just in time to see the winged bullet approaching; up went a feathered leg, a claw closed like a rat-trap, his mouth opened, and there was one gulp, and, quicker than one can write, this little Hummer's career was ended.

*Chlorostilbon caribæus*, Lawr.—This species was far from common, and I only took it in one locality, *i. e.* Caparo, in Trinidad.

*Phæthornis guyi*, Lesson.—It was in the depths of the high woods near Moruga, in the Savana Grande district of Trinidad, that I secured this bird, and the discovery was due to its curious harsh notes, which could scarcely be dignified by the term song; these are uttered whilst the birds rest on bushes only a few feet above the ground, and the position assumed is so erect that the beak is in a straight line with the tail-feathers, which point directly downwards.

*Phæthornis longuemareus*, Lesson.—This species was taken in the high woods, in a very shady spot close to a clump of Borassus Palms. Its shrill, weak, grating song was uttered whilst it was on the wing, and was sustained for some minutes. It was so small that it might easily have been mistaken for a large bumble-bee in motion.

*Lophornis ornatus*, Bodd. "Whiskerandos."—The only two I shot were obtained at Tacarigua, in Trinidad, and I never saw them elsewhere.

*Florisuga mellivora*, Linn. "The Jacobin."—This lovely bird I never met with in Trinidad, but whilst I was staying with

my kind friends Capt. M. Short and Mr. Trochilus Tucker in Tobago, I found it to be fairly common on the windward side of the island. It will not be out of place to mention that the last-named gentleman's father collected Humming-birds for the late Mr. Gould nearly thirty years ago, and, visiting him one morning by appointment in London, mentioned that he had received news by cable of the birth of another son. "Call him Trochilus," said Gould; and it was so arranged when Mr. Tucker returned to Ière! The young birds have a barred throat and dirty white breast, as immature plumage.

*Glaucis hirsuta*, Gm. "Rachette."—This bird was very partial to the flowers of the balisiers which abound on the banks of streams and damp shady places. I took it both at Claxton's Bay in Trinidad and Tobago.

*Agyrtia niveipectus*, Cab. and Heine. "Gorge blanc."—Found both in the Caparo Valley and Savana Grande districts of Trinidad, but I did not observe it in Tobago.

*Amazilia tobaci*, Gm.—It was not until I visited Tobago that I secured skins of this bird; the first one I shot was on my way to Robinson Crusoe's cave. Though I visited this historic cave in a vain attempt to secure the Fish-eating Bat, *Noctilio leporinus*, Linn., it was a sad awakening to view the reality, after the boyish remembrances I retained of Defoe's charming romance. In a few years there will no cave at all, and now the action of the waves—for it is on the windward side of the island—has reduced it to a mere cupboard of stalactitic limestone, in which you cannot stand upright, and the roof is so cracked that it looked as if the report of a gun might bring the whole thing down about one's ears.

*Campylopterus ensipennis*, Sw.—In size this was the largest of all my West Indian Hummers. I saw it nowhere, save on the Richmond Estate in Tobago, and then always on the wing.

*Bellona ornata*, Gould.—Though the male of this bird was very common in St. Vincent, I still had the greatest difficulty in obtaining a female, and when I did I also obtained the nest and eggs of the bird. The nest was built in the mouth of a small cave high up in the Wallilabo Valley, where I stayed with my hospitable friends, the MacDonalds, for the purpose of collecting.



*Eulampis holosericeus*, Linn.—I found this bird hard to obtain, and during a fortnight's collecting only took two specimens.

*Eulampis jugularis*, Linn.—Very partial to the flowers of the "bois immortel" trees, which have been introduced into St. Vincent for shade purposes.

The four following birds, or, as they are locally called, Honey-suckers, may almost be termed the first cousins to the *Trochilidæ* :—

*Cæreba cærulea*, Linn.—In the Savana Grande district of Trinidad only.

*Cæreba cyanea*, Linn.—Very common in Tobago at the flowers of the "bois immortel."

*Chlorophanes spiza*, Linn. — From Trinidad; collected in Savana Grande, at Moruga.

*Certhiola atrata*, Linn.—This bird, which is peculiar to St. Vincent, was observed in extraordinary abundance at "immortel" flowers, a dozen on one tree being no rare occurrence.

*Aramides cajanea*, P. L. Müll.—This waterfowl fell a victim to one of the traps I had set for Water Rats, *Nectomys palmipes*, baited with Indian corn.

*Momotus swainsoni*, Scl.—Shot in the high woods near Moruga, Trinidad.

*Icterus xanthornus*, Gm. "Corn Bird."—I shot one of these in Trinidad, but found it nesting in Tobago, where a colony had their pendulous nests in a large cotton tree.

*Trogon meridionalis*, Sw.—I obtained a pair of these birds in the Savana Grande district.

*Rhamphastos vitellinus*, Licht.—I secured one out of a flock, which fluttered down to the ground calling loudly for help, bringing up its companions, whose yells and screams reminded me of the parrot-house at the Zoo.

*Nyctibius jamaicensis*, Gm. "Poor me One" Bird.—The cry of this large Nightjar used to be attributed to a Sloth which is found in Trinidad (*Cholepus didactylus*). It is a long-drawn chromatic whistle, with clear intervals between each note. This bird is far from common.

*Pipra auricapilla*, Briss. "Louis d'or."—This beautiful little bird was only met with on one occasion near Moruga, Trinidad.

*Tanagra sclateri*, Berlep.—Mention of this species must not

be omitted, as it generally formed one of the crowd which frequented the flowers of the "immortel." It was specially abundant in Tobago.

*Mimus gilvus*, Vieill. "St. Vincent Nightingale."—The local name of this bird expresses the common opinion of its vocal powers; occasionally I heard it sing really well, but on the whole I think it is a lazy songster.

*Ortalis ruficauda*, Jard. "The Cockrico."—This bird I only met in Tobago; it is much sought after for the table, and is fast retiring before "civilization." Its flesh is somewhat similar to a Pheasant. I found it very wary, and its note is fairly described by its local name, many times repeated, which is to be heard at a great distance.

*Momotus swainsoni*, Scl. "King of the Woods."—Only procured in Tobago.

*Turdus gymnophthalmus*, Cab.—Plentiful in both Trinidad and Tobago, but more wild in the latter island, where it is shot for the table.

*Galbula ruficauda*, Cuv. "The Jacomar."—This lovely bird is one of the most expert flycatchers I ever observed. A pair were seen digging their nesting site in a bank of earth in Savana Grande.

*Actitis macularia*, Linn. "Sandpiper."—Common on the shores of Trinidad and Tobago.

*Myiadectes sibilans*, Lawr. "The Souffrière Bird."—So retiring is this bird, which is found round the twin craters of St. Vincent, that I could obtain no description even of its colours. Not until an altitude of 4000 ft. is attained is its exquisite and varied flute-like whistle heard. It is so marvellously shy that I had to make two ascents before I obtained a specimen; it seemed almost to possess ventriloquistic powers.

In conclusion, I desire to express my indebtedness to Mr. Ernst Hartert for the identification of the species.

## CURIOUS NESTS AND NESTING SITES OBSERVED NEAR THETFORD.

BY W. G. CLARKE.

THE nidification of our English-breeding birds must always have an especial interest to ornithologists, an interest which is accentuated by the fact that the abnormal is never wanting. Almost all the charm of searching for the domiciles of our feathered friends would be lost, if it were not for the constant element of uncertainty as to where the nests will be placed, and the consequent delight at finding them in some unique position. This variability is far less marked in nests than in nesting sites, therefore my notes upon curious nests are very brief.

A nest which was in my possession until quite recently was found in a hawthorn hedge at Lakenheath, Suffolk. A Wren had built its nest about three feet from the ground, and upon the dome of this a Linnet had also built, the two nests being firmly interwoven. Both birds were sitting upon their eggs at the same time, and safely reared their respective broods. Another twin-nest even more remarkable was found this year in the hamlet of Snarehill, Thetford. The nest of a Blackbird was situated in a wild apple tree adjacent to a convenient crotch. A Chaffinch thought this crotch a desirable site for a nest, and there built it, weaving its side into the loose bents surrounding the Blackbird's nest. Records of communistic nests are not very abundant, but instances occur yearly in this locality of joint nests of the Common and Red-legged Partridge.

In the last week of May in this year, a friend of mine found eggs of the Pheasant and Red-legged Partridge in the same nest, a few miles from Thetford. Mr. F. Norgate found a nest on Santon Warren which contained eight Teal's, one Duck's, and several Pheasant's eggs. A nest of the Song Thrush which I saw at Santon Downham in May, 1893, contained grass in the interior three inches in height, which seemed to have sprung from grass

seeds in the mud with which the interior of the nest was plastered. There was only one egg, of a dull blue colour, with maroon spots on the larger end.

Swallows often build their nests in remarkable situations. Every year their dwellings may be seen in the coprolite sheds belonging to artificial manure works near Thetford, where the smell is indescribable. One's olfactory organs must be affected before realizing what it is; but these Swallows seem to pay no heed, and rear their broods each year in safety. Swallows also build in the shops of the engineering works in this town, threading their way unerringly through the revolving shafting, and quite unmindful of the clang of the machinery. Nests, too, are to be found each year on the joists beneath Aldeby Swing Bridge, near Beccles, continually subject to the rattling and rolling of the trains above them, and the snorting of steamers beneath. In a boat-house at Martham this year, a Swallow's nest was found built in the folds of a sail which had there been stored. I was also struck by the fact in a recent visit to Rievaulx Abbey, Yorkshire, that almost without exception there was a Swallow's nest in each of the pointed arches of the Early English windows. But for queer nooks and crannies in which to place nests, no bird can approach the Blue Titmouse in its choice. It would seem to be the exception rather than the rule to find a nest of this bird where one would expect it. Each year there is a nest in the letter-box of the Ink Factory at Barsham, and for many years a "blue jimmy" used the village postal wall-box at Kilverstone for purposes of nidification. In 1894 a Blue Tit safely reared its brood in a crack about half an inch in width in the axle of one of the stanchions on the river Little Ouse, although people in crossing from one side of the river to the other generally used this axle as a hand-rail. At the same time there were eight callow youngsters in a nest built in the crack between two bricks from which the mortar had been weathered away in a wall near Thetford. In the spring of this year a friend found a Blue Tit's nest in a hollow gate-post, and with misdirected zeal split the post down the middle until the nest was reached. In spite of this, the parent bird refused to leave the eggs, which were on the point of being hatched, allowing herself to be lifted off the nest without any sign of fear. A still more curious instance has been published in the



'Transactions of the Norfolk and Norwich Naturalists' Society,' wherein it is recorded that about 1819 a man named Camplin climbed a gibbet in the parish of Wereham, Norfolk, upon which had been executed a person named Bennett, the trial taking place at Thetford. In the head of the skeleton a Blue Tit had built its nest, and the terrified family of nine or ten flew out on being disturbed. Another peculiar instance occurred this year at Stow Bedon Station, as related to me by the station-master. Two nests of the Blue Titmouse were there built in the point-box, one of them containing six and the other two eggs—the nests being built by different birds. Both nests were lined with feathers which the station-master's wife had turned out of a pillow. Despite the fact that the position of the nests was changed each time the points were moved, and that eight or nine persons were often observing this curiosity at one time, the six eggs were safely hatched and the young fledged—the other nest being deserted.

For many years past there has been a Great Tit's nest in a pump in the garden at Great Fakenham Rectory, which is always undisturbed by the owner—an ardent naturalist. In Gallow's Pits, Thetford, criminals were formerly interred after execution by the manorial or episcopal courts which could then enforce the penalty of death; now the pits are used as receptacles for rubbish. Amongst the miscellaneous collection of kettles to be found there, a Robin generally builds its nest year by year. Starlings notoriously nest in queer places. In a railway bridge at Santon, Norfolk, six bricks were missing, three on each side. Of the six holes, five were tenanted this year by Starlings. In the crotch of a beech tree in a plantation at Kilverstone, Norfolk, a piece of oak-bark had become fixed about three feet from the ground. Upon this bark a Nightjar had deposited its two eggs, in preference to the bare earth. A somewhat similar case occurred this year on Peddar's Way, East Wretham. A piece of the outer bark of a pine tree had been blown into the middle of a hawthorn bush, the concave side being uppermost. In this a Blackbird's nest had been built, the rim of the nest being level on either side with the edge of the bark. A short distance away was a big stack of fallen pines—relics of the great gale of 1895. The heart of one of these trees had rotted, and in the cavity thus formed was a Redstart's nest containing three eggs. In 1893 one of these

birds built its nest in a hole from which a brick had been displaced, not a yard from a gate through which hundreds of persons passed weekly, but it was not until the young birds were hatched that the nest was discovered. A few Black-headed Gulls nest yearly at Langmere, about four miles north of Thetford. On a certain Sunday in this year a gentleman found a Coot's nest on this mere close to the shore. On the next Sunday a log had been thrown quite across the Coot's nest, a Black-headed Gull's nest built upon the log, and one egg laid—all in a week. With this I will conclude these bare facts concerning curious nests and nesting sites that have come within my personal knowledge.

## EARTHWORM STUDIES.

BY THE REV. HILDERIC FRIEND.

Author of 'Flowers and Flower-Lore.'

## IV. A CHECK-LIST OF BRITISH EARTHWORMS.

SOME years ago I drew up a provisional list of the different species of Earthworms which were then known to exist in the British Isles, and published the same in 'The Naturalist' for January, 1893. Since then Rosa's 'Revisiione de Lumbricidi,' Beddard's 'Monograph of the Oligochæta,' Ribaucourt's 'Faune Lombricide de la Suisse,' together with a long series of pamphlets and memoranda, have appeared; in addition to my own special reports on the Earthworm fauna of Ireland, England, Normandy, and other parts. It therefore seems desirable that we should summarize our present knowledge for the guidance of collectors at home and students abroad. In this paper I shall place on record all the species and varieties which have come under observation up till the present time, so that we may see in the first place exactly what British species were known to science in this memorable Jubilee year, and at the same time afford a guide to collectors in the identifying of their captures.

In most cases I have, for the sake of convenience, followed Beddard's 'Monograph,' although I cannot in every instance endorse his conclusions. He has absorbed some good species which I have preferred to keep distinct, but in the present state of our knowledge such little differences are inevitable. Although I have given up the specific use of the term *Dendrobæna*, I believe the day is coming when the large genus *Allolobophora* will be divided into sections, of which *Dendrobæna* will be one. Dr. Ribaucourt, indeed, has submitted a synopsis on these lines, which Rosa and others have also from time to time considered and half adopted.

Our indigenous Earthworms fall under three genera, and number at present twenty-three species, besides a few subspecies

or well-marked varieties. When I first took up the study some years ago it was assumed that the total number of species did not exceed ten. I believe that two or three other species might be certainly added to the list if the localities as yet unsearched were to be examined. Special attention should be given to the Earthworms of Shetland, the Scottish Highlands, the extreme south-west of England, the Scilly and other isles, of all of which we at present know practically nothing.

Some years ago I adopted the plan of denoting the girdle-segments, and those carrying the glands known as *tubercula pubertatis* by means of a fraction. Thus  $\frac{30-36}{31-35}$  would denote that the species had a girdle in the adult which extended from the 30th to the 36th segment, while the 31st to the 35th segments were marked by tubercula. Sometimes, however, the tubercula are on alternate segments, when they are denoted by the symbol  $\frac{30-36}{31:33:35}$ . I have not seen any better method of denoting these important organs, so shall adopt it in the present list. The genus which is still the least satisfactory is *Allurus*. I formerly reported five species, but to-day I reckon three, with one well-marked variety. No new light having been thrown on Dugès' *Amphisbena*, I have dropped it from the list. I omit all aliens known to be imported from abroad, such as the ubiquitous *Perichæta*.

### I. GENUS LUMBRICUS.

Lip or prostomium cutting right through the peristomium, or forming a complete mortise and tenon. Girdle of five or six segments. On the four innermost a band formed by the tubercula pubertatis on the ventral surface. Eight setæ in each segment but the first, arranged in four couples, not in equidistant rows. Male pores on the 15th segment with or without papillæ. Colour dark brown, red, or violaceous, with iridescence. Body cylindrical in front, flattened behind to enable the creature to retain its hold in the burrow when the head is exposed. Slime exuded especially when irritated, but no coloured fluid thrown out from dorsal pores as is the case with many species of *Allobophora*. The species at present known in the British Isles, with some of the localities, are as follows:—



1. *Lumbricus herculeus*, Savigny.  $\frac{32-37}{33-36}$ . Generally distributed. Records wanted for islands all round the coasts of England, Scotland, and Ireland, and some few counties of England.

2. *L. papillosus*, Friend.  $\frac{33-37}{34-37}$ . First described by me in Proc. Roy. Irish Ac. (3), ii. p. 453. Hitherto found only in Ireland. A well-marked species, but very similar to, and easily mistaken for, the foregoing.

3. *L. festivus*, Savigny.  $\frac{34-39}{35-38}$ . Though first described in 1826, it was for nearly sixty years lost to view. I rediscovered it in 1890, and named it *L. rubescens*. This year it has been found again in France also. It is widely distributed, my own records including Sussex, Kent, Middlesex, Norfolk, Gloucestershire, Yorkshire, Lanarkshire, Down, Dublin, and other counties.

4. *L. rubellus*, Hoffmeister.  $\frac{27-32}{28-31}$ . Widely distributed. This species is fortunately free from the bewildering array of synonyms attaching to some others.

5. *L. castaneus*, Savigny.  $\frac{28-33}{29-32}$ . Mr. Beddard remarks truly that this species, like the last, has almost invisible male pores, owing to the absence of a glandular swelling, such as characterizes so many *Lumbricidæ*. The prostomium has a transverse furrow. It is apparently only to be distinguished from *L. rubellus* by the different position of the clitellum and the tubercula pubertatis. I should add, "and, as a rule, by the marked difference in their relative sizes, and the tendency of this species to crawl backwards." By an error in the ciphers, Beddard's 'Monograph' makes *castaneus* four times as long as *rubellus* (500 mm. to 120), whereas it should be half the length (50 or 60 mm. to 120); the former being ordinarily two or three inches long, and the later (*rubellus*) about five.

I may here point out an interesting feature in connection with this genus. In 1896 Dr. Ribaucourt described a new Swiss species (*L. studeri*), specimens of which reached me from Normandy just after the name had been adopted. This species filled up a gap in the chart which he had previously drawn up, and enabled us to set forth the regular succession of segments bearing the clitellum. The plan now stands as follows:—

1	<i>Rubellus</i>	27	28	29	30	31	32		
2	<i>Castaneus</i>		28	29	30	31	32	33	
3	<i>Melibæus</i>			29	30	31	32	33	
[4	<i>Tyrtæus</i>				30	31	32	33	34 35]
5	<i>Studeri</i>					31	32	33	34 35 36 37
6	<i>Herculeus</i>						32	33	34 35 36 37
7	<i>Papillosus</i>							33	34 35 36 37 (38)
8	<i>Festivus</i>								34 35 36 37 38 39

In October, 1893, I remarked ('Naturalist,' p. 296) that *L. tyrtæus* was probably the same as *Allolobophora profuga*, and now Dr. Ribaucourt supports my suspicion, though he does not amalgamate the two. The accompanying table or chart gives a bird's-eye view of the British species of the genus which will be helpful to collectors:—

#### A TABULAR VIEW OF THE BRITISH LUMBRICI.

LUMBRICUS.	SEGMENTS OCCUPIED BY			AVERAGE.		PAPILLE.	
	Girdle	Band.	First Dorsal Pore.	Length.	No of Segments.	Male Pore.	Elsewhere.
1. <i>herculeus</i> , Sav., 1826 .....	32-37	33-36	8/9	5 in.	150-200	15	26
2. <i>papillosus</i> , Friend, 1892 .....	33-37	34-37	9/10	4 in.	130-150	15	34, 36
<i>festivus</i> , Sav. = 3. <i>rubescens</i> , Friend, 1890 .....	34-39	35-38	5/6	4 in.	100-130	15	28
4. <i>rubellus</i> , Hoffmeister, 1845 .....	27-32	28-31	7/8	3 in.	100-120	0	0
<i>castaneus</i> , Sav. = 5. <i>purpureus</i> , Eisen, 1870 .....	28-33	29-32	6/7	2 in.	80-100	0	10

#### II. Genus ALLOLOBOPHORA.

The members of this genus fall more or less naturally into groups, of which the *Dendrobæna* is the best defined. As a whole the species of this genus may be known by the lip being only partially dovetailed into the 1st segment. There is a curious exception to this rule in *A. eiseni*, which has the head arrange-

ment of a true *Lumbricus*. There is a greater range in the number of girdle-segments than is found in the former genus. While in the British Lumbrici they number six, with the single exception of *L. papillosus*, in this genus they cover from four to ten segments. The tubercula are also more variable, being (1) absent, (2) on alternate segments, or (3) on a variable number of segments, either as papillæ or in the form of a band on the ventral surface of the clitellum. The male pores are on segment 15, and with or without papillæ. There are eight setæ on each segment, sometimes geminate as in *Lumbricus*, at other times more or less irregularly disposed. They are usually cylindrical throughout, and frequently exude a turbid fluid which is sometimes very pungent. The colour range is not limited as in *Lumbricus*. It varies from blue (in *A. profuga*) to green, ruddy brown, flesh, clay-colour, and alternate bands as in the Brandling. This is by far the largest genus, and has almost a world-wide distribution. The species, subspecies, and varieties known to science now number nearly one hundred. The following are known in the British Isles:—

6. *Allolobophora terrestris*, Sav. = *longa*, Ude.  $\frac{28-35}{32-34}$ . Very widely distributed, and often confused with *L. herculeus*, though easily distinguished therefrom. A pale variety (*lactea*) often found. The causes of variation have not yet been fully investigated.

7. *A. profuga*, Rosa.  $\frac{30-35}{31-34}$ . Well-marked species; usually steel-blue, with yellow tail and light-coloured girdle. Found in Ireland, North Wales, and several English counties.

8. *A. turgida*, Eisen.  $\frac{23-34}{31:33}$ . Widely distributed, and formerly confused with the next, with which also Mr. Beddard wrongly associates it under the name *calignosa*. I admit that *turgida* and *calignosa* are the same, but *trapezoides* is quite distinct. Ribaucourt has gone carefully into the whole matter.

9. *A. trapezoides*, Dugès.  $\frac{27-34}{31-33}$ . Note that in one case the papillæ are on two alternate segments (31 : 33), while in the other they cover three consecutive segments (31—33). There are other differences which at once appear when a good series is under examination. Beddard's remark that Michaelsen found an intermediate form seems to me to suggest the question of hybridity—a subject which I have discussed in 'The Naturalist' (October, 1892).

10. *A. rosea*, Savigny.  $\frac{26-32}{29-31}$ . Widely distributed. The fluid discharged on irritation leaves a white sediment behind, which seems to be a form of calcium, the study of which might throw some new light on the use of the calciferous glands.

11. *A. chlorotica*, Savigny.  $\frac{29-37}{31:33:35}$ . Very variable and ubiquitous. I place here for the present the worm I formerly described as *A. cambrica*. Until we know more of the limits and extent of variation, and can draw a firmer line between species and subspecies, form and variety, it is better not to multiply terms. Several subspecies and varieties have been named by Rosa, Ribaucourt, and others, and our British forms would well repay careful examination.

12. *A. georgii*, Michaelsen.  $\frac{29-35}{31-33}$ . Tubercula as in *trapezoides*, which it nearly approaches. I have received it from Clonmore, Co. Clare, Ireland, which is thus far its only decided British habitat.

13. *A. fetida*, Savigny.  $\frac{27-32}{28-30}$ . The well-known Brandling of the angler; at once recognized in England by its characteristic colour-bands. On the Continent more than one closely-allied form occurs. The species which comes nearest to it in our British fauna is the next.

14. *A. subrubicunda*, Eisen.  $\frac{26-32}{28-30}$ . Appears to be generally distributed in the British Isles, and liable to great variation, the forms of which (and their causes) merit special investigation.

15. *A. hibernica*, Friend.  $\frac{27-33}{30-31}$ . Probably the same as *A. veneta*, Rosa. At present known from Dublin and Louth in Ireland, but not found in England. (Proc. Royal Irish Acad. 1893, p. 402.)

16. *A. mammalis*, Savigny.  $\frac{30-36}{33-34}$ . I have found this worm in many parts of the country, and recorded it under Rosa's name *A. celtica*.

17. *A. arborea*, Eisen.  $\frac{27-31}{29-30}$ . Should not be placed under *subrubicunda*, as it is at least a good subspecies. Collected in or received from different parts of England, Ireland, and Wales.

18. *A. eiseni*, Levinsen.  $\frac{24-32}{0}$ . A pretty anomaly, owing to its having the cephalization of a true *Lumbricus*—a connecting link between the two genera.

19. *A. boeckii*, Eisen.  $\frac{29-33}{31-33}$ . Only two authentic records, earlier records belonging to *subrubicunda*. Apparently a boreal



species, but well marked. Much has been written on it by Rosa, Eisen, Ribaucourt, Beddard, and myself. It is found in Yorkshire and Scotland, and should be sought for elsewhere among old decaying timber or fallen trees in parks, woods, and forests.

20. *A. constricta*, Rosa.  $\frac{26-31}{0}$ . Another of the dendrobænic group. I have found it in Sussex, and this year have received it from the county of Antrim, together with a new variety, the description of which I append.

#### NEW VARIETY OF EARTHWORM.

20a. *Allolobophora constricta*, Rosa, var. *geminata*, Friend. Length in alcohol,  $1\frac{1}{4}$  in. or 32 mm. First dorsal pore,  $\frac{5}{8}$ . Colour like the dendrobænic group generally. Prostomium pale, scarcely at all cutting into the peristomium. Male pore not seated on papillæ; no swelling on segment 16. Girdle extending over seven segments (25—31). No *tubercula pubertatis*. Total number of segments 60, those behind the girdle triannulate. Setæ geminate or in pairs, as in the *Lumbricus* type. Found by Dr. Trumbull in wood, Co. Antrim, Ireland, 1897.

#### III. Genus ALLURUS.

This small group of worms is semi-aquatic, and may be readily distinguished by the square tail and the position of the male pores on segment 13 instead of 15, as in the two preceding genera. I reckon three British species and one well-marked variety.

21. *Allurus tetraedrus*, Savigny.  $\frac{22-26}{23-26}$ . Very widely distributed in the British Isles.

21a. *A. tetraedrus* var. *flavus*. A beautiful variety found in a stream near Carlisle, and one specimen in Calverley Woods, Yorkshire. Formerly called *A. flavus*, Friend.

22. *A. tetragonurus*, Friend.  $\frac{18-22}{19-21}$ . Described by me in 'Science Gossip,' Nov. 1892, p. 243, from a specimen from Bangor, North Wales. Doubtfully referred to *Tetragonurus pupa*, Eisen. A well-marked worm, but more specimens are desired.

23. *A. macrurus*, Friend.  $\frac{15-22}{20-21}$ . Found hitherto only in Dublin. The characters of this species are indisputable, but here again more material is wanted.

## NOTES FROM MID-HANTS:

SPRING AND SUMMER, 1897.

BY G. W. SMITH.

SINCE sending my notes for the winter of 1896 I have learnt from Mr. Chalkley that a Gannet was shot at East Tisted on December 12th, and a Peregrine Falcon at Whitchurch on the 5th of that month.

## JANUARY.

In water-meads (Winchester) this month shows very little change in bird-life from the last. The Common Gulls still remain with us, but *L. argentatus* has not paid a visit during the whole month. Mr. Kelsall, writing to me of sea-birds in the New Forest, says:—"There is a large pond in my parish about four miles from the sea which the Gulls visit every day in summer—Herring Gulls, I think. The forest people say that the Cormorants fly daily to Salisbury! They often pass over us. Our Gulls are not seen here in winter; perhaps they go further afield when they have no eggs or young. I find notes in my diary as follows:—March 13th, 1895; Gulls begin to pass over about this date; and March 15th, 1896, Gulls passing over."

On the 6th a Bittern, *B. stellaris*, was shot at Avington, and sent to Mr. Chalkley to be preserved. By the 29th Pied Wagtails were as numerous as ever in water-meads, but the Grey Wagtails were reduced to a few pairs. Reed Buntings were still common quite close to the town. On the 30th I saw two Dabchicks, *P. fluviatilis*, on the Itchen close to the town, for the first time during the winter. They were extremely wary, and dived down, to appear several yards off in an inconspicuous position by the bank, at the slightest disturbance.

The frost gave way on this date.

## FEBRUARY.

On the 4th the Common Gulls left suddenly and for good, save for one short visit, which lasted only a few hours, on the morning of the 25th, when five or six were wheeling at a great height above water-meads. The Pied Wagtails are diminished in numbers; the Grey Wagtails are only occasionally seen during the middle of the month. On the 9th there were seven or eight Dabchicks on the Itchen near the College and another party further down by Shawford. On the 20th the first inward migration of Peewits began, a company of fifty or so flying west in a long line on that date, and another on the 25th. On the 2nd a Brent Goose was shot at Medstead, and on the 15th I saw three Geese, which I suspected to be Brent, flying at a considerable height over water-meads. On the 18th a Great Spotted Woodpecker was shot at Sparsholt and sent to Mr. Chalkley to be set up. On the 23rd the Rooks first began to collect twigs for repairing their nests; they were very quarrelsome, and one bird was killed in a scuffle and fell down dying into meads. On the 24th I saw a company of about two hundred Wood Pigeons in a ploughed field bordering a wood at Whitchurch. Both species of Wagtail decreased steadily in numbers as the month progressed; during the whole winter neither species has been so numerous as in former years. Mr. Kelsall writes from the New Forest, "A pair of Wheatears, Feb. 27th." This is the earliest record I know.

## MARCH.

On the 1st a few Common Gulls came with a strong south wind to stay for a few hours in the morning, on the 4th and 6th; one Gull stayed through the greater part of the morning. On the 22nd Peewits were in abundance on Twyford Downs, probably with nests; in fact, on the 21st, several clutches were found in a ploughed field to the north of this spot. It is very curious how persistently this bird is persecuted and with what persistence it propagates its kind so successfully. On the 22nd I saw the Wheatear, male, for the first time this year, in water-meads. On the 24th a solitary Herring Gull was battling with a strong south wind above St. Catherine's Hill. The Dabchicks leave us about now, and are never seen so high up the river during the rest of the year. This fact applies to all our winter visitants in the

upper water-meads; they seem to come nearer the town during winter, and to distribute themselves more widely for the breeding season. The Reed Buntings, for instance, at the end of this month, have moved away to their breeding haunts a few miles down the river. Thus we have such birds as the Wagtails, Buntings, Dabchicks, &c., performing regular migrations on a small scale.

On the 25th a Thrush's nest was found with three eggs, and three Blackbirds' nests had eggs in two cases and young birds in the third. All the nests were in evergreens. The first Swallow arrived in water-meads on the afternoon of the 27th. On the 29th Mr. Chalkley received a Ring Ouzel from Avington, and on the 30th a specimen of the same bird from Highbridge, four or five miles on the opposite side of the town.

#### APRIL.

By the 2nd Swallows were numerous in water-meads, and on that date the first Sand Martin arrived. On the 3rd a stormy wind was blowing from the east, and two Herring Gulls payed a visit in the morning. The Jackdaws began their nests on this date in the College chapel tower. On the 4th a young Thrush of the year, fully developed except in the tail-feathers was seen, and the first Whitethroat was reported past St. Cross.

In Kent (Beckenham) the Swallows and Sand Martins arrived on the 19th; and on the 23rd I was fortunate in seeing the first birds of the season arrive in North Staffordshire.

Mr. Kelsall, from the New Forest, reports, "Chiffchaff, 1st; Cuckoo, 14th (heard in Kent first on 20th); Nightingale, 18th (in Kent 19th); Willow Wren, 20th." He says, however, that it is uncertain whether these were first arrivals, as he was away for "the first rush."

On the 30th eggs of the Great Tit were taken at Crabbe Wood. Pied Wagtails with their congeners have deserted the water-meads near the town by now, save for a few pairs of the first species, preparatory to spending the breeding season further down the river. They usually return about the middle of November (see *Zool.* 1897, p. 34).



## MAY.

On the 1st I saw the first Swift at Winton, and Mr. Nutt reported Meadow Pipits in water-meads. On the 3rd Swifts positively swarmed near St. Catherine's Hill, flying low, and uttering their cries. Up to the middle of this month, which has been bitterly cold, Swallows, Swifts, and Martins must have been suffering from want of food. I have never seen such numbers of them before flying, vainly for the most part, over the Itchen near the town.

On the 4th I found a clutch of six Wheatear's eggs, hard-set, on a warren (Longwood) four miles east of the town. This is an early date. I saw two Stone Curlews also there on this date, and Mr. Nutt reported these birds at Farley Mount, north-east of Winton. On the 5th I saw Willow Wrens at Compton Gorse, and heard what was very likely a Lesser Spotted Woodpecker. This little copse abounds in Nightingales, which were keeping up a lovely chorus when I visited it on the 8th. On the 10th Mr. Kelsall reports, "Wood Wren and Tree Pipit; Nightjar and Shrike reported." On this date Reed Buntings had eggs in water-meads (hatched on 12th), and I found a clutch of five Moorhen's eggs at Fishers Pond. I picked up a young Coot of the year on the bank, which seemed quite helpless, and had evidently been neglected by its parents. This bird breeds in fair numbers every year there, and I have March 15th, 1890, as the earliest record of its laying. It migrates partially to the coast in winter.

In the middle of the month a pair of Nuthatches, which have built in the same tree in the college meads for three years, had eggs. On the 12th a Stone Curlew's egg was brought me from a boy who had picked it up in "a hollow" near Chilcombe, three miles from the town. He said it was the only one, but how far he may be trusted is uncertain. It was quite hard-set. This egg is rarely found, though the birds breed here every year in small numbers. Two eggs were taken last year on May 6th, after a most persevering hunt, by Mr. Ensor. On this date (12th) a Carrion Crow's nest was found at Oliver's Battery, a mile from the town, with young birds in it. On the 15th a Willow Wren's nest was found with six eggs in it, and on this date five Hawfinch's eggs were taken in a wood two miles from the town. At

present the records for this bird in the neighbourhood are—“Nested at Alresford, 1891; seen near College, February, 1892; shot at Otterbourne, 1892, and at Hursley, 1893.” On the 17th Red-legged Partridge’s eggs were taken, and on this date Mr. Chalkley received two Tufted Ducks from Alresford, and a Hobby from Northwood. The Ducks have only been known to breed recently at Alresford, a pair first nesting there in 1890. A Wryneck was shot during this month near here, not a very common bird with us. On the 13th Chiffchaff’s eggs were found at St. Cross.

I have been on the look-out during the past few months for *L. ridibundus*, which often pays a visit in fair-sized flocks to water-meads, but I have not been successful. It has been suspected that it occurs in fair numbers in company with *L. canus* during the winter, but I am inclined to disbelieve this. I may here mention that although *L. canus* was very numerous during the winter months, the date of its departure was extremely early as compared with other years. Mr. Sutton Davies gives the beginning of May as the average date for its departure to the coast. On the 31st a Whinchat’s nest with three eggs in it was brought to me from a boy who had found it “near water” past St. Cross. At the beginning of this month an interesting variety of the Blackbird’s egg was found; ground colour pale blue, with a light brown continuous patch at the thick end, as if the egg had been “singed” there. Out of five eggs three were normal, and two presented the variety described.

#### JUNE.

On the 1st Lesser Whitethroat’s eggs were found, and on the 4th Reed Warbler’s. On the 14th Turtle Dove’s eggs were fresh; May 13th is the earliest date I know for the eggs of this species near here (1893). There were young birds in a Garden Warbler’s nest in the town on the 14th. Very little ornithological work has been done this month owing to general business.

#### JULY.

On the 11th I saw a mature Peewit in water-meads with the wings a dark brown colour all over. Otherwise the bird was typical, and I had no difficulty in recognizing it, as it flew for

some time over my head, and settled only a few yards off. I am inclined to think that it was in ill-health. On the 13th I saw about a dozen Peewits in water-meads; this is very early for these birds to be assembling, but no doubt it is not universal. On the 16th a large flock of Peewits, numbering sixty or seventy, were reported flying east across the valley, and there are several birds collected in water-meads. In the middle of the month a Common Buzzard was shot near here. This is the only bird of interest Mr. Chalkley has received during close season.

## O B I T U A R Y.

REV. ANDREW MATTHEWS.

WE regret to announce the death of this well-known British naturalist, who died, at the age of eighty-two, on September 14th last, at Gumley, of which he had been rector for forty-four years. He was born on June 18th, 1815, the day of Waterloo, and by a coincidence died on an anniversary of the death of the Duke of Wellington. Mr. Matthews was more widely known as an entomologist than an ornithologist, and may be said to have inherited his zoological tastes, as his father was also a naturalist and a contemporary of Dale, Stevens, Curtis, and other well-known men of that period. In 1849, in conjunction with his brother Henry Matthews, he published 'The History of the Birds of Oxfordshire and its Neighbourhood.' We learn from his son (Dr. J. C. S. Matthews) that he leaves a collection of British Birds containing about 450 specimens, chiefly obtained by himself and his father in Oxfordshire and the New Forest. This collection also comprises the first Ibis recorded in this country, shot in Norfolk 200 years ago and noted by Pennant, and two specimens of the Avocet, likewise mentioned by that old author.

As an entomologist he will be best remembered as an authority on the minute beetles, *Trichopterygidæ*, of which he described many species, and, in 1872, published his well-known 'Trichopterygia illustrata,' of which in his eightieth year he completed a second volume which is now in the publisher's hands. He was also the contributor on this group to Godman and Salvin's 'Biologia Centrali-Americana,' and joint author with the Rev. W. W. Fowler of a Catalogue of British Coleoptera in 1883. When we add that Mr. Matthews was also a successful floriculturist, especially with regard to Pelargoniums and Picotees, we take leave of a long, happy, and useful life passed in the culture and leisure of a rural rectory.

Mr. Matthews was an old contributor to these pages; we notice his name as far back as 1847.



## NOTES AND QUERIES.

## MAMMALIA.

## INSECTIVORA.

Lesser Shrew in Devon.—Early in September my friend Mr. Frank Brownsword sent me an adult Lesser Shrew, *Sorex minutus*, which had been brought into his house at Shebbear, North Devon, by a cat.—CHAS. OLDHAM (Sale).

## AVES.

Montagu's Harrier breeding in Ireland.—On August 24th last I received a letter from my cousin in Co. Kerry enclosing in the flesh what I identified as a young female Montagu's Harrier. He had shot it on Aug. 20th, and writes:—"I have seen six birds of this kind (four young and two old) constantly about in a rocky ravine near here, and the one I enclose is a young bird. . . . The old hawks make a strange clucking noise, and the young a kind of whistling scream." I have skinned the bird, and Dr. Bowdler Sharpe, on inspection, kindly confirmed my identification. The exact spot where the specimen was killed has been given me, but I refrain from disclosing it, in case any of the birds should nest there again next year. According to Mr. Howard Saunders's 'Manual of British Birds,' *Circus cineraceus* has only occurred three times in Ireland, and has never before been reported as having nested; so that the above facts seem well worth recording.—JOHN H. TRESDALE (St. Margaret's, West Dulwich, S.E.).

The Eggs of the Roseate Tern.—With reference to my remarks on the nesting of the Roseate Tern, *Sterna dougalli*, in the British Isles, which appeared in the April number of 'The Zoologist' (p. 165), it will be remembered that I therein emphatically stated that their eggs were easily distinguishable from those of allied species, notwithstanding the late Mr. Henry Seebohm's statement to the contrary in his recent work on Eggs of British Birds, and I will now endeavour to describe their general character. I was under the impression, until quite recently, that these notes would be original, but I find that the late (?) Rev. J. C. Atkinson, in his book on 'British Birds, their Eggs and Nests,' published in 1861, says: "Closer observation only has distinguished between their eggs and those of their more numerous associates." This is the fact, and an experienced eye can

readily distinguish the difference, I should say much more easily than between Carrion Crows' and Rooks' eggs, or eggs of other closely allied species. Like most others, they vary among themselves. The Roseates', for instance, in the density of the creamy yellow ground colour, some being very pale, others of a *buff* stone-colour. The markings generally consist of small speckles of reddish brown with small smoky grey underlying spots, distributed more or less all over the shell; others are marked with larger spots and *occasionally* blotches of a deep reddish brown, and *sometimes* there is a trace of the markings forming a zone round the thick end. Never, as in the case of Arctic and Common Terns' eggs, does the ground colour consist of a dark stone-colour, brown, bluish, green, dull green, or ashy grey, and they have a common characteristic different to those of the other species mentioned; while the eggs of the Roseate Tern are generally more elongated than those of the Common and Arctic species. As a rule the clutch consists of two eggs only, very rarely are there three.—E. G. POTTER (14, Bootham Crescent, York).

Little Gull and Red-necked Phalarope in Sussex.—On Aug. 11th last I saw shot, at the mouth of Rye Harbour, Sussex, a very fine immature male specimen of the Little Gull, *Larus minutus*. It was on the sands in company with a Common Tern; the weight was  $4\frac{1}{2}$  oz. On referring to 'The Zoologist' for the last seven or eight years, I was unable to find any recorded so early in the autumn. The bird is now in my possession. On Sept. 13th last a friend and myself obtained, in the Channel at Rye Harbour, two immature Red-necked Phalaropes, *Phalaropus hyperboreus*, both females, one weighing 1 oz., the other just over that weight. The birds have been jointly identified with Mr. Bristow, of St. Leonards.—E. P. OVERTON (166, Mount Pleasant Road, Hastings).

Common Swift roosting in Tree. — Last evening (Sept. 2nd), at seven o'clock, I was near the top of Stepney Hill, Scarborough, and saw two Swifts, *Cypselus apus*, flying near some isolated ash trees by the roadside. Presently one of the birds flew into a tree, amongst the smaller lateral branches, and as I thought to take flies from the leaves. After repeating this action the bird, to my great surprise, clung to a pendant branchlet, amongst its leaves, and there hung suspended vertically, its long wings drooping below the tail, at first in horseshoe form, and then afterwards brought together. The bird hung suspended at about twenty feet from the ground whilst I watched below for a quarter of an hour, till darkness and rain, which was falling freely, sent me away. I left the bird there hanging motionless, quite indifferent to the rain and breeze, which caused it continuously to sway backwards and forwards like a suspended scarecrow. The companion bird approached, and had a look at the other two or three

times, and seemed to endeavour to settle on the same twig, but it did not do so, and had disappeared when I left. The incident was a great surprise to me, as I had never heard that the Swift was in the habit of perching, even occasionally, much less settling down for the night in such a place and position—not really *perched*, but vertically suspended like a great hawk-moth. The Swifts have not all left here. I saw about a dozen flying over the main street this morning.—W. GYNGELL (Scarborough).

**Common Roller in Sussex.**—I have received in the flesh, obtained on Sept. 24th at Catsfield, near Battle, Sussex, an adult female Roller, *Coracias garrulus*; weight, 5 oz.; contents of gizzard, fragments of *Geotrupes*. It had been seen for several days by the keeper who shot it, and who considered it a kind of "Galley-bird," which is the local name for the Green Woodpecker. Markwich, who lived at Catsfield, recorded, in the 'Transactions' of the Linnean Society, one shot near Crowhurst Church on Sept. 22nd, 1790, almost the same date. Borrer, in his 'Birds of Sussex,' records it last in 1870.—G. W. BRADSHAW (Hastings).

**Survival of the Kingfisher.**—I was interested in reading Mr. Farman's account of the rarity of the Kingfisher in the Norfolk Fens ('Zoologist' for August, p. 354). Few matters ornithological have pleased me more in recent years than the abundance of the species, according to my experience. In this neighbourhood, within seventeen miles of London, the bird is common. Wherever I fish my experience is the same. Near Dulverton, where one constantly sees them on the Exe and Barle, there is a fish-hatching establishment, and, commenting one day on the traps set for the unfortunate birds, the keeper told me he had caught as many as thirty in a season. Near Malvern there is another similar establishment, and there I was told as many as sixty had been killed in a year. As the locality is far from suited to the habits of the species, I asked the keeper whether he supposed they had been attracted from a distance. His reply was that in his opinion they all came from the immediate neighbourhood—that the bird was really very common, but seldom seen on account of its retiring habits. In different parts of Herefordshire I generally see one or two when out fishing. My experience has been the same in other localities. There have been recent references also in the newspapers to the supposed scarcity of the Kingfisher. My own hope and belief is that, although such scarcity may exist here and there, the species as a species is widespread and abundant.

I do not know whether Canon Ingram would consider that what happened in the "fifties" came under the description of "modern history," as used by him in his note about the Wood Pigeons;\* but numbers must remember, as I do, the Rooks that in 1854 and 1855—how much later I

\* *Ante*, p. 383.

know not—built in the tree that stands at the corner of Wood Street, Cheapside.—T. VAUGHAN ROBERTS (Verulam House, Watford).

**Habits of the Lesser Spotted Woodpecker.**—Subsequently to a brief sojourn on Lundy Island during May of the present year, I had the pleasure of spending a few days at Clovelly, where I was favoured with excellent opportunities for watching some of the habits of *Dendrocopus minor*, a little bird whose life-history, by reason of its rarity and exceeding shyness, does not readily lend itself to close examination. On three or four consecutive mornings I found the male bird—the female, doubtless, was busy with the cares of incubation—haunting the topmost branches of a patriarchal elm immediately in front of The Court, and even if it was not in my mind on first coming out of doors, my attention was sure to be speedily arrested by its curious and far-reaching “krark-rk-rk-rk-rk-rk,” which sound I had little difficulty in establishing to my own personal satisfaction was caused by the astonishingly rapid vibration of the bird’s beak against the limbs of the tree. I believe this is the generally accepted explanation of one of the most peculiar sounds in nature. Nevertheless, the motion of the bill was so rapid as to be virtually indiscernible to the eye, even with the aid of field-glasses. The noise produced, syllabled as above, somewhat long drawn out, and with just the suspicion of a tremolo when heard at a distance, has been likened to various sounds; but it struck me—ambushed as I was close by—that it resembled more than anything else that caused by a cumbrous branch, partially detached from the main stem, gradually swaying to and fro with each extra heavy gust of wind. What, however, provided me with matter for still more earnest reflection was the way in which the little bird frequently gathered its food. Never stationary for long together, time after time it would take insects from under the leaves after the manner of the *Phylloscopi*. Occasionally it would vary this procedure by darting out and capturing an insect on the wing, in this respect reminding me forcibly of the Spotted Flycatcher. With its pretty dipping kind of flight and nesting economy I was already familiar, having come across the species on more than one occasion during the spring months in Herefordshire; also with its note, “pseep, seep, seep, seep, seep, seep”—resembling on a modified scale the cry, suggestive of mockery, of the Kestrel, and not unlike that of the Wryneck; as a rule, on uttering this note, the example I watched so long and attentively in its favourite haunts raised and threw its head well back. But the method of capturing its food, as recorded above, came to me as a revelation, and, so far as I am justified in my assumption—I can find no allusion to it anywhere—it is a detail which, for obvious reasons, we can hardly affect surprise at having been passed over in silence by writers on ornithology. Of the natural beauties of Clovelly and its surroundings most people know by repute; that is, of course, another



matter. It is enough for me that Ravens, Choughs, Peregrines, and Common Buzzards still flourish in the district, and that they gladdened my eye by occasionally ranging within view. And, again, not everywhere in England are the Green Woodpecker, Great Spotted Woodpecker, Lesser Spotted Woodpecker, Wryneck, Nuthatch, and Tree Creeper all to be met with in the course of an hour's ramble! No wonder Clovelly can add rare birds to its other multitudinous attractions; little welcome there, be it known, for collectors and exterminators.—H. S. DAVENPORT (Ormandyne, Melton Mowbray).

Aquatic Warbler in Hampshire.—My neighbour, Mr. Richards, of Farlington, sent me the other day a small bird that had been killed accidentally by his fox-terrier in Farlington Marsh. Neither of us could identify the species, so I sent it to Mr. Pratt, of Brighton, who pronounced it a male specimen of the Aquatic Warbler, *Acrocephalus aquaticus*. It agrees with the coloured plate in Borrer's 'Birds of Sussex.' Possibly some of your readers have recently heard of other specimens.—S. G. SCOTT (Havant Rectory).

I should like to add, with regard to the above interesting note, that although this appears to be the first Hampshire Aquatic Warbler mentioned in your pages, there is also a specimen in Mr. Hart's well-known collection at Christchurch, killed, like this one, by accident, and also on the coast, but at the south-western extremity of the county.—J. E. KELSALL (East Boldre, Southampton).

The Alleged Summer Appearance of the Shore Lark in Devonshire.—I notice a paragraph in 'The Zoologist' (p. 365) respecting the presumed occurrence of the Shore Lark in Devonshire during summer. From Mr. H. M. Evans's exact description of the locality and the birds, I have no hesitation in identifying both. I think there can be no reasonable doubt whatever that Mr. Evans has confused *Otocoris alpestris* with a pair of Red-backed Shrikes that have frequented the spot in question all the summer, and have reared a brood there. I have had this pair of birds under close observation the whole season, and have several times pointed them out to my wife, their haunt forming part of a favourite walk of ours. *O. alpestris* is an irregular visitor on migration (early spring and late autumn) to the shores of Tor Bay, occurring sometimes in small parties. *Lanius colluris* is fairly common here in summer, from May up to the middle or end of August.—CHARLES DIXON (Paignton, South Devon).

The Autumn Song of Birds.—I am sincerely sorry to find that Mr. Aplin thinks I misrepresented his meaning when criticising his notes on the autumn song of birds (Zool. 1894, p. 410, and August and September last); but, although having received from him a very kind letter on the

subject, and having most carefully re-read the whole of the articles in question, I still fail to see that I misrepresented him. I cannot understand how Mr. Aplin distinguishes the Robin and Starling from the other autumn singers (Zool. 1894, p. 410); nor do I know how these two species can "strike up in October or November" unless they have previously been silent. What I contend for is that they begin to sing in July and early August, *and never cease* till stopped by cold in winter. I am still firmly of that opinion. Like Mr. Aplin, I have found the Willow Wren silent in the last two weeks of June (Zool. 1894, p. 411, and August last); but I emphatically aver that the bird sings in numbers early in July (not in the hottest midday hours), and ends rather than commences in mid-August. I live opposite a thicket where Willow Wrens swarm. Early in July I could hear a dozen or more in full song at the same time, making a sweet chime with their repeated cadences. Will some other correspondents say which of us is the more correct? Let me state in conclusion that I fully appreciate the conspicuous excellence of Mr. Aplin's notes on birds generally, but I thought him wrong for once; hence this correspondence.—CHARLES A. WITCHELL (Eltham, Kent).

Hours at which some Birds commence to Sing.—Last April, while staying in Gloucestershire, my cousin and I arose early one morning to hear the birds begin to sing, and to see which bird began singing first. We got up at about a quarter past one a.m., went out at 1.45 a.m., and posted ourselves in a small field between the garden and a little wood, so as to hear as many birds as possible. The following are my rough notes taken down at the time, which I thought might interest readers of 'The Zoologist':—

1.45 a.m. Went out. Very cold. Not a sound. Pitch dark. 2 a.m. One Nightingale singing. 2.25 a.m. Cocks crowing all round (the cocks crowed spasmodically about every quarter of an hour). 2.30 a.m. Dawn just beginning to break. A Sparrow chirped once in the ivy against an outhouse. 2.40 a.m. Nightingales singing beautifully. Not light enough to read by. 3 a.m. No sound but Nightingales. 3.20 a.m. Robin calling and Cuckoo crying. 3.25 a.m. Redstarts singing and calling in garden. 3.27 a.m. Larks began to soar and sing all round. Scarcely light enough to read by. 3.30 a.m. Dead silence for about five minutes. One Nightingale singing far away in a larch wood. 3.35 a.m. Blackbirds began to sing in the garden. Sky Larks still singing and Cuckoo crying. 3.40 a.m. Thrushes singing. 3.47 a.m. Robin singing. 3.55 a.m. Quite light. No stars. Thrushes singing on all sides, making quite a deafening noise. 4 a.m. Great Tit singing up and down note. Wren singing. 4.10 a.m. Chiffchaff singing. 4.20 a.m. Starlings whistling. We did not hear a Willow Wren at all, although they abound in the wood; but their song was probably drowned by the Thrushes.—BERNARD B. RIVIERE (82, Finchley Road, N.W.).

Popular Ornithological Fallacies. — May I ask on what grounds Mr. R. V. Calvert, in the September issue of 'The Zoologist,' pitched upon Cuckoos, in default of Jackdaws, as the culprits in the matter of the destruction (by sucking the contents) of some eggs belonging to a Hawfinch, whose nest had been built in the fork of a whitethorn bush in Wychwood Forest in the spring of the present year? My experience leads me to believe that Cuckoos are caluminated when they are alleged to be addicted to this propensity. It is, of course, quite possible that Mr. Calvert may be in possession of that exceedingly desirable—if the charge is to be deemed absolutely proven—and *affirmative* evidence on the point, for which scientific ornithologists have long been waiting; if so, I trust it will be recorded in detail in the pages of 'The Zoologist' without delay. But, failing testimony of this kind, let me warn the rising generation of naturalists not to give a moment's heed to the oft-quoted fallacy, founded purely on *suggestive* evidence, that Cuckoos suck the eggs of little birds. That Cuckoos have been intercepted with eggs, either their own or those of other species, in their bills is no proof of the charge so frequently—as I have found in my walks abroad—preferred against them. Of the Cuckoo's economy so little is known that a large field is naturally presented for speculation; but it appears to me far more likely that the abstraction of an egg from the nest of an alien species may be prompted by an instinctive desire to mask, as it were, the presence of the Cuckoo's egg left behind in its place. Considering the enormous strides ornithology has made during the nineteenth century, the widespread interest that is taken in its study, and the amount of cheap literature that has appeared in connection therewith, it seems to me little short of incredible that, in addition to the one already referred to, there should still linger in the minds of many such preposterous notions as that Green Woodpeckers carefully remove the chips, hewn from their nesting cavity, to a distance; that small birds will not build in the immediate vicinity of other nests; that young Robins kill the old ones in the autumn; that Nightjars suck the milk of goats; that Swallows do not migrate, but hibernate; that only Nightingales sing at night; that Rooks and Crows are identical; that Cuckoos turn into Sparrowhawks in the winter; that Robins retire to the wilds to breed; that Barn Owls suck the eggs of dovecot Pigeons; that sitting Lapwings (that is, *females*) decoy intruders from their nests by their devices; that Nightingales yearly revisit the same spot for breeding purposes; that Landrails possess the gift of ventriloquism; that Wrens forsake if you insert a finger in their nest; that Mistle Thrushes never sing after the end of April; that Green Woodpeckers are particularly clamorous on the approach of wet weather; that Gulls never perch on trees; that the reeling note of the Grasshopper Warbler is not that of a bird at all; that Long-tailed Tits' nests have two



holes, through one of which the sitting bird's tail protrudes; that Swifts cannot rise from the ground; that a hooting Owl bodes evil to the listener; that there are two kinds of Magpie, one that builds in hedges, the other in trees; that the Wren is the female of the Robin; that Herons dangle their legs through a hole in the bottom of their nest; and that Kingfishers breed in the holes of water-rats. I am far from supposing that I have in the foregoing series exhausted the list of vulgar beliefs, but of one thing I am certain, and that is, that a love of the mysterious and marvellous where birds are concerned is the invariable concomitant of ignorance.—H. S. DAVENPORT (Ormandyne, Melton Mowbray).

PS.—In making use of, in an aberrant moment, the somewhat loose and frequently misapplied expression “hibernate” in connection with Swallows, as above, it has occurred to me that purists will not unreasonably infer what I by no means wish to imply. That Swallows on occasions will attempt hibernation, that is, attempt to pass the winter in an animate state in this country, is an accepted fact; but that they become torpid is quite another matter, and it is in this sense that I have not seldom detected people using the term “hibernate” in connection with Swallows wintering in England.—H. S. D.

Garden Lists of Birds.—By way of comparison with Mr. Mathew's interesting lists of birds in last month's 'Zoologist,' I add a list of birds seen by myself from the study window of this house during the ten years we have lived here. My list numbers fifty-five species, the total number observed in the parish (under 1000 acres) being about 101 :—

Mistle Thrush.	White Wagtail.	Green Woodpecker.
Song Thrush.	Tree Pipit.	Great Spotted Wood- pecker.
Fieldfare.	Spotted Flycatcher.	Lesser Spotted Wood- pecker.
Redwing.	Swallow.	Wryneck.
Blackbird.	Martin.	Cuckoo.
Redstart.	Sand Martin.	Barn Owl.
Redbreast.	Greenfinch.	Kestrel.
Blackcap.	Hawfinch.	Mallard.
Willow Wren.	House Sparrow.	Wood Pigeon.
Hedge Sparrow.	Goldfinch.	Stock Dove.
Long-tailed Tit.	Linnet.	Turtle Dove.
Great Tit.	Chaffinch.	Pheasant.
Coal Tit.	Brambling.	Grey Partridge.
Marsh Tit.	Bullfinch.	Red-legged Partridge.
Blue Tit.	Starling.	Moorhen.
Nuthatch.	Jay.	Lapwing.
Wren.	Jackdaw.	Whimbrel.
Tree Creeper.	Rook.	
Pied Wagtail.	Sky Lark.	

In addition to these I frequently hear the Nightingale and Tawny Owl, and this year the Tree Sparrow nested in an old stump in full view of the window, but the nest with three eggs was taken before the birds were



identified. I unfortunately spoiled the nest, thinking it belonged to *Passer domesticus*.—JULIAN G. TUCK (Tostock Rectory, West Suffolk).

[Having opened our pages to the subject of "Garden Lists of Birds," and drawn attention to the interest attached to same, our space will not allow the insertion of further lists.—ED.]

#### REPTILIA.

Smooth Snake in the New Forest.—I can confirm the experience of my friend Mr. Corbin regarding this interesting reptile. My house stands on the edge of Beaulieu Heath, in the Forest, and on July 6th, 1894, a beautiful specimen was caught crawling up a laurel bush in our garden. I intended to take it to the Zoological Gardens, but it escaped. It was freely handled, and made to exhibit itself on the dining-room table, but did not defend itself by stinking. Hampshire now claims all the British Reptiles and Batrachians excepting the Turtles and the Edible Frog, but the latter has been introduced into the marshes of the Itchen by Mr. T. A. Cotton, of The Mount, Bishopstoke.—J. E. KELSALL (East Boldre, Southampton).

#### PISCES.

Thresher Shark and Angel-fish at Lowestoft.—During a recent stay at Lowestoft, on the morning of Sept. 11th, I saw a freshly-killed Thresher, *Alopias vulpes*, which was landed from the smack 'Florence and May.' There had been an unusually large take of Mackerel during the previous night, and the fishermen told me that the shoals were met with about twenty miles from Lowestoft. The Shark measured 42 in. in the body, and the upper lobe of the caudal fin exactly another 42 in. There was quite an unusual number of Angel-fishes, *Rhina squatina*, also landed during the three weeks of my stay; I must have seen at least four or five. The fish-wharves at Lowestoft always repay a visit, and I have no doubt many rare and interesting marine forms could be found in the refuse of the trawl-nets, as well as in the maws of the deep-sea fishes. On Sept. 29th the 'Hastings Girl' took a second specimen of the Thresher in her Mackerel nets, which was also landed at Lowestoft, and I believe sent to London; it was much larger than that previously taken, measuring 6 ft. in the body and the same in the whip-like tail, or 12 ft. in all.—THOMAS SOUTHWELL (Norwich).

#### INSECTA.

Wasp, Tipula, and Spider.—My attention was recently drawn to the struggles of a Wasp and a *Tipula* (Daddy Longlegs) in a Spider's web. I at first thought that they were fellow-captives, and that the Wasp had attacked the *Tipula* under the impression that he was the author of his

misfortunes; but it soon became apparent that this was not the case, as the Wasp quickly stripped the legs and wings off his prey, shook himself free of the web, and carried off the carcase in his mouth. The owner of the web was an interested spectator, but did not take any part in the contest.—R. H. RAMSBOTHAM (Meale Brace Hall, Shrewsbury).

[This communication prompts an interesting question as to the combative power of Spider *versus* Wasp. The recorded verdict is somewhat ambiguous, as the few—probably not nearly exhaustive—notes here appended clearly show. *For the Spider*: The Rev. W. F. Kirby, quoting from Walck ('Araneid de France,' p. 202), relates that one species, *Segestria perfida*, "has been seen even to seize a very active Wasp." The late Prof. Westwood ('Mod. Class. Ins.' vol. ii. p. 247) states that he once observed "a Spider, belonging to the genus *Thomisus*, sucking a Wasp which it had killed. *For the Wasp*: In 'The Zoologist' (1859, p. 6732) is to be found the account of an experiment made by putting a Wasp into a Spider's web. In this case the Spider, who made a rush at the Wasp, was stung in its abdomen, and fell from its web dead upon the ground. In 'Nature,' vol. xvii. p. 381, is an account from the Piræus, describing the chasing and killing of a large hunting Spider by a species of Wasp, probably a *Pompilus*. There is a record in 'The Zoologist' for 1887, p. 310, of an observation made in Ceylon of a Mason Wasp—a large common species—seen dragging a large *Tarantula*, which it had paralysed, across a path. Belt ('Naturalist in Nicaragua,' p. 313) refers to Wasps storing their nests with Spiders, after benumbing them with their stings.

It will thus be seen that in this, as in most other branches of zoology, actual observations on the life-histories of animals are still greatly desiderated. It is probable that a conflict between Wasp and Spider depends in issue very largely on the species, and more particularly the genus, to which each belongs. Both Wasps and Spiders, as well as other animals, vary greatly in their habits and pugnacity; and hence—when possible—the observing naturalist should fortify himself with the additional knowledge imparted by the taxonomist, and thus add to the details of the occurrence the correct names of those which took part in it.—ED.]

## NOTICES OF NEW BOOKS.

*Life in Early Britain; being an Account of the Early Inhabitants of this Island and the Memorials which they have left behind them.* By BERTRAM C. A. WINDLE, D.S., &c. David Nutt.

ZOOLOGISTS who feel an interest in their own species, and would study some of the early factors which have served to mould the British race, will find this little book very helpful, and it is one that was much needed. It sketches the prehistoric and eohistoric eras in this country, from Palæolithic times to the Saxon occupation, and spans the period commencing when human weapons consisted of unpolished stone implements, to the iron sword, the coat of mail, and the Anglo-Saxon Church.

But these annals cannot be confined to a purely archæological consideration, nor can they be properly separated from the details of the early British fauna. Palæolithic man, who has not left an arrow-head to show us that he was acquainted with the use of the bow, lived in a Britain—still connected with the Continent—that would now be considered a hunter's paradise. The Hippopotamus, two species alike of Elephant and Rhinoceros, a cave Bear and a cave Lion, Hyæna, Bison, wild Horse, and Reindeer formed a wild Game which was ample for these poorly equipped savages "to chase and be chased by." Even in later Neolithic times, when England had been separated by the sea from the Continent and from Ireland, and primitive man, though still in the Stone Age, was better armed, although the larger animals had become extinct, there was still a fine mammalian fauna one would fain have seen. Our author here wisely quotes the graphic narrative of Boyd Dawkins. There were "wild boars, horses, roes and stags, Irish elks, true elks and reindeer, and the great wild ox, the urus, as well as the Alpine hare, the common hare, and the rabbit. Wolves, foxes and badgers, martens and wild cats were abundant; the brown bear, and the closely allied variety the grisly bear, were the two most formidable competitors of man in

the chase. Otters pursued the salmon and trout in the rivers, beavers constructed their wonderful dams, and water rats haunted the banks of the streams." Mr. Windle adds the remark that while many of the animals just mentioned are no longer to be found in England, only one, the Irish elk, has become absolutely extinct.

With the Bronze Period, synchronous with Celtic immigration, of which a later band—the Brythons—have been located in the fourth century B. C., we come to historic facts, and Pytheas, who then visited the country, has given his impressions. It was probably then, as our author describes it, covered with vast forests and marshes, "overhung with constant fogs and deluged with frequent rains." Pytheas was probably the first to mention the British beer, known by a Celtic term *curmi*, now *cuirm* in Irish, and *cwrw* in Welsh, and which the Greek physicians warned their patients against, as "producing pain in the head and injury to the nerves."

We cannot further pursue a subject which not only appertains to Anthropology, but also to the general zoologist, altogether relating to our British fauna, and affording many side lights to the actual status of our animal life of to-day, man included. The size of the book, some 230 pages only, of course denotes that it is suggestive to further reading elsewhere, and a very fair and useful bibliography is given as an appendix. (The name Dr. Beddoes, as written throughout, might with advantage be deprived of its ultimate consonant). Another useful appendix is a County List, giving localities where many primitive remains may be observed.

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*The Vivarium, being a Practical Guide to the Construction, Arrangement, and Management of Vivaria, containing full information as to all Reptiles suitable as Pets, &c.* By the Rev. GREGORY C. BATEMAN, A.K.C. L. Upcott Gill.

THOUGH animals and their habits are of course best studied under natural conditions, there are very many living creatures which can only be observed in captivity by naturalists. Certainly many of the reptiles included in this comprehensive volume—Crocodiles and Pythons, for example—are not usual out-door studies,



and the second are not commonly encountered, though far from scarce in proper localities. We speak of our own experience, having resided in two good Python haunts—the Straits of Malacca and the warm eastern regions of South Africa; and though Malays frequently brought us these reptiles in the first locality, having also inspected an ample local supply in a dealer's shop in Durban, and purchased a fine specimen from a Transvaal "transport rider," we still never met with a specimen under natural conditions during many forest rambles in both countries.

Very much is to be learned in the successful prevention of voluntary starvation by reptiles in captivity. Our own experience with Snakes, Monitors and other Lizards is a tragic one; no contumacious prisoners ever refused food with equal persistency. Dr. Bateman fully describes the method of necessary artificial feeding, but to seize an 18-ft. Python and force food down its throat is at least a somewhat heroic undertaking, for though a Python is non-poisonous, it can still bite (we have seen the effects of its teeth) and knows how to dispose of its body. We should have been very glad to have possessed the book when sojourning among a rich reptilian population, for it is full of good hints, practical advice, and information as to constructing Vivaria. The illustrations are very satisfactory, and the long descriptive enumeration of Reptiles and Amphibians—for which the writings of Dr. Günther and Mr. Boulenger have been consulted—which may be kept, really constitutes a zoological handbook in which many natural history observations are compiled. No doubt a specialist would find it necessary to make some comments, but books must be judged by the purpose for which they are written, and accuracy in every detail can only be expected and made imperative in the actual thesis of the author. Though we cannot all afford to find the necessary accommodation for Crocodiles and Pythons, Tortoises and Terrapins, Bull Frogs and Salamanders, in comparison to which Orchid-growing would be an economy, there are still very many interesting, small and easily procured reptiles whose housing and observation could not fail to contribute—as they have already done in the past—many of the fresh facts which slowly aggregate to a future knowledge of the real Natural History of Animal Life.

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*A Bibliography of Gilbert White, the Natural Historian and Antiquarian of Selborne.* By EDWARD A. MARTIN, F.G.S. Roxburghe Press.

THE 'Natural History of Selborne' has passed beyond the appreciation and love of naturalists and long since become an English classic, read and to be read as long as our language survives. Whilst science will be coexistent with humanity, few scientific books are perused after a century, save by specialists and the curious, for science is ever advancing, and her publications only describe the area to her new landmarks. Art and literature produce more immortal productions: a great picture is for all the time it can be preserved; a noble tragedy or fine poem receives the imprimatur of humanity; while a few books are never lost and seldom forgotten. Gilbert White, writing in an obscure parsonage, on the simple annals of its surrounding animal life, with no desire for fame, and little expectation of literary canonization, has cast a spell over all readers and charmed every lover of books. The interest in his writings is soon combined with a regard for the author, and we seem to have a personal acquaintance with White as we read him, as well as with the various animals whose life-histories he did so much to unravel and described so well. He was the Nestor of British zoological observers, and incited the study of Natural History in every lover of nature who had the aptitude and industry of observation combined with a facility to record such observations.

Zoology in a very important branch is thus open to all classes, to the leisured squire as well as to the recreative artizan, and an intimacy with the 'Natural History of Selborne' still inculcates the lesson, that in these Islands, as well as in the more prolific Tropics, the cataloguing of a fauna is not the sole end of the science.

The book has gone through many editions, seventy-three according to the investigations of Mr. Martin, commencing with the original edition in 1789, when the author was sixty-nine years of age,\* and within four years of his death, and ending with

\* Bloch, the ichthyologist, had reached the age of fifty-six when he commenced to write on ichthyological subjects.

Macmillan's American edition of 1895. Many competent editors have been engaged in the production of these editions, and as most of them have provided their own editorial notes without reproducing those of their predecessors, it would not be unwelcome to have yet another edition containing all the annotations which have been made from time to time.

The bibliography contributed by Mr. Martin is a most desirable and useful compilation, and will be of great service to librarians and all interested in Selbornian literature. The volume also contains a biography and much information concerning the village, church, and parsonage, which with all the attributes of obscurity have become through the delightful writings of a naturalist one of our well-known and not unvisited literary Meccas.

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*Bæveren (Castor fiber) i Norge, dens Udbredelse og Levemaade* (1896). Af R. COLLETT. Bergen: Griegs Bogtrykkeri. 1897.

THIS brochure on the Beaver in Norway is written by Prof. Collett, of Christiania, and is "Separataftryk af Bergens Museums Aarbog, 1897." Scandinavian scientific literature not infrequently appears in the English language, and in the publication under notice Prof. Collett has not trusted to a general knowledge of Norwegian, in which it is written, but has appended an excellent English summary of its contents.

"The Beaver still belongs to the fauna of Norway, and will, in all probability, be retained amongst it well into the next century, provided only the small amount of care is taken in protecting it as hitherto." Even at the close of the seventeenth century the Beaver had begun to decrease in numbers, though up to the middle of the eighteenth century they were "probably still distributed through most of the woodland valleys, from the southernmost parts of the country, to the farthest confines of Finmarken," and a great number of names, to be met with almost everywhere throughout the land, still bear the designation of the Beaver (Bjor-, Bjur-, Böver-, &c.)\*

\*In France we have similar survivals, bearing witness to its wide distribution in that country, as Bièvre, Beuvron, Beuvray, &c. In this country, Beverley, Bevere (near Worcester), and Nant Françon (the glen of the beavers), in North Wales, are cases in point.

“The occurrence of the Beaver in Norway at the present time is chiefly confined to the Stifts of Christiania and Christiansand (the Amt of Nedenæs, as well as that of Lister and Mandal) . . . The largest tribe is at present located in the middle and southern parts of the river Nisser (or Nid), in Nedenæs Amt.”

In 1883 Professor Collett estimated the number of surviving Beavers as about a hundred, and we are glad to read that “it may be regarded as probable that, since that time, the number has been maintained, or possibly somewhat increased.”

Twelve photographic plates afford beautiful representations of the natural homes and tree-felling powers of this once abundant animal.

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*The Concise Knowledge Natural History.* By R. LYDEKKER, B.A. F.R.S.; R. BOWDLER SHARPE, LL.D.; W. F. KIRBY, F.L.S.; W. GARSTANG, M.A., F.Z.S.; B. B. WOODWARD, F.L.S., F.S.S.; F. A. BATHER, M.A., F.G.S.; R. KIRKPATRICK; R. I. POCOCK; and H. M. BERNARD, M.A., F.L.S. Hutchinson & Co.

DURING recent years there have been published several illustrated general Natural Histories. We might mention, in sequence, Wood's, Cassell's, and the “Royal.” Of handy, condensed, or concise volumes on the subject, Baird's ‘Student's Natural History’ still held the field for handy reference to a busy man, a student, or a specialist outside his own study. Baird's volume referred to the “Animal, Vegetable, and Mineral Kingdoms”; and at least Plants should form a subject when the term “Natural History” is employed. We therefore prefer to consider this publication as devoted to a concise knowledge of Zoology, and if we cannot rely on the information provided by such a specially strong staff of authorities as have written the volume under notice, then should our faith be in vain. Most of the names of the writers are household words on their subjects. With Lydekker on Mammals, and Sharpe on Birds, and Woodward on Mollusca, we recognize old friends and old instructors; while the names of Garstang, Bather, and Bernard are linked with the groups they study. Mr. Kirby has written much on insects, but



we do not remember him having previously essayed the description of the Crustacea. Mr. Pocock has undertaken the subject "Vermes," and Mr. Kirkpatrick has contributed a necessarily short account of the Bryozoa, a term he prefers to Polyzoa.

This book is an undoubtedly useful manual for reference, and should find a place on most shelves. Journalists might well, and with advantage, keep it handy.

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*Citizen Bird: Scenes from Bird-Life in Plain English for Beginners.* By MABEL OSGOOD WRIGHT and ELLIOTT COUES. New York: The Macmillan Company. London: Macmillan & Co. Limited.

THIS book is dedicated to "all boys and girls who love birds and wish to protect them." The birds referred to in conversational method, recalling our 'Sandford and Merton' of long ago, belong to the North American Continent; and the name of Dr. Elliott Coues is sufficient for those critics who would deprive children of a book calculated to foster a love of the subject because of some errors in nomenclature. We still think a natural history publication may be too elementary in style, and that a young naturalist will grapple with and surmount many difficulties when his heart is in the subject. The merits of this work are its scientific accuracy, its illustrations, a short but clear description of each bird at the end of its conversational ordeal; and the last chapter, which is devoted to an orderly review of the birds referred to, "each bearing its scientific name, which the wise men write in Latin."

## EDITORIAL GLEANINGS.

THE British Museum Blue Book, giving among other returns a "Statement of the Progress made in the Arrangement and Description of the Collections, and an Account of Objects added to them in the year 1896," has been issued. Its perusal leaves no doubt as to the prosperity of our great institution, and is as satisfactory to the zoologist as to the British ratepayer. To really estimate its present flourishing condition it may be well to refer to the estimation in which it was held some seventy years ago. In the first number of the first volume of 'The Magazine of Natural History,' published in 1820, a writer thus expresses himself:—"There is no country that has the same facilities for procuring objects of natural history from every region of the globe as Great Britain; there is no country where larger sums of money have been expended to procure them; and yet there is no country in the civilized world where there are fewer facilities offered to the student of natural history than in England." Again, and in the same volume, we read:—"The zoological collections in the British Museum may be briefly dismissed. The whole collection of insects is contained in four small cases; nor are these completely filled. The birds and mammiferous quadrupeds are arranged according to the order of Linnæus, but want of room prevents their being placed in situations sufficiently accessible for inspection. The species of quadrupeds are not numerous, owing, I believe, to the decay which too speedily takes place in stuffed specimens, particularly in the atmosphere of London. From the liability to decay, the difficulty with which they are replaced, and the great space they occupy, stuffed specimens of quadrupeds might perhaps be conveniently dismissed from our collections, except of such rare animals as can seldom, if ever, be brought alive to Europe."

An inspection of our National Galleries is now the best answer to the warnings of this Cassandra; well-stocked entomological rooms represent the four badly filled small cases; the birds are unrivalled, and our British ornithological fauna may be said to be seen in a state of nature; while as to the boycotted quadrupeds, the mammals are one of the strong features of the institution, and are rapidly becoming too numerous for the sole hands of the talented mammalogist in charge. It is impossible to allude to the many acquisitions of the last year, but we may draw attention to some of the principal additions derived from "Purchases," "Bequests," and "Presents."

*Mammalia*.—A valuable series of Deer and Antelopes from the collection of the late Sir Victor Brooke.

*Aves*.—First in the list may be mentioned the Seebohm Collection, bequeathed by that well-known ornithologist, comprising, in skins, some 16,950 specimens, and including 235 skeletons. By purchase the collections were also enriched by the fine series of birds, chiefly Woodpeckers, brought together by the late Mr. Edward Hargitt; the Steere Collection of Birds from the Philippine Islands; and a fine collection of Fossil Bird remains from Patagonia, collected by Señor Ameghino.

*Insecta*.—Messrs. Godman and Salvin, who are among the most munificent donors, have presented 6192 Malacoderm Coleoptera from Central America; 4766 Butterflies (*Pierinæ*), all Old World species; 1375 Butterflies (*Satyrinæ*), and 610 *Sphingidæ*, and *Castniidæ*, from Central America. Mr. Godman has also presented the collection of British Hymenoptera made by Mr. Peter Cameron, comprising 2600 specimens, besides numerous microscopic preparations, larvæ, drawings, &c. There have also been purchased the Power Collection of British Coleoptera and Hemiptera, and the collection of Oriental Hymenoptera formed by Col. C. T. Bingham.

Specimens representing the life of the past, as well as that of the present, have been largely added. Lady Prestwich has presented the entire collection of Fossils brought together by her husband, the late Sir Joseph Prestwich; Mrs. Crawford Williamson has given ninety-three microscopic slides illustrative of works on the Recent Foraminifera by her husband the late Prof. W. Crawford Williamson; and Mr. G. Shrubsole has been the donor of 460 specimens of Palæozoic Polyzoa which belonged to his father, the late George William Shrubsole; while from Mrs. Pengelly have been received about 400 fossils selected from the collection of her husband, the late Mr. William Pengelly.

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WE recently (pp. 387-8) were able to report on the flourishing condition of both the Museum of Comparative Zoology at Harvard College and the Museum of the Chicago Academy of Sciences. We are, however, sorry to see by the 'Ann. Rept. Smiths. Instit. to July, 1895,' published in 1896, and just received, that the Secretary writes in a much more pessimistic manner on the finances and capacity of the National Museum at Washington:—"The problem of even providing shelter of any kind for the vast amount of material daily received from persons interested in the growth and work of the Museum still remains unsolved. The Institution is placed in an embarrassing position. It has been designated by law as the only depository of collections offered to, or made under the auspices of, the Government, and cannot, under the law, refuse to receive them. The fact remains, however, that when accepted there is no suitable place in which to

store them, and no space in the Museum building to exhibit such of the objects as should properly be shown to the public. As I have already pointed out, there is probably no museum in the world in which so small a proportion of the objects worthy of exhibition is visible to the public, or in which the objects are crowded together so closely. It is now more true than ever that if another museum building as large as the present one were provided, it could be at once filled with specimens already on hand." We feel no doubt that our American cousins will be equal to the occasion.

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OUR well-known contributor, Mr. J. Steele-Elliott, has favoured us with the first instalment towards 'The Vertebrate Fauna of Bedfordshire.' This is not only excellently printed on good paper, but is also issued for private circulation, a most commendable instance of a true zoological spirit, and one that should meet with warm appreciation, especially as Bedfordshire "has received less attention than almost any other county." The work has commenced with the birds, and the author informs us that when complete it is expected that the first volume will be devoted to Aves, and the second volume will embrace Mammals, Reptiles, Amphibians, and Fishes. We trust nothing will interfere with the due completion of a very useful book.

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MR. T. D. A. COCKERELL has contributed to the 'Proc. United States Museum' a memoir on "The Food Plants of Scale Insects (*Coccidæ*)." The author remarks that two practical points may be emphasized—one, the unexpected number of Coccids found on many of the cultivated trees and shrubs; and the other, the frequency with which species dangerous to fruit trees will occur on ornamental plants, which may be carried from place to place, and be the means of disseminating the scales. "It must, of course, be understood that the plants given as the hosts of *Coccidæ* have been in very many cases so infested only since they came into cultivation. It would be very desirable to distinguish in every case between the endogenous and exogenous Coccids on a plant, and also between those exogenous in a state of nature, and those only so in cultivation. But to do this would require more information than we at present possess." This is a welcome memoir on the subject, bringing the bibliography up to date, and giving a botanical classification to these insect-pests.

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WE have received from Messrs. Adam and Charles Black a pamphlet written by J. C. Ewart, Regius Professor of Natural History, Edinburgh, on 'A Critical Period in the Development of the Horse.' We read that, according to the evidence obtained by the Royal Commission on Horse Breeding, it appears that about forty per cent. of the mares selected for



breeding fail to produce offspring during any given year. This is a very high percentage of failure, but from reports recently received it seems to be still higher in certain districts in India. The author discusses and describes the fœtal appendages in the Horse, and proceeds to show that "while at the outset the Horse embryo has the same simple apparatus as the Opossum, a stage is soon reached when more elaborate and more permanent nutritive appliances are provided." Further, "that when the new apparatus is being substituted for the old,—when the Opossum plan is coming to an end, and the more permanent appliances are barely in working order,—that at this critical period the Horse embryo may readily drag its anchor and escape—behave as if it were a young American Opossum or an Australian Kangaroo." We were not previously aware that "there is a case on record of a mare bringing forth twins, a foal and a mule. She was presented to a Jackass fifteen days after being served by a Horse."

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THE Belgian South Polar Expedition left Antwerp in August on the steamer 'Belgica,' which, after a mishap to the machinery, again started from Ostend. This expedition takes provisions for three years, much of it consisting of tinned foods. M. de Gerlache and his officers express absolute confidence in the success of the expedition. The 'Belgica' is a whaling vessel of 263 tons, barque-rigged, and with a speed of seven knots. For some months she has been lying at Sande Fiord, in Norway, and has undergone considerable alteration with the view of strengthening her for the rough work before her. She has been furnished with every sort of apparatus likely to facilitate the objects of the expedition. Soundings to any depth will be taken with the sounding-line invented by the Prince of Monaco; fishing will be possible at a depth of 4000 ft., and the animal life of the upper sea-beds will be made the subject of study. It is expected that the 'Belgica' will be absent about two years. The costs of the expedition are being defrayed by public subscription.

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BETWEEN seven and eight p.m. on Aug. 16th a flock of Wild Geese was observed flying in the air near the 'Nag's Head,' Holloway. They flew round once, and then made off in the direction of Camden Town, forming crescents in their flight. This is a sight very rarely seen in London.—('Westminster Gazette.')

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ONE of the finest private collections of horns from South Africa yet formed is now being arranged in the town museum at Brighton, where it has been placed on loan. It was got together on the spot by Mr. J. Rosen, and includes upwards of 270 pairs, representing every kind of horned

animal to be met with south of the Zambesi. It is particularly rich in horns of the Koodoo, Eland, Klipspringer, and Gemsbok, or *Oryx*, which some identify with the Unicorn, its two horns often resembling in profile a single horn.—('Daily News.')

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ACCORDING to the 'Globe,' a subterranean laboratory has been opened at the Museum of Natural History, which is situated in the Jardin des Plantes, Paris. It has been created in order to study the influence of darkness on animals, and discover by experiment how animal species are thus modified. In short, it is an attempt to apply the doctrine of evolution by experiment; and as such must be regarded as unique in the world—a new departure, in fact. The idea seems to have originated in the researches made not long ago on the animals of the Catacombs of Paris.

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IN the 'Records of the Australian Museum,' vol. iii. No. 2, is a description, by Mr. R. Etheridge, Jun., of "An Australian Sauropterygian—*Cimoliosaurus*—converted into Precious Opal." The search for Opal in the Upper Cretaceous at the White Cliffs Opal-field on Momba Holding, about sixty-five miles north-north-west of Wilcannia, Co. Tungnulgra, has been signalized by the discovery of many beautiful examples of the entire conversion of the shelly envelopes of Pelecypoda and Gasteropoda, the internal shells of Belemnites, and Reptilian remains into precious opal by a process of replacement. Among other examples, and pre-eminent for its beauty, is a bivalve in the possession of a jeweller of Melbourne, and "without exception one of the most beautiful conditions of fossilization I ever beheld." The Survey Collection, previous to the Garden Palace fire, contained an ammonite wholly converted into precious opal, six inches in diameter.

# THE ZOOLOGIST

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No. 677.—November, 1897.

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## DESCRIPTION OF, AND NATURAL HISTORY NOTES ON, THE BURMESE WILD BULL.

BY HENRY S. WOOD,  
Surgeon-Captain, 44th Gurkhas.

*Bos sondaicus* is found in some parts of Burmah, and also in Sumatra and Java. It occurs in great numbers in the huge forests and grass-lands which lie between the Manipur and Burmese territories, that is, in the Kubbo-Kalé valley; and my observations have all been taken from specimens which I have obtained there. In my various hunting trips I have only managed to bag three of these animals, one being a magnificent Bull, whose description and measurements I give in detail. Although plentiful, these animals are so shy and their senses of sight, smell, and hearing so acute, that they are very difficult to approach. The Burmese name for *Bos sondaicus* is "Tsoing" or "Tsine"; Manipuri, "Lumsun Angangha"; in Java it is known as the "Banting." It would be interesting to know whether the animals found in Java and Burmah are identical in all details of colouring, &c. This animal is a handsome beast, and is much dreaded by the Burmese, who seldom hunt it. The hill tribes, however, trap the animal in pit-falls, and sometimes shoot it with arrows poisoned with aconite. A wounded Tsine will charge viciously; and the only way to escape from it when unarmed is to lie flat on the ground. It strikes with its feet as well as with its horns, and can inflict

serious wounds, the tips of the horns being very sharp and, in Bulls, curved backwards. There is also this tendency of the horns to curve backwards in old Cows. The colouring of an adult Bull and adult Cow are so unlike that at first one would think they were different species. A separate description of each may, therefore, be useful. These animals are found in herds varying from ten to thirty in number; and in the large herds there are generally found two or three small Bulls whose heads are not worth obtaining. The largest horns, as is the case in other bovine animals, are found in solitary Bulls who keep to themselves, and only occasionally mix with the Cows during the breeding season. When the green grass sprouts up, after the yearly fires, the old Bulls wander over large areas, and seldom remain in the same locality for two successive days; while, like the Bison, they are almost always on the move, feeding as they go along, and only lying down during the day when the sun is hottest. The Tsine can go for days without water, and the Burmese say that they only drink once in seven days. I have come across herds in absolutely dry districts, miles away from water. Another peculiarity of the Tsine is that it does not seem to mind the bites of the Gad or Horsefly, with which the teak forests abound at the beginning of the monsoon. The wild Buffalo, which has apparently a much tougher skin, is almost driven mad by these pests, and is compelled to take to the rivers and swamps to avoid them; whereas the Tsine will never resort to the water, but prefers to lie down in the forest surrounded by these buzzing tormentors, when no doubt its long and bushy tail assists in driving off the blood-suckers. During the rains these animals betake themselves to the low hills, where they feed on the bamboo, with which the hills are covered; and after the yearly fires they all descend into the valley, and wander through the vast teak forests. Unlike the Bison, they never come down to the rice fields of the villagers, and this is probably owing to their extreme shyness. The Cow calves during the rains, and the young is of a light red colour, only one being produced at a birth. At the beginning of the rains Tsine are always to be found at the foot of the low hills, where they browse on the tender new bamboo shoots. These animals also travel great distances to visit the so-called "salt licks," one or two of which



are generally found in places where the species is obtained, though many of these "salt licks" are nothing more than a mixture of mud and water which has a slightly saline taste. These "salt licks" are also visited by hundreds of Parrots, Green and Imperial Pigeons; and also by Elephants, Bisons, Pigs, and Sambar. The Tsine is often shot at these places by the hunter, who squats up in a tree close by. Bison and Tsine are never met together in a herd, although I have found both beasts within the radius of a mile of each other. The spoor of the Tsine is heart-shaped, and very pointed anteriorly, quite unlike the track of a Bison: this is owing to the hoofs of the former being much more pointed and Deer-like. These animals, either when feeding or lying down, always have a sentry, generally a Cow. When lying down they generally rest in a circle; and when the sentry suspects danger she either stamps her foot or gets up; and with a "psheu" and a snort the whole herd stampede with their tails in the air. Thus alarmed they go miles before stopping, and it is useless pursuing them under such circumstances. They are always in good condition, although at times subject to cattle disease. All specimens which I have shot had splendid coats, smooth and shining, like that of a well-groomed horse. The skin is much prized by the Burmans for making shoes. The under parts of the body in one Cow were covered with small warts, varying in size from that of a pea to a hazel-nut. The neck of the Bull is generally covered with scars, the result of wounds received in combat. The genital organs, too, in the Bull, are covered with huge ticks. In the paunch of this animal, mixed up with the grass, I have seen hundreds of a peculiar looking parasite, which in some cases are in such numbers that the stomach seems to be lined with them. These parasites are bladder-shaped, one-fourth of an inch long, and are of two kinds—one red, and the other white; they seem to adhere to the villi of the stomach, and feed on the blood or its serum; each has a distinct sucker like a leech, but they die very soon after exposure to the air. I have seen the same parasite in the stomachs of other animals, Sambar, &c.; but notably in the Tsine and Eld's Deer, *Cervus eldi*. These parasites do not seem to affect the animal's health, as they were always well conditioned, sleek, and fat. The human stomach is also said

to be infected by this peculiar parasite, but I have never seen a case.

#### DESCRIPTION AND DETAILS OF BULL TSOING.

The general colour of this Bull was of a light red, fading and becoming lighter as the flanks and under surface of the body were approached; here the colour was almost greyish, intermixed here and there with white; the inside of the thighs



FIG. 1.—SKULL AND HORNS: BULL TSOING. Length of left horn,  $33\frac{1}{2}$  in. Length of right horn, 31 in. Girth of left horn, 17 in. Girth of right horn, 16 in.

was of a yellowish grey, where the skin was almost devoid of hair, and here also secretes an unctuous brown substance resembling the wax of the ear. The inside of the fore legs and under parts of the chest were of a greyish white, and the anterior portion of the fore leg from the knee upwards of a reddish black colour; this tint is also slightly marked in the hind legs. There was just a vestige of a dewlap, this being about three inches in its greatest breadth.

Under surface of the chest a lightish yellow colour, intermixed with grey. The hair of the skin was short and glossy in the redder parts, but coarse and thick in the grey parts; on the belly the skin was about half an inch thick, but nearly one inch thick on the neck; the surface of the body pitted and scarred here and there from bites of insects and wounds received in battle; there were four rudimentary mammæ, half an inch in length, situated in front of the scrotum, two on each side of the mesial line, and of a saffron colour. The scrotum was covered with a fine silky greyish hair. The upper part of the head anteriorly and at the sides was of a tawny white; the under parts were much lighter, being almost grey; the muzzle greyish black; the neck reddish brown. Lips greyish white, covered with black bristles; and the lower lip had a fringe of long grey hairs projecting from its under surface. The tail has a distinct reddish brown tuft. The ears are comparatively small, when compared with those of the Cow: upper parts of ears reddish brown, posteriorly greyish white, tips and anterior edges jet black; greyish white hairs of considerable length projecting inwards from the anterior border; the interior of the auricle is of a saffron colour; the left ear was split in four places, the largest being six inches in length; colour round eyes greyish white, eyelashes black; fleshy parts of nose also black. Eyes: irides brown; cornea bluish white. The incisors of the lower jaw were loose and considerably worn down, showing that the Bull was probably an old one, perhaps twenty years of age. There was a most curious condition at the upper part of the head over the frontal region, where, instead of a skin covered with hair, there was a thickened portion of skin devoid of hair, and of a greyish black colour; its general surface was smooth, but in patches very warty like the skin of a Rhinoceros. This curious portion of skin extended like a chaplet over the head; the area it occupied would be represented in the dry skull by lines drawn between the upper parts of the orbit and between the bases of horns at the top of the skull; between the horns this cuticle formed a distinct projection or crest; this covering was soft on pressure and slightly moveable. This skin evidently forms a most excellent cushion for breaking the shock of any concussion on the forehead, *e. g.* as in fighting. The reason of its being present in the Tsine is that the bones of the skull are

much thinner and less massive than those of the Bison or Buffalo ; it is merely a protection to the brain. This skin on dissection was found to be more than two inches thick, and very adherent to the bone ; the horns, too, are evidently secreted from the outer part of this cuticle. There is a distinct dorsal ridge, which ends abruptly about the middle of the back, but no distinct hump.

The above description is taken from a Bull which I shot at Tammu, N.E. Frontier, on the 28th of June, 1896.

*Measurements as follows:—*

Height at shoulders .....	15 hands	FT.	IN.
Length (nose to tip of tail over back) .....		14	0
Length (nose to tip of tail across body) .....		11	9
Length of head and neck (above) .....		3	10
Length of head and neck (below) .....		3	0
Length of tail.....		2	11
Length of ears .....		0	10
Girth (middle of body).....		7	10
Girth (chest) .....		7	0
Girth of fore leg above knee .....		0	15
Girth of hind leg above hock .....		1	6
Girth of neck (middle) .....		3	10
Girth of haunch.....		1	11

SKULL AND HORNS.

Length of skull anteriorly .....	1	11½
Distance between orbits .....	1	2
Breadth of forehead (between horns).....	0	10
Length of left horn (base to tip round curve) .....	0	33½
Length of right horn (base to tip round curve) .....	0	31
Girth of right horn (base) .....	0	16
Girth of left horn (base) .....	0	17
Distance between tips .....	0	26¾
Distance between convexities.....	0	38½

HEAD.

Girth round muzzle .....	2	1
Length of eye-slit .....	0	3
Length of nares .....	0	2¾
Girth of head (above eyes) .....	3	4½

FEET AND LEGS.

Length of fore leg (hoof to knee) .....	1	6
Length of hind leg (hoof to hock) .....	1	10
Length of hoof, fore foot (under surface) .....	0	6
Length of hoof, hind foot (under surface) .....	0	5
Breadth of hoof, fore foot .....	0	4
Breadth of hoof, hind foot .....	0	4

\* Measured before—J. R. Melluse, Lieut. ; G. Warneford, Lieut. ; H. S. Wood, Surg.-Capt.



The section of a horn represents more an oval than a cylinder. The general colour of the horns is of a semi-transparent green, except the tips, which are jet black for about six inches, and the bases, which are very rough, irregular, gnarled, ringed, and rugged, and also black in colour. The horns gradually taper to a very sharp point; their direction being—(1) backwards and outwards; (2) forwards and upwards; (3) backwards, the tips looking almost directly back.

#### DESCRIPTION AND DETAILS OF COW TSOING.

The description is taken from a Cow which I shot at Tammu (Kubo-Kalé Valley) on the 28th of June, 1896. It was an extremely handsome, well-bred looking beast, in appearance half Antelope, half Cow.

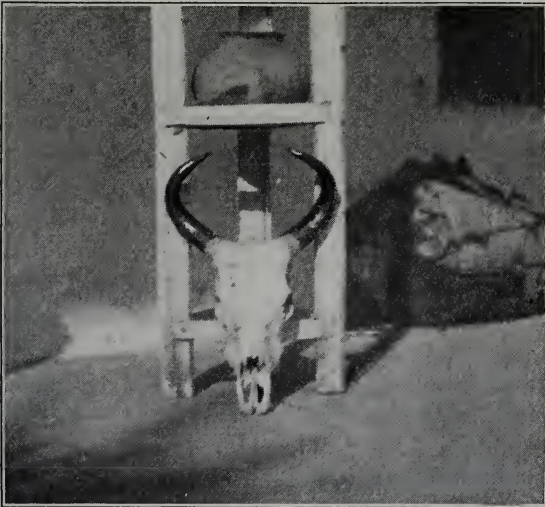


FIG. 2.—SKULL AND HORNS: COW TSOING. Length of left horn, 15 in. Length of right horn, 15½ in. Girth of left horn, 7½ in. Girth of right horn, 7½ in.

The general colour was light red, but as the upper parts near the back and buttocks were approached the red became darker, being almost a reddish brown. As the underparts were reached the red colouring became fainter and fainter, gradually merging into

white. The inside of fore legs and hind legs as also the belly were of a whitish colour; this was also noticeable on the under surface of the neck and on the lower jaw. The fore legs and hind legs for about four inches above the knee and hock respectively to the fetlock were of a whitish colour. There was a distinct dorsal ridge, which terminated abruptly about the middle of the back, where there was a distinct projection. Two very noticeable features were:—1. A dark black band which passed backwards along the spine from the termination of the dorsal ridge to the root of the tail; this band was about two inches broad at its commencement, but gradually tapered off until it was lost at the root of the tail. 2. A large round white patch on the posterior aspect of each buttock; each patch being a foot in diameter. The upper portions of the head were of a light red colour; the white rings noticed by Col. Pollock round the eyes were not present. The head was very game-like; there was a well-marked reddish black tuft at the end of the tail. The ears were very large, expanded at the extremity, and mobile; they were of a light red colour, the anterior borders being fringed with long greyish white hairs. The lips and muzzle were of a greyish white colour. The hair of the skin was short, smooth, and glossy. The skin close to the mammæ and that of the inside of the ears was destitute of hair, and of a light yellow colour. The great length of the animal was a striking feature.

*Measurements of the above were as follows:—*

	FT.	IN.
Height at shoulder .....	3	10
Length (nose to tip of tail over back) .....	13	7
Length (nose to tip of tail across body) .....	13	2
Girth round chest .....	5	9
Girth round belly .....	6	3
Girth of fore leg (thickest part) .....	1	6
Girth of hind leg (thickest part).....	2	6
Length of head and neck above .....	2	6
Length of head and neck below .....	1	7
Girth of middle of neck .....	2	11

DRIED SKULL.

Length anteriorly .....	1	5 $\frac{3}{4}$
Distance between orbits .....	0	7 $\frac{1}{2}$
Breadth across forehead .....	0	7
Distance between horns (top of skull) .....	0	6

HORNS.

Length of right horn .....	0	15 $\frac{1}{2}$
Length of left horn .....	0	15

	FT.	IN.
Girth of right horn (base) .....	0	7½
Girth of left horn (base) .....	0	7½
Distance between tips .....	0	7½
Distance between convexities.....	0	16½
Length of the ear .....	0	11

The colour of the horns was of a semi-transparent blackish green; the colour of the tips for about four inches was of a jet black. On minute examination numerous fine greyish white lines were seen running longitudinally downwards through the dark horny material; posteriorly near the base of the horns the colour was almost yellow. At the bases the horns were distinctly ringed in a regular manner; the horns above these rings were beautifully smooth, and terminated in fine tips. In the fresh specimens, each horn terminated at the base in a bulbous prominence, owing to its being covered by a soft pachydermatous skin devoid of hair, and from which the horn was evidently secreted. The direction of the horns was:—(1) upwards and outwards; (2) inwards; (3) upwards and slightly backwards. In an older Cow which I shot, this backward direction of the horn was well marked; the same tendency—as noted before—occurs in the Bull.

The chief points of difference between the Bull and Cow will be found in the following table:—

BULL.	Cow.
1. Colour dark red; parts, especially about head, greyish white.	1. Colour light red generally; under parts white.
2. No dark line extending from termination of dorsal ridge.	2. Dark line present.
3. Ear short.	3. Ear long, expanded.
4. Length short.	4. Longer in proportion to height.
5. White patches on buttocks posteriorly absent.	5. White patches present.
6. Black colouring on anterior aspect of fore legs present.	6. Black colouring absent.
7. Black tip and anterior edges of ears present.	7. The same absent.
8. Chaplet of thick cuticle over frontal bone present.	8. The same absent.
9. Eyes ordinary.	9. Eyes large and prominent.

## A WALK ACROSS LAPLAND.

BY H. C. PLAYNE and A. F. R. WOLLASTON.

ONCE more again this year the 1st of August saw us on our way northwards, wishing indeed that we could have started three months earlier, but ready to make the most of the only time at our disposal. As we travelled over a considerable extent of country, it will be better not to give a list of all the species of birds we met with, but to write some account of what seemed to us of most interest.

From Trondhjem we went to Hammerfest, through fjords which abound in bird-life; but the deck of a steamer is not a good point of observation, for one is only able to have a passing glimpse of a bird before it is out of sight. Richardson's Skua, *Stercorarius crepidatus*, was abundant, and we had excellent views of many a chase which ended in an unfortunate Tern giving up its prey. Of Buffon's Skua, *S. parasiticus*, with its long tail, we only saw one. We spent a short time on shore at Hammerfest between the hours of midnight and 2 a.m., and though the days of the midnight sun were past, we saw two Dippers, *Cinclus aquaticus*, playing about the stones of a stream at 12.30 a.m. In the afternoon of the same day we landed at the head of the Alten fjord, and began our walk, which was to bring us over the watershed into Finland, and to the northern shore of the Gulf of Bothnia.

Bramblings, *Fringilla montifringilla*, were very numerous among the birch trees, and we could nearly always hear the call-note of *Parus borealis*. This bird has also a song quite unlike any song of *P. palustris* that we had ever heard. The Lapp Tit, *P. cinctus*, was often with his cousin, but he seemed a much more silent bird. These were the only *Paridæ* that we met with until we reached Tervola, half-way between Rovaniemi and Torneå, where a Great Tit, *P. major*, was seen searching a window-frame for insects. On a small lake not far from Alten was a Brent Goosc, *Bernicla brenta*, with five young birds.



On Aug. 6th we climbed above the forest growth, and walked over the open fjeld, where the ground is partly covered with dwarf birch, and there are many lakes and swamps. Here were Redshanks, *Totanus calidris*, and Greenshanks, *T. canescens*, and other waders we were unable to identify. Golden Plovers, *Charadrius pluvialis*, were numerous, and their very melancholy whistle could be heard throughout almost all that country. We had the delight, too, of seeing Dotterels, *Endromias morinellus*, and three young birds in down. Not far from them was a Shore Lark, *Otocorys alpestris*, which seemed rather shy, and ran along the ground in front of us; we saw one more on the next day.

In the evening, at the stooe Suoluobme, a Wood Sandpiper, *Totanus glareola*, was shot. About the farms and hay-huts there was generally a crowd of Snow Buntings, *Plectrophenax nivalis*, so tame that they would run on the ground close to our feet. They were a pleasing substitute for the House Sparrow, a bird we did not see until we were thirty miles south of Kittila. Bluethroats, *Cyanecula suecica*, were very abundant where there were any bushes in damp places. A colony of Sand Martins, *Cotile riparia*, nested in a steep bank of the Alten river.

On a small pool of shallow water at Kautokeino we found three Grey Phalaropes, *Phalaropus fulicarius*, swimming with a buoyancy which was beautiful to see; while at the same time there were standing at the edge of the water a Ringed Plover, *Ægialitis hiaticula*, a Temminck's Stint, *Tringa temmincki*, and a Ruff, *Machetes pugnax*.

At Sieppa, a small Lapp settlement near the Finnish frontier, were hosts of House Martins, *Chelidon urbica*. The Lapps and Finns give these birds a warm welcome, and put up ledges under the eaves of their wooden houses, on which the Martins build their nests as closely together as they can be packed. Round each small farmhouse the birds could be seen in hundreds busily feeding young in the nests. These wooden houses, usually several miles apart, seem to be the only suitable nesting places for House Martins in the country. After leaving Sieppa, just before crossing the watershed, we came upon a flock of Whimbrels, *Numenius phæopus*.

For almost all the rest of the walk we were in forest, and here most noticeable was the absence of the Great Black Wood-

pecker, *Picus martius*. Last year we saw many of these birds near Rovaniemi, but during this summer, although we passed through a great deal more country, we did not hear or see a single specimen. *Picus major* was abundant, and we on several occasions heard and sometimes had glimpses of a bird which was no doubt *P. minor*. One day, too, between Muonioniska and Kittila, a male Three-toed Woodpecker, *Picoides tridactylis*, flew to a pine tree only a few yards off, and gave us a most excellent view of himself. Frequently, too, in the forest, Siberian Jays, *Perisoreus infaustus*, would come round to inspect us, flying with noiseless flight from tree to tree, and making at times curious though not unmusical sounds.

The country near Muonioniska seems to be much visited by collectors, for we found several of the natives with nests and eggs which they wished to sell. In a large swamp in this district, into which we wandered through losing our path, we saw two Cranes, *Grus communis*, which flew about uttering discordant cries—perhaps it was the swamp in which Wolley found them breeding—and on Aug. 26th, near Tervola, we saw three more of the same species migrating southwards.

We were not fortunate enough to see a flock of Waxwings, *Ampelis garrulus*, again, but as we were following a road near Rovaniemi one bird perched on the top of a pine close to us, and remained there a short time chattering in his curious way.

By the river banks, and in the clearings near the farms, were many Wagtails of three species (*Motacilla alba*, *M. flava*, *Budytes borealis*). A young *M. flava* was shot on Aug. 19th, only twenty-five miles south of Kittila. The Meadow Pipit, *Anthus pratensis*, was very common throughout our walk.

We reached Rovaniemi a week later than last year, and found the river crowded with logs, which seemed to have driven many of the Ducks away. Chiffchaffs, *Phylloscopus collybita*, were there singing again after their moult. On our way southwards from Rovaniemi we saw a Great Grey Shrike, *Lanius excubitor*, very near the place where we saw one last year, but he flew off before we could decide to which of the two races he belonged.

We were especially pleased to make sure of a bird which we unwittingly included in our list last year on rather scanty evidence, because we are told on the best authority that it has not

been recorded so far north. On Aug. 25th, between Jankala and Takkunen, about twenty miles south of Rovaniemi, we had a good view of a flock of Siskins, *Chrysomitris spinus*, feeding on the birch trees by the roadside. There was no doubt about them, but in order to have some proof we thought we had better shoot one; however, luckily for the bird, the shot was unsuccessful.

It may be worth recording that on the road between Kemi and Torneå we caught a Common Viper, which moved away sluggishly, but was vicious enough when caught; it was the only Snake we saw. On Aug. 26th we reached Torneå, and brought our walk to an end, for it was necessary to travel home quickly by steamer and rail.

THE INLAND BREEDING OF THE RINGED PLOVER  
IN NORFOLK AND SUFFOLK.

BY W. G. CLARKE.

THE Ringed Plover is chiefly known to ornithologists as a bird of the sea-shore, where its exceeding rapid movements and inconspicuous colouring render it difficult of observation. By far the greater number nest in such localities, but year by year, even before the return of spring, a small band migrate inland, and on the heaths and warrens of the Norfolk and Suffolk "breck" district undertake domestic responsibilities. It is a difficult task to estimate with any degree of accuracy the numbers of these heath-loving birds, but it cannot be very large. So far as I have been able to ascertain personally or by correspondence the Ringed Plovers only nest in eight localities in Thetford district, although they are likewise found in the Lark valley. These are Lakenheath, Wangford and Thetford Warrens, and Thetford, Barnham, Santon Downham, Wretham and Roudham Heaths. The two first named are on the border of the fenland, and Wangford Warren seems to be most favoured in point of numbers. Two or three pairs respectively are all that seem to nest upon Thetford, Barnham, Wretham, and Roudham Heaths. Previous to the spring of 1897 the latter was unknown to me as a breeding locality of the Ringed Plover; but three pairs then occupied a small "breck" in a corner of the heath. From the accounts we possess, it would seem that the Ringed Plover has become sadly diminished of late years in its local breeding haunts. Salmon termed them "very abundant" at Thetford in 1836. In 1863 they were "seen in small numbers" at Elveden, presumably on Thetford Heath, the locality they now occupy.

Certain theories have been advanced to account for the inland nesting of this bird; but that of Prof. Newton, the late Dr. Hind, of Honington, Suffolk, and other eminent authorities, seems most worthy of credence. Their supposition was that the Wash extended



as far inland as Brandon; Wangford and Lakenheath being on its shores. They likewise thought that an arm of the Wash extended along the valley of the Little Ouse to Thetford, and that consequently the present breeding-places of the Ringed Plover were coast sands in the post-glacial epoch. And year by year hereditary instinct has brought the warren-haunting Plovers inland, which led the first President of the Norfolk and Norwich Naturalists' Society to hazard the opinion in 1879 that with the death of the last of the heath-loving Plovers would cease altogether the inland appearance of that species. If the diminution in numbers of the Ringed Plover be not general amongst the shore birds, it would tend to further substantiate this opinion. In addition to the Ringed Plover, numerous species of plants and insects peculiar to the sand-dunes of the coast are found upon these inland heaths.\* The place-names of the district strengthen the theory that the Wash formerly extended as far as Brandon. It is extremely suggestive to note that the sandy heath at Elveden whereon the Ringed Plovers breed is still known as the "denes." This is the name applied on the Norfolk coast to the low sand-hills, and is synonymous with "dune." Although on the slope of a valley up which an arm of the Wash might at one time have possibly extended, the nearest stream is now more than a mile distant. The other breeding-places mentioned in the district would all have bordered upon an arm of the sea extending up the Little Ouse valley, except those on Roudham and Wretham Heaths; but neither of these would be more than four miles from the nesting-place on Santon Downham Heath. With so many other heaths and warrens in the district, it seems strange that their range should be so limited. In addition to the coast insects and plants found in these inland localities, *Helix virgata* and other species usually considered littoral abound.

J. D. Salmon, F.L.S., recorded the date of their first arrival as February 16th, 1834; February 5th, 1835; February 15th, 1836; and February 14th, 1837. They have, however, been seen

\* *Vide* paper "On Certain Coast Insects found extending inland at Brandon, Suffolk." By G. C. Barrett, Trans. of the Norf. and Nor. Nat. Soc., vol. i., 1870, p. 61, and 1871, p. 40. Also notes in the same Transactions on coast-plants found inland by Messrs. H. D. Geldart and Clement Reid, F.G.S.

as early as February 7th. Ringed Plovers were numerous on March 13th, 1835; commenced laying on April 1st; a nest with four eggs found on June 5th, and all departed by August 30th. In the following year they were again numerous on March 13th, but took their departure a week earlier, on August 23rd. Personally I have never seen them on Thetford Warren before March; but this doubtless arises from my limited opportunities of observation, rather than from a later inland migration. Clutches of two eggs have been found by March 30th. Nest there is none, as a rule, the merest hollow in the sand being utilised. Very rarely there are a few short pieces of dried grass. September 1st is the latest date on which the Ringed Plovers have been seen in the district. Their departure is usually taken about mid-August, which accounts for the local remark that they "go with the Cuckoos." The Ringed Plover is known locally as the "Stonehatch" or "Ring Dotterel," the former being more generally used. It is worthy of mention that the bracken-covered areas of our large warrens are not beloved of the Ringed Plover, but that it haunts stone-covered patches which are perfectly open. In such spots it is almost impossible to discover the Ringed Plover when motionless; when running the eye is attracted by the action. If one wanders too near the nest both birds will fly round and round the intruder's head, uttering their short mellow whistle. And if there should be nestlings they will feign a broken wing—anything to draw attention to themselves rather than their young. These tactics, however, are not always successful, and the men who can always find the nest of a Lapwing by the actions of the hen bird, can in like manner find that of the Ringed Plover; and I fear that even these eggs are sold, with those of Black-headed Gulls, Snipe, and sundry others, as "Plovers' eggs."

## THE MIGRATION OF BIRDS:

A PAPER ADDRESSED TO THE LIGHTHOUSE KEEPERS OF THE ENGLISH CHANNEL, AND TO THE LOCAL ORNITHOLOGISTS OF THE COUNTIES ABUTTING THEREON.

BY J. A. HARVIE BROWN,

Member of Committee of Migration of the British Association.

BETWEEN Varne Lighthouse in the east, and Start Lighthouse in the west, along the south coast of Great Britain, no returns have been received regarding the "Migration of Birds" by the British Association Committee on that subject, although schedules have been returned from all the other lighthouses of Great Britain and Ireland during *nine years'* endeavours of the Committee (1879 to 1887), and resulting in the Digest of the Reports of the Committee of these years, which latter took Mr. Eagle Clarke seven more years to work out, and which was presented by him to the Committee at the Liverpool Meeting of the British Association in 1896. The fault of this big blank in our annals does not lie with the appointed members of the Association's Committee. As a member of that Committee, I think the blank should be filled in. I therefore address this article, hoping that it will be circulated through them to the light-keepers of the south coast of England. It appears to me that such would be all the more important as an annex to Mr. Eagle Clarke's Digest, because the existing blank leaves a part of his deductions unsupported to the extent they should be; I mean his conclusions as to what he has termed in his Digest the *east-to-west migration line*.

It seems also, at the present time, specially desirable to obtain positive records from these stations, as we have good reason to believe that fresh series of observations will be before long undertaken at prominent stations outside our British limits, but upon the same east-to-west line. If these observations could be arranged for upon this south coast-line of England simultaneously

with the observations about to be instituted outside our British limits, above referred to; and which we expect will be undertaken, first in the autumn of 1898, and, if all goes well with the project, in the spring of 1899, by a member of our Committee: then a *completely new* set of observations would be instituted.

We cannot see that any great difficulty should exist if some south-country ornithologist will undertake both the work required, and the education of the lighthouse reporters, as has been done heretofore on our other coasts. Such work to be effective requires close attention and personal trouble in keeping in touch with the lighthouse reporters, with a considerable amount of personal supervision and active controlling interest. Personal visitations to the lighthouse reporters, a certain amount of education by the person who undertakes the charge by the dissemination of useful and practical literature, the collection of wings of birds, properly labelled with dates and records in accordance with the circulated schedules, and their items, are the most important branches of the enquiry.

We earnestly urge upon the ornithologists of the southern counties of England the importance of this quest. It is not yet too late to undertake it. If promptly taken up upon this hint, I am sure the present constituted Committee are not going outside the limits of the powers bestowed upon them in their urging the extension of the enquiry entrusted to their charge. And further, should any ornithologist of the south coasts of England rise to the occasion, I am sure that we are safe in promising every necessary assistance which our past experience in similar work enables us to give.

We want returns from all the lighthouses between Varne (east) and Start (west), and we want some resident ornithologist to take supervision of the whole, and to report.

With this belief we ask the British Association to add to our number one or more accredited naturalists, who will undertake the enquiry for our southern coast of England.



## NOTES AND QUERIES.

## MAMMALIA.

**Trapping Shrews and Voles.**—One is usually led to suppose that the Pigmy Shrew, *Sorex minutus*, is a scarce species in the South of England. It may consequently be of interest to put on record the capture by myself of a couple of specimens at Combe Martin, in North Devonshire, last September. I have also on previous occasions taken it at Southerndown, in Glamorgan-shire, in August, and in Leigh Woods, Somersetshire, in mid-winter. It is of course not to be supposed that the species is comparable in frequency of occurrence with the larger species, *Sorex araneus*. Perhaps on an average indeed only ten per cent. of the Shrews captured by myself have been Pigmies. But it by no means follows that a species of mammal is scarce because it is hard to trap or rarely seen. Take, for example, the case of our two small Voles, *Microtus agrestis* and *M. glareolus*. A few years back it was the custom to publish the capture of every specimen of the latter, and record it as “new to the county.” Yet nothing, I take it, is more certain than that the species is, and always has been—at least since historic times—abundant everywhere throughout Great Britain. I myself have caught it night after night in numbers in the counties of Glamorgan, Gloucester, Somerset, Devon, and Dorset. It even outdoes *Mus sylvaticus* in obtrusiveness. But with the Field Vole it is far otherwise. I have trapped it, it is true, but only at rare intervals, and, so to speak, by chance; that is to say, the specimens were found in the traps, either snapped by the hind quarters or lying in some other position, showing equally clearly that their capture was due to pure bad luck, like an accidental dart into the trap, and not to any eagerness after the bait. In fact, at a rough estimate I should compute that in the case of these two species the percentage of *agrestis* captured had not been higher than five; yet this is not attributable to any scarcity on the part of *agrestis*, nor to trapping in unfavourable localities. Traps have been set in their runs in the green fields, and even close to the nest containing young, but without success. Nevertheless the species is probably abundant everywhere in meadows and hay-fields, not to mention hedges and banks, where I have myself seen it. The same may be the case with the Pigmy Shrew. It may be as abundant as *S. araneus*, but harder to trap. The small amount of experience I have had of the species lends some support to this supposition, for in at least two cases I clearly recollect that the speci-

mens were caught in the way mentioned above as characteristic of *A. agrestis*; that is to say, with their heads nowhere near the bait. In conclusion, it may be added that in my opinion the difference with respect to being trapped observable between *agrestis* and *glareolus* is partly, at all events, explicable in connection with an habitual difference of diet between the two species. At the time when I had the best opportunities of trapping *agrestis*, I was not aware that bait like bread, cheese, boiled potato, and the like, which seem to be so attractive to *glareolus*, have no charm for the other species. This fact I have subsequently learnt by keeping the two in captivity; *glareolus* is omnivorous, *agrestis* much more of a vegetarian, going mad with delight over a piece of lettuce; but he is also, *miserabile dictu*, like his cousin *amphibius*, by no means impartial to members of his own species.—R. I. POCOCK (British Museum, Nat. Hist.).

#### A V E S.

**Osprey in Dorset.**—A very fine specimen of the Osprey, *Pandion haliaëtus*, was recently shot in the Fleet Waters, Dorset, by Mr. Russell, of Charlestown, an old sportsman bordering on seventy years of age. Mr. S. H. Wallis, of Weymouth, having heard that a rare bird had been obtained, proceeded to Charlestown, and at once recognized this very rare species on the British list. Mr. Wallis, who is a thorough naturalist, regrets the unfortunate death of such a rare visitor to English waters, and has added it to his collection. The bird has been entrusted to Mr. Watson, taxidermist, of Dorchester, for careful preservation.—(H. E. DRESSER, Orpington, Kent.)

**Sparrowhawk nesting in Thorn-tree.**—Is it not unusual for a Sparrowhawk to build a nest in a thorn-tree when suitable oak-trees are plentiful? My experience, which is fairly large, proves this to be the contrary. I found such in Cornbury Park, Oxon, on June 23rd last, containing six young. I might add that the nest was a completely made new structure, and was not situated in a fork, but among the smaller boughs near the top. At no great distance away, in a very similar position, was an old Squirrel's drey, the inside of which contained a Great Titmouse's nest, with two young and four addled eggs.—R. U. CALVERT (Ascott-sub-Wychwood, Oxford).

**Local Name of the Sheldrake.**—I should be interested to know if the Sheldrake, *Tadorna vulpanser*, is known as the St. George's Duck on all parts of the English coast which this bird frequents. Some friends shot a pair of these handsome Ducks about a year ago on the south coast of Wales, and told me that these birds were known there by the above name. I do not remember having seen the term in any book on ornithology, and fancy it must be used only in a few counties on the west coast. Some

years ago I first heard the name used by a fishmonger when he offered me a Sheldrake for sale.—C. B. HORSBRUGH (Richmond Hill, Bath).

[In Dr. Bowdler Sharpe's 'Handbook of the Birds of Great Britain' will be found an observation by Mr. W. E. de Winton, "that in South Wales the local names for this species are 'Perrénet' and 'St. George's Duck.'"—ED.]

**Fork-tailed Petrel in East Suffolk.**—A specimen of this bird was picked up on the ground alive, but quite exhausted, not far from the pier at Lowestoft, on Oct. 4th, and received by me in the flesh a few days later. It was in very good condition.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds, Suffolk).

**Nesting of the Great Northern and Black-throated Divers in Shetland.**—At the request of Mr. O. V. Aplin (*ante* p. 425), I give below the extract from my note-book recording the finding of the eggs of *Colymbus glacialis*. I was under the impression that this species had been proved to have bred in the British Islands. The resident who gave me the locality said he had found them there some years ago, and had then taken their eggs. I have written to him to supply, if possible, the date, and also particulars of the finding of the Black-throated Diver breeding; but for obvious reasons I do not care, nor have I permission, to publish his name. The note, made on the spot, is as follows:—"June 2nd. Started for walk over the hills towards Clouster. After going about seven miles I came across a fair-sized loch, seemingly miles from any habitation, and on glassing it I saw a Diver swimming near the shore. Creeping cautiously nearer, I came to about seventy yards from the place, when up got a couple of Great Northern Divers. Their heavy and laboured flight reminded me greatly of that of the Shag. I had my glass on them, so at once distinguished them before finding the eggs. They were placed on the summit of a slight grassy slope, and were about six feet from the water, the grass being merely flattened for their reception. The intervening track, mentioned as usually being found, was wanting in this case; but no doubt this may be accounted for by the eggs being only slightly incubated. I lay in wait for an hour, but the birds showed no signs of returning; and next day I had to leave the neighbourhood." The dimensions of the eggs are 3.80 × 2.15 and 3.55 × 2.15. — BERNARD A. E. BUTTRESS (Hendon, Middlesex).

P.S.—The following is the reply which I have received from the resident in Shetland. It will be noticed he bears out my statement (made in my list of birds observed) that the *Common Tern* is there:—"Oct. 10th, 1897. Great Northern Diver's eggs I took several times previous to 1880. After 1883 I was absent three years, and on my return I found sad havoc

played with mostly all the Divers. Since that time I have only twice taken the nest of the Great Northern Diver, 1891 and 1893; each time one nest only. The gentleman to whom I showed the Blackthroat breeding, and who gave me Saunders's 'Manual,' was Fred Howe Windham, Esq., whose address I do not at present know. His last address three years ago was The Castle, Castlereagh, Roscommon. Terns, *Common* and *Arctic*, have left; also the majority of sea-birds. Excepting Golden Plover, few winter visitors have yet arrived."—BERNARD A. E. BUTTRESS.

**Noddy Tern in Cheshire.**—The other day, when looking through a collection of stuffed birds, I saw and obtained a specimen which has since been identified as the Noddy Tern, *Sterna stolidus*, Linn.; it is in immature plumage, the grey on the crown being just visible. It was shot on the Dee marshes in winter about six years ago. As I believe this Tern has been only twice recorded in Europe,\* I think this specimen worth mention.—F. CONGREVE (Burton Hall, Neston, Chester).

P.S.—I obtained the Noddy from a small private collection belonging to Mr. Lawton, an ex-tenant of my father's. He killed and stuffed it himself. It is at present in our collection at Burton Hall, but it has been identified by the taxidermist of the Liverpool Museum, and by Dr. Herbert Dobie, of Chester.—F. L. CONGREVE.

**Eggs of the Roseate Tern.**—With regard to Mr. Potter's remarks on the above (p. 467), my experience, and that of several of my friends, is that we, at any rate, are not able to diagnose with certainty the eggs of these birds from those of the *Common* and *Arctic* Terns without further data to go upon. I do not say that Mr. Potter is wrong in his assertions, as it is very unwise to dogmatize on these matters; but I merely state my experience. Everyone who has visited a large breeding haunt of the *Arctic* or *Common* Tern knows what an infinite variety the eggs present in form, size, ground colouring, and markings; and with regard to the usual test given in books for eggs of the *Roseate* Tern, I have seen a pair of *Arctic* Tern's eggs far more elongated than any *Roseate* Tern's I have yet examined. I have not examined the shells of any of the three species microscopically. I believe it was Dr. Johnson who remarked that "a wager is the butt-end of a fool's argument," and I should be very sorry to back myself to pick out of a basket containing the eggs of all three species three eggs of the *Roseate* Tern in three consecutive draws, at the rate of a sovereign an egg; for, from what I have seen, eggs of all three species could be chosen so alike that it would defy the best oologist living to discriminate between them. I may mention that an ornithological friend of mine once backed himself to

\* Two specimens taken off the coast of Wexford, one still preserved in Dublin Museum.—ED.



pick out not only the egg of Brünnich's Guillemot, but also that of the Ringed Guillemot, from a basket containing eggs of the common bird. Needless to say he was found wanting. Mr. Potter mentions the *late* Canon Atkinson. I am glad to say that the author of 'Forty Years in a Moorland Parish' is still hale and hearty, and I had the pleasure of a long talk with him not many weeks ago at his home in Danby in Cleveland.—OXLEY GRABHAM (Chestnut House, Heworth, York).

**Nesting of the Great Plover.**—While crossing a nesting ground of the Great Plover in Lincolnshire, on June 7th last, I chanced to run against a nest containing four eggs, two rather larger and longer than the other two, thus having the appearance of belonging to two hens. The eggs were quite warm, and on my approaching the nest a Great Plover rose about eighty yards beyond it.—R. U. CALVERT (Ascott-sub-Wychwood, Oxford).

**Black-winged Stilt in Somerset.**—I have recently received a present of a specimen of the Black-winged Stilt, shot at Sedgemoor in July, 1896, a distance of four miles from here. The gentleman from whom I obtained it, and who had it in the flesh—Mr. C. Hooper, taxidermist, of Wells—thought it was some species of Snipe. The legs are about ten inches in length. This is, I believe, the first mention of the bird from Somerset, and the second from the West of England, one having been reported from Anglesea by Montagu. I shall be happy to send it for any naturalist's inspection.—STANLEY LEWIS (39, High Street, Wells, Somerset).

**Roosting of the Swift.**—*Apropos* of Mr. Gyngell's letter in last month's 'Zoologist' (p. 468), a friend of mine, when standing outside the house one evening at about eight o'clock, saw a Swift fly up and settle flat against the wall just under the eave. He watched it for some time, but it never moved. These birds evidently roost in this position, for which the forward-pointing hallux and toes of all the same length are well fitted. The Swifts did not leave the Norfolk coast till about Sept. 5th, but from the end of August till then were flying about along the cliffs in considerable numbers.—BERNARD RIVIERE (82, Finchley Road, N.W.).

**Wonderful Egg-producing Powers of the Wryneck.**—A friend of mine discovered the haunt of a pair of these birds, *Iynx torquilla*, in a plantation at Farnborough, in Kent; he had noticed them going and coming from an old decayed plum-stub about 5 ft. 6 in. or so in height. Not being able to see far down the hollow limb, he broke a strip away, which fortunately snapped off at the very bottom of the hole, a distance of fully two feet. When first found, on May 23rd, 1897, there were seven eggs lying on the bare wood, which he took, afterwards replacing the strip in

position. Two more eggs were laid by the 25th inst., and were left *in situ quo*, but had disappeared somehow the next morning. The bird deposited another on the 26th inst., to which were added two eggs of the House Sparrow, to make up for those that were missing; all the three, however, lay broken at the foot of the tree on the following morning. She then seemed to settle down to regular business, and continued laying every day without intermission, each egg being removed as soon as laid, the total number up to July 17th reaching sixty-two, less the three that were broken or missing, leaving fifty-nine eggs in my possession from the one bird, which I fancy must establish a record. Concurrently with this another bird was laying in an adjacent plantation, but in a more erratic fashion, the eggs in this case being removed in batches of four and five. On two occasions she stopped laying for a day or two, and then continued depositing again; total number of eggs forty-three. Yarrell mentions an instance on the authority of a Mr. Salmon, who states he took no less than twenty-two eggs from a Wryneck that had laid on a Redstart's nest of the preceding year. Not being easy of access from above, the nest was bodily removed by means of a very convenient hole at the bottom no less than five times before it was finally abandoned. Again, in 'Lloyd's Natural History' we find another case recorded by a Mr. Norgate of a Wryneck laying forty-two eggs for two years in succession (1872-73); as Mr. Seebohm remarks in 1874, "her reproductive powers were apparently exhausted, as only one egg was laid, and in 1875 the place was deserted." No doubt there may be many other parallel instances, and I should be glad to know if anyone has heard of the larger number, *viz.* sixty-two, having been either equalled or surpassed. It seems such an extraordinary number that it is certainly worthy of being placed on record.—H. ALDERSON (Hilda Vale Road, Farnborough).

Popular Fallacy concerning the Cuckoo.—Perhaps the following rhyme may be of interest to Mr. Davenport (if not already known to him) and others, as it may possibly explain the origin of the popular fallacy concerning the Cuckoo sucking the eggs of other birds. The rhyme is said to be well known in the midlands:—

"The Cuckoo is a merry bird,  
*She sings as she flies*;\*  
 She brings us good tidings,  
 And tells us no lies.  
*She sucks little bird's eggs*  
 To make her voice clear,  
 That she may sing Cuckoo  
 Three months in the year."

—C. B. HORSBRUGH (Richmond Hill, Bath).

\* See 'The Zoologist,' 1894, pp. 264, 306, 307, 308, 338, 340.

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CODLIN MOTH, p. 286.

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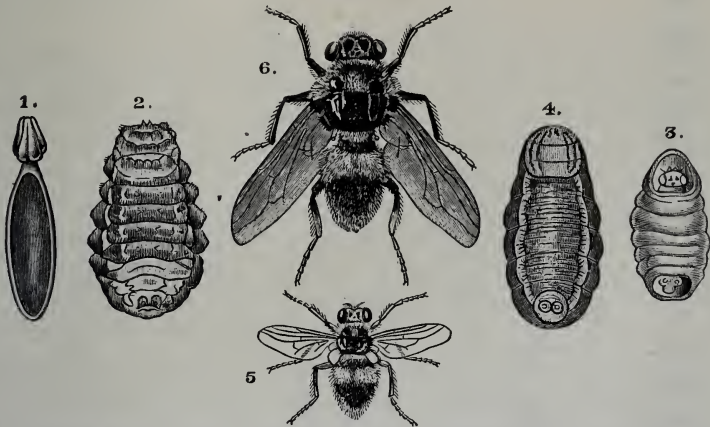
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**Do Cuckoos suck Eggs?**—I much regret I have no proof whatever to offer Mr. Davenport that the Hawfinch's eggs mentioned in 'Zoologist,' p. 426, were sucked by Cuckoos; neither have I any proof that they were sucked by Jackdaws. But the fact still remains that not only were the eggs sucked in the above-mentioned nest, but the contents of thirty-two other nests of the same species, with those of some scores of other nests I saw, had met with a similar fate. Cuckoos in this locality have been exceptionally plentiful during the past season, and with one exception (on an island in the Outer Hebrides during the spring of 1895), I have never known them to be so numerous.—R. U. CALVERT (Langley House, Ascott-sub-Wychwood, Oxford).

**Hypolais polyglotta in Sussex.**—As reported by Mr. Howard Saunders in the current issue of 'The Ibis,' the second of the Warblers mentioned by Mr. Ticehurst (*supra*, p. 333) has turned out, as the latter surmised, to be of this species. The specimen has been examined by Mr. Saunders and others, amongst them by the present writer, and is now in the possession of Mr. Boyd Alexander. The species has already been declared to be a member of our avifauna by Mr. Murray A. Mathew ('Birds of Pembroke-shire,' pp. 9, 10), but in this instance doubt may perhaps be reasonably entertained of the correct identification of the species.—W. RUSKIN BUTTERFIELD (St. Leonards-on-Sea).

**Willow Wren singing in Autumn.**—On looking over my note-books for 1891–93, in which years I noticed more particularly the dates on which our different birds were singing, I find that the Willow Wren figures therein as a comparatively common autumn singer. Thus in 1891 the dates are June 15th, Aug. 14th–22nd; in 1892, Aug. 1st–17th; in 1893, June 16th, 20th, July 1st, 6th, 25th, Aug. 7th, 9th, 24th, Sept. 8th. These notes refer mainly to Midlothian.—ROBERT GODFREY (46, Cumberland Street, Edinburgh).

**Mealy Redpoll off Coast of Kerry.**—Between 1889 and 1893 I received seven specimens of the Mealy Redpoll from the Tearaght Rock, a small but precipitous islet out in the Atlantic, nine miles west of Kerry. These Redpolls are very large, and I have always regarded them as Greenland Redpolls, *Linota hornemanni*, Holb. In this I hope to be confirmed by Mr. Howard Saunders, to whom two stuffed specimens have just been forwarded. Five were obtained in September, one in October, and one in November.—RICHARD M. BARRINGTON (Fassaroe, Bray, Co. Wicklow).

**Note on Pied and Grey Wagtail in the Itchen Valley.**—I wish to correct a statement I made on p. 462 in the October issue of 'The Zoologist' with relation to these birds. I there stated that by the end

of April Pied Wagtails, with their congeners, had deserted the water-meads near the town (Winchester) on the southern side, save for some of the first species, preparatory to spending the breeding season further down the river. Of course, as a rule, the Grey Wagtail leaves England altogether at the end of March, although I may mention that I have several well-authenticated records of its breeding in the Itchen Valley; and last May I myself saw the bird some four miles from the town. At the end of April, indeed, Pied Wagtails do extend their range a good deal to the south for the breeding season, and in autumn and winter congregate into small parties of seven and eight, which are especially regular in the near water-meads just south of the town, in company with parties of the Grey Wagtail. I also stated that both species returned to these water-meads about the middle of November. This is not accurate; the *usual* date is about the beginning of October, though last year I did not observe any Grey Wagtails near the town until December. The parts of the Itchen most frequented by both species in winter are decidedly the rich and fertile water-meads immediately south of the town for a distance of about five miles. This district is a favourite one for resident birds in winter, as Reed Buntings, Starlings, Rooks, Gulls, Jackdaws, Dabchicks, &c.—G. W. SMITH (Ivy Bank, Beckenham).

**Strange Nesting Habits—Nuthatch and Starling.**—Mr. W. G. Clarke's article last month (p. 449) reminds me of the following case of two birds building in close proximity to one another. I had noticed a pair of Nuthatches going in and out of a hole in a huge oak some time in the beginning of last May, so one day I brought a chisel and hammer, and set to work to reach the nest. At the first few strokes of the hammer a Starling flew out with a scream of alarm. I thought this was rather curious, but went on enlarging the hole, until I could get my hand in. All this time the two Nuthatches had been in a great state of agitation, uttering their "twit, twit-tit" of alarm. On inserting my hand I found that just beyond the entrance of the hole there was a cup-shaped hollow containing a Starling's egg. Beyond this there was a turning to the left, at right angles to the entrance. Round this corner the Nuthatches' nest must have been, but I could not get my hand there. Almost directly I had left the tree one of the Nuthatches entered the hole. In this case the Nuthatches must have hopped over the sitting Starling every time they went to their nest.—BERNARD RIVIERE (82, Finchley Road, N.W.).

**The Question of Popular Ornithological Fallacies.**—I am glad that Mr. Davenport has defended the Cuckoos (p. 473). Not only is it rash to conclude, because sucked eggs are found, that Cuckoos are the culprits, but such statements bring a beautiful and interesting bird into unnecessary



disgrace, and into danger of sharing the fate of the scores of harmless Kestrels which are annually destroyed. Yet it seems hardly fair to class the belief that Cuckoos suck eggs with such absurd fancies as that Nightjars suck the milk of goats, or that Cuckoos become hawks in winter. Hitherto I have supposed that this belief arose from the Cuckoo having at times been seen with its own egg in its mouth preparatory to depositing it in a nest. But this year I have heard two stories, based upon careful observation, which I must confess have rather shaken my faith in the Cuckoo, and which I will relate, and then leave your readers to form their own deductions. (1) Near Haddon Hall is a signal-box. One day this year the signalman saw a Cuckoo alight on the bank of the cutting near his box. As it did not rise again at once, but appeared to be busily engaged on the bank, he left his box, and went to the spot to satisfy himself as to the nature of the bird's doings. As he approached, the Cuckoo flew up, and just where it had been he found a Wagtail's nest with one egg in it, but on the bank outside the nest were the broken shells of other eggs. (2) A gamekeeper was crossing a moor (about six miles north-east of this place) when a Cuckoo rose from the ground a few yards in front of him. He at once went to the spot from which it rose, and there found a Grouse's egg partly sucked. I have seen the egg, and certainly the slit (for it was not a round hole pierced in the egg) was such as a Cuckoo's bill might be expected to make.

Some of the fallacies mentioned by Mr. Davenport result from ignorance and nothing else, but others arise from inexperience only. It is hardly surprising that to a casual passer-by the Landrail should appear to ventriloquise. The same may be said of the *burring* of the Nightjar. Mistakes are sometimes made because an observer takes for granted facts are universally and invariably true when they have been proved by his own personal experience. But is it not equally foolish for an ornithologist to suppose that a phenomenon has never occurred merely because it has not come under his own notice? Take the case of the Swift on the ground. Mr. Davenport considers it a popular fallacy resulting from ignorance to suppose that a Swift cannot arise again from the ground. Mr. Howard Saunders, in his 'Manual,' merely states that, "contrary to the popular belief, the birds are able to raise themselves from the ground." But he does not imply that they are always able to do so. No doubt they very often are able thus to raise themselves. Nevertheless, my own experience would have led me to the contrary conclusion, for I have never seen a Swift rise from the ground, though from time to time I have picked them up and thrown them into the air, and then they have flown away.

I should be glad to know whether experienced field naturalists in general consider it a "preposterous notion" to suppose that a Lapwing may

attempt to draw the attention of man or dog from her nest. Ten years ago last May I came suddenly upon a sitting Lapwing. She rose hurriedly from her nest, and tumbled along the ground, as if she could neither fly nor run.\* Am I to suppose that she had temporarily lost her power of flight owing to cramp through sitting long in one position, or that her behaviour was merely an expression of anxiety, or did she indeed wish to distract my attention from the whereabouts of her nest? What, may I ask, causes Ducks to leave their young, and to flap along the water in front of an intruder?—W. STORRS FOX (St. Anselm's, Bakewell, Derbyshire).

### INSECTA.

**The Stridulation of Orthoptera.**—I have read with much interest Mr. Aplin's note in 'The Zoologist' for September (p. 432) and, at least as far as Orthoptera are concerned, I can fully corroborate his account of the ventriloquial powers of these insects. Of the three groups of the stridulating Orthoptera, the first is the section called Acridioidea, which produces a buzzing sound by the friction of the posterior femora, which are finely serrated inside (*vide* Darwin, 'Descent of Man,' 2nd ed. p. 286, fig. 14), against the elytra. As the arrangement of the veins of that part of the elytra affected varies with the species, so does the intensity of the sound. It is a useful accomplishment, and to be able to determine the insect by its stridulation without seeing the performer is not very difficult.

In the Locustodea the sound is produced very differently, namely, by the friction of the basal part of the left elytron over the same part of the right, these parts being modified for the purpose. The stridulation thus produced is very shrill and hard to locate. I have often stalked down our large *Locusta viridissima*, L., and have usually found it on a bed of nettles or thistles, in the middle of a corn-field, or in stubble, invariably much farther away than I at first expected. The sound appears to come from almost beneath one's feet, but on walking straight towards it, seems to recede into the distance, until it suddenly strikes the ear, very harshly and shrilly at close quarters. As soon as the would-be capturer approaches, the sound ceases, and the insect remains invisible. The assimilation of the green colour of the insect and the green surroundings which it always chooses as a band-stand is so close, that it is almost impossible to detect the creature until it recommences to chirp, when the rapid movement of the elytra betrays its whereabouts. The stridulation of this species is loud and prolonged, but in several of its relatives is short and sharp, and all the more difficult to locate, as the observer does not obtain a fair chance to listen attentively. Such is the case with *Platycleis grisea*, Fabr., common on the chalky cliffs

\* *Vide ante*, p. 504.—Ed.

of our south coast. *Thamnotrizon cinereus*, L., may be often heard uttering a short sharp "tss, tss" in brambles and thickets before a shower of rain, or on a fine evening in the late summer and autumn; and it often chirps late into the night. The "Canadian Band," as the natives of the Dominion call the incessant chirping of insects after nightfall, is not heard in Britain, but in most countries, especially in the tropics, the sound is very loud, persistent and annoying. The chirp of the Cricket is well known, and also possesses ventriloquial properties to a certain extent.

This power of stridulation, in the Saltatorial Orthoptera, is confined to the males, except in one curious family, the Ephippigeridæ, confined to the south of Europe and the north of Africa, in which the female is also capable of producing a sound when irritated or frightened. I have never heard any insect of this family perform, but should think that they are able to chirp very loudly. The elytra are abbreviated until they are quite rudimentary and useless for anything but musical purposes; the posterior part of the pronotum is raised, and seems to act as a sounding-board, as Darwin noticed (*op. cit.* p. 284). It was this form of the pronotum that suggested to Serville the name *Ephippigera*, from its resemblance to a saddle. One interesting effect of this power of stridulation among the Orthoptera is that it puts, or seems to put, a check upon a strong tendency to abortion of the organs of flight. The wings themselves are not affected, and in a large proportion of species are quite rudimentary. The elytra of the females are often much smaller than in the males, as their services are not required for musical purposes. But in the males, even if the wings are abortive and the elytra useless for flight, the basal part at least of the latter usually remains, sometimes very highly modified, for the purpose of performing stridulation. The comparative development of the organs of flight in the Orthoptera is such an inconstant character, that no species is based upon their abortion or perfect development. There are a large number of species in which the wings are abbreviated normally, and perfectly developed by aberration (perhaps atavism), and *vice versâ*. In our commonest Grasshopper, *Stenobothrus parallelus*, Zett., the wings are rudimentary, and in the females the elytra also; but in the males the latter are perfectly developed for stridulation; yet there is a rare variety in which the wings are perfectly developed. I possess a very curious and rare variety of the tiny Cricket, *Tridactylus variegatus*, Latr., with the wings perfectly developed and caudate, the typical form having entirely abbreviated organs of flight.—MALCOLM BURE (Bellagio, East Grinstead).

Stridulation of Cicadidæ in Mashunuland.—You will observe that in accordance with your request I have paid special attention to the Cicadas, and very interesting insects I have found them to be. Personally I was much surprised and pleased to find so many different species in so limited



an area, say eight square miles; but I am not sufficiently acquainted with them to know whether this is an unusually large number.

Perhaps the few succeeding notes, such as they are, may be of use and interest to you. I reached this locality in the end of July, when there were apparently no Cicadas about. The little blackish species, *Tibicen nigricans*, Stål, was the first to appear, which it did during the second week in August, remaining till the end of September. Its call is quite distinct from all the other species, and not nearly so loud. It consists merely of a short chirp, hanging slightly on one note, and ending with a quick rise, the sound being incessantly repeated. The next species, *Platyleura rutherfordi*, Dist., began calling in the middle of September. I made no particular note of its cry, except that it was much louder than that of the former, and continuous. It was apparently confined to the smoother trunks of the "mosasa" tree. It continued calling until Oct. 15th, when I shifted camp four miles away. At this spot it did not occur, owing, I presume, to the fact that the "mosasa" tree is not found there, being replaced by a very nearly allied species, called by the Kafirs "mfuti." However, when I went back on the 22nd I could not find any of them. At my new camp, on Oct. 17th, I caught three species.

The species, *Pacilopsaltria marshalli*, Dist., occurs only on "mopani" trees, frequenting the smaller branches, to which its colouring is very well adapted. Indeed, I have found it to be one of the most difficult to detect, which doubtless accounts for the fact that it is the most easily approached, and sits very close. Indeed, I have often struck the branch on which one has been sitting, sharply with my net, without disturbing it. Its cry is the most monotonous of any species I know, being one continuous unbroken churr. I noticed a Cicada calling among "mopanis" in the end of September, which was probably this species. It disappeared in the middle of this month.

*Pacilopsaltria bombifrons*, Karsch, is not confined to any one tree, but frequents the small, smooth branches of many trees and shrubs. Its cry has a considerable range, starting on a somewhat low note and gradually rising to a high pitch, then falling again, and so on. I once came across a very large concourse of this species, there being quite sixty on a small bush, and making a terrible noise. At the first sweep I took two males and five females, and of the twenty I caught only six were males. By the way, I have noticed several facts which would lead me to suppose that Cicadas were polygamous, and I should be much interested to know whether your experience would bear this out.\*

\* Polygamy is quite probable, though in the Transvaal I had reason to believe that one species paired during the breeding season ('Naturalist in the Transvaal,' p. 67).—ED.



*Pæcilopsaltria horizontalis*, Karsch. This handsome species is by far the most scarce, and, moreover, I found it difficult to catch, owing to its habit of sitting high up on the small branches of the "machabel" tree, to which it seems confined. Like the preceding species, the cry starts low, and gradually rises to a very shrill and piercing note, much louder than that of any other species. Although I only captured it first on Oct. 17th, it must have been out some time before, as it disappeared about the end of the same month. I forgot to mention that, unlike *P. bombifrons*, the high note in its call is sustained for some time, alternating in regular cadences with the lower notes.

*Platypleura centralis*, Dist., differs from the preceding species in that it frequents the main trunk of its special tree (the "mfuti"), and this I suppose accounts for its markedly longer rostrum. The colouring is beautifully adaptive, and the black central line tends to the deception, from its resemblance to the cracks in the scaly bark. Like *Platypleura rutherfordi*, this insect continues calling after sundown, almost till dark; and I have also been awakened by it a good half-hour before sunrise. I have taken five examples at light. Is it possible that Cicadas fly much at night? When taking their numbers into account, it is very seldom indeed that I have ever seen any on the wing in the daytime, except when disturbed. This species, and also *Pæcilopsaltria bombifrons*, seem very subject to attack from a very large *Asilus* fly, which catches them on the wing. I have seen a good many too caught at rest by small Lizards. The cry is fairly high pitched, but not shrill or piercing; it is fairly steady, but broken occasionally for a few seconds by a lower churring note.

*Pæcilopsaltria leopardina*, Dist. I captured my first specimen on Nov. 2nd, but am inclined to think it was about the latter half of October, and that I overlooked it as being *P. horizontalis*. The cry is very similar, and has the same piercing shrillness, but it is not so loud, and the preliminary lower notes are characterized by a curious throbbing sound. At present it is quite the most ubiquitous kind, frequenting many different kinds of trees, but I have only seen it in any numbers on the "machabel." Have taken three at light.

*Monomatapa insignis*, Dist. I first noticed this species on the 15th, sitting on the thin stems of a bush, which occurred in a long strip between two patches of "mopani." There were a lot of them, and they were very conspicuous on the leafless stems; but now they have emigrated to the "mopanis." They did not begin calling till the 18th, and are hardly yet in full song. The cry is loud, but the chirp is not short or sharp, and there is an additional note at the end of it.—GUY A. K. MARSHALL.

[The above interesting notes are contained in a letter dated Nov. 21st, 1895, which I received from Mr. Marshall, with a collection of Cicadidæ

made at Gadzima, on the Middle Umfuli River, Mashunuland. The collection I have since worked out (Ann. Mag. Nat. Hist. Ser. 6, vol. xix. p. 125, 1897), and the present discussion affords a good opportunity for publishing these original field observations.—ED.]

**Stridulation of Cicadidæ.**—Both in Central Africa (Nyasaland) and the West Indies I have taken Cicadas at light. In the Transvaal I have also taken them at rest on tree-trunks, but I do not think they were taken in consequence of their “song” having thus localized them. It is always easy to spot what tree they are on, but I noticed they chose the tops of small trees which were out of reach and sight, as there they got the most sun. It is the warmth they need, and they do not generally shrill unless the sun is out. I have netted them in bright sunshine, as they flew off the trees on my approach. At Zomba I caught a large species by actually localizing its noise, but that was the only instance of the kind that I remember.—PERCY RENDALL (Devonshire Club, S.W.).

**Stridulation and Habits of Cicadidæ.**—By the above notes it will be seen that both Mr. Guy Marshall and Dr. Percy Rendall took Cicadidæ “at light.” This was my own experience in the Malay Peninsula; and yet, strange to say, in South Africa, though I visited the electric lamps of Pretoria for three years, and made a large collection of Heterocera and other insects therefrom, I never saw nor took a single specimen of the family under such conditions.

In addition to the two species, *Platypleura centralis* and *P. rutherfordi*, which Mr. Marshall found calling “after sundown almost to dark,” my experience was the same with the small and scarce species, *Platypleura haglundii*, Stål. This rare Cicadid I heard in the Waterberg district of the Transvaal just before sundown, and without any difficulty located the tree from whence the stridulating music proceeded, when by a close scrutiny in the fading light I took a set of specimens from off the twigs and branches, to the colour of which they assimilate in colouration. I cannot conceive that my ears or eyes were superior to those of any insectivorous bird. That birds do thus capture Cicadas is vouched for by Mr. A. H. Swinton, who paid considerable attention to the family in Italy. “About the commencement of July there appeared, as if by magic, certain greyish insectivorous birds with a harsh and guttural note, among the sunny vines and woody knolls where the Cicadæ had established their coteries; and these, sitting on the low brambles, sometimes two together, knavishly whistled a tune until an unwary chanticleer was inveigled to respond, and so betray his hiding. The obnoxious intruders then flew at him, and brought him to the ground in their beak and claws, screaming most piteously, ‘Whee! whee!’” (‘Insect Variety,’ p. 21). And that I am not alone in my expe-

rience of being assisted in the capture of Cicadidæ by discovering their position through their tell-tale stridulation is apparent by a narrative of the late Mr. Jenner Weir, who, exhibiting a specimen of *Cicadetta montana* at a meeting of the Entomological Society of London, is reported to have said, 'he was attracted to the spot where the insect was concealed by hearing it stridulate' (Proc. Ent. Soc. July 4th, 1877). At a subsequent meeting (Aug. 1st, 1877), Mr. Weir stated that Mr. J. Gulliver had also taken the species, and that that collector was also "guided by the sound so made in effecting the capture."—ED.

**Strange Pairing of Butterflies.**—Whilst shooting on the western borders of the Bog of Allen, in Kildare, Ireland, during the latter part of the month of August in this present year, I noticed a male Small Tortoiseshell Butterfly and a female Large Meadow Brown, interbreeding. Is this a circumstance of any rarity? I almost think it must be, for in the course of a long country experience nothing of the sort has come under my notice.—A. MARMADUKE LANGDALE (Thornecroft, Compton, Petersfield).

[The two butterflies being not even generically allied, but belonging to different subfamilies, this strange union, of which we have received definite particulars, would certainly be infertile in result.—ED.]

#### PRESERVATION OF ZOOLOGICAL SPECIMENS.

**Dermestes lardarius eating Specimens of Moths.**—In reply to Mr. Dallas's query about getting rid of *Dermestes* in insects (p. 433), the large moths are all the better for having their insides removed at the first, and treated with a weak solution of corrosive sublimate, or at least of benzoline. With old specimens, benzoline applied very lightly is most useful, but occasionally the mischief has extended to the wings, and the scales float off, leaving a black mass. In the case of heads, a solution of corrosive sublimate of such a strength as not to leave a white deposit on dark hair should be liberally applied, and when dry the hair should be brushed and combed, and wiped over with benzoline. Even when there are no *Dermestes*, it is a capital plan to saturate all heads once or twice a year with benzoline. For skins, &c., that are put away powdered naphthaline is excellent.—OXLEY GRABHAM (Chestnut House, Heworth, York).

## NOTICES OF NEW BOOKS.

*Darwin, and after Darwin.* Vol. iii. By the late GEORGE JOHN ROMANES, M.A., LL.D., F.R.S. Longmans, Green & Co.

THERE now exists almost a library of books which may be classified under the well-known term "Darwinism"; we have a terminology, used in representing the different views and theories, of a really turgid description; there has arisen a study in evolutionary polemics which bids fair in several cases to prove the whole work of some lives; and we might almost say—without intending offence—that dogmas have produced sectaries, and we hear of Lamarckians and Neo-Lamarckians, Neo- and Ultra-Darwinians; the apostles of Weismann and the disciples of Spencer. In fact, the study of Darwinism seems to have resulted in the evolution of a doctrinal literature that makes the reperusal of 'The Origin of Species' a matter of considerable importance, and of great refreshment to the wearied enquirer. In 1889 Mr. Wallace produced a brilliant volume which he entitled 'Darwinism,' and endeavoured to focus the new views which had arisen around the problem of the origin of species during the thirty years which had elapsed since Darwin published his memorable work. In this publication Mr. Wallace reaffirmed the theory, supporting it with new facts, but in a concluding chapter added some novel but incongruous views on the subject of "Darwinism applied to Man."

In 1892 Dr. Romanes published his first volume on 'Darwin, and after Darwin,' an exposition of the Darwinian theory, and a discussion of post-Darwinian questions. His lamented death occurred before the appearance of the second volume in 1895, which dealt with the questions of "Heredity and Utility," whilst the present and concluding section is devoted to the much-argued theses of "Isolation and Physiological Selection," with which the names of the Rev. J. S. Gulick and his own are so justly and indissolubly connected with papers severally communicated to



the Linnean Society. To those who would study in an authoritatively condensed manner the principles of the theories of Isolation and Physiological Selection in the process of organic evolution, as more or less opposed to what may be perhaps styled the all-sufficiency of Natural Selection as held by Mr. Wallace, this volume must of course be recommended. The arguments are here, their acceptance must be left to the reader, but their bearings on modern evolutionary speculation cannot be ignored.

This volume, as was the case with the last, has received the able supervision, and in some chapters the selective discretion, of Prof. C. Lloyd Morgan, and a portrait of Gulick forms an excellent and interesting frontispiece. New terms seem inseparable from any new theory of the method of evolution or a restatement of an old one. We notice the creation of "apogamy" for separate breeding, and "homogamy" for segregate breeding.

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*A Hand-Book to the Birds of Great Britain.* Vols. i.-iv. By R. BOWDLER SHARPE, LL.D. Edwd. Lloyd, Limited.

UNDER the popular name of 'Lloyd's Natural History' there is a possibility of this high-class work on British Ornithology being somewhat overlooked. It is not a re-edited and enlarged volume of the old Jardine series, but a thoroughly new and standard work written by one of our best authorities, and as such bound to be freely consulted and widely used.\* The many publications already existing on our native birds or those found in these islands make it imperative that new books on the subject do not necessitate unknown authors, while the information now required is that of an authoritative, condensed, and up-to-date character. Perhaps no work on British Zoology is to-day more difficult than the production of a new work on British Birds. The material for life-histories and habits is unlimited, but amidst these vast chronicles of avian existence great selective judgment is necessary, for all that are new may not ultimately prove true, nor are the true always new. In some books we wish that much might have been added, in others that much might have been

\* The first volume, which was then published by W. H. Allen & Co., was reviewed in this Journal, 1894, p. 468.

omitted. Many field observations require to be canonised by repetition, whilst a habit or characteristic, resting on a record beyond question, may still prove to be but an individual occurrence based on a local circumstance. We cannot have too many of these records; they are generally valuable and always suggestive, but the task of sifting and arranging them, of focussing the important, and not altogether discarding the less prominent, requires a master-hand. Dr. Sharpe, in the opening sentence of his Preface, remarks:—"Every ornithologist who, in the course of his career, may be called upon to write a book upon British Birds, will always find this to be one of the most interesting, but certainly one of the most difficult tasks which he has ever undertaken. He is sure to discover that not only is the path well-worn, but that the work of his many predecessors has been so well done that little chance of originality remains to him." The rule may be true, but this work is certainly an exception to it.

Our author commences with the Passeriformes, and places at their head the family Corvidæ, for which he gives his reasons.\* The Accipitres are divided into two sub-orders—PANDIONES for the Ospreys; and FALCONES, which "includes every Accipitrine bird except the Ospreys and the Owls." Geese, Swans, and Ducks (ANSERIFORMES) precede the Herons, Storks, and Ibises (ARDEIFORMES). Cranes (GRUIFORMES) follow, and then the Bustards and Plovers (CHARADIFORMES), the Thick-knees being considered Bustard-like Plovers "and forming the connecting-link with the True Plovers." Gulls (LARIFORMES), which, "though at first sight very different in appearance from the Plovers, are really allied to them," precede the Petrels (PROCELLARIIFORMES), which are followed by the Divers (COLYMBIFORMES), Grebes (PODICIPEDIFORMES), and the Rails (RALLIFORMES). The Pigeons (COLUMBIFORMES), the Sand Grouse (PTEROCLETES), and the Game-birds (GALLIFORMES) conclude the series.

A very thorough method is pursued throughout. The genus is shortly described by its principal structural characters, and its geographical distribution detailed. Each species is dealt with in sections, and is described under the stages of "Adult Male," "Adult Female," and "Young." Then we find its "Range in Great Britain," followed by what is much rarer in hand-books,

\* *Vide* 'The Zoologist,' 1894, p. 470.

its "Range outside the British Islands." This feature alone would make the book; it supplies a want long felt, and could not be contributed by a better authority. We do not say it has been unattempted before, but it is here detailed with a fulness and with a method that makes reference very easy, and will enlarge the horizon of many British collectors. "Habits" succeed the last section, and then follow "Nest" and "Eggs."

Dr. Sharpe in his "Nomenclature" is content to be original, and we share his belief that many opponents of his views on this subject "will be found adopting my nomenclature in the near future." Revolutionary as some corrections at first appear, especially the employment of identical generic and specific names, reasons, and, we think, good reasons, are given in the preface to the fourth volume, which will well repay perusal. In Fishes *Scomber scomber* has long been a well-used name for the common Mackerel, and though *Scomber scombrus* has been shown to be what Linnæus intended, the use of the incorrect term evidently did not occasion much disquiet to ichthyologists. *Thynnus thynnus* has also been used for the Tunny.

These volumes are published at a low price, and possess many coloured plates, which, if not in the highest form of art, are at least trustworthy references.

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*British Birds, with their Nests and Eggs.* Illustrated by F. W. FROHAWK. Vols. i., ii., iii. Hull: Brumby & Clarke, Lim.

THERE are some subjects which blossom perennially in literature, and whose interest is never exhausted. An example is afforded in British Zoology by Birds, which, by the number of their students, observers, and collectors, and the almost universal regard they inspire, have long incited the pencil of the artist and the pen of the naturalist, and volume follows volume on their story. In quite recent years we have had a new and revised edition of Yarrell; Seebohm's volumes devoted both to birds and their eggs; Howard Saunders's well-known and generally followed Manual; Lord Lilford's magnificent illustrations; Bowdler Sharpe's contribution to Lloyd's Natural History, not to mention works on the same subject by Hudson, Dixon, and others; and now there lie before us the first three handsome volumes of this



new work, which is a marvel in cheapness, and a credit to the publishers.

The publication, which is to be completed in six volumes, has been entrusted to the authorship of some well-known ornithological writers, and Mr. Frohawk illustrates throughout, each bird being the subject of a full-page illustration, while the eggs are depicted in a series of coloured plates.

Volumes i. and ii. and a portion of vol. iii. are devoted to the Passeres and Picariæ, and have been entrusted to the care of Dr. A. G. Butler, an aviculturist who has had much experience with the first group in captivity, and is therefore able to add original observations made under such conditions, as well as facts relating to nidification derived from a personal collection of nests and eggs. This contribution contains a special feature as to the treatment and food of the species in confinement, in this respect resembling a well-known volume by Bechstein. Dr. Butler has avoided the illustration of our casual visitors, or "Rare British Birds," which we think would have added to the completeness of the work. Many, especially of the smaller birds, may be more frequent visitors than generally supposed. Although we hear much of bird slaughter, such can seldom be laid to the charge of a real or capable ornithologist, and the gun of the collector is not so ubiquitous as sometimes described. Could such a scrutiny be maintained over the area of these islands as was and perhaps is still pursued in Heligoland, many more visitors, such as warblers and other of the smaller birds, might be noticed, if not secured. The keeper's gun is more to be feared than that of the ornithologist, but the first is seldom discharged at warblers, though, alas! too often at our decreasing Accipitres. Should the same restrictive method be pursued by the other authors throughout the work, a supplementary volume might be issued for the reception of "Strangers."

"Striges" and "Accipitres" have been dealt with by the Rev. Murray A. Matthew. We gladly quote his plea for the Barn Owl, than which "there is, perhaps, hardly any other bird that is so persecuted, and so ungratefully repaid. When they cannot find any other excuse, keepers will say they kill them because they are 'unlucky.' There is no bird more commonly found stuffed and distorted in a case in cottages and farm-houses throughout



the land than this poor Owl, the writer has always made it his endeavour to plead for and protect. Then, too, there is the wretched fashion of turning the masks, wings, and tails of these birds into fire-screens, and the still more senseless decoration of ladies' hats with their soft and downy feathers."

The few Steganopodes fall to the care of Mr. Henry O. Forbes, with whose name we are glad to see associated that of Anna Forbes, whom we have not forgotten as the authoress of "Insulinde." Mr. Forbes, however, has but just commenced his share of the work, and in future volumes will deal with the Herodiones, Odontoglossæ, and Gaviæ.

Some of the drawings by Mr. Frohawk, with their backgrounds, are very successful, and possess a charm of their own. We might instance the plates of the Redwing, Dipper, and Osprey as examples.

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*John Hunter: Man of Science and Surgeon, 1728-1793.* By  
STEPHEN PAGET. T. Fisher Unwin.

THAT John Hunter was a great surgeon requires no telling; that he was also a great teacher the names of some of his pupils amply testify—Astley Cooper, Abernethy, and Edward Jenner were among the number; that he was a great collector is proved by the fact that his museum has been calculated to have contained more than 13,000 specimens; and that he was at heart an ardent naturalist will be manifest to any reader of this book.

"John Hunter was the youngest son, and his mother spoiled him." So writes his biographer, but the second statement we greatly doubt. It appears to be based on the fact that "He would do nothing but what he liked, and neither liked to be taught reading nor writing nor any kind of learning, but rambling amongst the woods, braes, &c., looking after birds'-nests, comparing their eggs—number, size, marks, and other peculiarities." His mother, probably, instead of spoiling him by this independence, helped to mould his practice of seeing for himself in after life, and thus indirectly inculcated the habit of proof by experience, and not faith by books. His career was not one of all sunshine. "First came the years of waiting for practice, that rise from the river of Time like the lean kine in Pharaoh's dream

—poor and very ill-favoured and lean-fleshed, such as I never saw in all the land of Egypt for badness”; while to the people round Golden Square, where he pitched his camp, “he was a zealous student of the human body, who might or might not restore you to health, but would certainly wish to anatomize you if he failed.”

From a perusal of some of his letters—of which there are many, perhaps too many, printed—we seem to have lost the great surgeon, and to be reading the queries of a Gilbert White and the requests of an omnivorous collector. “In his old age, full of suffering, overworked, and close to death, he was yet writing to Africa for swallows, ostrich-eggs, a camel, cuckoos, a young lion, everything respecting the bee tribe, chameleons, and any other beast or bird.” There was something magnificent in the way he purchased for his collection; he simply spent all he had in acquisitions. Ordinary people will call this improvidence, but ordinary people do not form scientific collections or create museums. Nemesis, however, spares not the man of lofty ideal, and Hunter had his distressing thoughts. “He had saved no income for his wife and children, and he could not insure his life; his museum must be sold to keep them after he was dead, or, if not sold to Government, then brought under the hammer; and the greater part of his writings was still in manuscript.” Angina tortured him during his last years, but he received the mercy of a sudden death.

Two of his expressions will well bear repetition. “Never ask me what I have said, or what I have written; but if you will ask me what my present opinions are, I will tell you.” The other relates to an experience on the hedgehog by Jenner. “I think your solution is just; but why think? why not try the experiment?” Under the immortal fame of the great surgeon and anatomist lies buried a real and enthusiastic naturalist.

## EDITORIAL GLEANINGS.

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THROUGH the courtesy of Mr. Basil W. Martin, we have received the 'Fifth Report of the Department of Agriculture of the Province of British Columbia,' 1895-96. Much of interest to the zoologist is found under the heading "Noxious Animals and Animal Pests." At present there appear to be the following sums paid as blood-money:—Panthers (*Puma*), *Felis concolor*, 7½ dollars; Wolves, *Canis occidentalis*, 2 dollars; Coyotes, *Canis latrans*, 1 dollar. From enquiries made by the Department it seems to be the unanimous opinion that the price put upon the heads of Coyotes should be raised. "In point of fact, instead of their numbers being diminished, they are increasing to an alarming extent, rendering sheep-rearing in the upper country out of the question; calves, pigs, and fowls are also carried off in numbers." Wolves, though troublesome in places, are neither so numerous nor so bold as Coyotes. Panthers are still numerous about the settlements on Vancouver Island, where their depredations on sheep and pigs are severely felt. On the mainland Panthers are comparatively scarce, a few under the name of mountain lions being in the Smilkameen. None are found on Hornby Island, and this absence probably applies to all the Gulf Islands. Wild horses continue to be a source of great loss to the cattle men of the upper country, on account of the damage they do to the ranges. It is greatly to be feared that, owing partly to the depredations of these useless beasts, the ranges of the Upper Fraser were left so bare at the beginning of winter that a great loss will occur amongst the cattle of that section. "Licences to shoot unbranded stallions may be issued by the Government Agent of the district, upon such terms and conditions as such Government Agent may indorse upon such licence."

We read that a great influx of Owls, principally Dusky Horned Owls, *Bubo virginianus saturatus*, to the settled districts of the islands and Lower Fraser occurred last winter (1895). This curious migration was considered due to the excessively and unusually early cold weather in November, which it is believed drove these birds out of their haunts to the northward. The presence of such a number of Owls was undeniably a source of great loss to poultry keepers. Not only fowls, but rabbits, game, and even cats, fell a prey to their rapacity. "It is quite possible that on an occasion of this kind the harm done was much greater than any good the Owls may have performed." The introduced Pheasants, *Phasianus torquatus*, have been very numerous on Vancouver Island and on some of the Gulf Islands, and

complaints have reached the Department of the mischief wrought by them in grain and potato fields. Other farmers, and in places where Pheasants are most numerous, do not complain, some of them even speaking favourably of them.

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THE Year Book of the United States Department of Agriculture, 1896, has also been received. As in Canada, bounties are paid for the destruction of noxious animals, and during the last twenty-five years 3,000,000 dollars have been thus expended. In some regions the losses on account of Wolves and Coyotes are so serious as to threaten the success of the Sheep industry. It was estimated in 1892 that in New Mexico, where the Sheep were valued at 4,556,000 dollars, such losses varied from 3 to 7 per cent.; in Nebraska the value of Sheep was about 2,000,000 dollars, while the losses amounted to 5 per cent., or 100,000 dollars; and sheepowners in Central Texas suffered losses on account of wild animals to the extent of 10 to 25 per cent. The larger animals are gradually becoming rare, particularly in the East; but it cannot be said that bounties have brought about the extermination of a single species in any State. Wolves are now almost extinct east of the Mississippi river, except in Florida and a few other States; but their present rarity is due rather to the settlement of the country than to the number killed for rewards.

Mr. F. E. L. Beal has studied the habits and food of the Blue Jay, *Cyanocitta cristata*, which seems to have hitherto enjoyed a somewhat undeserved bad character. The accusations of eating eggs and young birds are certainly not sustained, while in destroying insects the Jay undoubtedly does much good. "The Blue Jay gathers its fruit from nature's orchard and vineyard, not from man's; corn is the only vegetable food for which the farmer suffers any loss, and here the damage is small. In fact the examination of nearly 300 stomachs shows that the Blue Jay does far more good than harm."

Asparagus was introduced into America with the early settlers from Europe, and is credited with having been cultivated there for two hundred years before being troubled with insects. Now two beetles destroy the crop, both introduced from Europe—*Crioceris asparagi*, which arrived about 1856, and *C. duodecimpunctata*, whose presence was detected in 1881. Fortunately they have found enemies in the land of their adoption. *C. asparagi* receives the attention of the spotted ladybird, *Megilla maculata*, whose larvæ appear "to have no other occupation than that of devouring those of asparagus beetles." Two Hemipterons, *Podisus spinosus* and *Stiretrus anchorago*, also destroy the larval pests, and some species of wasps and small dragonflies do a similar service. Mr. F. H. Chittenden has contributed the memoir on this subject.



MR. ERNEST SETON THOMPSON has published in the October number of our American contemporary 'The Auk' a communication on "Directive Coloration of Birds." The main thesis is that birds when *sitting* are *protectively* coloured; and when *flying, directly*. To illustrate this point an example is taken from mammals. "The common jack rabbit when squatting under a sage-bush is simply a sage-grey lump without distinctive colour or form. Its colour in particular is wholly protective, and it is usually accident rather than sharpness of vision which betrays the creature as it squats. But the moment it springs it is wholly changed. It is difficult to realize that this is the same animal. It bounds away with erect ears, showing the black and white markings on their back and under side. The black nape is exposed, the tail is carried straight down, exposing its black upper part surrounded by a region of snowy white; its legs and belly show clear white, and everything that sees it is plainly notified that *this is a jack rabbit*. The coyote, the fox, the wolf, the badger, &c., realize that it is useless to follow; the cottontail, the jumping rat, the fawn, the prairie dog, &c., that it is needless to flee; the young jack rabbit, that this is its near relative, and the next jack rabbit that this may be its mate, And thus, though incidentally useful to other species at times, the sum total of all this clear labelling is vastly serviceable to the jack rabbit, and saves it much pains to escape from real or imaginary dangers."

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YET another theory on the method of evolution! Mr. Stuart Jenkins has sent us a pamphlet on the "Origin of Vertebrates," reprinted from the 'Medical Age,' and published at Detroit, Michigan. The author commences with an expression of sympathy with Lord Salisbury's well-known utterances at the Oxford meeting of the British Association, and a belief in the fact—never denied—"that Darwin has not said the last word in regard to evolution." He also fortifies his proposition with the equally well-known views of Huxley on non-fertility between hybrids. The new theory, which is of course inevitable, is "that the divergence of the vertebrates from the lower type was caused by the parasitic implantation of one organism of the ganglionic type upon another, the implanted organism giving rise to the cerebro-spinal nerve system and internal skeleton." The brochure evidently requires more study than we have been able to afford to render this proposition clear. We read that "utility has cut but an insignificant part in structural evolution, which has been brought about entirely by modifications of the cerebro-spinal parasite due to variation of nutrition." This theory of Parasitism we must own we fail to adequately understand, and therefore apologise for representing it by a perhaps obscure digest.

MR. G. LACY, writing to 'South Africa,' has endeavoured to make a calculation as to how many Elephants have been killed in South Africa by white men. From careful study he has made the following list of those who have killed a hundred or more, but of course there must be others that could be added. :—

H. Hartley .....	600	Gordon Cumming ...	100
F. Green .....	500	A. Ericksson .....	100
J. Dunn .....	400	D. Hume.....	100
G. Wood .....	400	W. Jennings .....	100
Jan Viljoen .....	400	T. Jennings.....	100
Piet Jacobs .....	400	R. Lewis .....	100
C. J. Anderson .....	350	H. Wahlberg .....	100
M. Zwartz .....	300	J. Lee .....	100
J. Chapman.....	250	W. Hartley .....	100
J. Cane.....	200	T. Hartley .....	100
S. H. Edwards .....	200	H. Ogle .....	100
F. C. Selous .....	200	J. Todd .....	100
W. C. Oswell .....	200	H. Smuts.....	100
W. Finnaughty .....	200	J. Gifford.....	100
H. Larsen .....	200	H. Fynn .....	100
P. Zietsman.....	200	G. Shadwell.....	100
R. Benningfield .....	150	R. Dubois .....	100
J. H. Wilson .....	150	G. A. Phillips .....	100
W. C. Baldwin .....	100	C. Van Royen .....	100

He also believes that quite a hundred have killed between 50 and 100—say 7000 Elephants; and if 5000 are added for men who have shot less than 50 each, we arrive at about 20,000 Elephants. Except in the last item, this is not so much mere guesswork as some might suppose, for, though bags, whether fur, feather, or fish, are always to be received with caution, yet the above is considered fairly accurate for one reason, that, except in the cases of Selous, Cumming, and Baldwin, they do not rest on the testimony of the men themselves. One Matabele hunter, who shall be nameless, told the writer that he had shot 400, when to his certain knowledge 40 would cover his bag. Cane, Ogle, and Fynn date back to 1825–35, and Hume to 1830–40, but all the rest from 1850 to 1880, when Elephant hunting was practically over as a business. Mr. Lacy doubts if any one man has killed a hundred since that date, though perhaps numbers make the claim.

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WE heartily welcome the first number—published this month—of Mr. Howard Saunders's second edition, revised, of his 'Illustrated Manual of British Birds.' Both book and author are sufficiently well known to require no further comment, and we hope to notice the whole work at the completion of its twentieth number.

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MR. SYMINGTON GRIEVE has written a "Supplementary Note on the Great Auk or Garefowl (*Alca impennis*, Linn.)." These notes, we read, are written up to 31st July, 1897. A summary of existing remains of this bird is given. Number of birds represented by the following remains:—

Skins .....	79 or 80
Skeletons (more or less complete)	23 or 24
Detached bones.....	850 or 861
Physiological preparations .....	2 or 3
Eggs .....	70 or 72

Five reproductions from photographs of preserved specimens of the Great Auk are given as plates. This pamphlet is reprinted from the 'Transactions of the Edinburgh Field Naturalists' and Microscopical Society,' and published by W. Blackwood & Sons, Edinburgh.

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MR. REGINALD HEBER HORNE, JUN., writes in the 'Auk' on the subject of "Birds' Tongues in Pictures." He has satisfied himself "that from a distance of a few feet, with a strong opera-glass, a bird's tongue *cannot* be seen between the open mandibles when singing. In almost all drawings or paintings of singing birds one will find the elevated tongue shown clearly. The musical instrument of a bird is not its tongue, as almost everyone knows; the sounds and modifications are produced in the throat, and therefore why should the tongue be expected to show (except perhaps as a modulator)? To cut the tongue out of a picture of a singing bird detracts from it, and looks exceedingly strange, solely because we are used to seeing it so in likenesses, but not in life; but the portrait nevertheless becomes true to nature."

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IN this month's 'Entomologist's Monthly Magazine,' Mr. Edward Saunders concludes a series of papers entitled "Hints on collecting Aculeate Hymenoptera." The information given is, however, far more than the title conveys, and is, in fact, quite an unique account of the habits and times of appearance of these interesting insects, and based on personal experience and observation. It is a real contribution to the *Natural History* of Insects.

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IN September, Prof. Drechsel, of Leipzig, was seized with apoplexy whilst sitting at his working table at the Zoological Station of Naples, and, in spite of prompt assistance, died within twenty minutes of the moment of seizure. Prof. Drechsel was fifty-four years old, and was for some time Director of the Chemical Section of the Leipzig Physiological Institute. At the time of his death he was Professor of Physiological Chemistry at the

Berne University. He was distinguished for many important discoveries, and was engaged in the systematic study of the presence of iodine and bromine in marine animals, in the pursuance of which he had come to Naples, where the material needed was abundant and easy to obtain. On the 23rd his remains were interred in the English cemetery at Naples, the staff of the Zoological Station, many students, and visitors to Naples attending the funeral.

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As a result of a lecture on Wolmer Forest by their President, Mr. T. Whitburn, the Guildford Natural History Society have decided to present a petition to the Commissioners of Woods and Forests, praying that Wolmer Forest may be reserved as a sanctuary for wild birds, in which they, their nests and eggs, may remain unmolested throughout the year; that it may not be let at any time for game preserving, or for any purpose inimical to bird life; and that it may remain in perpetuity as a national memorial to the greatest outdoor naturalist England has produced—Gilbert White, of Selborne. Such a recognition, it is said, would show that the admiration of Gilbert White in the nineteenth century was not verbiage merely, but that it took such a practical shape as to be of value to the naturalist and the English speaking race for all succeeding time. The Society have no desire to attempt to interfere with the use of the Forest by the War Office for the purpose of military manœuvres.

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THE local angling club at St. Ives (Hunts) two seasons ago placed some Barbel in the Great Ouse, with a view of acclimatising them to that river, where they had hitherto been unknown. The fish came from the Thames, and the experiment looks as though it had been successful, for several tiny Barbel about 3 in. or 4 in. in length have just been caught in a cast or bait net. The Barbel turned in were from 3 lb. to 6 lb. each, and they are evidently thriving and breeding in the river, which by some authorities is considered to be a very suitable water for them.

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“NOTES on Larval Cestode Parasites of Fishes” is the title of a memoir by Prof. Edwin Linton in a recent issue of the ‘Proceedings of the United States National Museum.’ The material on which these notes are based consists of collections in about six hundred bottles and vials referable for the larger part to entozoa of fish. The author well observes “that the finding of a larval cestode parasite encysted in the tissues of a fish is not always proof that the fish is a true intermediate host. This goes without saying when the host of the encysted parasite is a large Shark. Beneden



invented the term *xenosite*, i.e. stranger, for this condition of parasitism." Eighteen parasites with their hosts are not only fully described, but illustrated by eight plates.

IN the 'Essex Naturalist,' Mr. Wilfred Mark Webb concludes his contribution on the "Non-Marine Molluscs of Essex." This is an excellent addition to our county faunas, and the summarized tabulation is as follows:—

CLASS OR ORDER.	ESSEX.			BRITISH ISLES.	
	Living.	Fossil only.	Extinct in Britain.	Living.	Extinct.
Stylomatophora .....	60	7	2	85	3
Basomatophora .....	25	0	0	27	0
Prosbranchiata .....	13	2	1	14	1
Pelecypoda .....	12	0	3	14	3
Totals .....	110	9	6	140	7

The general classification is according to Lang's 'Text-book of Comparative Anatomy,' the families are those given by Fischer in his 'Manuel de Conchyliologie,' and the generic names used are those adopted by Pilsbry in his 'Guide to the Study of the Helices.'

MR. HORATIO R. FILLMER is the author, and Messrs. Betts & Sons, Lim., the publishers, of an unpretending brochure on 'Waxbills, Grassfinches, and Mannikins; a Hand-book for Beginners in Aviculture.' The author in his preface remarks:—"I should like to accentuate the fact that this is a hand-book for beginners. It does not pretend to contain much that is new, and experienced aviculturists will learn little or nothing from it. For this reason it treats more fully of the cheaper and commoner species, and rare birds are either unnoticed or dealt with very briefly." It will doubtless prove useful to the now fast increasing numbers of bird-lovers who with living specimens study the habits of their pets in captivity.

MR. ELIAS LOUIS HETT, of Springfield, Brigg, has communicated with us on the subject of a proposed Dictionary of the Call-notes of British Birds. He writes:—"A short time ago I heard a bird-call which I did not recognize, beyond remembering that I had read of it a few days previously. I searched the volume without success, and the identity of the bird remained undecided. It then occurred to me that an alphabetical list of recorded

bird-calls would prevent the recurrence of a similar experience. Acting on this idea, I have now collected from the works of Messrs. Bechstein, Dixon, Kearny, Morris, Robinson, Swann, and Dr. Emerson the call of two hundred birds, or rather more than half of those which are accepted as British. I am very desirous that my list should be as complete and perfect as possible, and shall greatly esteem any co-operation which you can give me; either in checking calls already recorded, or supplying those of other birds, more particularly of any bird or birds which you may have had favourable opportunities of observing.

“You will doubtless note that I have frequently retained two or more spellings of a single call. This appears to be unavoidable, as our language is not phonetic, and many bird-calls may be spelt in different ways with equal approximation to correctness. I have also retained some very free renderings of calls which approximate to English sentences. Although the *call-bird* portion is complete as far as I have the materials, I have as yet only had the first page set up. If my appeal for co-operation meets with the response for which I hope, I shall at once finish the compilation, and see it through the press.”





*RHINOLPHUS HIPPOSIDEROS*, BECHST.



# THE ZOOLOGIST

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No. 678.—December, 1897.

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ON THE POSITION OF THE LESSER HORSE-SHOE  
BAT, *RHINOLPHUS HIPPOSIDEROS*, BECHSTEIN,  
DURING HIBERNATION.

BY R. NEWSTEAD, F.E.S.,  
Curator of the Grosvenor Museum, Chester.

(PLATE II.)

As I do not remember to have seen any figures illustrating the position of this strange little mammal when asleep or hibernating, the thought occurred to me that the readers of 'The Zoologist' would be interested in the accompanying photographs, taken from life, which admirably represent *Rhinolphus hipposideros* in its most characteristic form.

In the celebrated Cefn and Tremeirchion caves this bat is fairly common—more so in the former than the latter. But the little cave-dweller may very probably occur in any suitable habitat throughout the district. My first acquaintance with the species was through Mr. Brockton Tomlin, who brought a specimen to our Museum for identification.

On March 4th, 1896, Messrs. Coward and Oldham joined me in an expedition to the caves; and on April 12th of the present year I paid a second visit to Cefn. The examples met with were easily accessible, and one of them was photographed *in situ*; but the strong light from the magnesium ribbon put the little creature in a nervous state of apprehension, and the resulting picture was

not good, so I was obliged to resort to more favourable conditions in order to obtain the result here portrayed. On both occasions the bats were hibernating, but awoke on the slightest provocation; and when removed from the cave became very active and readily took to wing. On April 12th, at 1.30 p.m., the temperature of the Cefn cave, about twenty yards from the entrance, was  $9^{\circ}$  C., just  $1.25^{\circ}$  C. colder than the shade temperature outside.

I placed my captives in a well-ventilated cage in a suitable atmosphere, but the frail little creatures died in a few days. When sleeping they cling most tenaciously to the rock, and the feet are placed somewhat closely together, rarely are they widely separated; but I noticed one example hanging for a long time with its legs completely crossed. With the exception of the upper portion of the head with the tips of the ears and a narrow dorsal space, the animal is completely enshrouded in its wings. Sometimes the head is also covered, but the space between the fore arms is always exposed. The fingers bend suddenly inwards at the joints, and all meet on the ventral parts of the body, where they, together with the membrane, form an irregular pentagon. The anomalous position of the tail is noteworthy; it is reflexed over the back with its accompanying membrane closely overlapping the wrinkled membrane of the legs, thus forming a deep narrow trough: an excellent apparatus to carry off any drops of water that might fall upon it from the roof of its habitat. Viewed in profile, the animal bears a remarkable resemblance to the pupa of a butterfly, and is altogether a most interesting little creature to study.

An examination of their rejectamenta showed that they had been feeding, almost exclusively, upon the smaller species of Lepidoptera; there were fragments of other insects, but I failed to ascertain the order to which they belonged. A great deal remains to be done with the structural details of this species, but other pressing matters prevent my adding further to this communication.

# THE MARINE AND FRESH-WATER FISHES OF GREAT YARMOUTH AND ITS NEIGHBOURING COASTS, RIVERS, AND BROADS.

BY ARTHUR PATTERSON,  
Author of 'Man and Nature on the Broads,' &c.

NOTWITHSTANDING that Great Yarmouth, like Amsterdam, may be said to be built on herring-bones—in other words, owes



its existence and erstwhile importance to the great North Sea Herring Fishery—ichthyology, apart from those species which have a pecuniary interest for Yarmouthians, has never been a favourite nor a prominent study. Certainly a transient interest was evinced at one time, when the Aquarium (now a theatre) began its brief existence, and when Fishery Exhibitions were a novelty; and also when the late Frank Buckland stirred some to

observe and to gather together interesting facts in relation to local marine fishes; but beyond that, and the compilation of one or two lists, little systematic recording of rare species, and of the economy and changes of fish-life, has been done.

The fresh-water species have been fairly well attended to, their habits and habitats being alike known to anglers, river poachers, and others: the first are ever-increasing in number, and angling clubs in the neighbourhood are legion; the second, thanks to the energies of the Yare and Bure Preservation Society, have had their day, or nearly so; and if the Yarmouth district angling fraternity would give greater support, pecuniary and otherwise, to the Society, poaching would become an unknown quantity. Tons of fresh-water fishes have from time to time been netted—somewhat audaciously too—yet the rivers and broads still fairly abound in certain species. The owners and tenants of the Broadlands have found it to their interest to see that the races of coarse fish have not been unduly depleted.

New fresh-water species have not been, except in one or two instances, introduced, and these were failures. Notably a consignment of Trout, *Salmo fario*, turned into the Filby Broad (where they had access to the Ormesby and Rollesby Broad), and the Black Basse, *Centropristes atrarius*. A few of the former attained some size, almost the last survivor being hooked in 1896; and anglers were glad to be rid of the latter voracious species. Neither increased their numbers, and both are now virtually extinct.

The Norfolk coast-line is a favourite rendezvous for certain migratory species, Herrings to wit; the bays and shallows of the Norfolk Estuary (the Wash) form a very suitable breeding ground for many species, but the seaboard in the more immediate neighbourhood of Great Yarmouth is not, in my estimation, favourable to the habits of a great majority, the flat, sandy, shifting nature of the bottom affording but little shelter, although in the finer months it abounds in Crustacea and Entomostraca. The abundance of Crustacea may be imagined when some eighty Shrimp-boats, carrying a man and boy or two men each, working dredges, and in some cases small trawls with a beam of from twelve to fourteen feet, find their owners remunerative employment from March to end of September. Their catches are principally the Æsop's Prawn, *Pandalus annulicornis* (known locally as



the "Pink Shrimp"), and the Sand Shrimp, *Crangon vulgaris* (known as the "Brown Shrimp"). Two bushels of Shrimps are a no uncommon "take" in a single tide. "Browns" come inshore in the spring, and are then chiefly taken; the "Reds" arriving during the warmer months; after which the "Browns" are sought again. Following these crustaceans are a hungry horde of Pogges, Weevers, Sea-bullheads, and others, amongst them being occasionally discovered rare and interesting species. The Opossum Shrimp, *Mysis chameleon*, abounds, myriads of these semi-transparent creatures sometimes speckling a "square fathom" of salt-water. This species is the prey of many fishes, from Gobies up to large Flounders. From the shrimpers' refuse I have secured very interesting strangers, and I am of opinion that if our shrimpers would take the pains to preserve rare finds, many more species might yet be added to the county list.

This leads to my methods of finding rarities. For some three or four years I kept on good terms with the Shrimp-lads, who for a consideration brought me uncommon "finds." These lads have since grown up, and are now mostly in the Navy. Scarcely any boys are employed at the present time. I have patrolled the beach many hundred times, often before daylight, in hope of discovering new fishes amongst the refuse left by the "draw"-netters. And I have persuaded wharf-men, fish-salesmen, and keepers of fish-shops to save for me, until I could inspect, anything of a rare or curious nature. By so doing I have obtained the White and the Two-spotted Gobies from the Shrimp-lads, the Four-bearded Rockling and the Müller's Scopelus on the sands, and the Streaked Gurnard and Ray's Bream from the wharf and fish-shop.

The principal fishing craft of Great Yarmouth are as follows:—Trawler, carrying an immense trawl-net; wolder, a small trawler going out but thirty or forty miles; the lugger, carrying a fleet of drift-nets (sometimes reaching considerably over a mile in length when "shot"—this is for Herrings);—a few solitary boats carrying nets for Mackerel; and the Shrimp-boat, as before mentioned. Added to these, two or three boats proceed to sea "long-lining" for deep-sea fish, *e.g.* Skate, Cod, Conger, and so on. The June Mackerel fishery has become obsolete, the great early summer Mackerel shoals having forsaken their once local resorts.

Previous to 1876 the immediate waters teemed with many species of fish which now come only at intervals, and in far less numbers. There can be little doubt that prior to that time, when the Herrings were all landed on the beach, the fishes gathered to feast upon the tons of refuse that from time to time was necessarily thrown overboard. Now that the Herrings are landed two miles up-river, and even the garbage has a monetary value, there is nothing to attract them hither. The same remark applies to such birds as rare Gulls, Skuas, and Petrels, which are no longer commonly seen with us.\* At that time seine-netting (local, "drawing") afforded remunerative employment, boat-loads of Cod, Codlings, Whitings, Gurnards, and others being taken. Drawing is now carried on in a half-hearted, desultory fashion by a few odd boats in the early summer, just prior to the invasion of the visitors, Salmon-trout being the favourite quest.

The first list of Yarmouth fishes was published by Charles and James (now Sir James) Paget in their 'Sketch of the Natural History of Great Yarmouth'; it enumerates eighty-one species, but so accurate has it been found that I have been compelled to eliminate only two species—the Sordid Dragonet, *Callionymus dracunculus*, and the Toothed Gilthead, *Sparus niger*; the former, as is now well known, being either the immature or the female of *Callionymus lyra*, known at one time as the Gemmeous Dragonet. Dr. Lowe has since published, in the 'Transactions' for 1872-73 of the Norfolk and Norwich Naturalists' Society, a "List of Norfolk Fishes," with a supplemental list, which appeared in the 'Transactions' for 1893-94 (pp. 634-42).

In the year 1887 I resolved to confirm the Pagets' existing list of Yarmouth Fishes, with the result of not only deducting the above-named species, but nearly doubling it in the ten years which have since elapsed, including several new to the county. These will be noted later on. My own published notes are as follow:—

- (1) "List of Yarmouth Fishes," in 'Fish-Hook and Float,' 1888.
- (2) 'A List of the Fishes of the Great Yarmouth District,' under *nom de plume* of "Luberta." 1892.
- (3) "Notes" on rare and interesting species and varieties, in

\* See the author's remarks in Stevenson's 'Birds of Norfolk,' vol. iii. page 337.

the Norfolk and Norwich Naturalists' 'Transactions' in the years 1890-91 (pp. 227-30); 1891-92 (pp. 323-28); 1894-95 (pp. 114-17); 1895-96 (pp. 225-27); 1896-97 (pp. 293-95). "A Sketch of Yarmouth Fishes" also ran through the 'Naturalists' Chronicle' in 1896-97.

My best thanks are here tendered to Mr. T. Southwell, F.Z.S., of Norwich, for the ever-ready help he has afforded in identifying new species, and unravelling knotty points; indeed, it was greatly at his instigation that I have undertaken the task of working out the fishes of the district.

The following abbreviations will be helpful:— \* my own additions to the local list; † additions to county list; C. common; R. rare; F. frequent; R. R. rather rare; A. accidental; (?) doubtful species; [ ] has a doubtful claim to Yarmouth list.

*Gasterosteus aculeatus*. Three-spined Stickleback. C.— Abundant, and generally alone inhabiting the ditches where found. Brackish water does not inconvenience it, and I have found it alive and strong in the refuse left by the draw-netters on the beach. It undoubtedly comes down involuntarily on the ebb, thousands being drawn through the sluice-gates opening from the marsh-ditches into the rivers. Various armoured varieties occur. Local, "Stanickle"; male, "Redbreast."

\**G. pungitius*. Nine-spined Stickleback. C.— Shuns the society of the preceding species, which bullies it; generally but not always found by itself. Prefers entirely fresh water. Like *G. aculeatus*, is often spotted with the parasitic fish-louse, *Argulus foliaceus*. Local, "Tinker"; "Sweep."

*G. spinachia*. Fifteen-spined Stickleback. F.—Is frequently taken in summer in Shrimp-nets. Often found on Breydon; occasionally "nesting" there. Local, "Sawback."

*Perca fluviatilis*. Perch. C.—Numerous in the broads and rivers; often takes a bait in brackish water, on the verge of the "salts" coming up on the flood. It appears to be seeking the Shrimps which come with it. Is very partial to the Ditch Prawn, *Palæmon varians*. Hickling Broad, Reedham Ferry, and several other of its favourite haunts might be mentioned, but large specimens are much less frequently taken than formerly. It is said that the *Anacharis* weed has injuriously invaded many

of its spawning quarters, and undoubtedly the unrest caused by excursion steamers has acted detrimentally to the spawn. Complaint is also made of the decrease in numbers. Anglers should invariably throw back under-sized specimens. A Perch was taken at Ormesby on Sept. 4th, 1866, weighing  $4\frac{1}{2}$  lb.; length, 18 in.

† *Scorpena dactyloptera*. American Rose Perch. A.—Found a specimen of this rare British fish (the second for Great Britain) in a shrimper's catch on April 29th, 1894; length,  $5\frac{3}{4}$  in. (see 'Zoologist,' 1894, pp. 230 and 431). An eight-inch example was brought to me from Lowestoft, taken off that port on Dec. 11th, 1895.

*Labrax lupus*. Bass. F.—Not infrequently taken in spring in draw-nets, but rarely runs to any size. One, 8 lb. 10 oz.; length,  $30\frac{1}{2}$  in.; May 28th, 1895; another, 10 lb., May 18th, 1896. In October small specimens running from four to seven inches in length are not infrequently washed ashore. The Bass is not a favourite for the table. "Very rarely off Breydon" (Pagets). Local, "Sea Perch."

*Acerina vulgaris*. Ruffe. C.—Plentiful enough in some broads, less common in river-ways nearer town. Local anglers say that when you catch a Ruffe you may shift your ground. It is exceedingly attentive to those who fish in shallow waters. Rarely attains seven inches, but have seen one or two specimens taken that length.

*Mullus surmuletus*. Surmullet. R. R.—In the old fishing time was common enough, being often taken in the Mackerel-nets. "In some Mackerel seasons abundant, in others scarcely seen; in May, 1831, 10,000 were sent in one week to the London markets" (Pagets). Have weighed an example at 2 lb. Quite a number were taken in trawl-nets in the North Sea in May and June, 1896. [The Red Mullet, *M. barbatus*, remains yet to be discovered locally.]

*Pagellus centrodontus*. Sea Bream. R. R.—A few years ago, during the old-time landing of Herrings on the beach, was common, numbers being occasionally taken by draw-nets. Is now but seldom caught.

*Chrysophrys aurata*. Gilthead. A.—"Taken once or twice" (Pagets). One is also recorded from Pakefield, near Lowestoft, in April, 1829.



*Cottus gobio*. Miller's Thumb. C.—In the rivers and broads. Gurney records a Water Rail picked up on the Yare, and a Dabchick on the Wensum, both being choked in attempting to swallow fish of this species.

*C. scorpius*. Father-lasher. C.—One of our most abundant species in the warmer months. The shrimpers net thousands. They are voracious feeders, and are often found simply stuffed with Shrimps. When held in the hand they distend their gills, producing a curiously faint humming sound; hence the local urchins term them "hummers." Large ones occasionally take a bait. Local, "Hummer," "Hard-head," "Sea-bullhead."

(?) † *C. scorpius* var. *grœnlandicus*. Greenland Bullhead. R. R.—[Mr. Southwell considers this to be a variety of *C. scorpius*. As its colours are so distinctive, and there is to my mind a marked difference in the shape of the head, I am inclined to accept it as a true species. I have obtained several, one of which, in spirits, is preserved in Norwich Museum. A five-inch specimen in Shrimp-net, March 7th, 1895; another, 5½ in., Dec. 19th of same year. My first record, April 24th, 1890.]

\**C. bubalis*. Bubalis. A.—Although said to be not uncommonly met with in the Wash, it is the veriest straggler here. First specimen met with April 7th, 1891, in a Shrimp-net. Now in Norwich Museum. A second, Aug. 17th, 1895; a 4½-in. specimen taken in a draw-net.

*Trigla cuculus*. Red Gurnard. F.—Immature specimens are not infrequently taken in Shrimp-nets. In the adult state it is far less common than *T. gurnardus*.

(?) *T. pœcilopectera*. Little Gurnard. R.—[Recent authorities discard this as a true species; Couch does not. Dr. Lowe (Trans. Norf. and Nor. Nat. Soc. vol. iv. p. 21) gives it a place in his list as follows:—"On May 15th, 1873, while trawling in the Lynn roads with Mr. Ewles, I obtained a single specimen of this rare species; length, 2¾ in." &c. In the summer of 1890 I met with several fish answering Couch's description of the supposed species, and forwarded them to Dr. Günther, who pronounced them as the immature of *T. cuculus*; and that *T. pœcilopectera* was no true species.]

*T. hirundo*. Tubfish. R. R.—A much more suitable name is Sapphirine Gurnard, by which some writers distinguish the

species. In the immediate neighbourhood it is by no means common. Great numbers are, however, at times brought in by trawlers. As an article of food it is held in high esteem by the poorer classes. Exceedingly abundant in May, 1897 ('Zooologist,' *ante*, pp. 275, 339). A twenty-inch example ashore alive, Dec. 21st, 1890. Local, "Latchet."

*T. gurnardus*. Grey Gurnard. C.—Was once abundant, forty or fifty in the course of an hour being sometimes taken by sea-anglers from the piers. At intervals some smart takes are landed even now. Was unusually numerous offshore in September, 1894. Draw-netters occasionally secure a "trunk"-ful in a night.

†*T. lineata*. Streaked Gurnard. R.—The late Rev. C. J. Lucas, in 1895, met with a specimen in a fish-shop, forwarding it to me for identification. It is now in Yarmouth Museum; length,  $9\frac{1}{2}$  in. I met with a second on Nov. 22nd, 1895; length,  $12\frac{1}{2}$  in. And a third, taken off Lowestoft on March 9th, 1896, came into my hands a few hours later. I have met with one or two others since.

*Agonus cataphractus*. Pogge. C.—A most abundant species, taken in great numbers by shrimpers. Local, "Hardhead."

*Trachinus draco*. Greater Weever. F.—Abundant in fish-shops during the summer months, mostly brought in by trawlers. Occasionally entangled in the Herring-nets. It is excellent in the fry-pan, although only eaten by the poorer classes. Its dorsal fins appear to possess exceedingly venomous properties, with which fishermen righteously dread contact. A pricked finger produces intense pain, and often acute inflammation follows. It was no unusual thing to meet a fisherman with his arm in a sling from poisoned finger, when the local trawling industry was in a healthier condition than it is at present.

*T. vipera*. Viper Weever. C.—Taken in numbers offshore in the summer months. In as bad repute as the previous species, fishermen "heeling" it in the sand on sight. The fish knows well, even when lying on the sand, how to direct its dorsal spines at any near object, and has a deft way of pricking the fingers of those who carelessly handle it. An example was taken from a salt-water pipe on the quay on May 15th, 1897, after having been pumped in at the jetty, and traversing a system of pipes into a tank, and thence out

once again. It was kept awhile as a novelty by some cab-drivers in a pan of salt-water in their shelter ('Zoologist,' *ante*, p. 339).

*Sciæna aquila*. Maigre. A.—Has been met with in the autumnal Herring season. One scaling 75 lb. taken on Oct. 23rd, 1875; length, 4 ft. 9 in. A specimen taken off Sheringham in 1841 is in the Norwich Museum. Another cast ashore at Aldborough, in Suffolk, Aug. 30th, 1868; length, 5 ft.; weight, 84 lb.

*Scomber scomber*. Mackerel. C.—An important Mackerel fishery was carried on here in May and June until the end of the sixties, when the species, possibly on account of the incursions of trawlers into its feeding grounds, fell off to unremunerative numbers. Strangely enough, it has put in an appearance contemporary with the Herrings, and in September immense "takes" are sometimes made. Twenty "lasts" were landed on the fish-wharf on Sept. 25th, 1897, and on Oct. 9th one boat alone had as many as two "lasts," or 24,000 fish. Some of the drifters go out on purpose for the Mackerel. A specimen taken in November, 1881, scaled  $2\frac{3}{4}$  lb.; length, 20 in.; girth,  $10\frac{1}{2}$  in. An example shown me on June 15th, 1897, was entirely minus the Mackerel markings on its back, being of a whole-coloured deep blue, like an immature Pollack ('Zoologist,' *ante*, p. 340).

(?)\* *Scomber scriptus*. Scribbled Mackerel. R. R.—[This by some authorities is referred to as a variety of *S. scomber*. The first recorded county specimen I saw in the flesh at a meeting of the Norwich Naturalists' Society in September, 1894. Since then I have kept a look-out for the species, and have met with it as follows:—A twelve-inch example, June 25th, 1895; the first Yarmouth record. It is now in the Glasgow Museum. Another, Dec. 9th, 1895; also on Sept. 26th, 1896—length, 18 in.; Oct. 15th, 1896,  $15\frac{1}{2}$  in.; and three or four others since.]

*S. thynnus*. Tunny. A.—"Small specimens not infrequently taken during the Mackerel fishery" (Pagets). An example weighing 224 lb. was taken on Oct. 6th, 1870; length, 6 ft. 9 in.; girth, 4 ft. 4 in.

*Auxis rochei*. Plain Bonito. A.—In June, 1839, two examples were taken off Yarmouth, and came into Mr. Yarrell's possession (Yarrell's 'British Fishes,' vol. i. p. 160). Mr. Gunn, of Norwich, records a third taken off Yarmouth, now in Cam-

bridge Museum, in July, 1847. Small examples *undoubtedly occur* amongst Mackerel, but are overlooked.

[*Naucrates ductor*. Pilot Fish. A.—“Many years ago I saw a specimen freshly caught on the *Suffolk coast*, and sent for preservation to the late Mr. J. Tims, of Norwich, in whose house it was unfortunately destroyed by a fire on the premises” (J. H. G.). *Vide* Dr. Lowe’s “List of Norfolk Fishes,” *Trans. Nor. and Nor. Nat. Soc.* 1872–73, p. 30.]

*Zeus faber*. Doree. F.—I saw a twelve-inch example captured in a pool left by the ebb at the Bure-side in the autumn of 1879. More commonly taken in the trawl. A fine example, two feet in length, weighing  $8\frac{1}{4}$  lb., was entangled in a Scotchman’s drift-net off Yarmouth on Oct. 2nd, 1896; a very unusual “take” in that fashion. Its maw contained seven full-grown Herrings. A tiny specimen, the size of a crown-piece, was taken in a Shrimp-net on May 18th, 1897. Local, “Johnny Dory.”

*Sparus niger*. Ray’s Bream. A.—Has been cast ashore during rough weather. Mr. Gurney mentions a specimen in the Norwich Museum as taken off Yarmouth. Another recorded Jan. 25th, 1847. A fine specimen was toppled ashore at Caister during a heavy wind on Nov. 23rd, 1894; length,  $25\frac{1}{4}$  in.; depth, 9 in.; fork of tail,  $8\frac{1}{4}$  in.; pectorals,  $6\frac{1}{4}$  in.; weight, 6 lb. 10 oz. Now in Yarmouth Museum. Another taken in Herring-nets, Oct. 29th, 1895; length,  $23\frac{1}{2}$  in.; weight,  $5\frac{3}{4}$  lb. A pen-and-ink sketch of this fish appeared in the ‘Daily Graphic,’ Oct. 31st, 1895.

*Lampris luna*. Opah. A.—Four locally recorded examples have come to grief during stormy weather. The Pagets record two “found in the breakers, Nov. 1828; another, Dec. 24th, 1823”; a third came to grief in 1878; and a magnificent example was found alive on Caister beach by a coastguardsman, after a storm, on Oct. 17th, 1891. It has been preserved, and is in the possession of Mr. J. R. Nutman, fish merchant. Length, 38 in.; girth, 41 in.; width at “shoulders,”  $5\frac{1}{2}$  in.; weight, 51 lb.

†*Capros aper*. Boarfish. A.—I saw the first Norfolk recorded specimen lying on a shrimper’s stall on July 9th, 1881. It had been taken amongst “pink shrimps” that morning. Length 5 in. A second found, at high-water mark on north beach, by Mr. B. Dye on May 1st, 1882.

*Trachurus trachurus*. Scad. C.—Is a frequent take amongst



Mackerel and in the Herring nets. Fine examples are often found lying at the harbour mouth, undoubtedly thrown overboard as useless. It is seldom or ever eaten here. Small ones are frequently thrown ashore by the surf in October, running from  $2\frac{1}{2}$  in. to 4 in. in length. The Pagets say "it is rarely caught; and those that are taken are generally very small." According to J. H. G., "Frequent off Lowestoft." It may be that the young ones referred to were keenly in pursuit of young fry (*vide* Norf. and Nor. Trans. 1872-3, p. 31). Local, "Horse-mackerel."

\**Xiphias gladius*. Swordfish. A.—One came ashore at Palling beach on Nov. 30th, 1881. Length, 7 ft. 3 in.; sword (minus a small portion), 2 ft. 3 in.; radius of tail, 2 ft. The stomach contained food reduced to thin mucus. Another, taken into Lowestoft on Sept. 27th, 1893. Length, 9 ft. It was entangled in a Mackerel net.

\**Gobius minutus*. Little Goby. C.—Is abundant in the summer months; and is a frequent "take" in the Shrimp-nets. Is common enough on Breydon, where it seems quite at home on the ooze of the shallows. Has a curious way of hiding itself from view when disturbed, by stirring up the soil with its large ventral fins. Local, "Gobble-belly," "Gobble-guts."

*G. unipunctatus*. One-spotted Goby. C.(?)—Dr. Lowe thus disposes of it: "Norfolk estuary. Very common, Yarmouth.—Pagets." I have deemed it advisable to put a "?" to its local claim, as I have been unable to identify the species at present. It can hardly have been overlooked. Pagets' record is equally obtuse: Note—"Gobius minutus, Spotted Goby; occasionally taken in Shrimp nets." He refers to no other.

†*G. ruthensparri*. Two-spotted Goby. A.—I first obtained this species on April 13th, 1891, from a local shrimper. Curiously enough the same individual brought me a second on the 15th; and a third on the 18th; since which I have obtained no others. The "turning up" of more than one example of a hitherto rare or unrecorded species is a notable thing in ichthyology. It was, if we except Dr. Day's finding, prior to this, unrecorded for the county. It is decidedly the handsomest of the *Gobidæ*. Couch's figure, described as the Broad-finned Goby, fig. ci. vol. ii. p. 165, is identical in appearance with the above species. His so-called Two-spotted Goby, No. 3, fig. c,

p. 159, is a very poor representation. Dr. Lowe (Trans. Norf. and Nor. Nat. Soc., 1872-3, p. 32) introduces a so-called new species, *Gobius pusillus*. He also says (Ibid., 1893-4, p. 637): "His (Mr. Patterson's) claim for it as the first recorded Norfolk specimen is rendered doubtful by Mr. Day having pronounced my *G. pusillus* to be the same as *G. ruthersparii*. I think, however, that the two are quite distinct, and that *G. pusillus* is a good species." Against this deduction I am convinced that *G. pusillus* and *G. minutus* are identical, and his description exactly tallies with the last named.

\**G. auratus*. Yellow-speckled Goby. C.—Preferring a sandy habitat, this species abounds off this coast all the year round. The shrimpers net thousands; but no use is made of it, either as bait or food. Local, "Gobble-belly."

\**G. niger*. Rock Goby. R. R.—Was first recorded for Norfolk on June 13th, 1876, from an example taken at Hunstanton. I obtained the second, and the first for this locality, from a shrimper on Aug. 13th, 1889. I have had several since. It undoubtedly turns up every summer.

†*Latrunculus pellucidus*. White Goby. R. R.—Identical with *Gobius gracilis* of Couch, and *G. albus* of Yarrell. The first example of this new Norfolk species was brought me on June 9th, 1890, by a shrimp lad. It was identified by Dr. Günther. Subsequently a bribe of twopence apiece brought me so many that I had to withdraw the premium. Since that year I have very seldom met with the species. Its Smelt-like appearance, notwithstanding its prominent teeth, undoubtedly confounds it with the young of *Osmerus eperlanus*.

*Callionymus lyra*. Yellow Skulpin. C.—The Pagets describe it as "Very rare; taken in Shrimp-nets, April, 1816 and 1826." I have found it to be very commonly taken in the shrimpers' nets, a score being no unusual take in a morning's tide. Pagets give also "the Sordid Dragonet" (or Dusky Skulpin) as "also taken, May, 1816." As a matter of fact it is identical with *C. lyra*, being either the female or immature male. Local, "Tiger-fish."

*Cyclopterus lumpus*. Lump Sucker. F.—Large examples taken occasionally in Shrimp and draw nets. "One taken in river, 1819" (Pagets). Several taken in April and May, 1895, some two stones in weight; a previous record is of one 15 lb. in

weight, taken in a shrimp net on March 25th, 1890. Numbers of small examples, the size of chestnuts, and of a bright emerald-green colour, are taken every spring. A 26 lb. fish taken in a shrimp net on Feb. 24th, 1897.

*Liparis vulgaris*. Sea Snail. C.—Against Dr. Lowe's "Norfolk estuary; not common" (Trans. Norf. and Nor. Nat. Soc., 1872-3, p. 33), I have to record it as exceedingly abundant off Yarmouth in the summer months. The smacksmen complain of the way in which this species attach themselves to their shovels when heaving overboard the "rubbish" from the trawl-net. It is not eaten. Local, "Suckers."

[*L. montagui*. Montagu's Sucker (?). Dr. Lowe (Trans., 1872-3, p. 33) refers to this as "Frequently taken . . . much more common here than the preceding in the estuary; and several times in the river opposite Lynn in fresh water at low tide." Col. Montague says it "inhabits only the rocky parts of the coast." The sequence is obvious, yet I have a suspicion it has occurred at Yarmouth; but at present I have failed to identify it.]

*Lophius piscatorius*. Angler. R. R.—"Not uncommon in the roads, and sometimes in the harbour" (Pagets). Have known it taken in the draw-net. Smacksmen always examine the "pockets" of large specimens in search of fish there "stowed." Occasionally large soles and other edible fish are extracted. A large specimen, weighing about 1 cwt., was brought to me on June 3rd, 1897. A 30 lb. example, on July 23rd, 1897, contained a large Father-lasher. Local, "Pocket-fish."

*Anarhichas lupus*. Wolf-fish. R. R.—Fine examples are not infrequently brought in by smacksmen in the spring. There is no demand for it as an article of food, although proprietors of fried-fish shops clandestinely cut it up and sell it. Its flesh is excellent. Local, "Cat-fish."

*Centronotus gunnellus*. Butter-fish. C.—A frequent "take" in Shrimp and draw nets. It is exceedingly greasy and slippery. Local, "Nine-eyes."

*Zoarces viviparus*. Viviparous Blenny. C.—Very plentiful in summer months, taking a bait freely. Is excellent eating. Caught in small trawls on Breydon for Crab bait. On Nov. 17th, 1890, I extracted no less than 133 young ones,  $1\frac{1}{2}$  in. in length,

from an example measuring  $10\frac{1}{2}$  in. They oozed forth on the slightest pressure. Local, "Eel-pout."

\**Atherina presbyter*. Atherine. F.—Very numerous in Lowestoft harbour in summer months, where it affords immense diversion to visitors who angle for it. As a rule it is uncommon at Yarmouth, a few turning up now and again amongst Smelts. A great quantity caught off Gorleston in 1891; but there was no demand for them as food. Local, "Smolt," "Sand Smelt."

*Mugil capito*. Grey Mullet. F.—Very uncertain in its visits. Was formerly very plentiful on Breydon in summer, where shoals abounded amongst the *Potamogeton* or "wigeon-grass," seeking a vegetarian dietary. Very difficult to ensnare: "poke"-nets, *i. e.* a small-meshed net, have nets of much larger mesh on either side, and, rushing against these, the fish bagged itself. Frequently a whole school would jump over and escape. On Sept. 2nd, 1880, a 22-inch specimen took a Mussel bait at the fish wharf. No local angler has successfully fished for it. Becoming yearly scarcer; undoubtedly owing to the increasing sewage polluting the rivers, and the shoaling up of the "flats."

\**M. chelo*. Lesser Grey Mullet. A.—A lad, throwing out a line from a raft, close by Breydon, accidentally hooked a specimen of what Dr. Günther has decided to be the variety of *M. chelo* known as *M. septentrionalis*. This was on Nov. 10th, 1890. Length,  $7\frac{1}{2}$  in. Without doubt *M. chelo* sometimes occurs.

*Labrus maculatus*. Ballan Wrasse. A.—"A young one, about eight inches long, was taken with a hook in the outer harbour at Lowestoft in August, 1852" (J. H. G.). Dr. Lowe records one: "Yarmouth, April 15th, 1868."

*Gadus morrhua*. Cod. C.—Great numbers of Codlings are taken in some winters from the piers; crowds of small ones occasionally, in October, swarm up the Yare to Breydon, where they give unlimited sport, taking Mussel by preference. Their stomachs are generally found crammed with Shore Crabs (*Carcinus mænas*; local, "Sea Sammies"). Curiously, the Lugworm (*Arenicola piscatorium*) is the favourite pier-bait. Sometimes huge Cods are taken. The Scotchmen who "drift" for Herrings supplement their catches by lining for Cod; and large specimens are taken off Winterton in the winter months by "long-liners." I have found a Cod's maw full of Norwegian Lobsters (*Nephrops norve-*



*gicus*). Local, "Norway Shrimps." A well-defined specimen of the "Bull-dog" variety of this species was taken on the Britannia Pier, Dec. 21st, 1895. Length, 21 in. Have met with others.

? [Variety ——. "Rock Cod."—On Christmas Eve, 1890, I examined a peculiarly red-and-yellow mottled Cod of some eighteen inches. The fisherman termed it a "Rock" Cod, and did not seem to look upon it as an unusual occurrence. It was very like the Dorse (*Gadus callarias*) figured in Couch's 'Fishes,' vol. iii. p. 66. I have on one or two occasions seen tendencies to this coloration in what I felt satisfied was *Gadus morrhua*.]

*G. æglefinus*. Haddock. C.—Locally it is rare; but great quantities are brought in by trawlers from the North Sea. Occasionally taken from the piers.

*G. luscus*. Bib. C.—"One found on the beach, 1813" (Pagets). Small examples commonly enough taken in Shrimp-and draw-nets. It inflates with wind (through fright?), and cannot submerge itself after being taken, the Gulls generally ending their ebb-drift seawards from the shrimpers' refuse. Great numbers on Breydon during September, 1897. Local, "Bastard Whiting," "Whiting-pout."

†*G. minutus*. Power Cod. R.—I found the first recorded Norfolk specimen amongst the draw-netters' refuse by the seaside on April 6th, 1890; length,  $3\frac{3}{4}$  in. Very like a small codling at first sight; the larger eye, however, at once distinguishes it. Several others since, notably one on Oct. 13th, 1894; length, 10 in.

*G. merlangus*. Whiting. C.—Abundant in late autumn and during winter. Those caught from the beach and piers do not run large. Large specimens occasionally from deeper water. Largest on local record, March 29th, 1891; weight,  $7\frac{1}{4}$  lb.! One,  $22\frac{1}{2}$  in. long, on wharf, March 7th, 1895; this is large for the east coast. Two Whittings caught by smack 'Dutch Trader,' February, 1871; length respectively, 26 in. and 24 in.

†*G. pollachius*. Pollack. C.—Strangely enough, although so plentiful around Norfolk, this species remained unrecorded until I identified it from a number of juvenile examples I caught with rod and line in the entrance of the Bure on May 8th, 1888. These averaged eleven inches in length. For many years youngsters had been caught under the cognomen of "Pinnikin

Coles." During the spring of 1888 extensive dredgings were made in Lowestoft harbour, when this species was found to literally swarm. Adult fish are locally scarce. Local, "Pinnikin Coles."

*G. virens*. Coal-Fish. F.—The Pagets record it as "plentiful," undoubtedly confounding it with *G. pollachius*. Long-liners take big ones occasionally off Winterton. Have known it taken in the Bure.

*Lota vulgaris*. Burbolt. R.—Recorded from Yare, Bure, and Waveney. Lubbock ('Fauna of Norfolk') says:—"I have known many caught, and some two and three pounds in weight." The late Dr. Norman hooked a 2 lb. 2 oz. specimen at Burgh some years ago. I have not yet met with the species.

\**Merluccius vulgaris*. Hake. R. R.—Not on Pagets' list. Large examples occasionally brought in by smacks. Held in light esteem locally as an article of food.

*Molva vulgaris*. Ling. F.—Taken by long-liners; seldom, however, inshore. I have met with very juvenile examples from the shrimpers' nets. A  $3\frac{3}{4}$ -inch specimen, taken on April 14th, 1890, was very Sand Launce-like in shape, and also singularly unlike the adult in colour. Back orange; upper sides white, lower of a brownish tint, a streak of white between on either side; belly bluish white; fin-margins orange, the first and second dorsals ending with black spots.

\**Motella tricirrata*. Three-bearded Rockling. R. R.—In the spring of 1882 a fine specimen taken in a draw-net. One taken by line from the Britannia pier, Sept. 25th, 1890. Two or three since. A fourteen-inch male, sent to Mr. Southwell by the late Sir E. Newton from Lowestoft, Jan. 19th, 1894.

†*M. cimbria*. Four-bearded Rockling. A.—I found a specimen on the beach amongst some draw-netters' refuse, May 23rd, 1889. This is new to the Norfolk fauna. One since that date. This species grows to a larger size than *M. mustela*, which in some respects it much resembles.

*M. mustela*. Five-bearded Rockling. F.—Often taken in Shrimp- and draw-nets; sometimes in purse-nets in the river. "A very small specimen taken, Dec. 17th, 1821" (Pagets). Have known it taken on a hook on Breydon, and off Gorleston pier.

\**Raniceps trifurcus*. Lesser Forkbeard. A.—"A small

example at Great Yarmouth" (Couch's 'Fishes,' vol. iii. p. 123). A second, and the first, to my knowledge, of what Yarrell terms "one of the rarest of British species" ('Fishes,' vol. ii. p. 293), was brought me alive by a Shrimp-lad on April 11th, 1891; length,  $2\frac{3}{4}$  in. Another on May 6th.

*Ammodytes tobianus*. Lesser Sand Launce. C.—"Not uncommon; sometimes found in the sand off Winterton" (Pagets). Taken both by Shrimp and draw-netters. [I am strongly of opinion that the Short-nosed Launce, *A. cicereus*, occurs rarely off this coast.]

\**A. lanceolatus*. Larger Sand Launce. C.—More often left stranded by the draw-netters than taken in Shrimp-nets. Is undoubtedly, with "Herring syle," a favourite prey of the Terns.

*Hippoglossus vulgaris*. Holibut. F.—Occasionally taken on long-lines. One captured on June 1st, 1867, measured 72 in. in length; breadth, 30 in.; weight, 161 lb. Two recorded for March, 1868; weight, respectively, 140 lb. and 198 lb. Very large specimens come to our fishmongers from Grimsby; one, on April 1st, 1897, measured 7 ft. in length.

*Rhombus maximus*. Turbot. C.—Small examples taken in wolders, Shrimp and draw nets. Some very large specimens occasionally brought in from the North Sea. Two on the wharf on Feb. 1st, 1896, when gutted, weighed 29 lb. and 30 lb. "Double" Turbots not unfrequently occur, when both sides are found dark coloured, and spiny processes adorn the under surface as well as the upper. Occasionally a notch in the head holds one eye, which can see either way. If partially blotched underneath, the spines correspond thereon to the upper surface. I met with a fourteen-inch albino Turbot on March 1st, 1894; a narrow orange ring encircled each eye; and a fifteen-inch example, also white on the upper surface, on May 24th, 1897 (Zool. ante, p. 339).

*R. levis*. Brill. C.—Small examples common enough inshore. I examined an albino, 15 in. in length, on Feb. 13th, 1892. Irregular orange-red lines ringed the eyes; the fins were margined by a yellowish grey hue. A malformed Brill occurred on Oct. 19th, 1891, with the dorsal and anal fins rounded off under the tail as in the Müller's Topknot. [Very rarely a curious sport (is it an undescribed species?) comes to hand. On Feb. 26th, 1897, I saw a specimen of what might be termed a

“Brill-Turbot.” It was thought to be a hybrid. It exhibited a curious blending of the two species. It resembled the Turbot in shape; the head was a Brill’s, as were the markings; and it was deficient in the spines which distinguish the other side.—Trans. Norf. and Nor. Soc. 1896-97, p. 295.]

\**R. megastoma*. Sail Fluke. A.—First recorded for the county, June 18th, 1875; Norfolk Estuary. I obtained a five-inch specimen on May 3rd, 1893, which was taken in a shrimper’s net on that date.

†*Zeugopterus punctatus*. Müller’s Topknot. A.—A fine adult specimen was brought me by a shrimper on June 11th, 1890; length  $7\frac{1}{2}$  in. Not before recorded for county. Now in Norwich Museum. A second example, taken in a trawl-net on Smith’s Knowle, on March 11th, 1894; length,  $6\frac{1}{4}$  in.

*Pleuronectes platessa*. Plaice. C.—Large specimens appear to be decreasing; a great many immature are brought in and sold in the early winter. The trawlers mercilessly pursue the spawning fish. Prior to the advent of “carriers” to the fishing fleets, trawlers anchored in the roads; their fish were “ferried” ashore in huge ferry-boats, run up the beach on “troll-carts,” and sent off to London by train. Trolls and ferry-boats are now obsolete. A solitary troll-cart is preserved in Yarmouth Museum. “Peds” (hampers) of huge Plaice were then quite an institution. Examples are occasionally blotched (never wholly grey) upon the under side; in the patches red spots inevitably correspond with those on the upper side.

*P. limanda*. Dab. C.—Occasionally hooked on sandy patches a short way up the river, seldom on a muddy bottom. Frequent from the piers in summer. Small ones are named by the shrimpers as “Cock Soles.” Local, “Sand Dab.”

\**P. microcephalus*. Smeared Dab. C.—Considerable numbers from the trawlers. Not often caught inshore. Very ruddy-tinted examples, like the second figure in Couch’s ‘Fishes,’ vol. iii. p. 188, occur occasionally. Is erroneously named by fishers and others the “Lemon Sole,” with no tangible reason whatsoever.

†*Hippoglossoides limandoides*. Long Rough Dab. R. R.—I first recognized this as local, from a specimen sixteen inches in length, on a fishmonger’s slab, on Jan. 20th, 1891. I am surprised at its prior non-identification, as I have found several examples since.



†*Pleuronectes cynoglossus*. Pole, or Craig Fluke. R.—On Feb. 11th, 1892, I found an eighteen-inch example amongst a package of Soles. Another on the wharf, taken by a wolder, on March 21st, 1893; length, 19 in. Dr. Günther, to whom I forwarded it, confirmed my finding. Two small ones on March 14th, 1892. I found another in a heap of Dabs, Jan. 20th, 1896, which is now in Cambridge Museum. Under the name of “Witches,” this and the preceding species are frequently taken off the Yorkshire and Lincolnshire coasts.

*P. flesus*. Flounder. C.—Exceedingly abundant in neighbourhood. Ardently angled for on Breydon, prize matches being contested. The “runs” or “drains” veining that estuary at low-water teem with them, particularly in August. They feed on small Crabs, Opossum Shrimps, &c. Herons, *Ardea cinerea*, in turn, devour swarms of juveniles. With a “butt” pick made of straightened Cod-hooks I have taken from eighty to a hundred Flounders in an hour or two. Sea-caught Flounders are lighter hued than those taken on a muddy bottom. In early August they are plump; in September often thin. In January they spawn on Breydon; have taken twenty-inch examples in twenty feet of water. “Left-handed” Flounders are frequent, often three in every dozen taken. Local, “Butts.”

*Solea vulgaris*. Sole. C.—Shrimpers often net examples; now and again one taken on a hook off the piers, a nineteen-inch fish being taken there in September, 1897. Have seen them on Breydon. The largest of which I have a record weighed  $4\frac{1}{2}$  lb.; length,  $23\frac{3}{4}$  in.; width,  $8\frac{3}{4}$  in. Somewhat scarcer than formerly. An example minus even the vestige of a tail, Feb. 25th, 1896; length,  $7\frac{1}{2}$  in.; width,  $4\frac{3}{4}$  in.; three inches short of normal length. At a fish-shop, on Jan. 20th, 1890, I examined a Sole which had the mouth reversed, and opening towards the dorsal fin instead of turning down to the ventrals.

\**S. lascaris*. Lemon Sole. A.—On Jan. 21st, I met with a small example on the fish-wharf, which I forwarded to Mr. T. Southwell for identification. Only recorded previously for the Norfolk estuary—“several examples.” [I have reason to believe careful investigation would add the Variegated Sole, *S. variegata*, to the local list.]

*Salmo salar*. Salmon. R.—“Small ones have very rarely

been taken in the Mackerel-nets" (Pagets). One taken in a flooded meadow near Norwich on Dec. 1st, 1873. Sir Thomas Browne (1662) observes:—"Salmon no common fish in our rivers, though many were taken in the Ouse, in the Bure or north river, in the Waveney or south river, in the Norwich river but seldom, and in the winter. Four years ago fifteen were taken at Trowse mill (Norwich) at Christmas." Thanks to the pollution of our rivers, we have said adieu to this king of fishes. A seven-pound example taken in the draw-nets in the summer of 1888. A trawler brought in, on Feb. 27th, 1896, a forty-two-inch specimen. An eight-inch example taken in a draw-net on May 6th, 1896.

*S. trutta*. Salmon Trout. C.—Uncertain in its visits, this species appears in the summer months. It is sought by draw-netters, who do not catch so many now as formerly. Great care is taken not to damage the fish in handling. Rarely netted in the Bure and Waveney. [The so-called "Bull-trout," although ignored by Dr. Günther as "not attributable to definite species," has as much right, I think, to the distinction of a true species as the Twait and Allis Shads. It is occasionally taken here.]

*S. fario*. Common Trout. R.—Lubbock refers to this species as occurring in the Yare and Bure. At long intervals two or three fine examples have been taken at Acle. Several years ago the late Rev. C. J. Lucas turned out a number in Filby Broad, whence they had access to Rollesby and Ormesby Broads. Some increased in size, but they soon diminished in numbers. A local angler fishing at Filby on April 7th, 1896, hooked and landed a 2 lb. 9 oz. Trout; length, 18½ in. It took a lobworm, and when dissected was found to contain several thrown over as ground-bait.

*Osmerus eperlanus*. Smelt. C.—Very abundant offshore in the autumn, and on Breydon. Occasionally many scores are netted in the serving of a tide, both on the Breydon "flats" and at the harbour mouth. In summer the water is fairly alive at times with young fry. Large ones sometimes taken. I have several eleven- and twelve-inch records. On April 20th, 1891, a twelve-inch example weighed six ounces. Dr. Lowe refers to one "a foot long, which weighed only a quarter of a pound" (Trans. Norf. Nor. Nat. Soc. 1872-73, p. 41). An eight-inch

example taken in North river, Oct. 11th, 1893, with a double mouth.

†*Maurolicus pennantii*. Pearlsides. A.—Whilst turning over some freshly-thrown seaweed left by a draw-netter on the beach near the harbour mouth, I found a living example of this species. It was in company with some young Herrings and a number of Three-spined Sticklebacks. The double row of emerald dots running on either side the abdomen and the protruding lower lip proclaimed its identity forthwith; length,  $1\frac{1}{2}$  in. Three others were left on the sands after a gale on Feb. 24th, 1890, and another was picked up on Scratby beach in March, 1893.

*Esox lucius*. Pike. C.—Abundant in our broads and rivers. Attains to a large size, and is noted for its voracity. The late Dr. Norman recorded in 'Land and Water' one captured near Yarmouth which weighed  $36\frac{1}{2}$  lb., measuring 54 in. Very stunted individuals are found in the ditches north of the town.

*Scomberesox saurus*. Skipper. A.—But one record for Yarmouth; date uncertain (*vide* Trans. Norf. Nor. Nat. Soc. 1872-73, p. 42).

*Belone vulgaris*. Garfish. C.—An example was taken within five miles of Norwich (Lubbock). Occasionally several are landed in a day at the wharf with Mackerel. Is in no repute as food, being very oily. Local, "Guard-fish."

*Cyprinus carpio*. Carp. R. R.—Found in some broads, seldom taking a bait. On two or three occasions I have seen specimens that were found struggling in the salt-water on Breydon, having come down stream on the ebb-tide, one seven pounds. The dimensions given by Lubbock of one taken in a broad are as follows:—"Length,  $29\frac{1}{4}$  in.; girth, 29 in.; weight,  $13\frac{1}{2}$  lb."

\**C. auratus*. Goldfish. R. R.—Dr. Lowe, on Mr. Gunn's authority, says "these fish are bred in several mill-ponds in the county." A local angler-artist assures me this fish breeds in the Ormesby waterworks reservoir.

\**C. carassius*. Crucian Carp. R. R.—Very local; common in one or two broads, but never takes the hook. Taken at Fritton when the decoy is netted. "A solitary specimen has twice been observed in the Yare" (Lubbock). Dr. Lowe, on J. H. G.'s authority, says "it is common in ponds in East Norfolk. . . . Known to hybridize freely with Common Carp." The same writer mentions a specimen weighing 1 lb. 7 oz.

*Gobio fluviatilis*. Gudgeon. C.—“In plenty in most of the broads” (Pagets). Lubbock says, “Abundant in the higher parts of rivers, but not, I think, otherwise than of rare occurrence amongst the broads.” I have seen it in swarms in shallow water at Filby Broad; I caught a number with small red worms. Is never specially fished for.

*Leuciscus rutilus*. Roach. C.—Abundant in all our rivers, ponds, and broads. On the neap tides it comes as far down as the entrance of the Bure at Breydon, biting freely. Occasionally shoals, overtaken by the returning “salts,” may be seen struggling, nose out of water, up river, many perishing. One was taken in 1880 at Ormesby, weighing  $2\frac{1}{2}$  lb. The late Dr. Norman records one 2 lb. 2 oz.

[*L. cephalus*. Chub. (?).—I picked up a  $11\frac{1}{2}$ -inch example in the Waveney on April 20th, 1890. Probably it occurs in some numbers in that river. Against this we quote Lubbock:—“It is entirely unknown in the Bure, Yare, and, I believe, the Waveney; is very large in some Norfolk rivers—the Ouse, the Thet, and the Wissey near Stoke Ferry.” Its true claim to a place in the local list at present remains doubtful.]

*L. erythrophthalmus*. Rudd. C.—“Common in the rivers and broads” (Dr. Lowe). The late Dr. Norman caught one, weighing 3 lb. 1 oz. It is the characteristic fish of Heigham Sounds and Hickling Broad, where, when once discovered, it takes the hook with a dash and impetuosity which makes it a great favourite among local anglers. It is a pity it is useless for the table. Below Thurne mouth, in the Bure, it runs small and in no great numbers.

*L. vulgaris*. Dace. C.—Occasionally hooked on the river Bure and the broads, but not of any size. It was possibly introduced by being thrown in from the bait-cans of anglers.

*L. phoxinus*. Minnow. R. R.—Becomes more numerous in the higher reaches of the rivers. Possibly introduced in the same manner as the preceding.

*Tinca vulgaris*. Tench. C.—Fairly common in the broads, and in ponds, ditches, and other still waters. Have known it hooked occasionally, but is generally captured in “poke” and funnel nets made on hoops. Have seen specimens from the Bure. The late Dr. Norman hooked one weighing 5 lb. 14 oz. Thrives



in several clay-pits in disused brick-yards a few miles out of Yarmouth. [The Golden Tench is believed to have become naturalized, and to have bred sparingly in some of the broads.]

*Abramis brama*. Yellow Bream. C.—Abundant in the broads and rivers. Large ones taken at Acle. Dr. Norman caught one weighing 8 lb. 12 oz. It is reported that a Norwich angler on one occasion placed eleven Bream (from a catch in the Wensum) in the scales, which swung the balance at 55 lb. Only a few old-world rustics ever attempt to cook this species in the Broadlands. Large takes are sometimes thought worthy to feed the pigs on.

*A. blicca*. White Bream. C.—Abundant everywhere, more especially in the Bure, preferring rivers to broads.

[*Leuciscus buggenhagii*. Pomeranian Bream. R. R. — Much doubt exists as to the status of this so-called species. It is variously supposed to be a hybrid between the Rudd and the Bream; whilst Prof. von Siebold “proved it to be a hybrid between *Abramis brama* and *Leuciscus rutilus*.” I am as firmly convinced it is a cross between *A. blicca* and the Roach, with both of which the Bure abounds; and the Pomeranian Bream is taken there more frequently than elsewhere. It has the characteristics of the two species.]

*Engraulis encrasicolus*. Anchovy. R.—“A specimen found on the beach, May, 1830” (Pagets). By chance taken in the nets of the 'long-shore fishermen. Dr. Lowe records it as frequently caught in stow-nets near Lynn, running to eight inches in length. I met with an example taken among Herring, Oct. 23rd, 1893.

*Clupea harengus*. Herring. C.—Great Yarmouth owes its existence, importance, and prosperity to the Herring. The principal fishery commences in September and ends at Christmas. Roughly speaking, a thousand boats, local and Scotch, fish from the port; about 11,000 hands all round are directly connected with the fishery, and some 2000 miles of drift-nets are spread “to reap this harvest of the sea.” A “last” of Herrings is 13,200 fish. A boat sometimes brings in twenty “lasts”; sometimes a boat’s nets do not fall in with the “schools” of Herrings, and a night’s work may amount to a capful of fish. Between 20,000 and 30,000 “lasts” are taken yearly. The “history and circum-

stance" of the Herring fishery affords interesting reading. Food is seldom found in the stomachs of Herrings, yet they must devour myriads of Crustacea and Entomostraca. I dissected a six-inch example found on the south beach, April 13th, 1890; its maw contained 143 Opossum Shrimps. Have also found a six-inch example full of roe. Some imported Norway Herrings, on Dec. 17th, 1895, measured 15 in., girth 7 in., weight  $14\frac{1}{2}$  oz. A 'long-shore averages 10 in. I believe the Norway variety is simply aged Herrings.

*C. sprattus*. Sprat. C.—Abundant in October and November. Most of those sold hail from Aldeburgh and Southwold. Local boats no longer venture out for the fishing. On Dec. 5th, 1895, I examined some sprats; the ova were discernible with a strong lens. An unusual and out-of-season catch was made the third week in February, 1896, when roe and milt were found well developed. The ova differed very little in relative size from those of a Herring. I consider the Sprat spawns in March, at no great distance from the land.

*C. alosa*. Allis Shad. R. R.—Draw-netters occasionally fall in with the species. "Not uncommon with the Herrings" (Pagets). One taken near Norwich, 1840. Numerous (Twaite's also), May, 1895. Several,  $7\frac{1}{2}$  in. to 9 in., examples washed ashore, May 4th, 1891. One taken April 27th, 1893, weighed  $4\frac{3}{4}$  lb.

*C. finta*. Twait Shad. R. R.—One taken in draw-net, April 19th, 1893. Length, 17 in.; weight,  $4\frac{3}{4}$  lb. The Pagets do not mention this species. Seen it netted on Breydon. Usual number of spots on either side, nine. Saw one, May, 1895, with fifteen.

*C. pilchardus*. Pilchard. R. R.—Occasionally straggles into the Herring shoals. Fish curers who detect the species invariably nail it up "for luck" on a beam in the curing house. "Some few generally taken every year in the Herring nets; in some years they have been abundant, as in 1780 and 1790; and in 1799 so many were taken that one 'tower' received upwards of a 'last' as his perquisite" (Pagets). Nearly every year a few are observed.

*Anguilla vulgaris*. Sharp-nosed Eel. C.—The largest local record is as follows: March 26th, 1808, one taken in the river between the harbour mouth and Haven bridge. Length, 6 ft.;

girth, 21 in.; weight, 42 lb. Abundant in all our water-ways. Tons are taken every autumn in Eel-sets on their way to the sea; and a number of men pursue the species in the warmer months with "babs" composed of threaded Worms, and find the business sometimes fairly remunerative. On May 29th, 1892, I examined some Eels, and found the ova well-developed in one. I am strongly of opinion that many moderate-sized Eels do return to the rivers in spring, which is contrary to the recognized theory that they do not. A creamy white Eel, 15 in. long, taken in the Bure, June 6th, 1895. The "lips" had a pink tinge, as had the margin of the dorsal and anal fins.

*A. latirostris*. Broad-nosed Eel. C.—Not so abundant as the preceding species. Large ones often taken on the broads; one in the Bure, Aug. 10th, 1866. Length, 3 ft. 8 in.; girth, 10 in.; weight, 7¼ lb.

*Conger vulgaris*. Conger. C.—"Not uncommon in the roads; one, weighing nearly 50 lb., caught in 1808" (Pagets). Not infrequently found ashore during severe weather, with the wind E. Getting into shallow waters, the frost "nips" the Conger's bladder, which, distending, floats it helplessly on the surface, and the waves topple it ashore. I have met with several thus cast on the sands; notably one in the year 1879, which weighed 14 lb.

*Siphonostoma typhle*. Broad-nosed Pipefish. R. R.—I have met with specimens occasionally on the beach, and in the shrimpers' refuse.

*Syngnathus acus*. Greater Pipefish. C.—Often taken in the shrimpers' nets. Shrimpers often dry and varnish these fish, placing them on their "overmantels." Local, "Snakefish."

\**Nerophis æquoreus*. Ocean Pipefish. R. R.—This species is not infrequent. The first specimen recorded for the district was found at the seaside in some draw-netters' refuse on April 12th, 1890. Now in Norwich Museum. I have seen several since.

*Syngnathus lumbriciformis*. Worm Pipefish. R.—I have found this on the beach, and in the Shrimp-nets. An adult, carrying ova, 4½ inches in length, brought to me on Aug. 2nd, 1890. Under *S. barbarus*, the Pagets undoubtedly refer to this species.

*S. hippocampus*. Hippocampus. A.—"Occasionally met

with" (Pagets). About the year 1870 one was reported as having been found on the beach. I have not yet met with a locally taken example.

*Orthogoriscus mola*. Sunfish. A.—The Pagets record an occurrence in November, 1821. A second, taken in 1835, is in Norwich Museum. An example was toppled ashore near Caister on October 26th, 1860. Length, 4 ft.; weight, 154 lb. "Sometimes we meet with a *mola* or Moonfish, so named from some resemblance it hath to a crescent in the extreme part of its body, from one fin to another. One being taken near the shore of Yarmouth, before break of day, seemed to grunt and shiver like a hog" (Sir T. Browne). A few miles off Yarmouth a small example was taken in a "dydle" (a kind of landing net) over the side of a trawler, September, 1896. Length, 18 in.; from extremity of dorsal to that of anal fin, 2 ft. 4 in.; weight, 10 lb. Now in Yarmouth Museum.

*Acipenser sturio*. Sturgeon. R.—Has been rarely taken in the river and on Breydon. One large example stranded on the "flats," Oct. 10th, 1871; length, 7 ft. 10 in.; girth, 3 ft. 10 in.; weight, 392 lb. Instances of its taking a hook are rare. A 6½-ft. specimen was taken on a hook baited with Herring, off the beach, Dec. 10th, 1894. It was a "slinky" fish. The mouth was cut across to extract the hook.

*Carcharias glaucus*. Blue Shark. F.—Unfortunately too well known to the Herring fishermen, whose nets often suffer from its teeth and struggles as it becomes hopelessly rolled up in them. Examples upwards of 10 ft. long sometimes brought to the wharf; are invariably thrown on the manure carts.

\**Galeus vulgaris*. Tope. R. R.—Occasionally taken with Herrings. Fishermen know them as "shovel-heads," from the great breadth of the head. Occurs more frequently round Hunstanton. One taken in a Shrimp-net, Aug. 20th, 1891; length, 14 in.

*Zygæna malleus*. Hammerhead. A.—"One taken Oct. 1829; head now in Norwich Museum" (Pagets). I believe the tail accompanies it.

\**Mustelus vulgaris*. Smooth-hound. R. R.—Occasionally taken during the Herring fishery. I have seen several at one time on the wharf; and on one occasion saw three lying dead upon the sands.

*Lamna cornubica*. Porbeagle. R.—Scarcely a fishing season



passes over but one or two specimens occur. "One taken, 1818; another, 1822" (Pagets). I saw a 7-ft. example, Oct. 17th, 1891; another, 6 ft. 6 in., on Sept. 30th, 1893; yet another on Sept. 28th, 1894; length, 9 ft.

*Alopecias vulpes*. Thresher. R.—The earliest record of a locally taken example is July 4th, 1867; length, 14 ft. 5 in., of which the tail accounted for 7 ft. 4 in.; girth, 6 ft. One landed at Lowestoft end of Sept. 1879. "It weighed half a ton, and its tail was 10 ft. long" (Dr. Lowe). Another was caught by some Palling 'long-shore fishermen on Oct. 2nd, 1884; length, 12 ft. Two small examples at Lowestoft, Sept. 1897 (Southwell, Zool. *ante*, p. 475); another, 10 ft. 2 in. in length, landed at Yarmouth, Oct. 9th, 1897.

*Selache maxima*. Basking Shark. A.—"Several of this species have been taken at different times" (Pagets). Query:—Can the Pagets have confounded any of these with *Lamna cornubica*? I have not yet met with the species.

*Læmargus borealis*. Greenland Shark. A.—An example, 15 ft. long, was captured in shallow water off Caister, Nov. 11th, 1885 (Trans. Norf. Nor. Nat. Soc. 1893–94, p. 643). Two others have occurred off the Norfolk coast, *viz.*, one Jan. 21st, 1892, off Lynn; length, 13 ft. 2 in.; the other, July 12th, 1892, off Overstrand; length, 10 ft.

*Scyllum canicula*. Lesser Spotted Dog-fish. F.—"Our most common species" (Pagets). The fish must have changed about during the past fifty years, for a hundred Picked Dogs occur to one of this species. Frequently taken by trawlers, wolders, and rarely by shrimpers, from whom I have had specimens.

*S. stellaris*. Larger Spotted Dog-fish. R. R.—"One caught, 1828" (Pagets). Taken as in the preceding species. I have seen several on the beach and fish wharf.

*Acanthias vulgaris*. Picked Dog-fish. C.—An untiring foe to the Herrings, which it attacks even when gilled in the nets, biting out from the back chestnut-shaped pieces. Frequently the only catches of sea anglers from the piers. Found an example on Feb. 28th, 1890, on the beach; length, 27 in. A dead body was washed ashore on Jan. 23rd, 1890; a shoal of Dog-fish followed it into the breakers!

*Squatina vulgaris*. Monk-fish. R. R.—"One taken, 1817;

another, 1822; and others previously" (Pagets); and several others since. A 49-inch female gave birth to twenty-two young ones on board a fishing-smack; they were landed alive in a half-barrel of sea-water. Length of fresh-cast fish, 11 in. Two are in Norwich Museum.

*Torpedo vulgaris*. Torpedo. A.—An example is recorded from Lowestoft, Dec. 1st, 1883. Another, cast ashore alive at Palling, Feb. 23rd. 1883 (T. Southwell).

*Raia clavata*. Thorn-back Ray. C.—Large examples abundant in the neighbourhood during the winter months. Small examples frequent in the draw-nets. I have found the young in the egg-case cast up on the shore. Eaten with relish by the poorer classes. Local, "Roker."

†*R. radiata*. Starry Ray. A.—The first specimen recorded for the county came to hand May 11th, 1897; length, 22½ in. Very "Roker"-like in appearance, but distinguishable at once by its marvellous array of spines. It was beautifully mottled on the disc. It was forwarded to Norwich Museum, where it now is. The taxidermist assured me he is in no hurry to preserve another.

*R. batis*. Blue Skate. C.—Grows to considerable size in local waters. Numbers taken by long lines.

\**R. maculata*. Spotted Ray. C.—Frequently caught in Shrimp-nets; also on long-lines. In great esteem amongst the poorer classes. Local, "Homer."

†*R. miraletus*. Cuckoo Ray. R.—[This well-marked species had escaped notice as a locally occurring species until Feb. 4th, 1897, when I secured a fine female example, full of ova, from the size of hemp-seed up to chestnuts. It was taken on a steam-lugger's long-line. A smaller specimen, a male, was brought in on Feb. 16th ('Zoologist,' *ante*, p. 235). I have since seen two or three others. As the fishermen "worked" from Yarmouth Roads northwards as far as Grimsby, returning with their catch, some doubt may exist as to the claim this species has upon this list. I am almost certain, however, that it should be included.]

*R. pastinaca*. Sting Ray. R.—"A specimen taken in a Shrimp-net, August, 1813" (Pagets). Another recorded in 1869; length, 3 ft. 6 in.; weight, 56 lb. A third taken off shore, Oct.

1880, of a kindred size. I have known the fish on more than one occasion to be cut up and sold at fried-fish shops. A 2-ft. example on the fish wharf, Jan. 5th, 1897; it was furnished with a double "sting" or barbed dart. Presented by Mr. J. W. de Caux to Yarmouth Museum. [I am strongly of opinion that the *Shagreen* and the *Long-nosed Rays* have occurred; of the former I am convinced I saw a *side* exposed for sale in 1895.]

*Petromyzon marinus*. Sea Lamprey. R. R.—Is now and again netted on Breydon. I have seen two or three which were found struggling on the surface of the river as if affected by the sewage.

\**P. fluviatilis*. Lampern. C.—It is frequent in April, when shrimpers and draw-nets take many of them. I found a number dead upon the sands in April, 1890. They ascend the rivers to spawn. What Lubbock erroneously remarks with regard to the preceding species applies most certainly to this:—"Abundant in the Yare in April and May, when they run up to spawn." He evidently refers to the "River Lamprey."

## CUCKOOS SUCKING EGGS.

BY J. H. GURNEY, F.L.S., F.Z.S.

I AM glad Mr. Davenport has raised the question of Cuckoos sucking eggs, which, with so many good observers, ought to be definitely settled. To describe them as habitually sucking eggs by choice, as is occasionally done in popular books, is a little misleading, for their primary intent, it must certainly be conceded, is to remove, not to eat them. The Cuckoo's throat is very wide; and if in the operation of moving eggs from some Wagtail's nest an egg slips down, we have what in court would be called presumptive evidence that they by no means object to it. But to charge a Cuckoo with sucking the eggs of Pheasants and Wood Pigeons, and even Grouse (as in the case of the game-keeper cited by Mr. Storrs Fox), seems absurd. There is nothing to induce a Cuckoo to enter the nests of these birds, and even if they did their shells would be very tough for its feeble bill; while probably Cuckoos would not peck or impale an egg at any time, but rather try to crush it between the two mandibles. I once saw in an open meadow a Cuckoo rise from near a Skylark's nest, from which it had no doubt retreated a few feet on hearing my approach; I immediately went up, and found a broken Lark's egg in the nest. This was evidently the work of the Cuckoo, which may even have been sucking the egg when I came up. There were no other egg-shells in the grass; and if that Cuckoo could have been promptly shot, I should have expected to find the remains of other Lark's eggs in its œsophagus. A gentleman wrote in 'The Field,' under the initials of W. R. G. (I have unfortunately not kept the exact reference), that while he was sitting with a friend in Dorsetshire, in a room looking out upon an ivyclad wall, a Cuckoo passed the window. Knowing that a Pied Wagtail had her nest on the wall, the two observers approached the window, and watched the Cuckoo clinging to the ivy barely four yards away from them. They distinctly saw her



take an egg out of the nest, alight with it on the flower-border, and then, throwing up her head and apparently tossing the egg well back into her throat, crush the shell and let the contents trickle down. She then threw out the shell, which was picked up by the observers. If this is not accepted as good testimony, I would draw Mr. Davenport's notice to Mr. Sach's evidence in Dresser's 'Birds of Europe'; and especially to the narration by another correspondent of 'The Field,' H. L. W., who took out of a Cuckoo's crop, near Worcester, the recognisable remains of some eggs, two of which were Robins, and the rest apparently Hedge Sparrows ('The Field,' Jan. 28th, 1882). There is no bird about which so much has been written as the Common Cuckoo; and yet we have not reached the end of its history by a long way, as these stories show.

Dr. Bowdler Sharpe calls the egg-sucking Cuckoo a myth ('Birds of Great Britain,' vol. ii. p. 26); but the foregoing narrative seems inexplicable in any other way, and must be held to prove that, in one instance at any rate, a Cuckoo deliberately ate eggs. That they remove them from the nests of their dupes few will deny; and I have fairly clear evidence that they remove young nestlings as well.

On the 20th of last May I had been listening to the cry of the Spotted Crake on one of our Norfolk "broads," when three old Cuckoos, one behind the other, probably a hen and two cocks, flew past, and then over a small bog-myrtle bush, about two feet high, which stood quite by itself on the fen. In about three minutes one of these Cuckoos returned, and, either not seeing or heeding me, entered the little bush, where it remained certainly more than five minutes. I approached very cautiously, but found it impossible, in the long grass, to observe it even with strong binoculars.

A subsequent minute search revealed nothing in the bog-myrtle, but about eight feet from the bush was an empty Yellow Wagtail's nest, scattered round which, at distances varying from two to six feet, were five young Wagtails, doubtless dropped where they were by the Cuckoo. I take it that the object of this Cuckoo was by removing the young to make the old Yellow Wagtail build a new nest in which she might also deposit her egg. Probably

she was a Cuckoo with a special predilection for Yellow Wagtails' nests, and nothing else would suit her.

Cuckoos would probably be less likely to meddle with Hawfinches' eggs than those of most birds, because the nest of the Hawfinch is very rarely selected by them to lay in. Jays and Jackdaws were more probably the thieves which robbed the thirty-two nests alluded to by Mr. Calvert, assisted perhaps in their depredations by mice, which are very destructive little pests.

Mr. P. N. Emerson, in his 'Birds, Beasts, and Fishes of the Norfolk Broadland' (1895), writes:—"The evidence I have collected from [Norfolk] fenmen and others quite satisfies me that the Cuckoo does suck eggs; and, though I have never caught him, I have found eggs sucked that were whole before the Cuckoo hopped about them. . . . I have opened several Cuckoos' crops at the beginning of the season, and have upon some occasions found a yellowish substance which looked to me like nothing but egg." With this quotation I leave the much vexed question to those who have better opportunities than I have now of watching this inveterate nest-hunter.

We have had two nests this year with two Cuckoos in each; one belonged to a Pied Wagtail, and the other to a Spotted Flycatcher, but from what I can learn one Cuckoo only was reared in each nest.

## NOTES AND QUERIES.

## MAMMALIA.

**Trapping Shrews and Voles.**—I can fully endorse Mr. Pocock's remarks on the abundance of *Microtus glareolus* as regards my own county. I have trapped numbers of them, had many brought to me during haytime and harvest, and the cats often bring them into the house; but still, in districts that I have worked, *M. agrestis* is the preponderating species. *Sorex minutus* I have only succeeded in trapping once, though I am anxious to obtain specimens. *S. araneus* swarms, and *Crossopus fodiens* is common in suitable localities. *Mus messorius* I have never yet seen in the county. *M. sylvaticus* is ubiquitous, but though my friend Mr. James Backhouse and myself have examined a great number, we have not yet come upon the variety, as we consider it, *M. flavicollis*, though we are anxious to obtain a few specimens. *Muscardinus avellanarius* is very local.—OXLEY GRABHAM, M.A. (Chestnut House, Heworth, York).

## CARNIVORA.

**Common Seal in the River Arun, Sussex.**—In September last a Seal made its appearance off the mouth of the Arun at Littlehampton, and finally ascended the river above Arundel, at a distance of about seven miles from the sea. It was eventually shot, and whilst in the flesh I was afforded an opportunity of noting the following particulars. It was a male specimen of the Common Seal, *Phoca vitulina*, about three parts grown, measuring 3 feet 7 inches in length, girth 27 inches, front flapper 7 inches long, weight 40 lb., with the molar teeth placed obliquely, one of the characteristics of this species. With an acquaintance of the neighbourhood for over fifty years, this is, I believe, the first instance of such an occurrence; the animal, in this case, being no doubt attracted by the shoals of Bass which in the early autumn are taken here in considerable numbers. Within the last two seasons I have seen two brought on shore, both of them exceeding 12 lb. in weight—one caught on light roach tackle, after nearly an hour's tussle of a most exciting kind.—PERCY E. COOMBE (Surrey House, Arundel).

## AVES.

**Local Name of the Sheldrake**—Mr. C. B. Horsbrugh does not remember (*ante*, p. 508) seeing the name St. George's Duck in any book;

but, in addition to Dr. Bowdler Sharpe's 'Handbook,' mentioned in your editorial note, this name is to be found in Forster's 'Catalogus Avium in Insulis Britannicis Habitantium' (1817); Macgillivray's 'Manual of British Birds' (1846), and Swainson's 'Folk Lore and Provincial Names of British Birds' (1886). It seems to me to be co-related with St. George's Channel. In Clyde this bird is called Stocknet or Stockannet; and it also bears the following names in different localities:—Skelder, Skelgoose, Skeldrake or Duck, Scale Drake or Duck, Skell, Skeeling, Skeel Duck or Goose, Skeeling Goose, Shelder, Sheld Fowl, Sly Goose, Sky (?) Goose, Ruddy Goose, Bar-, Ber-, and Bur-gander, Bar Drake, Bay Duck, Burrow Duck, Links Duck, Pirenet or Perenet; *Gaelic*: Cra-ghiadh or Cradh-gheadh; and *Welsh* Hwyad-yr-eithin or Hywad-fruith.—HUGH BOYD WATT (3, Victoria Drive, Mount Florida, Glasgow).

**Heron Choked by a Frog.**—In the month of August, on the western borders of the Bay of Allan, in Kildare, Ireland, I came across an instance of a Heron being choked in the act of swallowing a frog.—H. MARMADUKE LANGDALE (Thorneycroft, Compton, Peterfield).

**An unrecorded Norfolk Great Bustard.**—Professor Newton, with his usual kindness, was good enough to inform me early in the present year that he had heard, through Mr. Osbert Salvin, of a Norfolk killed Great Bustard, which would shortly be sold by auction at Bournemouth, expressing a hope that if genuine it might be restored to its native county. After much negotiation and lengthened correspondence as to its history, I was enabled to purchase what has proved to be the finest male Bustard I have ever seen, and it is now in the collection of Mr. Connop, of Rollesby Hall, Norfolk, with many other local rarities. The history of the bird is briefly as follows. It was shot on Swaffham Heath about the year 1830 by a Mr. Glasse, Q.C., who then resided at Vere Lodge, Raynham, near Fakenham, Norfolk, and had remained in the possession of himself and Miss Glasse (his daughter), until it was sold with the effects of the latter shortly after her death at Bournemouth. I was able to obtain this information from a lady who knew Miss Glasse well, and had heard the history of the bird from her lips; it was also corroborated by Mr. Bear, the late Mr. Glasse's coachman, who assured me that his master had more than once mentioned the circumstance of his having shot the bird on Swaffham Heath to him; its history is therefore perfectly established. This superb old bird, if the estimated date of its death be correct, would not unlikely be the last male of the Swaffham drove—the last female having been killed in 1838.—THOMAS SOUTHWELL (Norwich).

**Occurrence of the Mediterranean Herring Gull, *Larus cachinnans*, in Norfolk.**—Whilst engaged in making a catalogue of the fine collection



of British Birds in the possession of Mr. E. M. Cunnop of Rollesby Hall, near Great Yarmouth, Mr. Cole, the Norwich bird preserver, pointed out to me a Herring Gull, which he said the late Mr. Stevenson had examined in the flesh, and believed to be *Larus cachinnans*. At his request Mr. Cole had noted the colour of the soft parts on the back of the case, and a careful examination led me to endorse the opinion expressed by Mr. Stevenson. Mr. Howard Saunders has also been good enough to examine the bird, and expresses himself quite satisfied with the correctness of the determination. The bird was shot by the veteran gunner, John Thomas, on Breydon Water, near Great Yarmouth, and sent by him in the flesh to Mr. Cole, on the 4th of November, 1886; it proved to be a male by dissection, and differed from the Common Herring Gull in the darkness of the mantle; the legs were a beautiful lemon yellow, and the bare ring round the eye deep orange-red. The mantle and orbital ring still retain their normal colour, but the legs have unfortunately been painted pale yellow, which Mr. Cole assures me he imitated from nature. The late season at which this southern species was killed seems remarkable; but still later in the same year (on December 26th), and in the same locality, a beautiful adult example of the Mediterranean Black-headed Gull was killed. I am not aware of any previous occurrence of *L. cachinnans* in Britain having been recorded.—THOMAS SOUTHWELL (Norwich).

**Note on Flight of Green Sandpiper.**—On the 4th September last I flushed in some marshes near here a bird that I thought, from its note and flight, to be a Wood Sandpiper (*Totanus glareola*). It rose with a very feeble sibilous note, and skimmed along close to the water till it settled again. I had some years ago killed the species close to the same spot, and that circumstance strengthened my conjecture as to the species. I flushed this bird several times without getting a shot, but its flight and note were always the same. Wishing to identify the bird, I went to the same locality again on the 7th September (three days later), when I again found the bird, which rose with the same note and flight. At its last rise I got a shot and killed it, and was surprised to find that it was the Green Sandpiper (*T. ochropus*). I have frequently met with this last species through many past years, and without exception it has risen wild, with a loud and shrill cry, invariably mounting high into the air, and never skimming the water. It seems, therefore, that the Green Sandpiper at certain times or seasons rises with the note and habit as to flight of the Wood Sandpiper. It would be interesting to know whether others have observed this variation of flight and note in *T. ochropus*.—W. OXENDEN HAMMOND (St. Albans Court, near Wingham, Kent).

**Green Woodpecker boring in November.**—While out after Woodpeckers on November 16th, I was much surprised to see in a decayed

beech-tree a new boring made by a Green Woodpecker, which had been worked out to a depth of eight or ten inches. I put some green fir-boughs under the hole, and find to-day (November 25th) that the work is still going on.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

**Supposed occurrence of a Great Spotted Cuckoo in Co. Kerry.**—On April 30th of this year Mr. Thomas King, lightkeeper at Skelligs Rock Lighthouse, reported “a Great Spotted Cuckoo on Rock at 8 a.m., very tired-looking, fresh south-west breeze, blue sky, cloudy.” Writing more fully to me, Mr. King says: “This bird was about the size of a Sparrowhawk, but more bulky in body; its feathers were ruffled and loose, and it appeared very much fatigued. Back of bird a dark slate colour; wing same colour as back, but feathers white at the points; throat orange or yellow; breast a light slate colour or grey; under tail white; all tail feathers white at the points; crest of a lighter colour than back and slightly erected; bill of a bluish black; tail about seven or eight inches long and inclined downwards. When first observed was coming from a south-westerly direction and lit on rock, and when approached within twenty yards would fly about the same distance away to another rock, and continued so for about half an hour, flying at short intervals when approached, and seemed very much frightened at the large number of Puffins that were flying about at that time. I had a good opportunity of seeing it as I followed it about from one place to another with the telescope, and lost sight of it at the north-east point of rock amongst the Puffins. I trust this description will give you an opportunity of judging its species; as far as I can see by the books at station, it resembles no other bird but the Great Spotted Cuckoo.” *Coccytes glandarius* (Linn.) has only once been obtained in Ireland. Its occurrence is noted by Thompson (‘Natural History of Ireland,’ vol. i. p. 364) as follows:—“The Cuckoo pursued by Hawks was taken by two persons on the Island of Omagh” (should be Omev, which is near Clifden, co. Galway). The bird when chased by the Hawks appeared fatigued, weak, and emaciated, as though it had taken a long flight, as Woodcocks and other birds of passage do on first arrival. The 1st of March, 1842, is said to have been the time of its capture.” This specimen, which was in the Museum of Trinity College, Dublin, in 1890, was examined by Saunders, who found it to be in immature plumage (‘Manual,’ p. 279). It is probable that both specimens reached the west coast of Ireland from the north of Spain, and from the description of the plumage the Skelligs bird was most likely an immature male.—RICHARD M. BARRINGTON (Fassaroe, Bray, Co. Wicklow).

**Presumed Summer Appearance of Shore Lark in Devon.**—With reference to Mr. C. Dixon’s letter on this subject (p. 471), I am anxious to state that I described exactly what I saw; and that to whatever species the

bird belonged, surely white under parts, with a conspicuous black band across the breast, cannot be referable to the Red-backed Shrike. I suggested the Shore Lark, though I knew its summer appearance would be opposed to experience, only because I could not identify the plumage I saw with that of any other bird.—H. W. EVANS (Athenæum, Plymouth).

**Egg-producing Powers of the Common Redshank.**—In connection with Mr. H. Alderson's note on the egg-producing powers of the Wryneck, the following may be interesting as illustrating those of the Common Redshank. The first clutch was completed about April 25th; these were taken about May 10th, and on May 16th there were two eggs in a new nest close by; these were destroyed by cattle or rooks, and by May 22nd another full clutch was laid a few yards away. These were taken on May 22nd or 23rd, and by June 1st four more eggs were laid eight or ten yards away; these were again taken, and the bird laid another full clutch, of which two were hatched on July 1st, the other two eggs being broken. Of course in this case it is much more difficult to be sure that all these eighteen eggs were the produce of one pair of birds; but the following are my reasons for thinking so: this is the first time that Redshanks have nested in this spot, at least for the six years I have known it; that never more than one pair of birds were seen there; and that all the nests were close together, but no two nests contained eggs at the same time. From these facts it would seem that gestation in this species lasts about five days.—A. BANKES (Otterwood, Beaulieu, Southampton).

**Egg-producing Powers of the Dipper.**—A somewhat similar case to that described of the Wryneck (p. 511) came under my own observation with regard to a Dipper. Twenty-eight eggs were taken from the same nest. After the twenty-eighth had been removed I was told of it, and with a little persuasion, and the help of a little current coin of the realm, I procured for the unfortunate bird immunity from further depredations. She laid four more eggs, and brought up three youngsters in peace.—OXLEY GRABHAM (Chestnut House, Heworth, York).

**Egg-producing Powers of Birds.**—I was much interested in Mr. H. Alderson's note in last month's 'Zoologist,' about the Wryneck, and I should like to ask him if he is absolutely certain that there were no *intervals* during the laying of the sixty-two eggs. I have often read that, by robbing a nest repeatedly, a bird may be made to lay an egg daily for about a month, but I have always considered that these reports were due to a want of careful observation in noticing the intervals between the batches of eggs laid. It seems to me impossible that a bird should be able to produce eggs at will, and I have always thought that the number of eggs to be laid was determined before the first was produced. If a female be examined just before

laying, the eggs to be laid are easily distinguished, as there is a sudden break off in size from the rest, not a gradual decrease. I have tried a good many experiments myself, and have never known a bird continue laying *an egg a day* beyond the normal number; but have always found that the bird continued laying up to its normal number, and that there was then an interval of a few days (during which, I suppose, the birds paired again) before the next lot was begun. For instance, in the case of a Starling which I experimented upon, there was an interval of five days between the two sets of eggs which it laid. I may mention that a good number of the birds experimented on deserted the nests. It would have been interesting if Mr. Alderson had noticed whether the eggs were fertilized, but I suppose they could not have been so.—BERNARD RIVIERE (Finchley Road, London).

**Hours at which some Birds Sing.**—In 'The Zoologist' (p. 472), Mr. Riviere touches on a very large subject, which occasionally attracts attention from observers, but which is yet far from having had an exhaustive treatment accorded to it. The hours at which birds begin to sing differ according to the season of the year and according to locality; they are also influenced in some other way, perhaps by weather conditions, as the same species occasionally show a marked difference of time in the hours at which they begin to sing on corresponding dates of different years. Mr. Riviere neglects to give the particular date in April, and thus deprives his note of the value it would otherwise have. In Shetland, during midsummer, no real darkness covers the land, and in consequence great activity prevails by night as well as by day. Larks and Wheatears sing at the hour of midnight, and the former has a long spell of uninterrupted song. Gulls of several species, Snipe, Arctic Terns, and other species of birds, make little difference between night and day, and are ever watchful and ready to meet any night intruder on their haunts long before he comes near their home. Further south, in the Forth area, for instance, we cannot boast an absence of darkness in summer, and we find that bird-life in the main enjoys a temporary halt every night. Yet even here many species of birds, such as Coot, Little Grebe, Heron, Peewee, Curlew, Redshank, &c., pay little regard to the succession of day and night. At dawn of day the songsters break forth one by one in song, till the whole grove or moorland rings with their melody. The Lark is the species in this neighbourhood that hails the day, but in the woodlands, where Larks are absent, Blackbird and Thrush generally rival each other in breaking the silence of night. Few things are more interesting to the field-naturalist, or more delightful to him, than the music of the grove, when it succeeds the dismal period of waiting on in the stillness and darkness of night. For several hours he has had little to attract his attention save the hooting and shrieking of Owls, the plaint of the Peewee, or it may be the terrific yell of a Heron,



when suddenly the sky above him bursts into life, or the woodlands around him are transformed into an orchestra; and whereas in the darkness he had abundance of time to note the spasmodic bird-calls that disturbed the silence, he now finds himself totally unable to cope with the superabundance of life that has so suddenly emerged from the gloom. In the following notes I have recorded the hours, with dates and localities, at which I have heard various common birds begin their song; notes which may be of interest when compared with similar ones made in other parts of the country.

Thrush, *Turdus musicus*.—Earliest, June 15th, 1893, Fife, 2.28 a.m. On the previous night, June 14th, the last Thrush was noted in song at 8.7 p.m.

Blackbird, *T. merula*.—Earliest, 2.17 a.m., July 6th, 1894, Fife. Latest, 8.52 p.m., June 14th, 1893, Fife.

Ring Ouzel, *T. torquatus*.—3.46 a.m., April 16th, 1895, Dumfries.

Wheatear, *Saxicola oenanthe*.—Calling 9.35 p.m., June 2nd, 1893, East Lothian.

Redbreast, *Erithacus rubecula*.—Earliest, 2.6 a.m. (calling, not singing), July 6th, 1894, Fife. Latest, 9.30 p.m., June 21st, 1894, East Lothian.

Whitethroat, *Sylvia rufa*.—Earliest, 2.35 a.m., May 24th, 1898, Edinburgh. Latest, 8.14 p.m., May 5th, 1893, East Lothian.

Chiffchaff, *Phylloscopus collybita*.—Earliest, 3.15 a.m., June 8th, 1893, Edinburgh.

Willow Wren, *P. trochilus*.—Earliest, 3.3 a.m., June 8th, 1893, Edinburgh. Latest, 8.38 p.m., June 13th, 1893, Fife.

Sedge Warbler, *Acrocephalus schœnobænus*.—Earliest, 1.32 a.m., June 8th, 1893, Edinburgh.

Field Sparrow, *Accentor modularis*.—Earliest on June 15th, 1893. I heard one give a snatch of its song at 1.25 a.m., but did not again hear the song till 4.5. On the previous night the Field Sparrow had ceased singing at 8.36 p.m., Fife.

Greenfinch, *Ligurinus chloris*.—Latest, 8.22 p.m. (the prolonged drawling note, given by Witchell as "zshweeo"), June 14th, 1893, Fife.

Chaffinch, *Fringilla œlebs*.—Earliest, 2.58 a.m., June 15th, 1893, Fife.

Bunting, *Emberiza miliaria*.—Latest, 8 p.m., May 5th, 1893, East Lothian.

Yellowhammer, *E. citrinella*.—Earliest, 2.37 a.m., May 23rd, 1894, Coldingham, Berwickshire. Latest, 8.22 p.m., June 14th, 1893, Fife.

Skylark, *Alauda arvensis*.—In connection with this species it may be interesting to give a series of dates, showing how the bird appears a little earlier as the season advances:—3.11 a.m., April 28th, 1893, Edinburgh;

2.39 a.m., May 11th, 1893, Edinburgh; 2.16 a.m., May 24th, 1893, Edinburgh; 1.59 a.m., June 3rd, 1893, East Lothian; 1.45 a.m., June 2nd, 1894, East Lothian.

This last entry records the time at which the birds begin their uninterrupted singing. From ten to twelve o'clock I had put up Larks frequently, but always in silence. At 12.16 midnight I heard the first Lark singing, not continuously from one spot, but giving snatches of his song as he flew; this method of song, resembling, however, the calling of the flocks in winter flight rather than real singing, continued for some time, and silence again ensued. The first bird to call, disturbed from my feet, rose at 12.38, and gave several notes as it mounted, but the real continued music of the Larks, as a whole, did not begin till 1.45 a.m.

Crow, *Corvus corone*.—2.48 a.m., June 15th, 1893, Fife. This refers to a bird calling without being disturbed by my presence. Such an explanation is necessary, as the Crow, like a number of other species, will sometimes call when disturbed by a midnight wanderer in its haunts.

Cuckoo, *Cuculus canorus*.—Earliest, 2.5 a.m., May 23rd, 1895, Lomond Hills, Fife.—ROBERT GODFREY (46, Cumberland Street, Edinburgh).

Notes from Scarborough.—The season so far, owing probably to the unusually mild weather, has been very unproductive in ornithological occurrences of sufficient interest to be worthy of note. A few Curlew Sandpipers were obtained on the coast during August; all that I saw were young birds. Early in September a Green Sandpiper was shot at Folkton, near Scarborough, and brought to me. It was one of a pair, the other escaping. On Nov. 2nd I had brought in a beautiful adult Spotted Crake, alive and uninjured. It had flown into some buildings, and was there captured by the workmen. On the same date the first Little Auk I have a note of for this season was taken at Filey. On Nov. 3rd a nice Albino Sparrow, with pink eyes and flesh-coloured legs and beak, was brought in from Yedmundale, near Scarborough. During the early part of the month a good many Waxwings have been about, and I know of seven which have been obtained mostly within a few miles of the town. A Peregrine Falcon has also been procured, and on the 15th I had an adult female Longtailed Duck brought in. This bird is seldom obtained in our district, and is only the second record I have of its occurrence.—W. J. CLARKE (44, Huntriss Row, Scarborough).

The Dictionary of British Bird-Song.—With reference to Mr. Hett's announcement of his Dictionary of Call-notes of British Birds, it may be of interest to readers of 'The Zoologist' to know that there will apparently be two "dictionaries," covering practically the same ground, published at about the same time. Ever since the publication of 'The

Evolution of Bird-Song' I have been preparing my 'Dictionary,' which is now ready for the press. I may say I mentioned this to Mr. Warde Fowler last spring. I have, of course, obtained help from others, and gleaned from the literature of the subject.—CHARLES A. WITCHELL (Eltham, Kent).

## PISCES.

The Porbeagle in Manx Waters.—The capture of this Shark, *Lamna cornubica*, is worth recording, as it is the first time it has been taken (or, at all events, recorded) off the Manx coast. It was found on November 3rd, by William Gawne, floundering in rather shallow water, in Derby Haven, at the south of the Isle of Man. He struck it with a bit of drift wood, "when it flew into the air"; he then killed it with a stone. When it reached me it was too far gone for preservation; but a photograph of it had been taken by Mr. Capam, by which it could be identified. I found it to be a good specimen, answering exactly to Day's description. I could not find the "spiracles" to which he refers as sometimes seen between the eye and first gill-opening. The colour was a dull grey, with peculiar sheen above and white beneath. It measured in a straight line from the tip of the snout to the centre of the tail,  $37\frac{1}{2}$  inches, and five inches more to the tip of the longest lobe. The viscera had been removed when sent to me; Gawne had noticed nothing in its stomach except "dirt." For some time previously he had noticed large fish in his nets cut clean in half, no doubt by this individual. Day says this species is not rare in the Orkneys and Shetland, has been met with all round the east coast,\* and is common in Cornwall. It appears to be infrequent on the west coast, but has been taken in Dublin Bay and Belfast Lough.

Last summer I obtained a specimen of an allied species, the Thresher, *Alopias vulpes*, from the Point of Ayre. It was even more decayed than this one. It also had not previously been recorded as Manx.

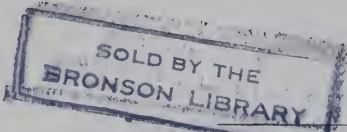
A movement is now on foot to have a good Museum in the Isle of Man, and I trust it will not be very long before we are able to provide for the due preservation not only of rare and unusual specimens, but of all the fish in our waters—a collection, in fact, which will afford a perfect illustration of the natural history as well as of the archæology of the Isle of Man.—P. M. C. KERMODE (Ramsey, Isle of Man).

Large Tunny on the Essex Coast.—A large specimen of the Common Tunny, *Orcynus thynnus*, the pectoral fin being only about a foot in length, was found ashore on Foulness on October 24th. It was quite nine feet long, and as much in circumference. Mr. H. L. Matthams writes me that "a full-sized man sitting on the top could not touch the ground with

\* Not uncommon at Great Yarmouth (*ante*, pp. 564-5).—ED.

his feet." It was estimated to weigh 5 to 6 cwt. The fish was quite fresh and was well fed, but its stomach was empty. Much of the flesh was eaten; this was red in colour and very firm when raw; fried, it resembled Eel, and fried well in its own fat, like that fish; boiled, it somewhat resembled Skate, the flesh being stringy.—EDWARD A. FITCH (Maldon, Essex).

**The Germon in British Waters.**—The Germon, or Long-finned Tunny, *Orcynus germo*, Day, has long been known as a visitor to British seas; but so infrequent are its occurrences on our coasts that the late Dr. Day could only enumerate four distinct occasions upon which this fine species had been obtained within our limits, the whole of these relating to the south-west of England. No specimens were taken between 1865 and 1889, in which latter year I obtained an example from a creek upon Burgh Marsh—*i. e.* upon the upper shores of the Solway Firth. I have now the pleasure of recording the capture of a second specimen of this handsome Tunny in the Solway Firth. On October 25th, 1897, a living Germon was found stranded upon the sands near Silloth. It was secured by a labouring man, who saw that he had obtained a prize. He had the sense to ride off to me on his bicycle; but unfortunately I was away from home. He then wrote to my taxidermist, and offered it to him as representing me; but he, being very busy, and supposing the fish to be a common Tunny, declined it, and wrote to me to report it. On my return home I found that the owner of the fish had kept it (in the hope of a high price) until it became decomposed, and he had to bury it in his garden. *I dug it up myself*, and found the fish but little altered in appearance. It was a Germon, with a pectoral fin sixteen inches long. It measured  $27\frac{1}{2}$  inches in girth, and 38 inches in length from the tip of the nose to the fork of the tail. I compared it with the figures given by Couch and Day. Couch's figure represents the Germon as tapering more sharply to the tail than was the case in this specimen; but perhaps this may be accounted for by the excellent condition of the recent wanderer. The left pectoral fin was damaged when disinterred; but I cut out the right pectoral fin as a proof of its identity. My identification of the 1889 specimen was confirmed at the Natural History Museum by Mr. Boulenger; since then I have procured other species of Tunny from the Solway Firth, as has my neighbour across the water, Mr. R. Service.—H. A. MACPHERSON (Allonby Vicarage, Cumberland).

















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